

**Relationship Between Chronotype, Proneness towards  
Smartphone Addiction and Nomophobia Among University  
Students**



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**2019**

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***BY***  
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A Research Report submitted in partial fulfillment of the  
**Degree of Masters of Science  
In Psychology**


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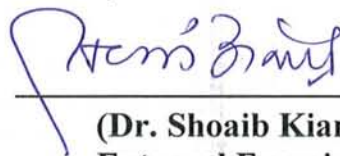
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## Certificate

This is Certify that M.Sc research report on “**Relationship between Chronotype, Proneness towards Smart Phone Addiction and Nomophobia Among University Students**” prepared by **Ms. Anam Nawaz** has been approved for submission to Quaid-I-Azam University Islamabad.



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**DEDICATED TO MY PARENTS**

**Relationship Between Chronotype,  
Proneness towards Smartphone Addiction,  
and Nomophobia Among University  
Students**

## CONTENTS

1	List of Tables	i
2	List of Appendices	iii
3	Acknowledgements	iv
4	Abstract	v
5	Chapter 1: INTRODUCTION	1
	Proneness towards smartphone addiction	2
	Theoretical perspective of smartphone addiction	4
	Nomophobia	6
	Symptoms and signs	8
	Dimensions of nomophobia	9
	Dependence addiction and nomophobia	10
	Demographic factors of nomophobia	10
	Predictors of nomophobia	11
	Theoretical framework of nomophobia	13
	Chronotype	15
	Relationship between study variable	17
	Pakistani context	19
	Rationale of the study	20
7	Chapter 2: METHOD	23
	Objectives	23
	Hypotheses	23
	Instruments	23
	Operational definitions	24
	Research design	25
	Sample	26
	Procedure	28
8	Chapter 3: RESULTS	29
9	Chapter 4: DISCUSSION	59
10	References	64
11	Appendices	76

## List of Tables

<b>Table 1</b>	Demographic details of sample (N=367)	27
<b>Table 2</b>	<i>Comparison of Alpha Reliability and Descriptive of the Measures (N=367)</i>	29
<b>Table 3</b>	<i>Correlation between Study Variables and Demographic Variables (N=367)</i>	31
<b>Table 4</b>	<i>Summary of Herarical Regression Analysis Predicting Nomophobia from Demographic Variables and Disturbance of Adaptive Function (DOAF) and Tolerance (Tol)</i>	33
<b>Table 5</b>	<i>Mean Differences on Gender among Study Variables (N=367)</i>	35
<b>Table 6</b>	<i>Mean Differences on Family System among Study Variables (N=367)</i>	36
<b>Table 7</b>	<i>Mean Difference on Using Data Package among Study Variables (N=364)</i>	37
<b>Table 8</b>	<i>Mean Differences on Using Smart Phone for Email checking among study variables (N=367)</i>	38
<b>Table 9</b>	<i>Mean Differences on Using Smart Phone for Social Media among Study Variables (N=367)</i>	39
<b>Table 10</b>	<i>Mean Differences on Using Smart Phone for Looking Information among Study Variables (N=367)</i>	40
<b>Table 11</b>	<i>Mean Differences on Using Smart Phone for Organizing Meetings and Events among Study Variables (N=367)</i>	41
<b>Table 12</b>	<i>Mean Differences on Using Smart Phone for Lecture and Notes among Study Variables (N=367)</i>	42
<b>Table 13</b>	<i>Mean Differences on Using Smart Phone for Talking with Family and Friends among Study Variables (N=367)</i>	43
<b>Table 14</b>	<i>Mean Differences on Using Smart Phone for Playing Games among Study Variables (N=367)</i>	44
<b>Table 15</b>	<i>Mean Differences on Using Smart Phone for Listening Music among Study Variables (N=266)</i>	45
<b>Table 16</b>	<i>Mean Differences on Using Smart Phone at Dinner Table among Study Variables (N=366)</i>	46

<b>Table 17</b>	<i>Mean Differences on Using Smart Phone during Boredom among Study Variables (N=366)</i>	47
<b>Table 18</b>	<i>Mean Differences on Using Smart Phone during the Gap between Classes among Study Variables (N=366)</i>	48
<b>Table 19</b>	<i>Mean Differences on Using Smart Phone while Having Fun with Friends among Study Variables (N=367)</i>	49
<b>Table 20</b>	<i>Mean differences on Using Smart Phone during Class among Study Variables (N=367)</i>	50
<b>Table 21</b>	<i>Mean Differences on Using Smart Phone during Talking to Others among Study Variables (N=366)</i>	51
<b>Table 22</b>	<i>Mean Differences on Using Smart Phone at Rest Room among Study Variables (N=366)</i>	52
<b>Table 23</b>	<i>Mean Differences on Using Smart Phone while Waiting of Others among Study Variables (N=366)</i>	53
<b>Table 24</b>	<i>Mean differences on smart phone usage during transportation among study variables (N=365)</i>	54
<b>Table 25</b>	<i>Mean Differences on Using Smart Phone while Walking among Study Variables (N=366)</i>	55
<b>Table 26</b>	<i>Mean Differences on Using Smart Phone while Driving among Study Variables (N=367)</i>	56
<b>Table 27</b>	<i>Mean Differences on Using Smart Phone while Watching TV among Study Variables (N=367)</i>	57
<b>Table 28</b>	<i>Mean Differences on Using Smart Phone when Being alone among Study Variables (N=367)</i>	58

## **List of Appendices**

<b>APPENDIX A</b>	Informed Consent Form	76
<b>APPENDIX B</b>	Demographic Sheet	77
<b>APPENDIX C</b>	Nomophobia Questionnaire	79
<b>APPENDIX D</b>	Smart Phone Addiction Proneness Scale	81
<b>APPENDIX E</b>	Composite Scale of Morningness	82
<b>APPENDIX F</b>	Author's Permission for Using Scale	85
<b>APPENDIX G</b>	Author's Permission for Using Scale	86
<b>APPENDIX H</b>	Author's Permission for Using Scale	87

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## **Abstract**

The present study examined the relationship between chronotype, proneness towards smart phone addiction, and nomophobia among university students. Sample comprised of university students including male (n=174) and female (n =193) students from different universities of Islamabad. The age range of sample was 18 to 31 years. Instruments used in the present study were nomophobia questionnaire (Yildirim, 2013), smart phone addiction proneness scale (Kim et al., 2014), and composite scale of morningness (Smith, Reily, and Midkiff 1989) which measures nomophobia, proneness towards smart phone addiction and chronotype respectively. Study was completed in two phases, phase one was intended to evaluate the language comprehension and cultural appropriateness for all the instruments. Phase two was the main study in which objectives and hypotheses of the research were assessed. Result showed that proneness towards smart phone addiction, nomophobia and chronotype (low score indicates eveningness) were positively correlated with each other. Proneness towards smart phone addiction was found significant predictor of nomophobia. Females scored high on proneness towards smart phone addiction which shows that females have more chance to become smart phone addicted. No significant result was found on group differences of family system which shows that nuclear and joint family system have equal chance to become nomophobic. Student who use data package score high on nomophobia. Furthermore result revealed that students who use smart phone for different purposes and in varying context score high on proneness towards smart phone addiction and nomophobia.



## **INTRODUCTION**

## Introduction

Digital revolution has brought drastic change in our lives. Now, smart phones and tablets are much in use despite of personal computers. The frequent use of smart phone is increasing day by day. Such latest trend of smart phone is called as smart revolution. The use of smart phone made our lives very facile. Since last decade, as technology is getting advanced, it brings smart phone with highly advanced features. The smart phone is widely popular among adolescences and adults because they use smart phone for different activities including chit chat with friends, watching movies and videos, playing games, for appointments and contacts and also being used for getting updates on social media. Smart phone is not only used as substitute for cell phone but for personal computer and other gadgets as well. They are wireless so easy to manage and can be approached at anytime and anywhere (Lepp, Barkley, Li, & Esfahani, 2015).

Worldwide, 1.85 billion people used smartphones in 2014. This number is increasing to be 2.32 billion in 2017 and 2.87 billion in 2020 (Statista, 2017). A study revealed South Korea showing the highest degree of smartphone ownership (88%) followed by Australia (77%), and the United States (72%) out of 40 nations. In another study on Korean smartphone use in 2016, 83.6 percent of Koreans aged over 3 years were using smartphone. Among them, 86.7 percent of males and 80.6 percent of females labelled using a smartphone, and 95.9 percent of adolescents were found to use a smartphone (Korea Internet and Security Agency, 2017). Without a doubt, number of smart phone users are increasing day by day across the world.

Pakistan has almost around 150 million smart phone subscribers and the number of smart phone users among this population approximate nearly 39% and if has risen up to about 50 % by 2017 (Imtiaz, Khan, & Shakir, 2015). Pakistan's population has no exception to this risk, as a large number of Pakistani adolescents population may also be effected by this high smart phone use obsession.

Smart phones are multitasking so it becomes a serious need for an essential part of university students' lives. According to research, 46% students are of view that they could not live without their cell phones. Smart phones are abundantly used throughout the day for different purposes, including conversation, entertainment

purpose, gaming and societal interconnection. There is vast diversion in applications (apps) for almost every age group, possible use and attachment (Smith & Page 2015). Smith and Page (2015) reported that as smart phones have large storage which permit users to download multiple apps, number of songs, images and different songs as well as hundreds of videos that is indeed a source of pleasure for everybody. This digital convergence is responsible for high percentage of ownership of smart phones among American adults from 35% in 2011 to 64% in 2014.

A research showed that 99% students, who have smart phones utilize their smart phone in every hour of their study (Smith & Page, 2015). Ireland and Woollerton (2010) held a survey in Stanford University on 200 iPhone utilizing students, which revealed that is recent adoptees, and ever-lasting users largely rely on it and hold it as a feature of their ways of life.

Smart phone brings many facilities in our lives but on the other hand it has some disadvantages such as over use of smart phone or smart phone addiction and nomophobia. Smart phone addiction is greatly responsible for physical and psychosocial problem and internet addiction as well. Negative impacts can also be seen publically. For example, pedestrians are so much engage with their cell phones while crossing the road, not aware about the signals of traffic that they are most expected to hit by a car. Using smart phone during driving is also risky for an accident and elementary school-aged children are highly liable to addiction of smart phone games and internet video games as well.

### **Proneness towards Smart Phone Addiction**

Proneness towards smart phone addiction is characterized as tendency for smart phone utilization. An excessive amount of utilization of smart phone hints at inclination towards smart phone addiction (Kim et al., 2013). The components of smart phone addiction are compulsion, functional impairment, tolerance, and withdrawal (Lin et al., 2014). A study revealed that smart phone addiction proneness might be smart phone compulsion that is considered as a social dependence described by issue with anxiety. Depicted pointers of proneness towards smart phone are withdrawal, resilience, impulse, tolerance, absence of control and health issue got from the utilization, and resistance.

Smart phone addicts invest excessive energy in their cell phones. The habitual utilization of smart phone demonstrates the indications of dependence. Torrecillas (2007) stated that 40% of youngsters and pre-adulthood went through over 4 hours every day only to send messages and calls. Consequently, such individuals mention that they experienced more psychosocial, and physical problems, and they indicated more distraction than the individuals who utilized under 4 hours every day (Alijomaa et al., 2016).

The reason for smart phone use is that the user rely upon innovation of smart phone. Concerning highlights, Oulasvirta (2012) stated that inspiration of smart phone use is strengthened by its advanced feature, lightweight, effectiveness of activity, connectedness, music, and video player, etc. In Europe, smart phone clients contacted their smart phone 10 to 20 times each day, their mean span on every checking is 10-250 seconds, and they spent 1-1000 megabyte (MB) every day (Falaki, Mahajan & Kandula, 2010). Oulasvirta (2012) mentioned in his research that checking the smart phone on hearing a notice sound or message expanded attribute to the tendency for smart phone addiction. Deursen, Bolle, Hagner and Kommers (2015) revealed that another risk for excessive usage of smart phone is social media. Salehan and Negahban (2013) proposed that the utilization of social network services (SNSs) are the expected variable of cell phone dependence. Park and Lee (2012) revealed that females are more dependent on cell phone for using social network services than males. Junco (2012) argued that excessive use of smart phone is related to gratification, which was received for expending and assuming media. Increasing risk of routine or addictive practices of smart phone usage is rewarded for pleasurable encounters. One's academic performance can likewise be affected by excessive utilization of cell phone (Enriquez, 2010; Junco, 2012). In connection gaming, one study indicated that potential risk factors for smart phone fixation is identified with gaming and various apps for gaming. Smart phone gaming, with or without the utilization of different application likewise enhance chance factor of addiction. An examination on the overall impacts of smart phone dependence demonstrated that, among smart phone matters, for example, consider, entertainment, SNS, and games, expect for study content, the other three constituent were noteworthy indicators of cell phone dependence. SNS had the most grounded impact on cell phone dependence

pursued by entertainment, and gaming (Jeong et al, 2016; Salehan, & Negaahban, 2013).

In spite of the fact that smart phone offers facilities in our life, yet everyone should be mindful of negative impacts of smart phone and the most concerning impact is addiction. Smart phone addiction is phenomenon that is related to over use of smart phone (Heron & Shapira, 2004; Young 1999). In particular, adolescent are at high risk of smart phone addiction. Youths are explicitly connected to smart phone, they think of it as their second self. Many users reported that they can't survive without it (Wajcman et al, 2007). Developmentally, youths encounter a few physical and mental changes. While on one hand, they rely upon their parents, on the other hand, to set up free space they attempted to autonomous from their parents. In view of this smart phone are essential for adolescents. They are more reliant on it and utilize it much as compared to adults. Young people, express their ideas in design and numerous different applications and look for passionate connections and support. They are great in performing multiple tasks and seek after quick responses and input (Tapscott, 2009). At the point when these attributes, incorporating curiosity in young people, are joined with youthful control skill, they are put at high danger of smart phone usage (Chambers, Taylor, & Potenza 2003).

Studies about gender differences show opposing outcome about utilization/addiction. A few studies indicated that women are more likely to incline towards smart phone addiction than man (Schifferstein, 2006). However, a few investigations appeared with opposite outcomes that male are more inclined to use smart phone than female (Morahan, 1999; Oztunc, 2013; Takao et al., 2009). In the long run, a few examinations found no outcome clearly about gender (Demirci, Orhan, Demirdas, Akpinar, & Sert, 2014). Age is another factor which play its role in use of cell phone. As indicated by National Information Society Agency Internet Addiction Review (2011), smart phone is generally used more among 10-20 years of age people than 20-30 years of age.

### **Theoretical Perspective of Smart Phone Addiction**

Proneness towards smart phone addiction may be explained by use and gratification theory:

**Use and gratification theory (UGT).** Addictive usage of smart phone might be explained by Usages and Gratifications (U&G). U&G theory proposes that persons perform as lively audience, handpicked media and are happy in order to accomplish their desires (Blumler, & Katz, 1974). The desires of an individual is stated as his/her objects for choosing that specific media content, and satisfaction of wishes results in gratification (Papacharissi, 2000). In short, this theory is about how person's desires and aims decide usage of media and its outcomes (Rubin, 2009). Mobile phone addiction has obtained significant concentration as one of the most essential consequences of smart phone use. As the various applications of smart phone results in enjoyment of different desires of a person, smart phone addiction might take place when she or he starts to depend on smart phone as only medium of pleasure (Papacharissi, 2000). In the same way, the quick invasion and acceptance of social networking sites (SNSs) such as Whatsapp, Instagram and Face book, are significance for U&G researches (Akpan, Akwaowo, Senam, 2013; Joinson, 2008; Quan, Haase & Young, 2010). Majid, Omar, & Rashid (2014) mentioned information in pursuit of amusement, social individuality, and self-disclosure as reasons for using SNSs. Information looking for purposes refers to the utilization of SNSs for examining information, knowledge about the actions going on in the society, and self-learning.

Amusement object refers to the use of SNSs as a way of escape from tension, and for entertainment and emotional discharge (Papacharissi, 2000) Discussions, social contact objective results in a sense of affiliation by contributing media in online chitchats, and linking with one's family, associates and friends and social media (McQuail, 1987). Privately individuality objects refers to make use of SNSs for achieving approaching into one's own individuality, and for keeping a separate and constant personality in online situation (Omar et al., 2014). Individual or self-disclosure motive comprises the need to unveil confidential information regarding oneself. Personal-disclosure refers to the ability of revealing close details of one's life or individuality (Omar et.al. 2014), and has been recommended a significant forecaster of secure companionship, and friendly interaction (Sprecher & Hondrick, 2004)



## Nomophobia

It is characterized as "the fear of being out of contact with the smart phone" (SecurEnvoy, 2012). This term is a shortened form of no mobile fear, which was first authored by UK Post Office amid to explore the tension caused by cell phone endure (SecurEnvoy, 2012). Two different terms nomophobe and nomophobia were presented and casually utilized so as to introduce nomophobia to the general population, nomophobe is a term used for somebody who is distressed with nomophobia. Nomophobia is a recent social behavior phenomenon developing from widespread mobile phone use, which causes symptoms such as: aggressiveness, emotional instability, anxiety and difficulty in concentration.

King, Valenca and Nardi (2010) define nomophobia as "signifies distress or nervousness when out of smart phone (SP) contact. It is the fear of being innovatively incommunicable, far off from the SP or not associated with the web".

King, et al. (2013) characterize nomophobia which portray the inconvenience or nervousness caused by the non-accessibility of a smart phone, personal computer or some other virtual gadget in people who use them in routine". Another definition of nomophobia presented by King, et al. (2014), stated that nomophobia is the unconventional dread of being not able to convey message through cell phone or the web. Nomophobia is a situational fear identified with agoraphobia and incorporates the dread of ending up sick and not being able to avail help in time of emergency.

Above definitions convey that inaccessibility of these gadgets develop the sentiment of tension yet this ongoing definition demonstrates that nomophobia is a situational fear and it is progressively identified with smart phone. International Business Times Definition (2013) also highlighted the tension caused by inaccessibility of cell phones. Nomophobia is an anxiety result from inaccessibility of cell phone signals, running out of battery, forgetting smart phone, no message or email notices for a specific timeframe. To put it plainly, it a dread of losing cell phone somewhere.

King, Valenca and Nardi (2010), suggested the word smart phone instead of cell phone. With the vast stockpiling, it offers various applications and enables individuals to remain associated whenever, to anyplace and give individuals consistent access to data. On account of this, individuals are associated with smart



phone like never before that's why when they lose contact with cell phone, they experienced more sentiment of uneasiness (Park et al; 2013).

An attempt to make clear that how people's behavior change with in connection with new innovation, King et al. (2013) detailed a case study– contextual analysis of an individual with social fear who demonstrated the combined effects of nomophobia. Such individuals who are have less socialized are increasingly inclined to this nomophobia. After medicinal treatment and CBT such patient shows lessen reliance on virtual gadgets for communication than and become more engaged in real life.

A study indicated that the youngsters reported, on one side that smart phones have made their life progressively agreeable, helpful and increasingly more secure however on the opposite side extraordinary cell phone use has prompted poor wellbeing which incorporates tiredness, stress, cerebral pains, and fixation challenges (Lenhart et. al., 2010). Among the young people, the unregulated utilization of gadgets have caused change in their academic performance because they spent more time on gadgets then on study. Study showed direct connection between individual's performance and educational perfection as those utilizing cell phones are distracted and are less mindful during their educational work (Ling, 2004).

In an Indian research, the author had come to now that 39.5% of students were nomophobic and another 27% were in danger of having nomophobia, demonstrating a high pervasiveness of the disorder among adolescents (Pavithra & Madhukumar, 2015). In another study working with an example of Turkish students, the outcomes uncovered that 42.6% of youthf grown-ups had nomophobia and their biggest feelings of fear were identified with lose of communication and data (Yildirim, Sumuer, & Adnan, 2015). A study by Gezgin and Çakır (2016) on an investigation gathering of 475 Turkish secondary school students demonstrated that their dimensions of nomophobic behavior were over the normal, being higher in female students regarding gender. A huge distinction was likewise found as respects the term of versatile web use, yet not as sees different factors, for example, school year, guardians' training levels and length of cell phone use.

As per the result of a study conducted among individuals in professional life (SecurEnvoy, 2012), it was concluded that the number of cell phone user displaying



nomophobic behavior had expanded in recent years. Likewise, 66% of cell phone user expressed that they felt restless due to losing their smart phone and communicated their dread about it (SecurEnvoy, 2012).

### **Symptoms and Signs**

Nomophobia happens in circumstances when an individual encounters nervousness because of the dread of not approaching a cell phone. The "over-connection syndrome" happens when cell phone use reduces the face to face interaction, essentially with a person's social and family collaborations. The term "techno-stress" is another approach to portray a person who keeps away from vis-à-vis communications by engaging in isolation including psychological issue, for example, depression.

Anxiety is driven by a few elements, for example, the loss of smart phone, not receiving any message for specific time period, and a dead smart phone battery (Braazzi & Puenete, 2014). Some clinical qualities of nomophobia incorporate utilizing the gadget impulsively, assurance from social correspondence, and its role as an intermediate object. Behavioral observation incorporates having at least one gadget with access to web, continually carrying a charger, and encountering sentiments of tension when thinking about losing the smart phone.

Other clinical qualities of nomophobia are increase in preference for communication through technological interfaces, decreased number of face-to-face interactions with humans, keeping the gadget in achieve when resting and never turned off, and look at the smart phone screen regularly to avoid missing any message, call, or notification (likewise called ringxiety). Nomophobia can likewise prompt an expansion of obligation because of the over the top utilization of information and the diverse gadgets the individual can have nomophobia may likewise prompt physical issues, for example, sore elbows, hands, and necks because of excessive use of smart phone (Braazzi & Puenete, 2014).

Irrational responses because of uneasiness and stress might be experienced by the person out in the open settings where smart phone use is confined, for example, in airplane terminals, institutions, emergency clinics and during work. Overuse of smart phone for everyday exercises, for example, acquiring things can cause the individual

financial problems (Braazzi & Puenete, 2014). Signs of trouble happen when the individual does not get any contact through a cell phone. Connection indications of a cell phone likewise incorporate the inclination to sleep with a cell phone. The capacity to convey through a cell phone gives the individual genuine feelings of calmness and security.

Nomophobia may go about as an intermediary to other disorders (Braazzi & Puenete, 2014). Those experiencing a underlying social issue are probably going to encounter apprehension, uneasiness, anguish, sweat, and trembling when isolated or powerless to utilize their computerized gadgets because of low battery, out of service area, no association, and so forth. Such individuals will regularly demand keeping their gadgets close by consistently, ordinarily coming back to their homes to recover overlooked phones.

Nomophobic behavior may strengthen social uneasiness tendencies and reliance on utilizing virtual and computerized correspondences as a technique for diminishing pressure produced by social tension and social phobia (King et al. 2013). Those experiencing panic disorder may likewise indicate nomophobic behavior; be that as it may, they will presumably report sentiments of rejection, depression, weakness, and low confidence as to their mobile phones, particularly when times with next to zero contact (couple of approaching calls and messages). Those with panic disorder will presumably feel essentially edge and discouraged with their cellphone use (King, et al. 2014).

### **Dimensions of Nomophobia**

According to king et al. (2014). There are four dimensions of nomophobia. These dimensions are:

- (1) Not being able to communicate.
- (2) Losing connectedness.
- (3) Not being able to access information.
- (4) Giving up convenience

## **Dependence, Addiction, and Nomophobia**

Nomophobia is commonly expressed as dependence on smart phone (Dixit et al; 2010) or addiction of smart phone (Forgays, Hyman, & Schreiber, 2014). The importance of nomophobia become unclear when it is informally used in term of addiction. For the characterization of nomophobia, as a fear or situational fear might be more qualified (King et al, 2014). Despite the fact that nomophobia isn't viewed as a smart phone reliance or smart phone dependence, it might be comorbid with risky engagements of smart phones.

Studies about gender differences and cell phone addiction are opposing. A few examinations revealed that females are bound to be dependent on cell phones and bound to participate in tricky cell phone use (Billieux, Linden, & Rochat, 2008; Chang, Cheng, Lee, & Lin, 2014; Schifferstein, 2006; Walsh, White & Young, 2008). Be that as it may, a few studies appeared with inverse discoveries with males appearing higher on risky cell phone use contrasted to females (Morahan, 1999; Öztunç, 2013; Takao et al., 2009). A few examinations found no significant gender differences (Akpınar, Demirci, Demirdas, Orhan, & Sert, 2014). Age has another connection with problematic cell phone use. As per the National Information Society Agency Internet Addiction Survey (2011), cell phone addiction is increasingly common among 10– 20-year old than among 20– 30 years old.

## **Demographic Factors and Nomophobia**

Regarding socio-demographic factors and their relation to nomophobia, some studies have highlighted gender differences, reporting mixed results (Güzeller & Guner, 2012; SecurEnvoy, 2012; Yildirim, & Corria, 2015). The investigation in UK in 2008 conducted on more than 2,100 individuals clarified that nomophobia sufferer are 53% (Mail Online, 2008). It was appeared by research that 58% of male and 48% of female demonstrating feeling of nervousness when not being able to utilize their smart phone. Another research directed by SecurEnvoy (2012), studied 1,000 workers and demonstrated that the number of individuals experiencing nomophobia expanded from 53% to 66%. Another study revealed that 70% of women contrasted with 61% of men that following to losing their smart phone they demonstrates the sentiment of uneasiness (SecurEnvoy, 2012). As for the effects of age, the research findings are inconsistent because some studies have found that higher scores for nomophobia

correlated with younger ages (Buckner et al., 2012; Smetaniuk, 2014), while others found no significant differences (Çagan, Çelik, & Ünsal, 2014; Yildirim et al., 2015). As far as the connection among age and nomophobia is concerned, the examination discovered that 18-24 of age were most inclined to nomophobia with 77% of them recognized as nomophobic, second by 25-34 at 68%, the third most nomophobic were at the age 55 years and older smart phone users.

Numerous studies have tried to mark out the risk factors related with smart phone addiction, highlighting the psychological and demographic factors. Regarding the psychological variables that lead to smart phone addiction, maximum research has used the Big Five model as a conceptual framework for personality (Buckner, Castille, & Sheets, 2012; Landers & Lounsbury, 2006). In particular, the main pathways leading to dysfunctional smart phone use are extraversion and neuroticism (Butt & Phillips, 2008; Ehrenberg, Juckes, White, & Walsh, 2008). In the framework of this investigation, low self-esteem has also proven to be a strong forecaster of problematic smart phone use (Butt & Phillips, 2008; Hong, Chiu, & Huang, 2012; Leung, 2008).

### **Predictor of Nomophobia**

The Korea Internet and Security Agency reported in 2014 that smartphone usage amongst Korean university students in their twenties was 99.8%, with a per day average of 152.1 minutes, which was the maximum rate of any age group (Korea Internet and Security Agency, 2015). It is easier to access smartphones for Korean graduate students as compared to Korean undergraduate students or office employees because of more free time and are less under the supervision of parents and teachers. In addition, using smartphones might release their worry about the unpredictable future and tension from interpersonal conflicts, such as romantic relationship breakups.

Due to excessive use, therefore, the high smartphone usage rate among graduate students is apt to lead to smartphone addiction. A survey conducted by Ministry of Science, Information and Communication Technology (ICT), and Future Planning (2014), revealed that 20.5% of university students are at the urge of smartphone addiction, with 3.2% are at higher risk, and 17.3% at mild risk. According to this research, about one in five university students are at risk of problematic smart

phone use, which is a severe issue that may interfere with their abilities to live healthy lives. Although both smart phones and the internet also have a high probability for addiction, the handiness of smartphones might put them at greater risk of becoming addictive than either basic mobile phones or the internet. Some researchers which have examined the relationship between attachment styles and internet or smartphone addiction report that Korean youth or university students who have an insecure attachment style are more likely to become addicted to the internet or smartphone than those with a secure attachment style (Choi & Seo, 2015). In order to meet their need for attachment, these young people are adapt to use smartphones, by considering their smartphone as object of attachment. Other studies have revealed that depressed Korean university students are more likely be addicted to smartphones (Jeon, 2014). Presenting a significantly positive correlation with smart phone addiction depression was found to be the highest predicting factor among other risk factors for addiction, for Korean university students (Kim, 2015). However, one of the other predictor for addiction is loneliness (Park, 2014).

In a study by Park (2014), smartphone addiction and loneliness presented a significantly positive correlation. The study also reported, through multiple regression analysis, that loneliness was a major predictive factor for social networking service addiction (Park, 2014). Furthermore, loneliness has been found to be a mediating factor between attachment style and smartphone or internet addiction. Flores (2004), in exploring the relationship between insecure attachment style and addiction, suggested that addiction resulted from attachment problems. According to the attachment theory of Bowlby (2004), attachment is established between an infant and the infant's primary caregiver through emotional bonds facilitated by physical contact and familiarity. Insecurely attached persons have a negative image of self or others in their internal working models due to their early experiences. As a result, insecurely attached people might either become dependent on or avoidant of others (Einsworth, 1978). Brennan et al. (1998), define "attachment anxiety" as having a fear of rejection and "attachment avoidance" as a fear of closeness and dependency. According to Flores, the reason why substance abusers become addicts is because they experience difficulties with emotional regulation. Addiction is regarded as an alternative to overcoming the difficulties in their relationships, which worsens their attachment

capabilities. Those who have insecure attachment styles are likely to become addicted due to their deficiency in regulating their emotions effectively (Flores, 2004).

### **Theoretical Framework**

The nomophobia may be explained by the behavioral theory for smart phone addiction.

**Behavioral theory.** Seeking of a behavior to repeat an experience that was result of an initial exposure to a stimulus is termed as addiction. After a number of repetitions of the behavior-stimulus cycle, the addiction becomes recognized. The nature and cruelty of the addiction may vary over passage of time, and it may be regulated by the efforts of victim to obtain control over his habit as to make it less visible. In a few cases sufferer will be able to recover for a certain period of time or even permanently (West, 2001).

Operant conditioning seems a very crucial role in the establishment of addicts, especially in cases where the role of past experiences particularly the one that are being strengthen by the positive reinforcements. The previous actions that have had desirable outcomes, whether reinforcement is positive or negative, are stronger to be continued ahead. For the frequently performed actions when there is more promising reward, the ultimate outcome is establishment of that action (Hyman, 2005; Mazur, 2006).

Studies based on operant conditioning state that when any action has well-built cognitive or behavioral reliance, then the person develops difficulty in making a conscious alternative on his own to prevent any type of behavior. The person may undergo some negative results due to continuous display of that behavior. In such instances the behavior being learnt usually is the one that gets maladaptive or problematic (West, 2001).

The expansion of complicated behaviors and compulsion has also been accredited to extreme appetites. In this model, an dependence is being considered as a physically powerful accessory to an 'appetitive activity', where the association is so physically powerful that a person finds it firm to adjust the motion or performance despite the fact that it has some adverse impact on one's life. Excessive behavior research addressed that a person concerned in these behavior to an excessive quantity



may experience symptoms like a person being worthy of label as an addict. Essential aspects of addiction contain cognitive or behavioral dependency, mood amendment, loss of control, and continuation of such behavior despite negative effects (Griffiths, 2005).

The diathesis-stress model also gives some knowledge explanation of the idea of problematic smartphone usage. This model explained that, an individual may be innately susceptible to fall for it: however, a distinct event is required to trigger dysfunctional terms of the problematic use of smartphone, the unique event may purely be the prevalence to a new device in market, such as a work-based iPhone, which usually are behaviors. An individual have tendency to problematic behavior. In reported as triggering problematic behavioral patterns (Davis, 2001).

When a smartphone connections provides a 'reward' for the consumer, operant conditioning come to play and take place, as well as the release of neurotransmitters, increasing further exchanges of activity with the device. Enlarged smartphone use may direct to the development of an excessive appetite for the extensive use of the device, resulting in impairment of functioning as well. These extreme appetites can then establish the behavior as unconscious habit (Ben-Elia, & Ettema 2011).

Neal, Wood and Quinn, (2006) found in their study that when a particular course of achievement has been constantly awarded then then the particular behavior aiming at a goal attainment is actively and automatically triggered with the surety of subsequent rewarded provision. These auto triggered behaviors can automatically lead to the development of habits and in severe cases result to addiction. Smart-devices present salient rewards rapidly to help this habit configuration. They facilitate people to avoid monotony and deal with a need of stimuli in daily situations at the same time use of make them aware of attractive events happening around that can be enjoyed social networks. The rewards that were afforded by smart-devices could direct to checking habits and donate to the extent of participation the person has with their smart-device as well as overall usage of the device for his purpose (Oulasvirta, Rattenbury & Raita, 2012).

As the theory suggest that when a person starts doing a behavior continuously it becomes habitual and more frequent. Smart phone is a device which has many interesting features that attract people toward it. These features make people curious

to use it again and again even without any reason. That is why most of the smart phone users become addict of using it. This addiction can further leads to the negative consequences on physiological as well as psychological functioning (Thomee, Harenstam & Hagberg, 2011).

### **Chronotype**

Chronotype or circadian rhythm is identified with the endogenous circadian clock that synchronizes to the 24-hr day (Adan et al; 2012). Person's circadian rhythm can be assembled into three classes as "morning type," "neither sort," and "night type", yet they can likewise be viewed as a continuum (Natale & Cicogna, 2002). Morning type get up early morning and get exhausted at early night hours, rapidly fall asleep, generally awakening new in the first part of the day. Night types rest late around evening time and wake up late the following day, regularly with a more awful feeling at morning. The specific variable which effect ones' chronotype, for example, endogenous factor-hereditary elements, biological factors, gender and age, just as exogenous components social, cultural and environmental ones (Adan et al., 2012).. Study revealed that evening type have more irregular sleep/ wake habits. These subjects build up a sleep debt on workdays and extend their duration of sleep during the weekend (Roenneberg et al., 2003) Sleep debt is generated by the largest differences in sleep timing between work and free days. This disparity between social and biological time has been described as "social jetlag" (Wittmann, 2006). Apparently, evening-type individuals exhibit greater social jetlag than morning-type individuals.

Adan and Natale (2002) stated that individual born between April and September, during summer, were considerably less likely to be morning types than individual born between October and March, during winter. This statement is consistent with the research of Mongrain et al. (2006). These investigators proposed that the relationship between chronotype and season of birth reveals the impact of the intensity of light and/or the variation in the photoperiod length during the gestational or perinatal period on the characteristics of the circadian system.

Choronotype additionally connected with the markers of social behavior. Night active owls have bigger individual systems than morning active warblers, though with less successive contacts to each system part. Owls are more focal than



warblers from the point of view of the members' whole informal organization. The distinction in close to home system measure is too extensive to even consider being clarified by this centrality contrast.

The lack of rest or low quality rest in college undergraduate is because of the way that correspondence to innovations were getting to be boundless, media screen, for example, TV, computer games, smart phones and PCs (Carney, Edinger, Istre, Lindman, & Meyer 2006; Ellis, Suen, & Tam, 2008). Correspondingly, Crowley, et al. (2014), found that the light discharged from media screens in the prior night sleep time may postpone the circadian rhythm. Additionally, an excess of smart phone use lead to restlessness. Bartel, Gradisar, and Williamson (2014) investigated that these all innovations, for example, web, PC, video gaming and smart phone utilization were altogether connected with later sleep times, identified with latency in rest, however research was inconsequential to restlessness. Lemola, Perkinson, Brand, Grob, and Dewald, (2014) said that smart phone use before bed rest and later sleep times demonstrated that owners were identified with higher electronic media use. Additionally, electronic media was contrarily identified with restlessness and emphatically to rest troubles.

Interest for the investigation of the individual difference known as circadian typology (morning, neither, and night type) has expanded in the most recent years. In spite of the fact that the scores in morningness– eveningness can be considered as a continuum (Natale & Cicogna, 2002). A research showed that 15– 20% of people indicated that they are morning type or evening type and remaining 60% indicated that they are neither type (Adan et al., 2008). It has been seen that circadian typology contrasts by sex; ladies were more inclined toward the morningness in self-revealed questionnaire (Adan & Natale, 2002).

Age differences have additionally been found to impact circadian typology, with older age identified with a higher morningness score (Milia & Bohle, 2009). A few later works point to the way that night type typology is related with lower self-control attributes (Adan et al., 2010), higher risk of suffering from mood disorder and unhappiness (Lewy, Lefler, Emens, & Bauer, 2006), and motivation control (Adan, 1994). This is predictable with a neurobiological model that contends that singular contrasts in the serotonergic level are firmly associated with the balance of the

circadian rhythm (Randler, 2008). Larger amounts of serotonin is related to more elevated amounts of morningness, and furthermore to higher amounts of stability in personality characteristics.

### **Relationship between Proneness towards Smart Phone Addiction, Chronotype and Nomophobia**

Smart phone, which is the most favored and demanding instrument in present day society, have turned out to be vital parts of day by day life, around the globe. The excessive utilization of smart phones by people everything being equal, however especially youngsters, has prompted the more youthful age getting to be dependent on innovation. It is obvious that individuals of each age, especially teenagers, can't work without their smart phones under any condition. Youngsters like to utilize the internet for stimulation, unwinding and social connection just as to maintain a strategic distance from pressure, getting away from the real world and to accomplish a feeling of opportunity of social contact. These reasons that are not formative and can cause harm when utilized exorbitantly (Dirik, 2016; Kalkan, & Kaygusuz, 2013). Under the present conditions, unmistakable changes have happened in individuals' tendencies, including their spending, shopping, utilization of smart phones, PCs and other mechanical gadgets and numerous different issues. Today, compulsion is never again a one-dimensional idea and it is extremely hard to characterize (Dirik, 2016). Fixation is generally caused by the association between numerous variables including organic or hereditary tendency, mental structure, social condition and the idea of the movement (Griffiths, 2003). As per Lee (2006), current compulsion isn't just identified with medications or opiates; it can likewise refer to over tolerance in gambling, Internet amusements, and even cell phones, which fall into the class of behavior dependence (Kwon, Kim, Cho & Yang, 2013).

Emanuel (2015) demonstrated that smart phones empower us to remain educated, engaged, and connected anywhere with a compact gadget. The current cell phones resemble workstations as a result of including web perusing, WiFi, third party applications, and so on (Katz & Aakhus, 2002), and in the twenty first century, they are progressively versatile and alluring, particularly for youths. An incredible number of young people appreciate utilizing their cell phones and its applications. Utilizing various types of music, backdrop, and so forth. In Germany, 25% of the 12– 19 years-

old teenagers possessed a cell phone in 2011 while this number has expanded to 72% in 2013 (Südwest, 2013).

Albeit, cell phones have positive results, for example, sending messages, playing games, or using numerous applications (Lepp, Barkley, & Karpinski, 2014), whereas their abuse can cause a wide scope of issues. There might be therapeutic issues, for example, harming fingers and lower arms (Ming, Pietikainen & Hanninen, 2006), wounds of the vertebrae of the neck and spine (Sherman et al, 2010), and physiological issues including sorrow (Takao, Takahashi, & Kitamura, 2009; Turel & Serenko 2010; White, Hyde, Walsh, & Watson 2008). Turel and Serenko (2010) concluded that cell phone dependence may be a sort of non-substance. Kim (2013) noticed that cell phone abuse can be an indication of cell phone addiction. Lin et al. (2014) uncovered the dimensions of cell phone dependence, for example, resilience, withdrawal, immediate indications, and hindrance.

There are a few factors that affect ones' chronotype, for example, endogenous components – hereditary elements, organic factors, age, and sexual orientation, as well as exogenous elements – social, and ecological ones (Adan et al., 2012). The reasons for restlessness in college undergraduate is because their interaction with innovations were getting limitless through media screen, for example, TV, computer games, smart phones and PCs (Carney, Edinger, Meyer, Lindman, & Istre, 2006; Ellis, Suen & Tam, 2008). Thus, Crowley, Tarokh, and Carskadon (2014) found that the light produced from media screens in the prior night sleep time may postponed the circadian rhythm. Also, unnecessary cell phone use may prompt restlessness (Badre, 2008; Vollmer, Michel, & Randler, 2012). Heath, et al., (2014) found that utilizing data and correspondence advancements, for example, web, PC, video gaming, and telephone utilization were altogether connected with later sleep. Lemola, Perkinson, Brand, Dewald, and Grob (2014) showed that cell phone possession was identified with higher electronic media use in bed before rest and later sleep times. Additionally, electronic media use was adversely identified with rest span and emphatically to rest challenges. Cell phone utilization can be viewed as a predecessor of a social habit, and a study demonstrated that eveningness inclination is identified with web compulsion or risky web use (Lin & Gau, 2013; Randler, Horzum, & Vollmer, 2013), just as to PC amusement addiction (Randler, Horzum, & Vollmer, 2014). Moreover, Nimrod's (2015) discoveries demonstrate that morning people are inclined toward

utilizing customary media in conventional situations, while night people announced altogether higher inclination for utilization of new media for entertainment purposes.

### **Pakistani Context**

In Pakistan, Kamran (2010) carried out the research on smart phone usage patterns of university students. He came with a result that both male and female students use their smart phone extensively, mostly for text messaging. The statistical figures of the result showed that, in average, received call by male students was 4.3 % as compared to 4.1% by female students. While the Number of dialed calls by male students were 3.9% and 3.4 % were by female students. However, students were reported to use texting as major source of communication. The average numbers of text messages received were 98.4 and 85.7% by male and female students received calls by male students were 4.3% respectively. Similarly both male and female students sent almost same number of text messages.

Ali (2004) reported in his findings that there existed a positive correlation between the prevalence of depression and the usage of the technology. Khalid (2015) brought to the light that affectionate parenting style would lower the susceptibility of children falling for the addiction of smart phones and other technology at an early age. Another of the recent study considered that the prevalent between the raising of anxiety and aggression with an increase use of technology (Arif, 2015)

Researches in Pakistan on the subject of smart phone use have been limited to few aspects. Ahmad and Qazi (2011) found the patterns of mobile phone consumption in students. Their findings showed that majority of the students regarded smart phone as a necessity, and a tool of convenience. Some studies addressed the consequences of smart phone overuse. Excessive use of smart phone results in social and economic impact on smart phone user, such as social maladjustment, domestic conflicts, poverty and gambling. Another study by Ali (2013) concluded that the ratio of male students who started using a mobile in early age were found to be more dependent on smart phone as compared to females students. He also found that male students were the main users of smart phone who first started using cell phone either two, three or four years ago. In Pakistan the use of smart phone was more in male students as compared to female. This shows that men have more access to different kind of resources including ownership of smartphone, internet access on computer and net cafe. They

also have more interaction with society as compared to female students so females are more likely to use their smart phone as an only source of social interaction. The results showed that the duration of cell phone use has great impact on the user's quality of health. It was also apparent that with the passage of time, females were superseding the male among new users of smart phone (Ali, 2013)

Pakistani review directed by Ahmed et al. (2011) portrays the level of addiction among undergraduate looking at the level of phone use among graduates. Results indicated that the larger part of students could set their needs and obligations, their smart phone use and responsibilities. Their research additionally uncovered that a minority of the students (4.8-18.5%) postured extreme addictive behavior. Consequently, they uncovered that students of college utilized their cell phones to modest extent and avoided outrageous a state of mind that heads them to addictive cell phone utilize.

In Pakistan gender differences exists with regards to utilization of smart phones. Another review researched approach buyer's conduct towards advanced mobile phone (Apps, for example, email, programming, ring tone, Internet perusing) (Osman et al., 2012). Hafidha (2014) uncovered in his research that in users, for the most boys were generally a more prominent shoppers. Females had a higher incline to acknowledge or pay for ring ones and backdrops, which are proposed to alter or enhance their cell phone beauty. Male customers seem to have incline on those flexible advanced mobile phones that were useful and reasonable in satisfying their information needs.

### **Rationale of the Study**

For many of the individuals, smart phone are the first thing they touch when wakeup, and the last one they look at before going to sleep. In fact, 81 % of users keep their smart phone nearby for the entire day and check it 110 times per day on average (Hocking, 2015). While use of smart phone has been raising all across age and financial sectors, but the largest consumer group of smart phone services are university students (Head & Ziolkowski, 2012). Generally those individuals who have some emotional and psychological problems such as anxiety, depression, loneliness, impulsivity and have been easily distracted are more likely to develop smart phone addiction (Choe, Choi, Kim, & Park, 2008).

Up till now, no study has yet explored the relationship of between chronotype, proneness towards smart phone addiction and nomophobia in Pakistan. The aim of this study is to find out the relationship between these variables among university students. The focus of this study is to obtain a better understanding that how proneness towards smart phone addiction and chronotype is related to nomophobia that may affect health-related problems and findings of the study may be applicable to evaluate the impact of overuse of smart phone.

In Pakistan, recent research conducted by Imtiaz, Khan and Shakir (2015) indicated that the frequency of smart phone usage is getting high among young individuals. According to the findings of the study, Pakistani population is at great risk for developing smart phone dependency because the growing rate of smart phone usage will definitely be increasing in coming years. Especially, in this era of technology boom, adolescents and late adults have become more vulnerable to have health related problem because of extensive use of smart phone. As behavioral theory of addiction suggest that smart phone interaction provide a reward for the user and leads to further interaction with the smart phone. When one uses anything repeatedly, then it becomes habitual and this habit then takes the form of addiction. A person develops difficulty in making a conscious choice to avoid the behavior and may experience negative consequences due to repeated performance of the behavior (Rush, 2011).

The sample of present study is university students because students are more vulnerable to smart phone addiction. Javid et al. (2011) highlighted a number of disadvantages and negative effects of the smart phone use on students' academic achievement. Students wasted their precious time and money spent on writing and sending useless messages, sending missed calls, listening to music and watching movies. Moreover, one of the indicators was found to be a lack of attention among students during class. Free messengers and various kinds of social media applications provided by smart phone, which are useful and fun. But these also have negative effects, which permit students to send free messages and chat wherever they can get Wi-Fi (Wireless Fidelity) access.

The purpose of present study is to find the effect of demographic variables ((i.e., age, gender, family system, purposes of smart phone usage and different context

in which smart phone is being used) on nomophobia and proneness towards smart phone addiction. Researches shows that the students who spent more time on smart phone, avail different applications and have high interest in different models of smart phone have high risk to become nomophobic (Kim et al., 2014). Finally, there is scarcity of research on this topic in Pakistan so finding of the study may be applicable to evaluate the impact of proneness towards smart phone addiction and contribute to a thoughtful understanding of nomophobia and chronotype for university students.

## **METHOD**



## Method

### Objective of the Study

1. To explore the relationship between proneness towards smart phone addiction, nomophobia and chronotype among university students.
2. To investigate the relationship of demographics (e.g., age, gender, family system, using data package, different context in which smart phone is being use and different purposes for smart phone use) with proneness towards smart phone addiction, nomophobia and chronotype among university students.

### Hypotheses

1. Proneness towards smartphone usage will positively predict nomophobia.
2. Chronotype (eveningness) will positively predict the nomophobia among university students.
3. Males will score higher on proneness towards smart phone addiction and nomophobia as compared to females.

### Instruments

**Smartphone addiction proneness scale (SAPS).** Smart phone addiction proneness scale was developed by Kim et al. (2014). It consisted of 15 items in which 1 indicted as strongly disagree and 4 indicated as strongly agree. The internal consistency is 0.88. SAPS have 4 sub scales (disturbance of adaptive functions, virtual life orientation, withdrawal and tolerance). In resent research, two subscales are used including disturbance of adaptive functions and tolerance. That consist of 9 items in which two items are reversed coded including item number 5 and 7. Score range is (9-36), high score shows more proneness towards smart phone usage.

**Nomophobia questionnaire (NMP-Q).** Nomophobia questionnaire was developed by Yildirim in 2013. NMP-Q consists of 20 items rated on seven point Likert scale, ranging from “strongly disagree” coded as 1, to “strongly agree”, coded as 7. Overall score range is 20-140, high scores on NMP-Q indicated high level of nomophobia. The internal consistency is .91.

**Composite scale of morningness (CSM).** Composite scale of morningness was developed by Smith, Reily, and Midkiff (1989) and adapted by Randler (2008). It consist of 13 items, score range is 13-62 (3 items are 4 point Likert scale and 10 items are 5 point Likert scale), high score indicates greater degree of morningness. Score 22 or below indicates an evening type, score above 44 indicates a morning type, and score in between indicated intermediate between these two neither morning type nor evening type. The internal consistency is .87.

**Demographic sheet.** Demographic sheet was utilized to obtain basic information and experiences of each individual in the sample. The general variables includes age, gender, and educational level, majors of study, department and family system. Some questions regarding smart phone usage such as time of smart phone use, and which apps are used most frequently on smartphone are also asked.

### **Operational Definition**

**Proneness towards smart phone addiction.** Proneness towards smart phone addiction is defined as inclination of people towards the use of smart phone. Smartphone overuse can be a sign of proneness towards smart phone usage. The components of smartphone proneness are tolerance, withdrawal, virtual life orientation, and functional impairment (Kim, 2013).

In current study proneness towards smart phone addiction is measured with scores on smart phone addiction proneness scale (SAPS) developed by Kim et al. (2013). High scores indicates more proneness towards smart phone usage.

**Nomophobia.** Nomophobia is defined as “the fear of being out of smart phone contact” (SecurEnvoy, 2012). Nomophobia is a term that refers to a collection of behaviors or symptoms related to smart phone use. Nomophobia is a situational phobia related to agoraphobia and includes the fear of becoming ill and not receiving immediate assistance (Baczynski, Carvalho, King, Nardi, & Silva, 2013).

In recent research nomophobia is operationally defined through nomophobia questionnaire (NMP-Q) developed by Yildirim (2013). High score on NMP-Q shows high level of nomophobia.

**Chronotype.** Chronotype or circadian preference is related to the natural endogenous circadian clock that synchronizes to the 24-hr day (Adan et al., 2012).

Individuals' circadian preferences can be grouped into three categories as "morning type," "neither type," and "evening type," but they can also be seen as a continuum (Natale & Cicogna, 2002). Morning types wake up early in the morning, feel exhausted in the early evening hours, and quickly fall asleep, usually waking up fresh in the early morning. Evening types go to sleep late at night and wake up late the next day, often with a worse feeling in the morning (Adan et al., 2012). The natural endogenous circadian clock that synchronizes to the 24-hr day (Adan et al., 2012).

In the present study, chronotype is assessed by Composite scale of morningness (CSM). Score 22 or below indicates an evening type, score above 44 indicates a morning type, and score in between indicated intermediate between these two neither morning type nor evening type.

### **Research Design**

The present research was a quantitative, correlational research in which cross-sectional method was used. Aim of the study was to explore the mediating role of chronotype in the relationship between proneness towards smart phone usage and nomophobia among university students. Through empirical testing study was conceded to investigate the objectives and hypotheses. Survey method was used to collect data from participants.

### **Phase I: Tryout**

**Objective.** It was carried out to check the cultural validity and understanding of question used in above giving instruments i.e., SAPS, NMP-Q and CSM.

**Procedure.** To use the above mentioned instrument it was ethically needed to take permission for using scales in our research so permission were taken from their authors. For the purpose of gaining sample, 10 students, including 5 men and 5 women were approached in university following convenient sample technique. The age of participants ranges from 18 to 26 years of Quaid-I-Azam's university. Every participant was clarified the purpose of study and there assent for participation was gotten. The sample participants were also provided with written and also verbal direction to give their assessment about the cultural suitability and simplicity of comprehension of all the items of the following instruments the participants were insured that the obtained information will be kept private and this information will be

utilized just for research reason. The reactions uncovered that the students easily understand the statement of the each item of all the scales. A committee was called to give their condemnation acquired and to make a judgment about further procedure to be follow in this research. Among the two member of committee one was lecturer and assistant professor. The committee approved the scales. The results of the experts and participants opinion showed the questionnaires were easy to understand, culturally reliable and comprehensible for students. Committee recommended no change in any of items so; the same scales were used in main study.

### **Phase II: Main study**

**Objectives.** The reason behind the main study was to test the expected hypotheses and objectives.

**Sample.** For the main study, a sample of 367 students (174 males and 193 females) was selected. Age of participants ranged between 18-31 years ( $M=22.31$ ,  $SD= 2.39$ ). They were the students of BS, M.Sc and M.phil. Students participated in research from both discipline i.e. social science and natural science and they participated from different department of different universities of Islamabad (QAU, NUML, urdu university and Islamic university). The information was gathered from the purposive sampling techniques and consent was gotten from the participants. In the present study different demographics of age, gender level of education and study discipline were also catered. The inclusion criteria was that the students should have their own smartphone and using it on daily basis. The frequency of participants in each demographic category is presented in the following table.

Table 1

*Demographic Details of Sample (N=367)*

<b>Variables</b>	<i>f</i>	%	<b>Variables</b>	<i>f</i>	%
<b>Gender</b>			<b>Year of Study</b>		
Male	174	47.4	12	1	.3
Female	193	52.6	13	30	8.2
<b>Data Package</b>			14	70	19.1
Yes	300	81.7	15	50	13.6
No	67	18.3	16	162	44.1
<b>Family System</b>			17	17	4.6
Nuclear	195	53.1	18	33	9.0
Joint	172	46.9	19	2	.5
<b>Usually Checking</b>			20	2	.5
Every 5 minutes	70	19.1	<b>Duration Usage</b>		
Every hours	53	14.4	Less than a year	15	4.1
Every 10 minutes	66	18.0	1-2 years	30	8.2
Every 2 hours	34	9.3	2-3 years	53	14.4
Every 20 minutes	42	11.4	3-4 years	66	18.0
Every 3 hours	31	8.4	4-5 years	72	19.6
Every 30 minutes	38	10.4	5-more years	131	35.7
More than three hours	32	8.7			

## **Procedure**

Data were taken by both male and female students from the different universities of Islamabad. Permission was acquired through administration of institution. Participants were first explained the detail of study purpose, and confidentiality of their names and information was insured. After confirming their willingness, they were provided with questionnaires. Consent form was presented to participants and signature was sought for their volunteer participation in the research. Respondents were also acknowledge for their corporation. They were given all instructions in detail and all their queries were addressed. They were also ensured about ethical consideration (anonymity and confidentiality).

## RESULTS



## Results

The present study was aimed to explore the relationship between chronotype, proneness towards smart phone addiction and nomophobia among university students. The SPSS-21 soft was used and appropriate statistical procedures were applied for data analysis. For all of the scales Chronbach's alpha coefficient were computed to determined reliability. Descriptive statistics showed the normality of the data. Correlation coefficient was computed to find the relationship between variables. To find mean differences independent t-test was applied. To check the predictability of chronotype and proneness towards smart phone addiction for nomophobia regression analysis was applied.

The reliability estimates were conducted for nomophobia questionnaire (NMQ), composite scale of morningness (CSM), smart phone addiction proneness scale (SAPS) and subscales of SAPS that were disturbance of adaptive functioning (DOAF) and tolerance (Tol). The assessment was carried by Chronbach's alpha coefficient.

Table 2

*Comparison of Alpha Reliability and Descriptive Statistics of the Measures (N = 367)*

Scales	No. of items	$\alpha$	Mean	Standard Deviation	Range		Skew	Kurtosis
					Actual	Potential		
MNQ	20	.90	91.71	24.26	31-79	20-100	-.07	-.19
SAPS	9	.66	22.19	04.05	9-34	9-36	-.48	.14
DOAF	5	.56	12.04	02.59	5-20	5-20	-.26	.08
Tol	4	.52	10.14	02.01	4-16	4-16	-.17	.04
CSM	13	.65	35.04	05.99	16-54	13-55	-.00	.53

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 2 shows descriptive statistics for all the variables involved in the present study. Actual and potential range of scores for all the instruments has been reported. Mean indicates the average score of each for the present sample ( $N=367$ ). Standard



deviation indicates the deviation in scores for each instrument. All the scales have acceptable range of alpha coefficient. The values of skewness and kurtosis indicates that data is within normal range between -1 to +1.

Table 3

*Correlation between Study Variables and Demographic Variables (N = 367)*

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 NMQ	-	.40**	-.15**	.37**	.32**	.04	.02	.17**	.16**	.14**	.14**	.10*	.17**	.15**	.05	.04	-.00	.02
2 SAPS		-	-.19**	.90**	.84**	-.04	-.01	.01	.22**	.07	.08	.00	.13**	.14**	.06	.06	.01	.03
3 CSM			-	-.15**	-.19**	-.01	.05	-.09	-.17**	-.12*	.05	-.05	.02	.02	-.08	-.07	-.05	-.10
4 DOAF				-	.54**	-.03	.03	.02	.19**	.07	-.07	.02	.12*	.14**	.06	.05	.00	.00
5 Tol					-	-.05	-.06	.00	.20**	.05	-.08	-.03	.11*	.11*	.04	.05	.03	.07
6 Age						-	.69**	.20**	-.07	.06	.10*	.00	.16**	.16**	-.06	-.03	.09	.09
7 year.of.study							-	.15**	-.10*	.07	.05	-.01	.00	.02	-.10*	-.07	.04	.09
8 duration.usage								-	.02	.10	-.05	.15**	.14**	.15**	.06	.05	.09	.13*
9 perday.usage									-	.19**	-.09	.16**	.11*	.16**	.25**	.25**	.04	.10*
10 perday.checking										-	-.06	.06	.03	.05	.22**	.18**	-.02	.06
11 usually.checking											-	-.06	.00	-.04	-.09	-.08	.01	-.03
12 no.of.apps												-	.01	.04	.11*	.13*	-.00	.07
13 outgoing.calls.perday													-	.88**	.10	.12*	.26**	.11*
14 incoming.calls.perday														-	.18**	.21**	.21**	.20**
15 outgoing.text.perday															-	.94**	-.03	.30**
16 incoming.text.perday																-	-.00	.38**
17 outgoing.emails.perday																	-	.33**
18 incoming.emails.perday																		-

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; CSM = Composite Scale of Morningness; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance

\*\* $p < .01$ , \* $p < .05$

In table 3 Pearson product moment correlation was computed to evaluate the relationship between study variables and demographic variables. Result showed that nomophobia has significant positive correlation with proneness towards smart phone addiction and its subscales disturbance of adaptive function and Tolerance. Evening type has significant positive correlation with nomophobia and proneness towards smart phone addiction and its subscales i.e., Disturbance of adaptive function and Tolerance. Result also showed that duration usage, per day usage, per day checking, no of app, outgoing calls per day and incoming calls per day have significant positive relation with nomophobia.

Table 4

*Summary of Hierarchical Regression Analysis Predicting Nomophobia from Demographic Variables and Disturbance of Adaptive Function (DOAF) and Tolerance (Tol)*

Variables	$\beta$	SE	95%CI	
			LL	UL
Step 1				
duration.usage	.830*	.144	.699	3.963
perday.usage	.262**	.127	.122	1.154
perday.checking	.010	.091	-.002	.036
usually.checking	.369**	-.126	-1.639	-.189
outgoing.calls.perday	.254**	.212	.005	1.003
incoming.calls.perday	.235	-.086	-.652	.274
Step 2				
duration.usage	.777**	.142	.777	3.832
perday.usage	.252	.047	-.257	.733
perday.checking	.009	.075	-.004	.031
usually.checking	.344*	-.103	-1.424	-.070
outgoing.calls.perday	.237	.193	-.007	.924
incoming.calls.perday	.220	-.106	-.664	.201
DOAF	.525**	.258	1.362	3.425
Tol	.683**	.146	.403	3.089
CSM	.198	-.046	-.576	.203
$R^2$	.01			
$\Delta R^2$	.13			
$F$	6.77			
$\Delta F$	11.57			

*Note.* DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

\*\* $p < .01$ , \* $p < .05$

In table 4, summary of hierarchal regression analysis shows that at step 1 duration usage, data package, per day usage and outgoing calls contribute significantly to regression model  $F = 6.67$ ,  $p = .00$ ,  $R^2 = .01$  (1%). In step 2 controlling the demographic variables the proneness towards smart phone addiction contribute significantly to the nomophobia  $F = 11.57$ ,  $p = .00$ ,  $R^2 = .13$  (13%).

Table 5

*Mean Differences on Gender among Study Variables (N = 367)*

Variables	Male (n = 174)		Female (n = 193)		t(365)	p	95%CI		Cohen's d
	M	SD	M	SD			LL	UL	
NMQ	91.27	25.07	92.17	23.56	-.35	.722	2.53	5.89	-
SAPS	22.66	3.85	21.80	4.20	1.94	.050	.42	-.00	.20
DOAF	12.32	2.49	11.79	2.65	1.96	.050	.27	-.00	.20
Tol	10.29	1.91	10.00	2.10	1.39	.163	.21	-.12	-
CSM	34.95	5.66	35.11	6.23	-.25	.804	.62	1.393	-

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 5 shows the mean difference among male and female regarding study variables. Result indicated significant differences among males and females on smart phone addiction proneness scale and its subscale DOAF. As compared to females, male scored higher on proneness towards smart phone addiction. But on DOAF males scored higher than females. All the other variables showed non-significant differences on both the groups.

Table 6

*Mean Differences on Family System Among Study Variables (N = 367)*

Variables	Nuclear (n = 192)		Joint (n = 172)		t(365)	p	95%CI		Cohen's d
	M	SD	M	SD			LL	UL	
NMQ	92.44	24.04	91.43	24.48	.40	.069	1.01	2.54	-
SAPS	21.93	4.50	22.54	3.41	-1.43	.150	-.60	.42	-
DOAF	11.89	2.88	12.26	2.18	-1.39	.162	-.37	.27	-
Tol	10.04	2.13	10.27	1.84	-1.101	.271	-.23	.21	-
CSM	34.95	6.55	35.09	5.35	-.23	.813	-.14	.63	-

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 6 shows the mean difference among nuclear and joint family system regarding study variables. Result indicated no significant differences among nuclear and joint family system on all the study variables.

Table 7

*Mean Difference on User and Non-user of Data Package Among Study Variables**(N = 364)*

Variables	Users (n = 300)		Non-users (n = 64)		t(365)	p	95% CI		Cohen's d
	M	SD	M	SD			LL	LU	
NMQ	94.28	24.27	81.09	20.96	4.03	.001	6.76	19.62	.58
SAPS	22.35	3.92	21.42	4.63	1.67	.09	-.16	2.03	-
DOAF	12.12	2.54	11.68	2.87	1.21	.22	-.26	1.14	-
Tol	10.23	1.96	9.73	2.22	1.80	.07	-.04	1.04	-
CSM	34.88	5.71	35.76	7.28	-1.06	.29	-2.50	.74	-

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 7 shows the mean difference among groups who use data package and who don't use data package regarding study variables. Result indicated significant differences among groups who use data package and who don't use data package on nomophobia questionnaire. As compared to the group who don't use data package, the group who use data package score high on nomophobia. All the other variables showed non-significant differences.



Table 8

*Mean Differences of User and Non-user of Smart Phone for Email Checking Among Study Variables (N = 367)*

Variables	User (n = 152)		Non-user (n = 215)		t(365)	p	95%CI		Cohen's d
	M	SD	M	SD			LL	UL	
	NMQ	98.82	24.49	86.73			22.86	4.84	
SAPS	22.73	4.03	21.81	4.03	2.14	.03	.07	1.75	.23
DOAF	12.39	2.52	11.80	2.62	2.15	.03	.05	1.12	.22
Tol	10.33	1.97	10.00	2.03	1.53	.12	-.09	.74	-
CSM	35.26	5.69	34.88	6.20	.60	.54	-.86	1.63	-

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 8 shows the mean differences on using smart phone for email checking regarding study variables. Result indicated significant difference among groups who use smart phone or not for email checking on nomophobia, proneness towards smart phone addiction and tolerance. Group who use smart phone for email checking score high on nomophobia questionnaire and also score high on smart phone addiction proneness scale and its subscales tolerance. No significant differences was found among groups on chronotype.

Table 9

*Mean Differences on User and Non-user of Smart Phone for Social Media Among Study Variables (N = 367)*

Variables	User (n = 278)		Non-user (n = 88)		t(365)	p	95% CI		Cohen's d
	M	SD	M	SD			LL	LU	
NMQ	94.44	23.98	83.23	23.43	3.84	.00	5.46	16.94	.23
SAPS	22.38	4.06	21.65	4.01	1.53	.12	-.21	1.73	-
DOAF	12.14	2.59	11.76	2.60	1.21	.22	-.23	1.01	-
Tol	10.23	2.03	9.86	1.93	1.51	.13	-.11	.85	-
CSM	34.91	5.96	35.38	6.13	-.63	.52	-1.91	.97	-

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 9 shows the mean differences on using smart phone for social media regarding study variables. Result indicated significant difference among groups who use smart phone or not for social media on nomophobia. Group who use smart phone for social media score high on nomophobia questionnaire. All the other variables showed non-significant differences.

Table 10

*Mean Differences on User and Non-user of Smart Phone for Looking Information Among Study Variables (N = 367)*

Variables	User (n = 190)		Non-user (n = 176)		t(365)	p	95%CI		Cohen's d
	M	SD	M	SD			LL	LU	
	NMQ	97.51	22.89	85.68			24.22	4.80	
SAPS	22.45	4.15	21.92	3.94	1.25	.21	-.30	1.36	-
DOAF	12.25	2.57	11.84	2.60	1.51	.13	-.12	.94	-
Tol	10.20	2.08	10.08	2.00	.55	.57	-.29	.53	-
CSM	34.94	5.68	35.22	6.27	-.44	.65	-1.5	.95	-

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 10 shows the mean differences on smart phone usage for looking information regarding study variables. Result indicated significant difference among groups who use smart phone or not for looking information on nomophobia. Group who use smart phone for looking information score high on nomophobia questionnaire. All other variables indicated no significant differences.

Table 11

*Mean Differences on User and Non-user of Smart Phone for Organizing Meetings and Events Among Study Variables (N = 367)*

Variables	User (n = 49)		Non-user (n = 317)		t(365)	p	95%CI		Cohen's d
	M	SD	M	SD			LL	LU	
NMQ	97.59	26.48	90.85	23.85	1.81	.071	-.57	14.04	-
SAPS	21.87	4.48	22.23	3.99	-.57	.569	-1.58	.870	-
DOAF	11.85	2.87	12.07	2.55	-.54	.589	-.99	.56	-
Tol	10.02	2.06	10.16	2.01	-.45	.651	-.75	.46	-
CSM	35.61	4.62	34.97	6.18	.69	.487	-1.17	2.45	-

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 11 shows the mean difference among groups who use or not use smart phone for organizing meeting and events regarding study variables. Result indicated no significant differences on all the study variables between groups who use or not use smart phone for organizing meeting and events.

Table 12

*Mean Differences on User and Non-user of Smart Phone for Lecture and Notes Among Study Variables (N = 367)*

Variables	User (n = 170)		Non-user (n = 197)		t(365)	p	95%CI		Cohen's d
	M	SD	M	SD			LL	UL	
NMQ	96.58	23.33	87.56	24.33	.814	.00	4.09	13.92	.37
SAPS	22.82	4.17	21.64	3.88	.416	.00	.34	2.00	.29
DOAF	12.45	2.62	11.69	2.51	.384	.00	.23	1.29	.02
Tol	10.36	2.03	9.95	1.98	.786	.05	-.00	.82	.20
CSM	35.74	5.19	34.44	6.56	.003	.03	.07	2.52	.05

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 12 shows the mean difference among groups who use or not use smart phone for lectures and notes regarding study variables. Result indicated significant differences on all the study variables between groups who use or not use smart phone for lecture and notes. Group who use smart phone for lecture notes score high on nomophobia questionnaire, smart phone addiction proneness scale and its sub scale and also on evening type chronotype.

Table 13

*Mean Differences on User and Non-user of Smart Phone for Talking with Family and Friends Among Study Variables (N = 367)*

Variables	User (n = 229)		Non-user (n = 138)		t(365)	p	95%CI		Cohen's d
	M	SD	M	SD			LL	LU	
	NMQ	96.39	23.43	84.02			23.72	4.87	
SAPS	22.37	04.23	21.89	03.74	1.10	.26	-.37	1.34	-
DOAF	12.21	02.64	11.76	02.49	1.61	.10	-.09	0.99	-
Tol	10.15	02.05	10.12	01.96	0.15	.87	-.39	0.46	-
CSM	35.62	06.04	34.07	05.80	2.42	.01	.29	2.81	.26

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 13 shows the mean difference among groups who use or not use smart phone for talking with family and friends regarding study variables. Result indicated significant differences on nomophobia and chronotype. The group who use smart phone for talking with friends and family score high on nomophobia questionnaire and evening type chronotype. No significant differences were found on proneness towards smart phone addiction and its subscales.

Table 14

*Mean Differences on User and Non-user of Smart Phone for Playing Games Among Study Variables (N = 367)*

Variables	User (n = 111)		Non-user (n = 256)		t(365)	p	95%CI		Cohen's d
	M	SD	M	SD			LL	LU	
NMQ	97.95	22.43	89.05	24.57	3.27	.00	3.55	14.25	.37
SAPS	22.82	4.05	21.91	4.03	1.98	.04	.00	1.81	.22
DOAF	12.50	2.59	11.85	2.57	2.27	.02	.07	1.22	.25
Tol	10.32	2.00	10.06	2.01	1.12	.26	-.19	.70	-
CSM	35.09	5.07	35.02	6.36	.09	.92	-1.24	1.40	-

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 14 shows the mean difference among groups who use or not use smart phone for gaming regarding study variables. Result indicated significant differences on nomophobia and proneness towards smart phone addiction and DOAF. The group who use smart phone for gaming score high on nomophobia questionnaire, smart phone addiction proneness scale and DOAF. No significant differences were found on chronotype between both the groups.

Table 15

*Mean Differences on User and Non-user of Smart Phone for Listening Music Among Study Variables (N = 266)*

Variables	User (n = 184)		Non-user (n = 182)		<i>t</i> (365)	<i>p</i>	95%CI		Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			LL	LU	
NMQ	98.76	23.94	84.45	22.36	5.90	.00	9.54	19.07	.69
SAPS	22.58	3.99	21.78	4.09	1.90	.05	-.02	1.63	.19
DOAF	12.41	2.55	11.66	2.59	2.80	.00	.22	1.28	.29
Tol	10.16	1.95	10.11	2.08	.25	.80	-.36	.46	-
CSM	35.11	5.55	35.00	6.42	.19	.84	-1.11	1.35	-

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 15 shows the mean difference among groups who use or not use smart phone for listening music regarding study variables. Result indicated significant differences on nomophobia and proneness towards smart phone addiction and a sub scale DOAF. The group who use smart phone for listening music score high on nomophobia questionnaire, smart phone addiction proneness scale and DOAF. No significant differences were found on chronotype between both the groups.



Table 16

*Mean Differences on User and Non-user of Smart Phone at Dinner Table Among Study Variables (N = 366)*

Variables	User (n = 71)		Non-user (n = 295)		t(365)	p	95%CI		Cohen's d
	M	SD	M	SD			LL	LU	
NMQ	104.92	22.46	88.40	23.49	5.36	.00	10.4	22.57	.71
SAPS	23.12	3.79	21.95	4.09	2.18	.02	.11	2.21	.29
DOAF	12.49	2.39	11.93	2.63	1.62	.10	-.11	1.23	-
Tol	10.63	2.00	10.02	2.00	2.30	.02	.08	1.13	.30
CSM	34.18	5.94	35.26	6.00	-1.3	.17	-2.63	.47	-

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 16 shows the mean difference among groups who use or not use smart phone at dinner table regarding study variables. Result indicated significant differences on nomophobia and proneness towards smart phone addiction and its subscale tolerance. The group who use smart phone at dinner table score high on nomophobia questionnaire, smart phone addiction proneness scale and tolerance. No significant differences were found on chronotype between both the groups.

Table 17

*Mean Differences on User and Non-user of Smart Phone during Boredom Among Study Variables (N = 366)*

Variables	User (n = 262)		Non-user (n = 104)		t(365)	p	95%CI		Cohen's d
	M	SD	M	SD			LL	LU	
NMQ	94.75	24.76	84.42	21.29	3.74	.00	4.90	15.76	.44
SAPS	22.37	3.99	21.75	4.20	1.30	.19	-0.31	1.53	-
DOAF	12.21	2.57	11.66	2.62	1.83	.06	-0.03	1.13	-
Tol	10.16	1.93	10.09	2.23	0.27	.78	-0.39	0.52	-
CSM	34.83	5.94	35.51	6.12	-0.98	.32	-2.05	0.68	-

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 17 shows the mean difference among groups who use or not use smart phone during boredom regarding study variables. Result indicated significant differences on nomophobia. The group who use smart phone when the getting bored score high on nomophobia questionnaire. No significant differences were found on smart phone addiction proneness scale and chronotype between both the groups.

Table 18

*Mean Differences on User and Non-user of Smart Phone during the Gap Between Classes Among Study Variables (N = 366)*

Variables	User (n = 124)		Non-user (n = 242)		t(365)	P	95%CI		Cohen's d
	M	SD	M	SD			LL	LU	
NMQ	102.25	21.99	86.41	23.69	6.19	.00	10.80	20.85	.69
SAPS	23.24	3.76	21.65	4.11	3.60	.00	0.72	2.45	.42
DOAF	12.78	2.37	11.66	2.62	3.97	.00	0.56	1.66	.45
Tol	10.45	1.90	9.98	2.06	2.12	.03	0.03	0.90	.24
CSM	34.25	6.00	35.45	5.97	-1.81	.07	-2.50	0.09	-

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 18 shows the mean difference among groups who use or not use smart phone during the gap between classes regarding study variables. Result indicated significant differences on nomophobia and proneness towards smart phone addiction and its subscales. The group who use smart phone between classes score high on nomophobia questionnaire and smart phone addiction proneness scale and its subscales. No significant differences were found on chronotype between both the groups.



Table 19

*Mean Differences on User and Non-user of Smart Phone while Having Fun with Friends Among Study Variables (N = 367)*

Variables	User (n = 105)		Non-user (n = 262)		t(365)	p	95%CI		Cohen's d
	M	SD	M	SD			LL	LU	
NMQ	102.5	25.02	87.46	22.63	5.57	.000	9.73	20.34	.63
SAPS	23.13	3.51	21.81	4.21	2.84	.001	0.40	2.23	.34
DOAF	12.48	2.31	11.86	2.68	2.07	.034	0.03	1.20	.25
Tol	10.64	1.90	9.94	2.03	3.04	.000	0.24	1.15	.36
CSM	33.86	5.62	35.51	6.09	-2.39	.013	-3.00	-0.29	.28

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 19 shows the mean difference among groups who use or not use smart phone for having fun with friends regarding study variables. Result indicated significant differences on all the study variable. The group who use smart phone for having fun with friends score high on nomophobia questionnaire and smart phone addiction proneness scale but the group who don't use smart phone for fun with friends score high on eveningness chronotype.

Table 20

*Mean differences on User and Non-user of Smart Phone during Class Among Study Variables (N = 367)*

Variables	User (n = 82)		Non-user (n = 285)		t(365)	p	95%CI		Cohen's d
	M	SD	M	SD			LL	LU	
NMQ	99.81	26.17	89.42	23.22	3.47	.00	4.50	16.28	.42
SAPS	22.62	3.94	22.07	4.08	1.08	.27	-.44	1.55	-
DOAF	12.32	2.56	11.96	2.60	1.11	.26	-.27	.99	-
Tol	10.29	2.00	10.10	2.01	0.75	.45	-.30	.68	-
CSM	33.89	5.72	35.37	6.04	-1.98	.04	-2.95	-.01	.25

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 20 shows the mean difference among groups who use or not use smart phone during class regarding study variables. Result indicated significant differences on nomophobia and cronotype. The group who use smart phone during class score high on nomophobia questionnaire. But the group who don't use smart phone during class score high on eveningness chronotype. No significant differences were found on proneness towards smart phone between both the groups.

Table 21

*Mean Differences on User and Non-user of Smart Phone during Talking to Others Among Study Variables (N = 366)*

Variables	User (n = 100)		Non-user (n = 266)		t(365)	p	95%CI		Cohen's d
	M	SD	M	SD			LL	LU	
NMQ	98.84	24.71	89.02	23.62	3.49	.00	4.29	15.33	.41
SAPS	22.95	3.97	21.91	4.06	2.17	.03	.10	1.96	.26
DOAF	12.41	2.54	11.91	2.60	1.63	.10	-.10	1.09	-
Tol	10.54	2.06	10.00	1.98	2.28	.02	.07	.99	.28
CSM	34.64	5.75	35.19	6.09	-.78	.43	-1.93	.83	-

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 21 shows the mean difference among groups who use or not use smart phone during talking with others regarding study variables. Result indicated significant differences on nomophobia, proneness towards smart phone addiction and Tolerance. The group who use smart phone during talking to others score high on nomophobia questionnaire, smart phone addiction proneness scale and tolerance. No significant differences were found on chronotype between both the groups.

Table 22

*Mean Differences on User and Non-user of Smart Phone at Rest Room Among Study Variables (N = 366)*

Variables	User (n = 182)		Non-user (n = 184)		t(365)	p	95%CI		Cohen's d
	M	SD	M	SD			LL	LU	
NMQ	96.53	23.24	86.93	24.41	3.85	.00	4.69	14.49	.42
SAPS	22.50	4.14	21.90	3.96	1.41	.15	-.23	1.43	-
DOAF	12.34	2.62	11.75	2.54	2.18	.02	.05	1.12	.23
Tol	10.15	2.07	10.14	1.96	.03	.97	-.40	0.42	-
CSM	35.32	5.79	34.75	6.19	.91	.36	-.66	1.80	-

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 22 shows the mean difference among groups who use or not use smart phone at rest room regarding study variables. Result indicated significant differences on nomophobia and DOAF. The group who use smart phone at rest room score high on nomophobia questionnaire and DOAF. No significant differences were found on smart phone addiction proneness scale and chronotype between both the groups.

Table 23

*Mean Differences on User and Non-user of Smart Phone while Waiting of Others Among Study Variables (N = 366)*

Variables	User (n = 197)		Non-user (n = 170)		t(365)	p	95%CI		Cohen's d
	M	SD	M	SD			LL	LU	
NMQ	96.41	23.69	86.33	23.86	4.04	.00	5.18	14.96	.42
SAPS	22.49	4.28	21.84	3.75	1.52	.12	-.18	1.47	-
DOAF	12.28	2.74	11.77	2.38	1.87	.06	-.02	1.04	-
Tol	10.20	2.00	10.07	2.02	0.65	.51	-.27	.55	-
CSM	34.74	6.27	35.38	5.65	-1.02	.30	-1.87	.59	.11

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 23 shows the mean difference among groups who use or not use smart phone while waiting for others regarding study variables. Result indicated significant differences on nomophobia and chronotype. The group who use smart phone while waiting score high on nomophobia questionnaire. But the group who don't use smart phone while waiting score high on eveningness chronotype. No significant differences were found on smart phone addiction proneness scale and its sub scales between both the groups.



Table 24

*Mean differences on User and Non-user of smart phone during Transportation Among Study Variables (N = 365)*

Variables	User (n = 129)		Non-user (n = 236)		t(365)	p	95%CI		Cohen's d
	M	SD	M	SD			LL	LU	
NMQ	95.89	25.42	89.58	23.31	2.39	.01	1.13	11.50	.26
SAPS	22.82	4.18	21.87	3.95	2.15	.03	.08	1.82	.03
DOAF	12.46	2.69	11.83	2.51	2.22	.02	.07	1.18	.24
Tol	10.36	1.97	10.04	2.03	1.46	.14	-.11	.75	-
CSM	34.17	5.74	35.47	6.07	-1.99	.04	-2.58	-.01	.18

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 24 shows the mean difference among groups who use or not use smart phone during transportation regarding study variables. Result indicated significant differences on all the study variable. The group who use smart phone during transportation score high on nomophobia questionnaire and smart phone addiction proneness scale but the group who don't use smart phone during transportation with friends score high on eveningness chronotype.

Table 25

*Mean Differences on User and Non-user of Smart Phone while Walking Among Study Variables (N = 366)*

Variables	User (n = 96)		Not user (n = 270)		t(365)	p	95%CI		Cohen's d
	M	SD	M	SD			LL	LU	
NMQ	103.7	22.10	87.42	23.61	5.91	.00	10.90	21.76	.42
SAPS	23.39	3.63	21.77	4.12	3.41	.00	.68	2.55	.41
DOAF	12.77	2.28	11.79	2.65	3.20	.00	.37	1.57	.40
Tol	10.62	1.94	9.98	2.01	2.71	.00	.17	1.11	.32
CSM	34.45	5.57	35.24	6.14	-1.10	.26	-2.19	.61	-

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 25 shows the mean difference among groups who use or not use smart phone while walking regarding study variables. Result indicated significant differences on nomophobia and proneness towards smart phone addiction and its subscales. The group who use smart phone while walking score high on nomophobia questionnaire, smart phone addiction proneness scale and its subscales. No significant differences were found on chronotype between both the groups.

Table 26

*Mean Differences on User and Non-user of Smart Phone while Driving Among Study Variables (N = 367)*

Variable	Users (n = 48)		Non-user (n = 319)		t(365)	p	95%CI		Cohen's d
	M	SD	M	SD			LL	LU	
NMQ	104.18	27.10	89.87	23.28	3.88	.00	7.06	21.56	.56
SAPS	23.12	2.63	22.05	4.21	1.71	.08	-.16	2.30	-
DOAF	12.79	2.06	11.93	2.64	2.13	.03	.06	1.64	.36
Tol	10.33	1.46	10.11	2.08	.69	.48	-.39	.83	-
CSM	34.29	5.70	35.15	6.03	-.93	.35	-2.69	.96	-

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 26 shows the mean difference among groups who use or not use smart phone while driving regarding study variables. Result indicated significant differences on nomophobia and DOAF. The group who use smart phone while driving score high on nomophobia questionnaire and DOAF. No significant differences were found on smart phone addiction proneness scale and chronotype between both the groups.

Table 27

*Mean Differences on User and Non-user of Smart Phone while Watching TV Among Study Variables (N = 367)*

Variables	User (n = 92)		Non-user (n = 275)		t(365)	p	95%CI		Cohen's d
	M	SD	M	SD			LL	LU	
	NMQ	101.3	23.16	88.54			23.81	4.47	
SAPS	23.39	3.26	21.79	4.21	3.31	.00	.65	2.54	.42
DOAF	12.78	2.25	11.80	2.65	3.17	.00	.37	1.58	.40
Tol	10.60	1.68	9.98	2.09	2.57	.01	.14	1.09	.33
CSM	34.35	5.86	35.27	6.03	-1.26	.20	-2.33	.50	-

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 27 shows the mean difference among groups who use or not use smart phone while watching TV regarding study variables. Result indicated significant differences on nomophobia and proneness towards smart phone addiction and its subscales. The group who use smart phone while watching TV score high on nomophobia questionnaire and smart phone addiction proneness scale and its subscales. No significant differences were found on chronotype between both the groups

Table 28

*Mean Differences on User and Non-user of Smart Phone when Being alone Among Study Variables (N = 367)*

Variables	Users (n = 232)		Non-users (n = 135)		t(365)	p	95%CI		Cohen's d
	M	SD	M	SD			LL	LU	
	NMQ	97.01	23.13	82.68			23.55	5.68	
SAPS	22.34	4.10	21.94	3.97	.91	.36	-.46	1.26	-
DOAF	12.17	2.61	11.82	2.56	1.23	.21	-.20	.89	-
Tol	10.16	2.01	10.11	2.02	.24	.81	-.37	.48	-
CSM	34.78	6.15	35.48	5.70	-1.08	.27	-1.98	.57	-

*Note.* NMQ = Nomophobia Questionnaire; SAPS = Smart Phone Addiction Proneness Scale; DOAF = Disturbance of Adaptive Functioning; Tol = Tolerance; CSM = Composite Scale of Morningness

Table 28 shows the mean difference among groups who use or not use smart phone when being alone regarding study variables. Result indicated significant differences on nomophobia. The group who use smart phone being alone score high on nomophobia questionnaire. No significant differences were found on smart phone addiction proneness scale and chronotype between both the groups.

## **DISCUSSION**

## Discussion

The purpose of the present study was to explore the relationship between chronotype, proneness towards smart phone addiction, and nomophobia. Moreover effect of demographic such as age, gender, family system, usually checking of smart phone, data package, per day checking, per day usage, when use smart phone and why use smart phone have been evaluated. In order to fulfill the requirement of the study, sample of 367 students was collected from different universities of Islamabad (Quaid-E-Azam University, NUML, Urdu university and Islamic university).

### Psychometric Properties of Study Variables

For achieving the objectives of the present study, data analysis was carried out in different steps. The internal consistency of the scale was determined with the help of alpha coefficient. Descriptive analysis of scales show acceptable range of reliabilities (Table 2). It was observed that the value of skewness and kurtosis for all the variables were within acceptable range, thus the score for all the variables were considered to be normally distributed.

### Relationship between Chronotype, Proneness towards Smart Phone Addiction and Nomophobia.

The first hypothesis of the research was that proneness towards smart phone addiction will positively predict nomophobia. To carry out this relation, correlation analysis and regression was done and it showed significant result (table 3 and table 4). So the hypothesis one is accepted. Previous researches supported the result that over use of smart phone can lead to the behavioral addiction (nomophobia) (Bianchi & Phillips 2005). Deursen (2015), highlighted that smart phone use not only produces feeling of pleasure and reduces pain but also lead to functional impairment which is the sign of addiction (nomophobia).

Second hypothesis of the study was that eveningness will positively predict nomophobia among university students. In table 3 it is indicated that nomophobia has significant negative correlation with chronotype (where low scores indicate eveningness). But according to the result findings of regression (table 4) chronotype did not predict nomophobia among university students so hypothesis is not accepted.

### **Group Differences on User and Non-user of Smart Phone for Different Purposes Among Nomophobia, Proneness towards Smart Phone Addiction and Chronotype**

The students who use smart phone for email checking, social media, looking information, lecture notes, talking with friends and family, gaming and listening music score high on nomophobia and proneness towards smart phone addiction. Research indicated that high level of dependency on smart phone because smart phone is easy to carry. Students can move anywhere with smart phone. They use smart phone to contact with teachers and class fellows, discuss class work on whatsapp groups, can easily access to new information using smart phone, and when getting bored the use smart phone for gaming and listening music. Known (2013) had stated that smart phones are abundantly used throughout the day for different purposes, including conversation, entertainment purpose, gaming and societal interconnection.

### **Group Differences on User and Non-user of Smart Phone on Different Context Among Nomophobia, Proneness Smart Phone Addiction and Chronotype**

The students who use smart phone at dinner table, when getting bored, during classes, between classes, for fun with family and friends, while talking to others, while driving, transportation, while walking, at restroom, while waiting for others, when getting alone score high on nomophobia showed great dependency on smart phone. When they get out of touch with mobile they feel anxiety and restlessness. Past research indicated that youths are explicitly connected to smart phone they think of it as their second self. Many users report that they can't survive without it (Wajcman et al, 2007).

### **Group Differences on Nomophobia, Proneness towards Smart Phone Addiction and Chronotype.**

On the bases of gender differences t-test was run which shows significant differences on proneness towards smart phone addiction. However, male scored high as compared to females. Hypothesis no. 3 was approved. Kamran (2010) supported that male students are more addicted to smart phone as compared to female. Because the social circle of the male was vast as compared to female students, boys are more





aware of different technologies, application and their update and male have more fake accounts on different sites.

T-test show no differences among nuclear and joint family system. Now a day smart phone usage is more in Pakistani culture as compared to others technologies so nuclear and joint family may be equally use smart phone because of its vast applications.

Students who use data package score high on nomophobia as compared to students who don't use data package. Data package allow the students more excess to social media. Wifi is limited to only home or department but if you have data package you can use social media when you are out of home and department. They are wireless so easy to manage and can be approached at anytime and anywhere. (Lepp, Li, Barkley, & Esfahani, 2015).

### **Limitation and suggestion**

Various limitations were found in conducting the study such as:

- 1 The sample of the study was too small and taken only from universities of Islamabad (Quaid-E-Azam University, NUML, Urdu university and Islamic university). For generalization, the study should be replicated with large sample, included all universities of Islamabad.
- 2 Self-report method in itself has some methodological problem, for example participants might have control their personal information. Therefore mixed method research and control of social desirability are recommended.
- 3 The effect of other demographic variables such as time spend with family, father and mother education should also be considered for further research on these variables.
- 4 Present study was cross-sectional so further research can use longitudinal and qualitative study method to see impact of proneness towards smart phone addiction on nomophobia over a period of time.

### **Implications**

- 1 The present research is adding to existing body of literature which is comparatively new and less researched area. Current study helps understanding the wide range of predictors of nomophobia among the university students.
- 2 Similarly it would be useful in spreading awareness among university students about different predictors of nomophobia. This ultimately can be instrumental in guiding students towards the appropriate use of smart phone.
- 3 Beside general awareness this research will also help parents in understanding the predictors of nomophobia on their children, and in this way they can monitor the use of smart phone. Parents can help their children from becoming nomophobic by keeping a close check on their activities.

- 4 Present study also suggest that parents, teachers and psychologist should work in collaboration in order to make awareness programs for the students about the appropriate use of their smart phone.
- 5 Furthermore this research will provide foundation for future research on smart phone addiction and nomophobia in Pakistan.

### **Conclusion**

The present study indicated the result of relationship between chronotype, proneness towards smart phone addiction and nomophobia. Result shows that proneness towards smart addiction have positive correlation with nomophobia. More use of smart phone lead to more dependency on smart phone, more the dependency predicts more anxiety and fear to be out of smart phone (nomophobia). Finding of the present study will help clinical psychologist, family therapist, teachers and parents to make intervention against smart phone addiction and nomophobia among university students.

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## **APPENDICES**

## Appendix A

**Informed Consent**

I, Anam Nawaz, M.Sc research student at National Institute of Psychology, Quaid-I-Azam University, Islamabad. I am conducting a research as per requirement of degree. This research aims to explore the “relationship between chronotype, proneness towards smart phone addiction and nomophobia among university students”. I request you to support my purpose and participate in this research. I assure you that information provided will be kept confidential and will only be used for research. You have all the right to quit at any stage of data collection. Participation in this research is completely based on your willingness to participate. If you agree to participate then please sign below.

Your help, support and participation will be highly appreciated.

Thank you!

Signature \_\_\_\_\_

Anam Nawaz

anam.nawaz998@gmail.com

## Appendix B

## Demographics

1. Your age \_\_\_\_\_
2. Gender \_\_\_\_\_
3. Year of study \_\_\_\_\_
4. Your major subjects \_\_\_\_\_
5. Department \_\_\_\_\_
6. Family system: Nuclear/ Joint

## Smartphone Use

7. For how long have you been using a smartphone?
  - a. Less than a year
  - b. 1 year to less than 2 years
  - c. 2 years to less than 3 years
  - d. 3 years to less than 4 years
  - e. 4 years to less than 5 years
  - f. 5 years or more
8. Do you have a mobile data plan/package that allows you to access the Internet through your smartphone?
  - a) Yes
  - b) No
9. Approximately how much time per day do you think you spend using your smartphone? \_\_\_\_\_ hours
10. On average how many times per day do you think you check your smartphone? \_\_\_\_\_ times
11. How often do you think you usually check your smartphone?
  - a. Every 5 minutes
  - b. Every hour
  - c. Every 10 minutes
  - d. Every 2 hours
  - e. Every 20 minutes
  - f. Every 3 hours
  - g. Every 30 minutes
  - h. Other (please specify): \_\_\_\_\_
12. Please indicate the average number of times per day you do the following on your smartphone.
  - a) Number of phone calls you make per day : \_\_\_\_\_
  - b) Number of phone calls you receive per day : \_\_\_\_\_
  - c) Number of text messages you send per day : \_\_\_\_\_
  - d) Number of text messages you receive per day : \_\_\_\_\_
  - e) Number of emails you send per day : \_\_\_\_\_

f) Number of emails you receive per day : \_\_\_\_\_

13. Approximately how many apps do you have on your smartphone? \_\_\_\_\_ Apps

14. For which of the following purposes do you usually use your smartphone? (Please select all that apply.)

- |   |                                   |
|---|-----------------------------------|
| a. Checking email                         | b. Checking social media          |
| c. Looking information up on the Internet | d. Scheduling meetings and events |
| e. Checking lecture notes                 | f. Talking with family or friends |
| g. Games                                  | h. Music                          |
| I. Others (please specify) _____          |                                   |

15. In which of the following contexts would you use your smartphone? (Please select all that apply.)

- |                             |   |
|-----------------------------|---|
| a. At a dinner table        | b. When I'm bored                         |
| c. Between classes          | d. While hanging out with friends         |
| e. During a class           | f. While talking to somebody              |
| g. In the restroom          | h. While waiting for someone or something |
| i. On public transportation | j. While walking                          |
| k. While driving            | l. While watching TV or a movie           |
| m. When I'm alone           | n. Other (please specify): _____          |

## Appendix C

Please indicate how much you agree or disagree with each statement in relation to your smartphone.

S.no	Items	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1	I would feel uncomfortable without constant access to information through my smartphone.							
2	I would be annoyed if I could not look information up on my smartphone when I wanted to do so.							
3	Being unable to get the news (e.g., happenings, weather, etc.) on my smartphone would make me nervous.							
4	I would be annoyed if I could not use my smartphone and/or its capabilities when I wanted to do so.							
5	Running out of battery in my smartphone would scare me.							
6	If I were to run out of credits or hit my monthly data limit, I would panic.							
7	If I did not have a data signal or could not connect to Wi-Fi, then I would constantly check to see if I had a signal or could find a Wi-Fi network.							
8	If I could not use my smartphone, I would be afraid of getting stranded somewhere.							
9	If I could not check my smartphone for a while, I would feel a desire to it.							
10	I would feel anxious because I could not instantly communicate with my family and/or friends.							

11	I would be worried because my family and/or friends could not reach me.							
12	I would feel nervous because I would not be able to receive text messages and calls.							
13	I would be anxious because I could not keep in touch with my family and/or friends.							
14	I would be nervous because I could not know if someone had tried to get a hold of me.							
15	I would feel anxious because my constant connection to my family and friends would be broken.							
16	I would be nervous because I would be disconnected from my online identity.							
17	I would be uncomfortable because I could not stay up-to-date with social media and online networks.							
18	I would feel awkward because I could not check my notifications for updates from my connections and online networks.							
19	I would feel anxious because I could not check my email messages.							
20	I would feel weird because I would not know what to do.							

## Appendix D

**Instruction:** Please read all the questions carefully and *tick* the option which is best according to you.

Sr.no	Statement	Strongly Disagree	Disagree	Agree	Strongly Agree
1	My grades dropped because of excessive smart phone usage				
2	I have a hard time accomplishing what I have planned because of my smart phone use.				
3	People comment frequently on my excessive smart phone use.				
4	Family and friends complain that I use my smart phone too much.				
5	My smart phone does not distract me from studying.				
6	I tried to reduce the time I spend on a smart phone but failed.				
7	I can control my smart phone usage time.				
8	Even when I know I should stop, I continue to use my smart phone.				
9	Spending a huge amount of time on a smart phone has become my habit.				

## Appendix E

**Instructions:** For each item, please *tick* response that best describes you.

1-	<p>Considering only your own “feeling best” rhythm, at what time would you get up if you were entirely free to plan your day?</p> <p><input type="checkbox"/> a. 5:00 - 6:30 a.m.</p> <p><input type="checkbox"/> b. 6:30 - 7:45 a.m.</p> <p><input type="checkbox"/> c. 7:45 - 9:45 a.m.</p> <p><input type="checkbox"/> d. 9:45 - 11:00 a.m.</p> <p><input type="checkbox"/> e. 11:00 a.m. – 12:00 noon</p>
2-	<p>Considering only your own “feeling best” rhythm, at what time would you go to bed if you were entirely free to plan your evening?</p> <p><input type="checkbox"/> a. 8:00 - 9:00 p.m.</p> <p><input type="checkbox"/> b. 9:00 - 10:15 p.m.</p> <p><input type="checkbox"/> c. 10:15 p.m. - 12:30 a.m.</p> <p><input type="checkbox"/> d. 12:30 - 1:45 a.m.</p> <p><input type="checkbox"/> e. 1:45 a.m. – 3:00 a.m.</p>
3-	<p>Assuming normal circumstances, how easy do you find getting up in the morning?</p> <p><input type="checkbox"/> a. Not at all easy</p> <p><input type="checkbox"/> b. Slightly easy</p> <p><input type="checkbox"/> c. Fairly easy</p> <p><input type="checkbox"/> d. Very easy</p>
4-	<p>How alert do you feel after the first half hour after having awakened in the morning?</p> <p><input type="checkbox"/> a. Not at all alert</p> <p><input type="checkbox"/> b. Slightly alert</p> <p><input type="checkbox"/> c. Fairly alert</p> <p><input type="checkbox"/> d. Very alert</p>
5-	<p>During the first half hour after having awakened in the morning, how tired do you feel?</p> <p><input type="checkbox"/> a. Very tired</p> <p><input type="checkbox"/> b. Fairly tired</p> <p><input type="checkbox"/> c. Slightly tired</p> <p><input type="checkbox"/> d. Not at all tired</p>
6-	<p>You have decided to engage in some physical exercise. A friend suggests that you do this one hour twice a week and the best time for him is 7:00-8:00 am. Bearing in mind</p>



	<p>nothing else but your “feeling best” rhythm, how do you think you would perform?</p> <p><input type="checkbox"/> a. Would be in good form</p> <p><input type="checkbox"/> b. Would be in reasonable form</p> <p><input type="checkbox"/> c. Would find it difficult</p> <p><input type="checkbox"/> d. Would find it very difficult</p>
7-	<p>At what time in the evening do you feel tired and as a result, in need have sleep?</p> <p><input type="checkbox"/> a. 8:00 - 9:00 p.m.</p> <p><input type="checkbox"/> b. 9:00 - 10:15 p.m.</p> <p><input type="checkbox"/> c. 10:15 p.m. – 12:30 a.m.</p> <p><input type="checkbox"/> d. 12:30 - 1:45 a.m.</p> <p><input type="checkbox"/> e. 1:45 a.m. – 3:00 a.m.</p>
8-	<p>You wish to be at your peak performance for a test, which you know is going to be mentally exhausting and lasting for two hours. You are entirely free to plan your day, and considering only your own” feeling best” rhythm, which ONE of the four testing times would you choose?</p> <p><input type="checkbox"/> a. 8:00 - 10:00 a.m.</p> <p><input type="checkbox"/> b. 11:00 a.m. - 1:00 p.m.</p> <p><input type="checkbox"/> c. 3:00 - 5:00 p.m.</p> <p><input type="checkbox"/> d. 7:00-9:00 p.m.</p>
9-	<p>One hears about “morning” and ”evening” type people. Which ONE of these types do you consider yourself to be?</p> <p><input type="checkbox"/> a. Definitely a morning type</p> <p><input type="checkbox"/> b. More a morning than an evening type</p> <p><input type="checkbox"/> c. More an evening than a morning type</p> <p><input type="checkbox"/> d. Definitely an evening type</p>
10-	<p>When would you prefer to rise (provided you have a full day’s work – 8 hours) if you were totally free to arrange your time?</p> <p><input type="checkbox"/> a. Before 6:30 a.m.</p> <p><input type="checkbox"/> b. 6:30 – 7:30 a.m.</p> <p><input type="checkbox"/> c. 7:30 - 8:30 a.m.</p> <p><input type="checkbox"/> d. 8:30 a.m. or later</p>

11-	<p>If you always had to rise at 6:00 am, what do you think it would be like?</p> <ul style="list-style-type: none"><li><input type="checkbox"/> a. Very difficult and unpleasant</li><li><input type="checkbox"/> b. Rather difficult and unpleasant</li><li><input type="checkbox"/> c. A little unpleasant but no great problem</li><li><input type="checkbox"/> d. Easy and not unpleasant</li></ul>
12-	<p>How long a time does it usually take before you “recover your senses” in the morning after rising from a night’s sleep?</p> <ul style="list-style-type: none"><li><input type="checkbox"/> a. 0-10 minutes</li><li><input type="checkbox"/> b. 11-20 minutes</li><li><input type="checkbox"/> c. 21-40 minutes</li><li><input type="checkbox"/> d. More than 40 minutes</li></ul>
13-	<p>Please indicate to what extent you are a morning or an evening active individual?</p> <ul style="list-style-type: none"><li><input type="checkbox"/> a. Very morning active (morning alert &amp; evening tired)</li><li><input type="checkbox"/> b. To some extent, morning active</li><li><input type="checkbox"/> c. To some extent, evening active</li><li><input type="checkbox"/> d. Very evening active (morning tired &amp; evening alert)</li></ul>

## Appendix F

## Permission for Using Scale in Research.

anam.nawaz998 <anam.nawaz998@gmail.com>

Fri, Nov 2, 2018,  
11:13 PM

to yuniizzang

Dear Yunhee Lee,

I hope that you will be doing well. I am Anam Nawaz , MSc Research Student at Psychology Department at Quaid-i-Azam University, Islamabad, Pakistan. I am conducting an academic research on university students entitled "Mediating effect of Chronotype between the relationship of proneness towards smart phone usage and Nomophobia" under supervision of Ms. Arooj Mujeeb (Lecturer) for which I need to use your scale entitled "Smart phone Addiction Proneness Scale SAPS". I request you to grant me permission for using your scale in my research and I assure you that scale will be used for data collection in current study only.

Warm regards,

Anam Nawaz

Yunhee Lee <yuniizzang@gmail.com>

Tue, Nov 6, 2018,  
11:29 AM

to me

Yes. you can use it. you have my permission to use the scale.

2018년 11월 3일 (토) 오전 3:13, anam.nawaz998  
<anam.nawaz998@gmail.com>님이 작성:



## Appendix G

**Permission for Using Scale in Research****anam.nawaz998 <anam.nawaz998@gmail.com>**Fri, Nov 2, 2018,  
11:43 PM

to caglar.yildirim

Dear Mr. Caglar Yildirim

I hope that you will be doing well. I am Anam Nawaz, MSc Research Student at Psychology Department at Quaid-i-Azam University, Islamabad, Pakistan. I am conducting an academic research on university students "Mediating role of Chronotype in the relationship between proneness towards smart phone usage and Nomophobia Among University Students" under supervision of Ms. Arooj Mujeeb (Lecturer) for which I need to use your scale entitled "Nomophobia Questionnaire". I request you to grant me permission for using your scale in my research and I assure you that scale will be used for data collection in current study only.

Warm regards,

Anam Nawaz

**Caglar Yildirim <caglar.yildirim@oswego.edu>**Sat, Nov 3, 2018,  
12:06 AM

to me

Hello,

This is an automated message in response to your inquiry regarding my research on nomophobia. If you are writing to seek permission to use the Nomophobia Questionnaire in your research, this message serves as my permission. Thus you can use the NMP-Q in your research projects. <http://cs.oswego.edu/~caglar>

Thank you for your message and interest.

All the best,

Caglar Yildirim

Appendix H

**Permission for Using Scale in Research**

**anam nawaz** <anam.nawaz998@gmail.com>

Mon, Apr 8,  
11:05 AM

to mzickar

Dear Sir,

I hope that you will be doing well. I am Anam Nawaz, MSc Research Student at Psychology Department at Quaid-i-Azam University, Islamabad, Pakistan. I am conducting an academic research on university students "Mediating role of Chronotype in the relationship between proneness towards smart phone usage and Nomophobia Among University Students" under supervision of Ms. Arooj Mujeeb (Lecturer) for which I need to use scale entitled "Composite Scale of Morningness" developed by Carlla S. Smith. Now i get to know that he was passed away. As a head of department can you please guide me to whom i get the permission of using this Scale in my research?

Warm regards,

Anam Nawaz

**Michael John Zickar** mzickar@bgsu.edu via [falconbgsu.onmicrosoft.com](mailto:falconbgsu.onmicrosoft.com) Mon, Apr 8,  
6:08 PM

to me

You have our permission to use this scale. Best of luck with the research!

--Mike Zickar