

Role of Cell Phone Media Usage on Behaviors of Toddlers: A Case Study of District Bahawalpur

Muhammad Husnain¹, Zaki Abbas² and Hannan Khan Tareen³

<https://doi.org/10.62345/jads.2023.12.3.33>

Abstract

This research is conducted to analyze the behavioral changes in toddlers on exposure to different media on cell phones. We conducted a closed-form survey of 140 parents to observe cell phone exposure in terms of physical, verbal, mental, emotional, and psychological changes (PVMEP) in the behavior of children aged between 1-3 years. Each survey submits 30 responses, as the six categories mentioned above contain five questions. It is inferred that only 2.85% of toddlers never used cell phones, whereas 34.1% very frequently used phone media. We used a z-test to analyze the data statistically and reported that the parents strongly agreed with 25.4% mental, 32.2% verbal, psychological 34.1%, emotional 23.2%, and physical 24.7% changes in kids. The results concluded that cellphone exposure for a long time causes behavioral changes in toddlers, affecting them in being socially inactive, communication delay, lack of concentration, lack of expression, and physical weaknesses. We also concluded that children with less exposure to cell phones are more social and have their cognitive abilities appropriately developed.

Keywords: Toddlers, Cell Phones Media, Behavioural Effects, PVMEP.

Introduction

This research is conducted in the district of Bahawalpur to study the effects of cell phone exposure on toddlers' behavior. Cell phones are a necessity of time and entertainment these days, especially for kids. While cell phones have eased our lives, and around 6 billion people are actively using cell phone media across the globe (Bernritter, 2022), it is also a curse. The negative consequence of using media is that it harms the psychology of toddlers as they become less social and do not interact with other kids their age. Studies have shown that Toddlers aged 1-3 years old have a higher % exposure to social media apps. It may cause health issues and affect their psychology, which is dangerous for their future life (Divan, 2008). It may affect toddlers not paying attention to their surroundings, resulting in children being unable to think critically due to less focus.

Another essential thing is sleep deprivation because of the use of cell phones. To get proper growth of toddlers, they must complete their sleeping cycle, which is more than other age groups. According to the American Academy of Pediatrics (AAP), smartphones, laptops, televisions, or electronic devices should not be placed in a child's room. AAP has suggested engaging toddlers in outdoor play and other physical activities.

¹ PhD Scholar, Department of Media & Communication Studies, Islamia University Bahawalpur and Lecturer, Department of Media & Communication UMT, Sialkot, Email: muhammad.husnain@skt.umd.edu.pk

² PhD Scholar, Department of Media & Communication Studies, Islamia University Bahawalpur, Email: abbas.zaki@ymail.com

³ Lecturer, Department of Media & Communication Studies, Islamia University of Bahawalpur, Email: hannankhan.tareen@iub.edu.pk



Different studies reveal that toddlers more exposed to cell phones are at higher risk of healthy lifestyles, building relationships, and exhibiting low social interactions. Research also reveals that long-term exposure to social media affects the psychosocial behavior of toddlers, which causes less attention, hyperactivity, impulsivity, and emotional problems (Kılıç, 2010). This sign is alarming as toddlers are becoming less interactive, watching mobile screens closely and wasting their precious hours scrolling social media apps. Nowadays, almost every parent lets children use cell phones because parents want to do their chores or silence them in public. Another primary reason, nowadays, is that parents use their cell phones more than give their children due attention, as we see in homes, restaurants, and other public places. According to a leading pediatrician, Dr. Dmitri Christakis, *Toddlers need laps more than apps*. Also, exposure to any graphics is very dangerous for toddlers when their theory of mind is undeveloped at an early age. Any violence, loud behaviors, and anger send strong signals to their brain cells and result in the violent or annoying behavior of a toddler who starts doing weird things just to get the attention of their loved ones. Instead, children should be engaged in playing sports, coloring, drawing, and solving puzzles to develop their problem-solving skills which are much needed in the future. We need to consider the fact that toddlers are vulnerable to changes in the environment, and cell phone media should not be that change. On the other hand, smartphones emit- Ionizing radiation that can cause brain tumors, especially when the brain is developing.

According to a study, Toddlers who actively use cell phone media are twice as likely to get Attention-deficit hyperactivity disorder (ADHD). ADHD in toddlers is a brain disorder in which toddlers ignore things in their surroundings, act without thinking of the results, and are overly active. It also affects toddlers' ability to learn a language. Studies have shown that toddlers seek the attention of their parent's vocals. Strong signals from their parents' verbal communication build simple grammar, high-pitched tone, and exaggerated enthusiasm in toddlers' brain structure. Due to excessive cell phone exposure, this structure breaks, and toddlers struggle to learn language, and these problems occur in their school life. In Pakistan, there needs to be more active work done on children's media. Children in Pakistan watch content from foreign countries, posing a significant societal issue. The videos and cartoons Pakistani Kids watch belong to a different society and culture. It leads children to imitate scenes done in foreign countries and to face humility in their own culture. Also, content creators nowadays use mockery, laughing sound effects, abusive language, violent actions, and curse words, which the toddlers are watching and learning. Parents should monitor what images their kids see on the screen and take responsibility for their kids interacting with mobile screens (Chau, 2010).

Researchers from the Finnish Institute of Health (FIH) reveal that exposure to cell phones for an extended period has terrible effects on children's well-being. Accurate measures should be taken to prevent smartphone exposure in young children, especially Toddlers. According to Northwestern Medicine History 2017, some health tips associated with smartphone exposure are:

- Keep toddlers safe from cell phones to avoid emitting radiation.
- Please do not make them eat food using cell phones, as the food may enter their windpipe.
- Use a parental account so toddlers can monitor which content they consume.
- Make a schedule for giving cell phones.
- Make toddlers busy with playing toys or activities so they do not ask for a smartphone.
- Do not use smartphones in front of toddlers.

For this purpose, we conducted a closed-form survey having five responses: strongly agree, agree, neutral, disagree, and strongly disagree against five categories of construction to study MVMEP changes in toddlers. We also collected the demographics of the parents, the gender of the child,

and the screen-time exposure of the child. The screen-time exposure again collected detailed information by asking five questions covering different aspects of phone media exposure. Parents must choose between 6 responses: never, very rarely, rarely, occasionally, frequently, and very frequently. On average, our observed screen time for Toddlers is 4.1 hrs, which is way more than the recommended screen time for toddlers by the World Health Organization (WHO). WHO recommends that toddlers' screen time should be at least half an hour or less. The objectives of this research are:

- To highlight the effect of cell phone media exposure on toddlers and its adverse effects on toddlers' psychological, verbal, mental, emotional, and physical (PVMEP) health.
- To create awareness in parents about the exposure of cell phone media and its effects on toddlers.
- To emphasize the limited use of smartphones to control behavioral changes in toddlers.

Section 2 covers the literature review, section 3 includes the proposed methodology and data collection steps, section 4 covers the deduced findings, section 5 presents results, and section 6 provides the conclusion.

Limitations of Research

In our research, the data was collected through online platforms; this may cause manipulation of results as we need to know which person filled out the survey. Any response may be subject to errors and manipulation of data by respondents. Also, the collected data is restricted to a population aged between 1-3 years, and conducted in one geographical area i.e. Bahawalpur.

Problem Statement

Toddler are being influenced by consuming more hours of their life watching cellphone media, which affects their cognitive behavior and lifestyle. It should be controlled to prevent any negative impacts on young children.

Literature Review

Humans are keen to socialize and have limited resources to engage themselves, which is a significant reason behind cell phone media usage. Boyd D. et al. stated that cellphone media could be categorized into two categories: interactive media, where users interact and socialize on a platform, and non-interactive media, where users listen to music and watch videos. As a result, our young generation lives in a highly digital world and has acquired digital skills (Boyd, 2008). Grimes et al. introduced that a baby cannot process images completely besides looking at bright and colorful screens. They are likelier not to identify themselves when looking in the mirror (Grimes, 1996). Tandon et al. said that toddlers are at high risk of becoming smartphone addicts as they have low intellect ability compared to other age groups. At about age 2, a little child's mind has grown enough for them to understand that they are a different individual from their folks and parental figures (Tandon, 2020). With this mindfulness, they have a feeling of control that empowers them to become more accessible. Little children express their freshly discovered autonomy and control through decisions (like demanding the blue cup, not the purple one). Shoukat et al. researched 439 kids and their parents to examine cell phone use and its effect on children's health. A year later, they repeated the same process, and it was found that the children who were excessively using smartphones during night hours showed poor health, anxiety, depression, and stress (Shoukat, 2019). Boumosleh et al. surveyed 663 students and found anxiety, depression, and suicidal thoughts among those who had a positive relation with excessive

smartphone use (Matar Boumosleh, 2017). Alayi et al. discussed that smartphone addiction is the same as getting addicted to drugs but without a substance (Alavi, 2012). Cha et al. conducted online research in Malaysia that showed that smartphone addiction releases dopamine in the brain, a happy hormone released while taking drugs. Cha et al. researched two groups of people where the group with excessive gaming and cell phone media use exhibited more suicidal thoughts and anxiety than the standard group (Cha, 2018). Hardell et al. have studied the effect of cell phone usage on children's and adults' health and showed that the RF radiation emitting from phones is a leading cause of brain tumors like glioma and acoustic neuroma (Hardell, 2018). Sadetzki et al. studied that smartphone beta radiations are a factor of sleep deprivation in kids, leading to insomnia, cyberbullying, changing behaviors of kids, brain tumors, anxiety, and depression (Sadetzki, 2014). Lissak et al. mentioned that smartphones affect behavioral change in kids, leading to problems in their childhood, causing physiological issues, neurological issues, addiction, and sleep issues (Lissak, 2018).

Research Methodology

Population

Our population is 140 parents of toddlers under 1-3 years old in Bahawalpur.

Sampling Size

We used a purposive sampling technique to collect our data and found that 95% of respondents lived in a healthy relationship, and the rest, 5%, were divorced or widowed.

Data Collection

The data were mainly collected using a questionnaire on online Google Forms provided to the parents in Bahawalpur city.

Categories of Construction

Our online questionnaire survey contained five different categories covering different aspects that can cause behavioral changes:

- i. Mental
- ii. Verbal
- iii. Psychological
- iv. Emotional
- v. Physical

Different checkpoints were already developed for the respondents before they started filling out surveys. They were asked about their marital status if they had children, and their age group. Respondents were instructed that they could close the survey if they were single, had no children, or did not lie in the age group 1-3 years. We divided our questionnaire into different sections, where we got close-ended information from parents. In the close-ended section, marital status, age of children, number of children, and information about toddlers' physical, emotional, and psychological behaviors are asked. We discuss the mental state of toddlers after using smartphones, their energy levels, and verbal communication skills.

Data Analysis

SPSS (Statistical Package for Social Sciences) was used to represent and analyze data. Data from the survey was extracted to SPSS sheets, and descriptive statistics were used to analyze and

visualize data. The data was stored in diagrams and graphics to represent values gathered from the survey.

Data Presentation

In this research, the data is presented in tables and inferential statistics.

Research Questions

- i. How is mental behavior affected by contact with cellphones in toddlers?
- ii. How does cell phone media exposure affect verbal behavior in toddlers?
- iii. How psychologically is the behavior of toddlers affected by exposure to cell phones?
- iv. How toddler's emotions are affected by the extensive use of cell phones?
- v. How does over-exposure to mobile screen time affect toddlers' physical activity?

Research Hypothesis

- i. Exposure to cell phone media is more likely to raise mental health problems in toddlers.
- ii. It is more likely that exposure to cell phone media refrains the verbal development of toddlers.
- iii. Exposure to cell phone media is more likely to impact toddlers' psychological behavior.
- iv. It is more likely that exposure to cell phone media affects the emotional behavior of toddlers.
- v. It is more likely that exposure to cell phone media affects the physical development of toddlers.

Methodology

This study conducts a quantitative approach to gather numerical data. It applies statistical and content analysis to learn the behavioral changes in toddlers when exposed to cell phone media.

Theoretical Framework

This study uses social learning theory, which highlights the importance of observing, modeling, and then imitating the behaviors, attitudes, and emotional reactions of others.

It tells that behavior is learned from the environment through observational learning (McLeod, 2011). We applied this theory to observe that children pay attention to people/characters in the surroundings where they spend most of their time and encode their behavior. At a later time, they may imitate the behavior they have observed.

Results

We divided our questionnaire into six sections, and each section contained five questions, leading to a total of 30 questions. Because each participant responded to every question asked, we got to have 700 responses against each section of the questionnaire and hence a total of 4200 answers. In each table, 700 responses are represented where 'f' means frequency and '%' means percentage to check null hypotheses.

Table 1 shows the number of respondents and the essential information needed to participate in this research. There were 140 respondents who provided information about 67 girls and 73 boys aged 1-3 years. We also collected information about the marital status of the parents. We found out that 95% of toddlers live in a healthy environment with both parents to spend time with.

Table 1: Basic Information of Participants

Marital Status		Age of Toddler							
		12-18 m		18-24 m		24-30 m		30-36 m	
	Widowed/ Divorced	Girl	Boy	Girl	Boy	Girl	Boy	Girl	Boy
133	7	13	15	24	17	15	18	15	23

Table 2 shows the 700 responses collected by covering different aspects of cellphone media usage in toddlers, which may be in the form of watching cartoons, any social media kids channels, online gaming, video-calling, and religious video exposure. We provided six options to be chosen on the survey, which says never used phone, very rarely means 15-20 minutes use per day, rarely means 1-2 hours per day, occasionally means 2-4 hours per day, frequently means 4 to 6 hours, and very frequently means more than 6 hours per day. It is observed that 34.1% of toddlers very frequently use cell phone media, and only 2.85% have never used it in their daily routines.

Table 2: The toddler's exposure to cell phone media

	Never			Very Rarely Rarely				Occasionally		Frequently		Very Frequently	
	N	f	%	F	%	f	%	f	%	f	%	f	%
Girl	310	11	3.54	22	7.09	36	11.6	49	15.8	82	26.4	110	35.4
Boy	390	9	2.30	32	8.20	51	13.07	73	18.7	96	24.6	129	33.0
Total	700	20	2.85	54	7.71	87	12.4	122	17.4	178	25.4	239	34.1

Table 3 covers the response of parents regarding the changes in mental health of their toddlers, where we asked 5 questions against 5 responses strongly disagree, disagree, neutral, agree, and disagree. We observed that 24.6% strongly agree to the changes in the mental health of their toddlers, and 16.4% agree to this.

Table 3: The toddler exhibited changes in mental behavior

	Strongly Disagree			Disagree		Neutral		Agree		Strongly Agree	
	N	f	%	f	%	f	%	F	%	f	%
Girl	310	74	23.8	55	17.7	48	15.4	51	16.4	82	26.4
Boy	390	99	25.3	69	17.6	62	15.8	64	16.4	96	24.6
Total	700	173	24.7	124	17.7	110	15.7	115	16.4	178	25.4

Table 4 covers parents' responses regarding the changes in the verbal health of their toddlers, where we asked five questions against five responses: strongly disagree, disagree, neutral, agree, and disagree. We observed that 32.2% strongly agree with the changes in the mental health of their toddlers, and 25.8% agree with this.

Table 4: The toddler exhibited changes in verbal behavior

	StronglyDisagree			Disagree		Neutral		Agree		Strongly Agree	
	N	f	%	f	%	f	%	F	%	f	%
Girl	310	11	3.54	31	10.0	74	17.2	81	29.6	113	39.3
Boy	390	27	4.35	50	11.7	100	18.7	100	30.5	113	34.6
Total	700	38	5.4	77	11.0	127	18.1	181	25.8	226	32.2

Table 5 covers parents' responses regarding the changes in the psychological health of their toddlers; we asked five questions against five responses: strongly disagree, disagree, neutral, agree, and disagree. We observed that 34.1% strongly agree with the changes in the mental health of their toddlers, and 24.4% agree with this.

Table 5: The toddler exhibited changes in psychological behavior

	StronglyDisagree			Disagree		Neutral		Agree		Strongly Agree	
	N	f	%	f	%	f	%	F	%	f	%
Girl	310	33	10.6	36	11.6	54	17.4	79	25.4	108	34.8
Boy	390	50	12.8	49	12.5	68	17.4	92	23.5	131	33.5
Total	700	83	11.8	85	12.1	122	17.4	171	24.4	239	34.1

Table 6 covers parents' responses regarding the changes in the emotional health of their toddlers; we asked five questions against five responses: strongly disagree, disagree, neutral, agree, and disagree. We observed that 23.2% strongly agree with the changes in the mental health of their toddlers, and 27.0% agree with this.

Table 6: The toddler exhibited changes in emotional behavior

	StronglyDisagree			Disagree		Neutral		Agree		Strongly Agree	
	N	f	%	F	%	f	%	F	%	f	%
Girl	310	60	19.3	50	16.1	41	13.2	83	26.7	76	24.5
Boy	390	91	23.3	55	14.1	51	13.0	106	27.1	87	22.3
Total	700	151	21.5	105	15.0	92	13.1	189	27.0	163	23.2

Table 7 covers parents' responses regarding the changes in the physical health of their toddlers, where we asked five questions against five responses: strongly disagree, disagree, neutral, agree, and disagree. We observed that 24.7% strongly agree with the changes in the mental health of their toddlers, and 25.5% agree with this.

Table 7: The toddler exhibited changes in physical behavior

	StronglyDisagree			Disagree		Neutral		Agree		Strongly Agree	
	N	f	%	F	%	f	%	F	%	f	%
Girl	310	61	19.6	42	13.5	37	11.9	77	24.8	93	30.0
Boy	390	90	23.0	58	14.8	60	15.3	102	26.1	80	20.5
Total	700	151	21.5	100	14.2	97	13.8	179	25.5	173	24.7

Descriptive Statistics

N shows the total number of participants, std—standard deviation, min, and max show minimum and maximum ranges, respectively. The significance level tells internal consistency between

respondents. It exhibits the similarities and differences between the responses of all participants.

Table 8: Ranges of different scales for five possible behavioral changes

Scales	N	Range	Min	Max	Mean (μ)	Std. (σ)	Significance level
Cell phone media exposure	140	22	7	29	26.61	8.53	0.925
Effect on Mental behavior	140	19	4	23	17.84	4.80	0.895
Effect on Verbal behavior	140	20	5	25	22.07	6.86	0.906
Effect on Psychological behavior	140	17	8	25	19.44	4.38	0.768
Effect on Emotional behavior	140	18	6	24	22.07	4.55	0.842
Effect on Physical behavior	140	20	5	25	18.73	7.45	0.771

Correlations

Pearson's correlation factor tells the relationship between two independent variables. We obtained a coefficient between all six variables and see that the proposed research hypothesis is highly relatable. Table 9 shows that cell phone media exposure is correlated to mental, verbal, emotional, physical, and psychological health with a correlation factor of 0.54, 0.78, 0.78, 0.66, and 0.84, respectively. It is also shown that emotional and psychological health changes mainly affect physical behavior, with a positive correlation of 0.88 and 0.86.

Table 9: Pearson's Correlation between five scales for different behavioral changes

Scales	Cellphone Exposure	Mental Behavior	Verbal Behavior	Psychological Behavior	Emotional Behavior	Physical Behavior
Cellphone Exposure	1	0.541	0.784	0.846	0.785	0.662
Mental Behavior	0.541	1	0.819	0.853	0.773	0.849
Verbal Behavior	0.784	0.819	1	0.805	0.823	0.811
Psychological Behavior	0.846	0.853	0.805	1	0.794	0.864
Emotional Behavior	0.785	0.773	0.823	0.794	1	0.882
Physical Behavior	0.662	0.849	0.811	0.864	0.882	1

Correlation is significant at the 0.01 level (2-tailed).

Z-test

Z-test works assuming data is usually distributed, and data points are independent and have equal opportunity to get selected. This test provides the probability of occurrence of an event with some confidence level α when compared with a null hypothesis. In this research work, we have used this test to observe the truthfulness of our proposed hypotheses statistically and conclude that excessive exposure to cell phone media in toddlers (either a girl or a boy) affects mental, verbal, psychological, emotional, and physical behaviors. The formula to calculate z-score is given by:

$$\frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\frac{\hat{p}_2(1-\hat{p}_2)}{n_1+n_2}}}$$

Where \hat{p}_2 is the observed probability of scales (Agree, Strongly Agree) of each five is behavioral changes, and $\hat{p}_1 = \frac{178+239}{700} = 0.595$ is the probability of population having cell phone media exposure (Frequently, Very Frequently), and n is the number of participants.

Results

Hypothesis-1 testing

For hypothesis-1 that exposure to cell phone media raises mental health problems in toddlers, we have 115 Agree and 178 Strongly-Agree responses.

Level of significance: $\alpha = 0.05$

$\hat{p}_2 = 0.418$, $\hat{p}_1 = 0.595$, $n = 140$

Sample Evidence: z-score= 6.004,

P-Value= 0.0000

The p-value is less than 0.05 so we accept our research hypothesis-1.

Hypothesis-2 testing

For hypothesis-2 that exposure to cell phone media refrains the verbal development of toddlers, we have 181 Agree and 226 Strongly-Agree responses.

Level of significance: $\alpha = 0.05$

$\hat{p}_2 = 0.581$,

$\hat{p}_1 = 0.595$, $n = 140$

Sample Evidence: z-score= 0.482,

P-Value= 0.0000

The p-value is less than 0.05 so we accept our research hypothesis-2.

Hypothesis-3 testing

For hypothesis-3 that exposure to cell phone media impacts psychological behavior of toddlers, we have 171 Agree and 239 Strongly-Agree responses.

Level of significance: $\alpha = 0.05$

$\hat{p}_2 = 0.585$,

$\hat{p}_1 = 0.595$, $n = 140$

Sample Evidence: z-score= 0.344,

P-Value= 0.0000

The p-value is less than 0.05 so we accept our research hypothesis.

Hypothesis-4 testing

For hypothesis-4 that exposure to cell phone media effects emotional behavior of toddlers, we have 189 Agree and 163 Strongly-Agree responses.

Level of significance: $\alpha = 0.05$

$\hat{p}_2 = 0.502$,

$\hat{p}_1 = 0.595$, $n = 140$

Sample Evidence: z-score= 3.20,

P-Value= 0.0000

The p-value is less than 0.05 so we accept our research hypothesis-4.

Hypothesis-5 testing

For hypothesis-5 that exposure to cell phone media effects physical behavior of toddlers, we have 179 Agree and 173 Strongly-Agree responses.

Level of significance: $\alpha = 0.05$

$\hat{p}_2 = 0.502$,

$\hat{p}_1 = 0.595$, $n = 140$

Sample Evidence: z-score= 3.20,
P-Value= 0.0000

The p-value is less than 0.05 so we accept our research hypothesis-5.

From the z-test of our research work, we can see that exposure to cell phone media dramatically influences toddlers' mental, verbal, psychological, emotional, and physical behavior. This research agrees with the truthfulness of null hypotheses H1 to H5 with a significance level of 0.01 and concludes that long-term exposure to cell phones affects toddlers' behavior. Overall, 25.4% of parents strongly agree, and 16.4% agree that exposure to cell phone media causes mental behavioral changes that align with H1. Also, 32.2% of parent strongly agree, and 25.8% of parent agree that exposure to cell phone media causes verbal behavioral changes, which help us prove H2. 34.1% of parents strongly agree, and 24.4% agree that exposure to cell phone media causes psychological and behavioral changes, which tells the truthfulness of H3. 23.2% of parents strongly agree, and 27% of parents agree that exposure to cell phone media causes emotional and behavioral changes, which aligns with H4. Moreover, 24.7% of parents strongly agree, and 25.5% agree that exposure to cell phone media causes physical behavioral changes, supporting H5.

Conclusion

Our research concludes that excessive exposure to cell phone media is the main reason for mental, physical, emotional, verbal, and psychological changes in behavior in toddlers. Toddlers should be using mobile screens for not more than 30 minutes a day, as suggested by WHO, and should be engaged in physical activities for better cognition. Parents' responses align with the proposed hypothesis and help us to conclude that parents should be adequate.

References

- Alavi, S. S., Ferdosi, M., Jannatifard, F., Eslami, M., Alaghemandan, H., & Setare, M. (2012). Behavioral addiction versus substance addiction: Correspondence of psychiatric and psychological views. *International journal of preventive medicine* 3(4), 290.
- Bernritter, S. F., Okazaki, S., & West, D. (2022). Mobile Technology and Advertising: Moving the Research Agenda Forward. *Journal of Advertising*. 51(4). 407-410.
- Boyd, D. (2008). *Why youth (heart) social network sites: The role of networked publics in teenage social life. Youth, identity and digital media. Edited by David Buckingham, The John D. and Catherine T. MacArthur Foundation Series on Digital Media and Learning.* The MIT Press, Cambridge, MA, 2007-16.
- Cha, S. S., & Seo, B. K. (2018). Smartphone use and smartphone addiction in middle school students in Korea: Prevalence, social networking service, and game use. *Health psychology open* 5(1).
- Chau, C. (2010). YouTube as a participatory culture. *New directions for youth development* 128, 65–74.
- Divan, H. A., Kheifets, L., Obel, C., & Olsen, J. (2008). Prenatal and postnatal exposure to cell phone use and behavioral problems in children. *Epidemiology*, 523-529.
- Grimes, J. (1996). On the failure to detect changes in scenes across saccades. *Perception* 5, 89–110.
- Hardell, L. (2018). Effects of mobile phones on children's and adolescents' health: A commentary. *Child Development* 89(1), 137–140.

- Kılıç, A. O., Sari, E., Yucel, H., Oğuz, M. M., Polat, E., Acoglu, E. A., & Senel, S. (2019). Exposure to and use of mobile devices in children aged 1–60 months. *European journal of pediatrics* 178(2), 221-227.
- Lissak, G. (2018). Adverse physiological and psychological effects of screen time on children and adolescents: Literature review and case study. *Environmental Research* 164, 49–157.
- Matar Boumosleh, J., & Jaalouk, D. (2017). Depression, anxiety, and smartphone addiction in university students-A cross-sectional study. *Plos One*. 12(8).
- McLeod, S. (2011). *Albert Bandura's social learning theory*. Simply Psychology.
- Sadetzki, S., Langer, C. E., Bruchim, R., Kundi, M., Merletti, F., Vermeulen, R., & Cardis, E. (2014). The MOBI-Kids study protocol: challenges in assessing childhood and adolescent exposure to electromagnetic fields from wireless telecommunication technologies and possible association with brain tumor risk. *Frontiers in public health* 2: 124.
- Shoukat, S. (2019). *Cell phone addiction and psychological and physiological health in adolescents*. *EXCLI journal* 18, 47.
- Tandon, A., Kaur, P., Dhir, A., & Mäntymäki, M. (2020). Sleepless due to social media? Investigating problematic sleep due to social media and social media sleep hygiene. *Computers in human behavior*. 113.