Problematic TikTok Use and Its Association with Poor Sleep: A Cross-Sectional Study Among Greek Young Adults

Aglaia Katsiroumpa *, Ioannis Moisoglou, Parisis Gallos, Zoe Katsiroumpa, Olympia Konstantakopoulou, Maria Tsiachri, Petros Galanis

Posted Date: 24 December 2024

doi: 10.20944/preprints202412.2088.v1

Keywords: TikTok; TikTok Addiction Scale; problematic use; young adults; poor sleep

 doi:10.20944/preprints202412.2088.v1

Article

Problematic TikTok Use and Its Association with Poor Sleep: A Cross-Sectional Study Among Greek Young Adults

Aglaia Katsiroumpa [1,*], Ioannis Moisoglou [2], Parisis Gallos [3], Zoe Katsiroumpa [1], Olympia Konstantakopoulou [1], Maria Tsiachri [1] and Petros Galanis [1]

[1] Clinical Epidemiology Laboratory, Faculty of Nursing, National and Kapodistrian University of Athens, 11527 Athens, Greece
[2] Faculty of Nursing, University of Thessaly, 41110 Larissa, Greece
[3] Faculty of Nursing, University of West Attica, 12243 West Attica, Greece
* Correspondence: aglaiakat@nurs.uoa.gr

Abstract: Background: TikTok use is constantly increasing, especially among young adults. Although there is a negative association between problematic TikTok use and users' health, no study until recently has investigated the association between TikTok use and poor sleep. Thus, our aim was to evaluate TikTok use among young adults and its association with poor sleep. **Methods:** We conducted a cross-sectional study in Greece. Our sample included 361 adults aged 18-35 years old. We employed a convenience sample through social media. We used the TikTok Addiction Scale (TTAS) to measure levels of TikTok use among our participants. **Results:** Mean time of TikTok use was 2.4 hours (SD; 1.6), while mean TTAS score was 2.3 (SD; 0.7). The 11.6% of the participants are problematic TikTok users. We found a negative correlation between the duration of night sleep and levels of TikTok addiction. Also, we found a positive correlation between sleepiness in work/class and levels of TikTok addiction. Furthermore, younger ages were correlated to increased levels of TikTok addiction and time on TikTok. Levels of TikTok addiction were higher among females. **Conclusions:** We found that higher levels of TikTok addiction and TikTok use were correlated with reduced duration of night sleep, and increased sleepiness in work/class.

Keywords: TikTok; TikTok Addiction Scale; problematic use; young adults; poor sleep

1. Introduction

Social media are constantly becoming more and more addictive. The new, advanced algorithms of extreme accuracy concerning the preferences of users have led to the ultimate intrusion of social media in our daily life and especially in young people' s routine [1,2]. Within the last years, social media have reached every corner of the world, spanning from entertainment to business, marketing and politic purposes, with an estimated number of five billion registered users worldwide. Hierarchically, in numbers, first comes China, followed by India, USA and lastly Europe with approximately 680 million European users [3].

It seems that among all available applications and platforms, TikTok is the most famous and preferable application among young people, especially among generation Z, with 35% of its users being between 16 and 24 years old. Furthermore, the total number of 1.5 billion users per month, declares TikTok matchless, outstanding from all other social media and establishing it as the ultimate application for the new generations [3]. These numbers can be explained in the context of addiction as followed: the recognition that the users obtain via followers stimulates their dopaminergic system; this system is responsible for pleasure because of the reward mechanism which leads to addictive behaviors and the intense need to repeat these actions that provoke the pleasure on the first place [4,5].

Generally, concerning TikTok, individuals can create videos for up to 60 seconds, or just consume by attending others' videos. The application was launched back in 2016, and it has been

 doi:10.20944/preprints202412.2088.v1

reported that active users are approximately 1.08 billion internationally. Furthermore, it is reported that 90% of the total registered users are daily visiting the platform of TikTok. The average time spent daily is estimated to be 52 minutes [6,7].

Although most of the reasons that individuals keep using TikTok are harmless, such as filling spare time or see what is being talked about, it is a matter of concern what kind of results the prolonged and daily use of TikTok brings upon the users, since the time spent varies from 52 to 150 minutes or even more [3,8]. It is indicated that time reduction, even just a week's break, or total abstention from social media (including TikTok) can improve the well-being, depression and anxiety of individuals [9].

It is also suggested that the prolonged use of TikTok is associated, both indirectly and directly, with body dissatisfaction and damaged body image, especially among women, leading to mental issues such as stress, depression and bad self-esteem [10–13]. Another finding in literature which supports the above, declares that even body positive videos on TikTok are failing to serve their purpose, promoting ideal, unrealistic body standards and leading to major mental issues [14,15]. It is crucial that since the majority of TikTok consumers refers to the vulnerable age of youth, adverse effects on youth mental health and wellbeing may arise and things might get complicated concerning issues of poor mental health, self-esteem, depression and insecurity [9,16].

Yao et al. found that the exceeded use of TikTok increased the levels of social anxiety and distress [17]. Furthermore, it is supported that the short video flow enhances the addiction and indirectly reduces the learning motivation and the well-being of users [18]. In addition, problematic TikTok use is characterized by concentration and time distortion, which means that the users are absorbed in the on-line world and suggests the distraction of individuals form the real, off-line world [19]. According to another study, the systematic use of TikTok on a weekly base brings negative effects to the individuals leading to hazardous alcohol consumption and tendency to gambling [20]. Users of medium or high levels of TikTok use have more possibilities to develop addictive behaviors and mental problems [21].

According to the study of Chao et al. between a non-addicted and an addicted sample to TikTok, results showed worse mental health to the addicted sample. In addition, this sample was related to an outrageous number of issues such as mental issues (e.g. depression, anxiety, stress, loneliness) and social difficulties (e.g. social anxiety, attention problems, lower life satisfaction). Furthermore, addicted users faced more stress and poorer performance in their academic life, more bullying and victimization. Lastly, it was found that this sample had experienced worse parental relationships, negative parenting styles and lower parental education levels in contrast with the non-addicted sample. Lastly, the individuals of addictive behavior to TikTok seemed to experience poor sleep quality [22].

It is supported by literature that sleep is a predictor for a number of different diseases and disturbances. For example, according to a meta-analysis, sleep disturbances can increase the risk of dementia, Alzheimer and vascular dementia in individuals [23]. It is also supported that there is a bidirectional relationship between sleep disorders and migraine [24]. Additionally, literature supports that a variety of sleep disorders (such as narcolepsy, central sleep apnea, obstructive sleep apnea, and insomnia) result to different cardiovascular outcomes (such as increased risks of illnesses like acute coronary syndrome, hypertension, cardiovascular mortality, and coronary artery calcification) [25].

It is also underlined that the prolonged use of screens which produce blue light (such as mobile phones, tablets, computers etc.) is responsible for several sleep disorders such as insomnia, disoriented circadian cycle, sleeplessness [26,27]. This finding is also supported by a systematic review which found a negative association between screen time especially during the night time and sleep quality [28].

Since TikTok users invest so much of their time in front of a screen, it is a matter of concern what the quality of their sleep is. According to Al-Garni et al., 34.7% of their sample was poor sleepers. It was also found that the excessive use social media among students, especially TikTok use, was a significant predictor of poor sleep [29,30]. Zhang et al. found that the 86.1% of the sample delayed its nighttime sleep for TikTok and was experiencing a poor sleep quality because of the expanded use of TikTok, instead of getting rest and sleep [31].

 doi:10.20944/preprints202412.2088.v1

A meta-analysis suggests that problematic TikTok use is responsible for negative impact on sleep quality [32]. On the other hand, physical activity is a protective factor against bedtime delay and poor sleep [31,33–35]. Yet, it is found that physical activity is usually eliminated among TikTok users leading to increased sleep disorders [31,34,36].

According to a systematic review there is a significant association between excessive social media use (including TikTok) with poor sleep quality. In addition, it was found that the frequent use of social media was proven as a risk factor for poor sleep [37]. In accordance with another systematic review for individuals between 16-25 years old the use of social media was found associated to shorter sleep duration and poorer quality in sleep. This systematic review investigated the relationship between social media and several sleep outcomes in the context of delayed bedtime or problems falling asleep, sleep duration (early awakening or sleep disturbance), daytime tiredness and function, sleep deficits and sleep quality [38].

In this context, we performed a study to evaluate TikTok use among young adults in Greece and its relationship with poor sleep. To the best of our knowledge this is the first study that examines the association between TikTok use and poor sleep. Moreover, our study measured levels of TikTok use for first time among users in Greece.

2. Materials and Methods

2.1. Study Design and Participants

We conducted a cross-sectional study in Greece. Our sample included 361 adults aged 18-35 years old. We employed a convenience sample through social media, i.e., TikTok, Instagram and Facebook. We created an online version of the study questionnaire using Google forms, and then we disseminated it through social media. Data collection was performed during July 2024. All adults aged 18-35 years old that understand the Greek language could participate in our study. Also, our participants should have a TikTok profile to participate in our study. We excluded participants without a TikTok profile and those aged over 35 years old. We applied the Reporting of Observational Studies in Epidemiology (STROBE) [39]. We used G*Power v.3.1.9.2 to calculate our sample size. Considering a small effect size between TikTok use and poor sleep (correlation coefficient = 0.2), a confidence level of 95%, and a margin error of 5%, sample size was estimated at 314 participants.

2.2. Measurements

We measured gender, age, and the time that the participants spend on TikTok. Moreover, we measured poor sleep with two questions. First, we asked participants to answer the number of hours that usually sleep when they have to go to their work/class the next day. Then, we asked participants how sleepy they felt at work/class. Answers were on a five-point Likert scale; not at all (1), a little (2), moderate (3), a lot (4), very much (5).

We used the TikTok Addiction Scale (TTAS) to measure levels of TikTok use among our participants [40]. The TTAS measures attitudes of TikTok users during the last 12 months. In particular, the TTAS comprises 15 items such as “I think about how I could reduce my work/study to spend more time on TikTok”, “I have had difficulties closing TikTok”, and “I use TikTok so much that it has had a negative impact on my work/study”. The TTAS includes six factors: salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse. All answers are on a five-point Likert scale from 1 (very rarely) to 5 (very often). Total score on the TTAS and the six factors range from 1 to 5. Higher scores indicate higher levels of TikTok addiction. Developers of the TTAS suggested a cut-off point of 3.23 to distinguish TikTok users [41]. Thus, TTAS score ≥ 3.23 indicates a problematic TikTok user, while score < 3.23 indicates healthy users. In our study, Cronbach’s alpha for the TTAS was 0.90, while Cronbach’s alpha for the six factors was higher than 0.60.

2.3. Ethical Issues

We did not collect personal data of the participants. We informed participants about the aim and the design of our study. We asked participants if they agree to participate in our study, and, thus, we

 doi:10.20944/preprints202412.2088.v1

obtained their informed consent. The Ethics Committee of the Faculty of Nursing, National and Kapodistrian University of Athens (approval number; 510, June 2024) approved our study protocol. Additionally, we applied the guidelines of the Declaration of Helsinki to conduct our study [42].

2.4. Statistical Analysis

We present categorical variables with numbers and percentages. Also, we present continuous variables with mean, standard deviation, median and range. We used the Spearman correlation coefficient to estimate the correlation between the TTAS and poor sleep. Also, we used the Pearson correlation coefficient to estimate the correlation between the TTAS and age. We used the independent samples t-test to identify differences between genders according to the TTAS, and time of TikTok use. Moreover, we used chi-square to compare categorical variables. P-values less than 0.05 were considered statistically significant. We used the IBM SPSS 21.0 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.) for the analysis.

3. Results

3.1. Demographics

In our sample, 83.1% (n=300) were females and 16.9% (n=61) were males. Mean age was 23.3 years (standard deviation; 4), while median age was 22 years (range; 17).

The mean duration of night sleep was 6.4 hours (standard deviation; 1). In our sample, 3.9% (n=14) reported that they do not feel sleepy at work/class, 29.9% (n=108) reported that they feel a little sleepy, 37.1% (n=134) reported that they feel moderately sleepy, 26.3% (n=95) reported that they feel quite sleepy, and 2.8% (n=10) reported that they feel very sleepy.

3.2. TikTok Use

Mean time of TikTok use was 2.4 hours (standard deviation; 1.6), while median time was 2 hours (range; 7.9). Mean TTAS score was 2.3 (standard deviation; 0.7), while median was 2.3 (range; 3). Descriptive statistics for the TTAS are shown in Table 1. Mean score for the factors "mood modification" and "tolerance" was the highest, followed by the factors "conflict" and "salience". The lowest mean score was for the factors "relapse" and "withdrawal symptoms".

In our sample, 11.6% (n=42) of the participants had a mean TTAS score ≥ 3.23 indicating problematic TikTok users, while 88.4% had a mean TTAS score < 3.23 indicating healthy users.

Table 1. Descriptive statistics for the TikTok Addiction Scale.

Factor	Mean	Standard deviation	Median	Range
TikTok Addiction Scale	2.3	0.7	2.3	3
Salience	1.8	0.8	1.5	3.5
Mood modification	3.4	0.9	3.5	4
Tolerance	3.0	1.0	3.0	4
Withdrawal symptoms	1.3	0.6	1	2
Conflict	2.3	1.0	2.3	4
Relapse	1.7	0.9	1	4

3.3. Associations Between Study Variables

Correlations between the TTAS, time of TikTok use, age, duration of night sleep, and sleepiness in work/class are shown in Table 2. We found a negative correlation between the duration of night sleep and levels of TikTok addiction. In particular, we found a negative correlation between duration of night sleep and scores on TTAS ($r = -0.14$, p-value < 0.01), "salience" factor ($r = -0.15$, p-value < 0.01), and "conflict" factor ($r = -0.19$, p-value < 0.01). Also, we found a positive correlation between sleepiness in work/class and levels of TikTok addiction. There was a positive correlation between sleepiness in work/class and scores on TTAS ($r = 0.29$, p-value < 0.01), "salience" factor ($r = 0.12$, p-

 doi:10.20944/preprints202412.2088.v1

value < 0.05), "mood modification" factor (r = 0.31, p-value < 0.01), "tolerance" factor (r = 0.28, p-value < 0.01), and "conflict" factor (r = 0.28, p-value < 0.01).

We found that younger ages were correlated with increased levels of TikTok addiction and time of TikTok use. We noticed this negative relationship between age and scores on TTAS (r = -0.28, p-value < 0.01), "salience" factor (r = -0.21, p-value < 0.01), "mood modification" factor (r = -0.31, p-value < 0.01), "withdrawal symptoms" factor (r = -0.16, p-value < 0.01), "conflict" factor (r = 0.28, p-value < 0.01), and "relapse" factor (r = -0.15, p-value < 0.01).

Table 2. Correlations between the TikTok Addiction Scale, time of TikTok use, age, duration of night sleep, and sleepiness in work/class.

Variable	Duration of night sleep	Sleepiness in work/class	Age
TikTok Addiction Scale	-0.14**	0.29**	-0.28**
Salience	-0.15**	0.12*	-0.21**
Mood modification	-0.06	0.31**	-0.31**
Tolerance	-0.07	0.28**	-0.10
Withdrawal symptoms	0.01	0.05	-0.16**
Conflict	-0.19**	0.28**	-0.31**
Relapse	0.01	0.09	-0.15**
Time of TikTok use	-0.01	0.07	-0.24**

* p-value < 0.05. ** p-value < 0.01.

Table 3 shows the association between gender, TTAS and time of TikTok use. Levels of TikTok addiction were higher among females rather than males. In particular, females showed higher mean scores than males regarding TTAS (2.4 vs. 2.1, p-value = 0.01), "salience" factor (1.9 vs. 1.6, p-value = 0.01), "mood modification" factor (3.5 vs. 3.2, p-value = 0.02) and "withdrawal symptoms" factor (1.4 vs. 1.2, p-value = 0.03). Also, mean time of TikTok use was higher among females rather than males (2.5 vs. 2.1, p-value = 0.03).

Thirteen percent (n=39) of females were problematic TikTok users, while the respective percentage for males was 4.9% (n=3) (p-value = 0.07).

Table 3. Association between gender, TikTok Addiction Scale and time of TikTok use.

Variable	Males		Females		P-value[a]
	Mean	Standard deviation	Mean	Standard deviation	
TikTok Addiction Scale	2.1	0.6	2.4	0.7	0.01
Salience	1.6	0.6	1.9	0.8	0.01
Mood modification	3.2	0.8	3.5	0.9	0.02
Tolerance	2.8	1.1	3.1	1.0	0.13
Withdrawal symptoms	1.2	0.4	1.4	0.6	0.03
Conflict	2.1	0.9	2.4	1.0	0.05
Relapse	1.5	0.8	1.8	0.9	0.07
Time of TikTok use	2.1	1.3	2.5	1.7	0.03

[a] independent samples t-test.

4. Discussion

TikTok seems to emerge among all other social media and affects new generations' lives. This urged us to study whether the problematic TikTok use can involve in sleep's quality among young people. This cross-sectional study was conducted in Greece, during the July of 2024. We formed a convenience sample of 361 adults aged 18-35 years old. We collected our data through social media, i.e., TikTok, Instagram and Facebook by creating an online version of the study questionnaire using Google forms.

Since our study was the first to examine the association between TikTok use and poor sleep, we aim to enlighten research on this field. Therefore, as there are few similar studies in the literature,

 doi:10.20944/preprints202412.2088.v1

our findings will be discussed and interpreted according to studies which investigated the relationship between social media problematic use and sleep quality too.

Concerning the nighttime sleep duration, our results suggest that the mean time was 6.4 hours. Furthermore, 37.1% of our sample stated that it feels moderate sleepy while 23.3% feels quite sleepy and 2.8% reported that it feels very sleepy. These numbers come across other studies which also support that the social media use on a daily basis brings sleep disturbances such as inadequate sleep in terms of sleep quality and quantity, resulting to daytime sleepiness [32,37,43–45]. This result is the outcome of the following combination of events: first of all, TikTok and social media users are bound to expose themselves to blue light screens which are responsible for sleeplessness and sleep disturbances [26–28]. Secondly, the addictive influence of TikTok and social media works in favor of sleeplessness [46]. Lastly, the time that the users devote to social media reduces or even excludes them from other activities such as physical activity which work beneficially for the sleep procedure [31,33–35].

The mean time of TikTok use was 2.4 hours in our sample, while the highest scores per factor are attributed to "mood modification" and "tolerance" followed by the factors "conflict" and "salience". The lowest mean score was for the factors "relapse" and "withdrawal symptoms". The time spent in TikTok in our study agrees with the results from other sources, as the Statista and the study of Al-Garni et al. where the time that accounted for all platforms (Youtube, Facebook, TikTok, Instagram e.t.c.) were 5 hours. So our result (2.4 hours) is between this range of time [3,29].

According to our findings, 11.6% of our participants exceeded the cutoff point of the TikTok Addiction Scale (TTAS). This means that 11.6% of our sample belonged to the high-risk group for TikTok addiction. This result can be explained by the physiological pathway that the TikTok uses leading to addiction. It is known that TikTok stimulates the dopaminergic reward system which is responsible for addictive outcomes [46]. Also, our finding comes across to other studies concerning short-video addiction and social media addiction, where the 34.2% and 14% of the sample respectively, was found addicted to social media and TikTok [22,47].

Concerning our study variables, we found that the higher the levels of TikTok addiction were, the poorer the night sleep. This outcome has been certified by other results from similar studies and systematic reviews concerning social media and sleep quality. According to these studies, social media and TikTok use bring less sleep at nighttime and sleep disturbances [29,30,38,44,48]. In addition, our study results suggest a positive correlation between sleepiness in work/class and levels of TikTok addiction. Daytime dysfunction is an outcome found in other studies too [38,49]. Also, in our study, we found positive correlation between sleepiness in work/class and scores on TTAS, "salience" factor, "mood modification" factor, "tolerance" factor, and "conflict" factor. It has also been related in other studies and systematic reviews that poor sleep quality and sleepiness at daytime lead to anxiety, stress while social media and TikTok where found responsible for behavioral problems and reduced concentration [30,44,47].

Lastly, our results suggested that younger ages and females were correlated to increased TikTok addiction. These results can be explained in the context that younger people belong to more vulnerable groups and use TikTok more than the older generations [2,3,46]. On the other hand, social media are addressing major part of their context to women (for example image, beauty products e.t.c.) leading to higher addiction for females [13–15,50].

Our study had several limitations. Since we used a convenience sample of young adults through a web-based survey we cannot generalize our results. Therefore, selection bias is probable in our study. Further studies with random and stratified samples could add significant information in this field. Also, we performed a cross-sectional study, and, thus, we cannot infer causal relationships between TikTok use and poor sleep. Our study provided evidence for the association between study variables but further research should be conducted on this field to get more valid results. Although we used a valid tool to measure levels of TikTok addiction (i.e., the TikTok Addiction Scale), since the tool is a self-reported questionnaire self-reported bias is probable in our study. Further studies using valid tools in different countries, samples and settings could further confirm our results.

 doi:10.20944/preprints202412.2088.v1

Finally, we assessed poor sleep through two single items. Future research may improve this measurement by using valid tools to measure sleep quality such as the Pittsburgh Sleep Quality Index.

5. Conclusions

We found that a significant percentage of our participants may suffer from problematic TikTok use, and, thus, further examination should be done for those. Applying valid tools such as the TikTok Addiction Scale to identify high-risk TikTok users is essential for timely interventions to reduce negative consequences of TikTok addiction. Moreover, our findings showed that higher levels of TikTok use were correlated with reduced duration of night sleep, and increased sleepiness in work/class. Since literature on the association between TikTok use and poor sleep is limited further studies should be conducted to further validate our findings.

Author Contributions: Conceptualization, A.K. and P.G. (Petros Galanis); methodology, A.K., I.M. and P.G. (Petros Galanis); software, P.G. (Parisis Gallos), O.K. and P.G. (Petros Galanis); validation, P.G. (Parisis Gallos), Z.K., O.K., M.T.; formal analysis, P.G. (Parisis Gallos), O.K. and P.G. (Petros Galanis); investigation, A.K., I.M., Z.K. and M.T.; resources, A.K. I.M., Z.K. and M.T.; data curation, I.M., P.G. (Parisis Gallos), Z.K. and M.T.; writing—original draft preparation, A.K. I.M., P.G. (Parisis Gallos), Z.K., O.K., M.T., and P.G. (Petros Galanis); writing—review and editing, A.K. I.M., P.G. (Parisis Gallos), Z.K., O.K., M.T., and P.G. (Petros Galanis); visualization, A.K. and P.G. (Petros Galanis); supervision, P.G.; project administration, A.K. and P.G. (Petros Galanis). All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of the Faculty of Nursing, National and Kapodistrian University of Athens (approval number; 510, June 2024).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Our data are available on Figshare repository. doi.10.6084/m9.figshare.28053503

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Kim, S.A. Social Media Algorithms: Why You See What You See Technology Explainers. *Geo. L. Tech. Rev.* **2017**, *2*, 147–154.
2. Swart, J. Experiencing Algorithms: How Young People Understand, Feel About, and Engage With Algorithmic News Selection on Social Media. *Social Media + Society* **2021**, *7*, 20563051211008828, doi:10.1177/20563051211008828.
3. Statista Social Media - Statistics & Facts Available online: https://www.statista.com/topics/1164/social-networks/ (accessed on 7 October 2024).
4. Koetsier, J. Digital Crack Cocaine: The Science Behind TikTok's Success Available online: https://www.forbes.com/sites/johnkoetsier/2020/01/18/digital-crack-cocaine-the-science-behind-tiktoks-success/ (accessed on 18 November 2024).
5. Montag, C.; Yang, H.; Elhai, J.D. On the Psychology of TikTok Use: A First Glimpse From Empirical Findings. *Front. Public Health* **2021**, *9*, 641673, doi:10.3389/fpubh.2021.641673.
6. Oberlo 10 TikTok Statistics You Need to Know in 2023 Available online: https://www.shopify.com/blog/tiktok-statistics (accessed on 20 October 2024).
7. Datareportal Digital 2023: Global Overview Report Available online: https://datareportal.com/reports/digital-2023-global-overview-report (accessed on 20 October 2024).
8. McCashin, D.; Murphy, C.M. Using TikTok for Public and Youth Mental Health – A Systematic Review and Content Analysis. *Clin Child Psychol Psychiatry* **2023**, *28*, 279–306, doi:10.1177/13591045221106608.

9. Lambert, J.; Barnstable, G.; Minter, E.; Cooper, J.; McEwan, D. Taking a One-Week Break from Social Media Improves Well-Being, Depression, and Anxiety: A Randomized Controlled Trial. *Cyberpsychology, Behavior, and Social Networking* **2022**, *25*, 287–293, doi:10.1089/cyber.2021.0324.
10. Bissonette Mink, D.; Szymanski, D.M. TikTok Use and Body Dissatisfaction: Examining Direct, Indirect, and Moderated Relations. *Body Image* **2022**, *43*, 205–216, doi:10.1016/j.bodyim.2022.09.006.
11. *Self-Objectification in Women: Causes, Consequences, and Counteractions.*; Calogero, R.M., Tantleff-Dunn, S., Thompson, J.K., Eds.; American Psychological Association: Washington, 2011; ISBN 978-1-4338-0798-5.
12. Ibn Auf, A.I.A.A.; Alblowi, Y.H.; Alkhaldi, R.O.; Thabet, S.A.; Alabdali, A.A.H.; Binshalhoub, F.H.; Alzahrani, K.A.S.; Alzahrani, R.A.I. Social Comparison and Body Image in Teenage Users of the TikTok App. *Cureus* **2023**, doi:10.7759/cureus.48227.
13. Neighbors, L.A.; Sobal, J. Prevalence and Magnitude of Body Weight and Shape Dissatisfaction among University Students. *Eating Behaviors* **2007**, *8*, 429–439, doi:10.1016/j.eatbeh.2007.03.003.
14. Harriger, J.A.; Wick, M.R.; Sherline, C.M.; Kunz, A.L. The Body Positivity Movement Is Not All That Positive on TikTok: A Content Analysis of Body Positive TikTok Videos. *Body Image* **2023**, *46*, 256–264, doi:10.1016/j.bodyim.2023.06.003.
15. Seekis, V.; Kennedy, R. The Impact of #beauty and #self-Compassion Tiktok Videos on Young Women's Appearance Shame and Anxiety, Self-Compassion, Mood, and Comparison Processes. *Body Image* **2023**, *45*, 117–125, doi:10.1016/j.bodyim.2023.02.006.
16. McCashin, D.; Murphy, C.M. Using TikTok for Public and Youth Mental Health – A Systematic Review and Content Analysis. *Clin Child Psychol Psychiatry* **2023**, *28*, 279–306, doi:10.1177/13591045221106608.
17. Yao, N.; Chen, J.; Huang, S.; Montag, C.; Elhai, J.D. Depression and Social Anxiety in Relation to Problematic TikTok Use Severity: The Mediating Role of Boredom Proneness and Distress Intolerance. *Computers in Human Behavior* **2023**, *145*, 107751, doi:10.1016/j.chb.2023.107751.
18. Ye, J.-H.; Wu, Y.-T.; Wu, Y.-F.; Chen, M.-Y.; Ye, J.-N. Effects of Short Video Addiction on the Motivation and Well-Being of Chinese Vocational College Students. *Front. Public Health* **2022**, *10*, 847672, doi:10.3389/fpubh.2022.847672.
19. Qin, Y.; Musetti, A.; Omar, B. Flow Experience Is a Key Factor in the Likelihood of Adolescents' Problematic TikTok Use: The Moderating Role of Active Parental Mediation. *IJERPH* **2023**, *20*, 2089, doi:10.3390/ijerph20032089.
20. Savolainen, I.; Oksanen, A. Keeping You Connected or Keeping You Addicted? Weekly Use of Social Media Platforms Is Associated with Hazardous Alcohol Use and Problem Gambling among Adults. *Alcohol and Alcoholism* **2024**, *59*, agae024, doi:10.1093/alcalc/agae024.
21. Brand, C.; Fochesatto, C.F.; Gaya, A.R.; Schuch, F.B.; López-Gil, J.F. Scrolling through Adolescence: Unveiling the Relationship of the Use of Social Networks and Its Addictive Behavior with Psychosocial Health. *Child Adolesc Psychiatry Ment Health* **2024**, *18*, 107, doi:10.1186/s13034-024-00805-0.
22. Chao, M.; Lei, J.; He, R.; Jiang, Y.; Yang, H. TikTok Use and Psychosocial Factors among Adolescents: Comparisons of Non-Users, Moderate Users, and Addictive Users. *Psychiatry Research* **2023**, *325*, 115247, doi:10.1016/j.psychres.2023.115247.
23. Shi, L.; Chen, S.-J.; Ma, M.-Y.; Bao, Y.-P.; Han, Y.; Wang, Y.-M.; Shi, J.; Vitiello, M.V.; Lu, L. Sleep Disturbances Increase the Risk of Dementia: A Systematic Review and Meta-Analysis. *Sleep Medicine Reviews* **2018**, *40*, 4–16, doi:10.1016/j.smrv.2017.06.010.
24. Tiseo, C.; Vacca, A.; Felbush, A.; Filimonova, T.; Gai, A.; Glazyrina, T.; Hubalek, I.A.; Marchenko, Y.; Overeem, L.H.; Piroso, S.; et al. Migraine and Sleep Disorders: A Systematic Review. *J Headache Pain* **2020**, *21*, 126, doi:10.1186/s10194-020-01192-5.
25. Ravichandran, R.; Gupta, L.; Singh, M.; Nag, A.; Thomas, J.; Panjiyar, B.K. The Interplay Between Sleep Disorders and Cardiovascular Diseases: A Systematic Review. *Cureus* **2023**, doi:10.7759/cureus.45898.
26. Hester, L.; Dang, D.; Barker, C.J.; Heath, M.; Mesiya, S.; Tienabeso, T.; Watson, K. Evening Wear of Blue-Blocking Glasses for Sleep and Mood Disorders: A Systematic Review. *Chronobiology International* **2021**, *38*, 1375–1383, doi:10.1080/07420528.2021.1930029.
27. Kessel, L.; Siganos, G.; Jørgensen, T.; Larsen, M. Sleep Disturbances Are Related to Decreased Transmission of Blue Light to the Retina Caused by Lens Yellowing. *Sleep* **2011**, *34*, 1215–1219, doi:10.5665/SLEEP.1242.

28. Hale, L.; Guan, S. Screen Time and Sleep among School-Aged Children and Adolescents: A Systematic Literature Review. *Sleep Medicine Reviews* **2015**, *21*, 50–58, doi:10.1016/j.smrv.2014.07.007.
29. Al-Garni, A.; Alamri, H.; Asiri, W.; Abudasser, A.; Alawashiz, A.; Badawi, F.; Alqahtani, G.; Ali Alnasser, S.; Assiri, A.; Alshahrani, K.; et al. Social Media Use and Sleep Quality Among Secondary School Students in Aseer Region: A Cross-Sectional Study. *IJGM* **2024**, *Volume 17*, 3093–3106, doi:10.2147/IJGM.S464457.
30. Garett, R.; Liu, S.; Young, S.D. The Relationship between Social Media Use and Sleep Quality among Undergraduate Students. *Information, Communication & Society* **2018**, *21*, 163–173, doi:10.1080/1369118X.2016.1266374.
31. Zhang, X.; Feng, S.; Peng, R.; Li, H. Using Structural Equation Modeling to Examine Pathways between Physical Activity and Sleep Quality among Chinese TikTok Users. *Int J Environ Res Public Health* **2022**, *19*, 5142, doi:10.3390/ijerph19095142.
32. Galanis, P.; Katsiroumpa, A.; Katsiroumpa, Z.; Mangoulia, P.; Gallos, P.; Moisoglou, I.; Koukia, E. Impact of Problematic TikTok Use on Mental Health: A Systematic Review and Meta-Analysis 2024. Preprints. https://doi.org/10.20944/preprints202411.0266.v1.
33. Alnawwar, M.A.; Alraddadi, M.I.; Algethmi, R.A.; Salem, G.A.; Salem, M.A.; Alharbi, A.A. The Effect of Physical Activity on Sleep Quality and Sleep Disorder: A Systematic Review. *Cureus* **2023**, doi:10.7759/cureus.43595.
34. Kredlow, M.A.; Capozzoli, M.C.; Hearon, B.A.; Calkins, A.W.; Otto, M.W. The Effects of Physical Activity on Sleep: A Meta-Analytic Review. *J Behav Med* **2015**, *38*, 427–449, doi:10.1007/s10865-015-9617-6.
35. Liu, S.; Xiao, T.; Yang, L.; Loprinzi, P.D. Exercise as an Alternative Approach for Treating Smartphone Addiction: A Systematic Review and Meta-Analysis of Random Controlled Trials. *IJERPH* **2019**, *16*, 3912, doi:10.3390/ijerph16203912.
36. Faust, A.M.; Auerbeck, A.; Lee, A.M.; Kim, I.; Conroy, D.E. Passive Sensing of Smartphone Use, Physical Activity and Sedentary Behavior among Adolescents and Young Adults during the COVID-19 Pandemic. *J Behav Med* **2024**, *47*, 770–781, doi:10.1007/s10865-024-00499-x.
37. Alonzo, R.; Hussain, J.; Stranges, S.; Anderson, K.K. Interplay between Social Media Use, Sleep Quality, and Mental Health in Youth: A Systematic Review. *Sleep Medicine Reviews* **2021**, *56*, 101414, doi:10.1016/j.smrv.2020.101414.
38. Brautsch, L.As.; Lund, L.; Andersen, M.M.; Jennum, P.J.; Folker, A.P.; Andersen, S. Digital Media Use and Sleep in Late Adolescence and Young Adulthood: A Systematic Review. *Sleep Medicine Reviews* **2023**, *68*, 101742, doi:10.1016/j.smrv.2022.101742.
39. Vandenbroucke, J.P.; Von Elm, E.; Altman, D.G.; Gøtzsche, P.C.; Mulrow, C.D.; Pocock, S.J.; Poole, C.; Schlesselman, J.J.; Egger, M.; for the STROBE Initiative Strengthening the Reporting of Observational Studies in Epidemiology (STROBE): Explanation and Elaboration. *PLoS Med* **2007**, *4*, e297, doi:10.1371/journal.pmed.0040297.
40. Galanis, P.; Katsiroumpa, A.; Moisoglou, I.; Konstantakopoulou, O. The TikTok Addiction Scale: Development and Validation. *AIMS Public Health* **2024**, *11*, 1172–1197, doi:10.3934/publichealth.2024061.
41. Galanis, P.; Katsiroumpa, A.; Moisoglou, I.; Konstantakopoulou, O. Determining an Optimal Cut off Point for TikTok Addiction Using the TikTok Addiction Scale. *Arch Hell Med* **2024**, *Under press*.
42. World Medical Association World Medical Association Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects. *JAMA* **2013**, *310*, 2191, doi:10.1001/jama.2013.281053.
43. Armitage, R.C. Social Media Usage in Children: An Urgent Public Health Problem. *Public Health* **2021**, *200*, e2–e3, doi:10.1016/j.puhe.2021.09.011.
44. Bozzola, E.; Spina, G.; Agostiniani, R.; Barni, S.; Russo, R.; Scarpato, E.; Di Mauro, A.; Di Stefano, A.V.; Caruso, C.; Corsello, G.; et al. The Use of Social Media in Children and Adolescents: Scoping Review on the Potential Risks. *IJERPH* **2022**, *19*, 9960, doi:10.3390/ijerph19169960.
45. Carter, B.; Rees, P.; Hale, L.; Bhattacharjee, D.; Paradkar, M.S. Association Between Portable Screen-Based Media Device Access or Use and Sleep Outcomes: A Systematic Review and Meta-Analysis. *JAMA Pediatr* **2016**, *170*, 1202, doi:10.1001/jamapediatrics.2016.2341.
46. Pedrouzo, S.; Krynski, L. Hyperconnected: Children and Adolescents on Social Media. The TikTok Phenomenon. *Arch Argent Pediat* **2023**, *121*, e202202674, doi:10.5546/aap.2022-02674.eng.

 doi:10.20944/preprints202412.2088.v1

47. Spina, G.; Bozzola, E.; Ferrara, P.; Zamperini, N.; Marino, F.; Caruso, C.; Antilici, L.; Villani, A. Children and Adolescent's Perception of Media Device Use Consequences. *IJERPH* **2021**, *18*, 3048, doi:10.3390/ijerph18063048.
48. Exelmans, L.; Van Den Bulck, J. Bedtime Mobile Phone Use and Sleep in Adults. *Social Science & Medicine* **2016**, *148*, 93–101, doi:10.1016/j.socscimed.2015.11.037.
49. Reid Chassiakos, Y. (Linda); Radesky, J.; Christakis, D.; Moreno, M.A.; Cross, C.; COUNCIL ON COMMUNICATIONS AND MEDIA; Hill, D.; Ameenuddin, N.; Hutchinson, J.; Levine, A.; et al. Children and Adolescents and Digital Media. *Pediatrics* **2016**, *138*, e20162593, doi:10.1542/peds.2016-2593.
50. Sampasa-Kanyinga, H.; Colman, I.; Goldfield, G.S.; Janssen, I.; Wang, J.; Podinic, I.; Tremblay, M.S.; Saunders, T.J.; Sampson, M.; Chaput, J.-P. Combinations of Physical Activity, Sedentary Time, and Sleep Duration and Their Associations with Depressive Symptoms and Other Mental Health Problems in Children and Adolescents: A Systematic Review. *Int J Behav Nutr Phys Act* **2020**, *17*, 72, doi:10.1186/s12966-020-00976-x.