

The neurocognitive basis of selfie-related behaviors in adolescents

Ergenlerde özçekim ile ilgili davranışların nörobilişsel temeli

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ABSTRACT

Selfie-related behaviors which are accepted as only one of the results of social media addiction are known as selfie uploading, capturing selfie, sharing selfie, selfie posting and selfie editing and it also affects our daily life in every aspect. Neuro-behavioral studies which indicated the relationship between the behavior or addiction of heavy selfie takers and sharing them on social media and self-objectification, narcissism, and psychopathology have caused this current problem a syndrome feature such as a "Selfitis behaviors scale". Screenagers-teenagers group constitutes a special risk group in selfie-related injuries and deaths owing to their high dynamic properties with especially in countries such as India where the adolescent population is high. Dangerous neurobehavioral acts related with problematic smartphone usage and selfie-related injuries are primarily associated with temporary distraction and the lack of self-awareness. Every behavior associated with many brain regions and it interacts each other in selfie-related behaviors. Through a multitude of afferent and efferent connections, prefrontal area is in mutual relationship with the other areas of cortex cerebri, namely thalamus, hypothalamus, basal ganglia, limbic system and cerebellum. We evaluated that the effects on adolescents of selfie-related behaviors with neurocognitive and behavioral perspective in this study.

Keywords: Selfie-related behavioral, neurocognitive, adolescent

ÖZ

Sosyal medya bağımlılığının sonuçlarından biri olarak kabul edilen özçekim ilişkili davranışlar, özçekim fotoğrafları çekme ve düzenleme, sosyal medyaya yükleme, paylaşma ve gönderme olarak bilinmekte ve günlük hayatımızı her yönden etkilemektedir. Yoğun olarak özçekim kullanıcılarının davranışlarının; nesneleştirilmiş beden bilinci, narsisizm ve psikopatoloji ile ilişkili olduğunu gösteren nörodavranışsal araştırmalar bu güncel soruna bir "Özçekim bağımlı davranış kadranı" gibi bir sendrom özelliği kazandırmıştır. Özellikle Hindistan gibi ergen nüfusunun yüksek olduğu ülkelerde, özçekim ilişkili yaralanma ve ölümlerde, genç akran grubu yüksek dinamik özellikleri bakımından özel bir risk grubunu oluşturur. Özçekim ilişkili tehlikeli davranışlara, sorunlu akıllı telefon kullanımı ile özçekim sırasındaki geçici dikkat dağınıklığı ve öz farkındalık eksikliği neden olarak gösterilmiştir. Özçekim ilişkili davranışların her birinde birçok beyin bölgesi birbiriyle etkileşime girer. Prefrontal alan, çok sayıdaki afferent ve efferent bağlantılar aracılığıyla, thalamus, hypothalamus, basal ganglionlar, limbik sistem ve cerebellum gibi cortex cerebri'nin diğer alanları ile karşılıklı ilişki içindedir. Ergenlerde özçekim ilişkili davranışların etkilerini bu çalışmada nörobilişsel ve nörodavranışsal açıdan değerlendirdik.

Anahtar Kelimeler: Özçekim ilişkili davranış, nörobilişsel davranış, ergen

INTRODUCTION

Taking selfies, especially in the last decade, has been a symbol of self-expression with the introduction of smartphones into daily lives and the innovative social media applications they offer for photo/video sharing. Incorporation of social media to smartphones produced as a response to increasing need for social communication has led socially oriented humans to develop adaptive behaviors to this technology. As selfie allows an individual to take a photo of himself/herself and choose “the best” photo to be posted online, it gives him/her the opportunity to create his/her own social image (1). The desire to attract attention and the pressure on the individual to create a variety of selfies in an effort to protect his/her social image have caused people, particularly the youth, to share selfies including crazy behavior, and thus causing this understanding to enter our lives as a social phenomenon or syndrome. The history of selfie dates back to 1523 when artists started painting their own portraits on convex mirrors (2). The first distress signals regarding selfies arrived towards the end of 2011. However, first footprints of the selfie phenomenon were felt in the project by the Time magazine named “The Top 10 Selfiest Cities in the World” in which Instagram photos were ordered according to geographical coordination. Besides, digital oligarchies of the world announced 2014 as “The Year of Selfie” on Twitter (3). Still, the fast rise of definitions and events regarding selfies can be said to have occurred as of 2014. In other words, while the period until 2014 was a period of introduction to and usage of selfie, after this date the period of questioning selfie has now started.

In this review study, we evaluated the different effects of selfie-related behaviors in terms of neurocognitive and behavioral on adolescents in the light of current literature.

The Progression of Selfie

Neurobehavioral studies which indicated the relationship between the behavior or addiction of heavy selfie takers and sharing them on social media and self-objectification, narcissism, and psychopathology have caused this current issue to gain the characteristics of a syndrome (4). With its negative results, especially in young adults, indicating narcissistic, psychopathological and asymmetric behavior tendencies (5-7) with accompanying temporary distraction and a momentary lack of the self-awareness (8) and positive results such as “promoting positive effect through smartphone photography” (9), the selfie phenomenon has become the focus of neuropsychology in recent years as it reflects the complexity of human behavior and points to gender-specific behaviors (10). There are some data showing that particularly males with histrionic and narcissistic personality traits take more selfies. As such personalities are fond of being the focus of attention, taking selfies and sharing them on social media provide them with this opportunity. Social acceptance is quite important in adolescence, and qualitative research have demonstrated that posting selfies and especially receiving likes, responses and feedbacks in terms of their numbers are very effective in social acceptance for adolescents. Heavy or addictive use of smartphone, selfie and social media (11), has introduced to researchers working in the social field a new generation of teenagers named “screenagers” who try to learn almost everything through digital screen (12,13). Selfie-related behaviors actually have provided us with significant

information about the social effect size of behaviors, most of which reflect pathological personality traits. In other words, occult pathological behaviors have manifested themselves in the form of selfie.

The Effect Size of Selfie

Screenagers-teens group constitutes a special risk group in selfie-related injuries and deaths owing to their high dynamic properties. Selfie-related accidental risks which occur as a hazardous result of selfie-related neurocognitive behaviors and smartphone addiction (>4 saat-1) (14), can lead to injuries and deaths, particularly in teenagers or young adults, in every phase of daily life (15, 16).

According to reliable social media resources, by the end of 2011, the country where the most selfie-related fatal accidents occurred was India, in which 259 deaths occurred in at least 137 incidents, followed by Russia, the United States of America and Pakistan. Nearly, 243 million adolescents live in India according to UNICEF Report (2011). It can be explained cause of both selfie-related injuries and heavy user smartphone among adolescents in India. (11). When the causes of selfie-related injuries are examined through a neurobehavioral perspective, various factors come to the fore such as way of posing during selfie taking, the properties of the area where the pose is given, taking individual or group selfie, desired appearance, age, gender and psychological condition. The type of injury and scenery choice can vary depending on the society's culture, geographical structure, technological means and the level of development. People frequently prefer natural sceneries and especially cliff edges and railways in order to emphasize expression (extroversion) of crazy behavior traits, thus performing emotionally controlled mental reflection. In fact, while the preferred scene of incident in India is usually train and railway, in tourist victims, it ranges from mountains and cliff edges to high-rise buildings in urban centers. Choice of dangerous scenes in taking selfies is usually the determining factor for injury and death types. For instance, multiple body injuries from falling from a high ground, deaths as a result of drowning or high voltage electrocution can be seen. Selfie syndrome, which applies to frequently travelling active age group and involves various preventable risks that it creates, has fallen into the area of interest of travel medicine, emergency medicine, adolescent psychiatry and preventive medicine (15-17).

Neurocognitive Bases of Selfie-Related Behaviors

In current literature, dangerous neurobehavioral acts related with smartphone usage and selfie are associated with temporary distraction and the lack of self-awareness (8, 19). For this reason, mechanisms that explain such unintentional accidents during taking selfies from a neurobehavioral perspective have gained importance. Over 400 scientific articles on selfie have so far been accessed over Web of Science (Clarivate analytics 2019), and only 130 of these have been accessed over ‘Pubmed’ through search with the keyword ‘selfie.’ More than 25% of these published articles include selfie-related behaviors. Behavioral scientists explain the basis of selfie-related behaviors as social acceptance, attention grabbing, overcoming loneliness as well as self-presentation and self-esteem (1). In the meantime, definitions such as narcissism, extroversion, body-esteem, social comparison and orientation are interpreted as parts of selfie-related behaviors. Selfie uploading, capturing selfie,

sharing selfie, selfie posting and selfie editing, which are typical behaviors of interconnected selfie-related behaviors, have entered the literature as new definitions. Some behavioral scientists, on the other hand, have used social cognitive theory in order to explain selfie-related behaviors.

The oldest theory on emotional process in the brain posits that the left hemisphere is responsible for cognitive processes while the right hemisphere is dominantly in charge of processing emotions. The stimulants presented on the left visual field (in the right hemisphere) are evaluated more emotionally, and more autonomous responses are produced. Consequently, when the right hemisphere control in selfie poses where the left cheek is in the forefront, the right amygdala activeness in the expression of fear, and the right insula activity in narcissism are considered, it is believed that in selfie accidents, cognitive functioning of environmental control is suppressed as a result of the suppressing of the left hemisphere, which is responsible for cognitive skills, during emotional dominance of the right hemisphere. The weakening of motor skills control makes it difficult to prevent potential accidents (20). In social communication, processing of interoceptive and exteroceptive senses are also important. Focusing on the representation of insight in presenting the self activates interoceptive pathways. It has also been demonstrated that the right insula in the brain plays a critical role in interoceptive attention. As information such as the spatial location of the place and its motivational importance triggers exteroceptive attention, encode spatial information is coded by the right amygdala and modulated as reward predictor with the responses of avoiding anticipated threat stimulants (anticipating preventive consequences) (21). Recent research has shown that amygdala participates in the modulation of spatial attention caused by emotional stimulants and is in correlation with spatial distraction. Additionally, it has been reported that a group of neuron population which produces dopamine in ventral tegmental area (VTA) and substantia nigra pars compacta respond in proportion to the motivational significance of anticipated consequences (22). Amygdala and dopamine neurons are interrelated, and dopamine neurons determine the amount of motivation for emotional stimulants. It is still uncertain whether these paths can regulate the spatial and non-spatial aspects of attention (23). Leathers and Olson (2012) reported that lateral intraparietal area (LIP) neurons are sparked in proportion to the spatial and positional intensity of anticipated consequences (24). Examinations of selfies have shown that left cheek pose in selfie is frequently used unintentionally. The right hemisphere is dominant in emotional control, as a result of which the left side of the face creates a more intense emotional expression (25). In their study where they examined the active centers in the brain when an emotion is expressed on the face by fMRI, Critchley et al. (2000) determined activity in middle temporal gyrus in the brain during facial expressions and mimics (26). Middle temporal gyrus including fusiform face area (FFA) is activated as it is the area in which people's own faces and others' faces are recognized. Through amygdala and stria terminalis, the limbic system, hippocampus and hypothalamus connection help to form emotional, autonomous and endocrinal responses to the messages sent by facial expressions on recognized faces. Information about the person is processed through facial expressions and mimics with inferior frontal gyrus and limbic system. Thus, we give information to our surroundings about our personality without even noticing it. Working on these

principles, the brain makes judgements about facial expressions depending on frightened, neutral and happy expressions. During frightened facial expression, high stimulation is observed in the amygdala-hippocampal component and posterior hippocampus. Similarly, pupil diameter is evaluated in differentiating between frightened facial expression and other expressions. Pupil diameter, which enlarges with an autonomous response to excitement and increases the interest on the face. In their study in which they evaluated unconscious physiological responses to half face images, Hess et al. (27) (1987) identified a direct correlation between pupil size and subjective happiness and determined that the left half of the face is perceived as more attractive. In their study "the perception of scientists as unpopular emotional, logical rationalists" in the images in the portrait collection of Royal Society, Nicholls et al. (28) (1999) identified a right-cheek priority in which the right cheek is perceived more scientifically as logical rationalists. Prefrontal and orbitofrontal cortex, which is a rather developed area in humans, covers Brodmann's 9th, 10th, 11th, 12th, 17th and, 46th areas in which the rostral of motor and premotor areas. Through a multitude of afferent and efferent connections, prefrontal area is in mutual relationship with the other areas of cortex cerebri, namely thalamus, hypothalamus, basal ganglia, limbic system and cerebellum. Thanks to these widespread connections, prefrontal area assumes an important role in forming behaviors and responses based on past experiences, making decisions and developing anticipation. It also has an impact on people's personality. Prefrontal cortex areas are the areas where complicated responses such as calmness, extreme joy, grief and happiness, friendship and nervousness originate. It is the headquarters of the brain. Time management, judging, planning, arranging, behavior control, detailed thinking and response to an effect are all realized in this area. Where and how we will act and behave, the behavior model necessary to reach our aim, the way to manage in order for our aim to be realized, and mature and effective personality traits are formed in this region. Kobayashi et al. (29) (2006) have identified a nerve population in lateral prefrontal cortex which gives responses similar to stimulants that are appetizing or anticipating preventive consequences (Table). It has also been demonstrated that those who perform selfie-related behaviors have more worries regarding body perception and eating. The relationship between too much sharing of selfie activities and body form and weight gain and dissatisfaction with the body has also been shown (30).

Table. Selfie-related behaviors and interested brain area

Selfie-Related Behaviors	Interested Brain Area
Eksteroceptive attention (spatial information, motivational modulation), fear expression on face	Right amygdalae
Anticipating preventive consequences	Ventral tegmental area-substantia nigra- Lateral prefrontal korteks
Anticipating consequences of spatial and orientational motivation	Lateral intraparietal area
Motor control of mimic muscles of the face	Contralateral Fascial nerve
Face recognition	Temporal medial gyrus
Emotionally, endocrine and autonomous responses to faces	Stria terminalis, Hypothalamus, Hippocampus, Lymbic lob
Forming behaviors and responses based on past experinces, making decisions, developing anticipation	Prefrontal cortex
Appetizing or anticipating preventive consequences	Lateral prefrontal korteks

CONCLUSION

It is believed that selfie-sharing related behaviors consequently enhances achieving the internalized ideals of appearance points which cannot be concealed in direct communication and with which one is not pleased with. It can be argued that too much activation of the related points in the right hemisphere, which is dominant in the emotional process centers in the brain, increases focusing on the self.

Selfie has enabled us to redefine our behavioral and personality traits and discover our body perception characteristics. Selfie-related behaviors are used as reflection of self esteem, body esteem and self presentation in social interaction. Therefore, selfie is considered a phenomenon which necessitates a multi-disciplinary approach.

ETHICAL DECLARATIONS

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