

The Relationship Between Mobile Screen Time and Depression in College Students

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ABSTRACT

The inordinate use and reliance on screen time, specifically as one's primary choice of leisure, has become a new normal for those living in the 21st century. College students often spend significant amounts of time engaged in screens for academic, social, and leisure purposes (Fountain et al., 2011). This cross-sectional non-experimental study, utilizing retrospective correlational design, aimed to test for a potential relationship between mobile screen time and the severity of depression/depressive symptoms in college students and the association between screen-related categories and the severity of depression symptoms in college students. Results found that there was no significant ($p < .05$) relationship between mobile screen time usage and depression. A discussion is provided on mobile screen time usage and the severity of depression in college students, and the role of recreational therapy (RT) in preventing, combating, and treating addiction/addictive screen time behaviors and enhancing healthy relationships with mobile screens. Implications of this study provide insight into a greater understanding of depression and mobile screen time usage of college students.

The Relationship Between Mobile Screen Time and Depression in College Students

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LIST OF ABBREVIATIONS

RT: Recreational therapy.	7
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IRB: Institutional Review Board	11
PHQ/PHQ-9: Patient Health Questionnaire	11
IBM SPSS: Statistical Package for the Social Sciences	16
<i>r</i> : Pearson Correlation Coefficient	16
N: Final Sample	17
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SECTION 1: MANUSCRIPT

Introduction

The use of technology as leisure is not a new concept but has become the new “normal” for the majority of the population living in the twenty-first century (Gulliksen et al., 2023). The advances in twenty-first-century technology make it possible for consumers in any part of the world, regardless of age, to experience a wider variety of fast-acting stimuli that are available practically anywhere via mobile devices. This immediate access ultimately entices consumers to indulge in the use of screens for longer than the suggested two-three hours per day (Nakshine et al., 2022). In today’s digital era, college students especially spend an increasing amount of time engaging with screens, whether for academic purposes, social interactions, entertainment, or a combination of them all (Murtagh, 2023). Similarly, the college experience often comes with its own set of challenges and adversity. Juggling academic demands, social pressures, and personal responsibilities can create a unique and demanding environment leading to stress that impacts various aspects of students’ lives (Singh, 2024). College students find themselves in a web of perpetual connectivity, where the allure of smartphones and social media constantly beckons. The pressure to remain digitally engaged, coupled with the demands of academic life, poses a challenge to disconnection and relaxation (Nguyen & Hargittai, 2024). As the digital era surges forward, the impact of prolonged screen time remains a pressing and contentious issue.

Screen time is sedentary time spent passively watching screen-based entertainment (e.g., TV, computer, mobile devices) and does not include active screen-based games where physical exertion or movement is required (World Health Organization, 2019). With the ever-changing advances in twenty-first-century technology, screen time has become the central component of the daily lives of many, but the effects of usage are unknown (Muppalla et al., 2023). The debate

around the physical and psychological effects of screen time on users continues to be a growing concern in modern society with the proliferation of digital devices contributing to increased sedentary behavior and potential hazards to physical health, mental health, and overall well-being (Devi & Singh, 2023). The pressure to promptly respond to messages, manage online personas, and stay updated on information can quickly become an overwhelming task (Alutaybi et al., 2020). Additionally, the reliance on technology for academic purposes, such as online assignments and virtual learning, may lead to increased student screen time that mirrors the increasing rate of depression among college students (Li et al., 2022).

As recorded in the Healthy Minds Study, 44% of college students reported symptoms of depression, 37% reported anxiety disorders, and 15% reported having seriously considered suicide in the past year—the highest recorded rates in the history of the 15-year-old survey (Cook, 2023). Understanding the risk factors and symptoms of depression can help with both early identification and treatment, therefore understanding the relationship between screen time and mental health in college students may present an opportunity to combat and even decrease rates of depression (Bowe, 2023).

Literature Review

Impact of Depression and Mental Health

Depression, as defined by the National Institute of Mental Health (2024), is a common but serious mood disorder causing severe symptoms that affect how a person feels, thinks, and handles daily activities, such as sleeping, eating, or working. Symptoms include, but are not limited to, feelings of sadness, emptiness, or hopelessness, angry outbursts, irritability or frustration, loss of interest or pleasure in most or all normal activities, sleep disturbances, tiredness and lack of energy, reduced appetite, anxiety, slowed thinking, feelings of worthlessness or guilt, trouble concentrating, frequent or recurrent thoughts of death, suicidal thoughts, suicide attempts or suicide, and unexplained physical problems (Mayo Clinic, 2022). Risk factors for depression can include personal or family history of depression and major negative life changes trauma, or stress (National Institute of Mental Health, 2024).

Studies of depressive disorders have stressed the importance of mortality and morbidity associated with depression. Lépine and Briley (2011) suggested that the mortality risk for suicide in depressed patients is more than 20-fold greater than in the general population. Beyond the United States, suicide presents a serious public health concern at the international level resulting in over 700,000 deaths per year, ranking as the fourth leading cause among young adults worldwide (Bertuccio et al., 2024; Värnik et al., 2009; World Health Organization, 2021). In 2019 alone, 703,000 lives were lost to suicide, equating to one death by suicide every 45 seconds and suicide rates are only continuing to rise (World Health Organization, 2021). Between 2000 and 2018, the United States suicide rate increased 35%, thus contributing to the subsequent decrease in US life expectancy (Martínez-Alés et al., 2022). In addition to suicide deaths,

suicidal ideation (i.e., thinking about and planning suicide) and non-fatal suicide attempts are prevalent in the college student population (Li et al., 2020; Uchida & Uchida, 2017).

Students' mental health and well-being are not only important in their own right, but also as a factor contributing to society's overall well-being (Bhujade, 2017). College students are in a unique and special period of life where they grow from adolescence to adulthood consequently learning and making many important life lessons and decisions (Lei et al., 2016). During this phase, students face the challenges of identity and role transformation and more diversification and complexity from families and institutions (Liu et al., 2022). Similarly, these college students may experience the "persistence, exacerbation, or first onset of mental health and substance use problems while possibly receiving no or inadequate treatment" (Pedrelli et al., 2015, pg. 503). In recent years, the prevalence of depression among college students has gradually increased, even exceeding that of the general public, which has become a global phenomenon (Liu et al., 2022). Because of this new public health threat, the general well-being of society has expedited an examination of the factors related to our mental health outcomes (Insel, 2023).

Digital Leisure

Leisure can be defined as "a relatively freely chosen humanistic activity and its accompanying experiences and emotions (e.g., enjoyment and happiness) that can potentially make one's life more enriched and meaningful" (Iwasaki et al., 2010, pg. 485). Although the terms leisure and recreation are often interchangeable, recreation is defined as activities or experiences that occur during one's free time and span across a wide spectrum of activities (Hurd & Anderson, 2011). One end of the recreation spectrum includes activities that society deems inherently "good" or socially acceptable, while the opposite end holds untraditional, deviant, or "taboo" activities (Hurd & Anderson, 2011). These socially unacceptable recreation activities,

otherwise known as “purple recreation,” may include substance use, vandalism, excessive gambling, and/or any other activities that can cause harm to oneself, others, or society (Curtis, 1979; Hurd & Anderson, 2011; Wright, 2009). However, when one’s chosen leisure or recreation activity begins to resemble deviant or taboo behavior, the quality of the activity’s enrichment and meaningfulness comes into question (Curtis, 1988; McLean & Hurd, 2012; Stebbins, 1997; Williams & Walker, 2006; Wright, 2009). While participating in leisure and recreation activities often promotes mental health benefits (Takiguchi et al., 2023), the opposite effect may result from participation in purple recreation. The growth of digital leisure usage has brought into the question of whether excessive usage can perpetuate it becoming purple leisure within society.

Digital leisure is defined as “the time spent by individuals using digital tools and platforms for entertainment, recreation, acquiring knowledge, communication, socialization, and escaping from a negative mood state during their free time” (Tutar & Turhan, 2023, pg. 16). Digital leisure presents a vast array of new opportunities to play, learn, get informed, and become entertained (Lupton 2016). Digital leisure activities include, but are not limited to, watching television, engaging with computers, mobile phones, and the internet (e.g., online chatting, building virtual connections/friendships, joining virtual spaces, socializing in virtual environments), and playing video games (Tutar & Turhan, 2023). While these activities may certainly provide positive benefits, the amount and type of digital engagement may bear adverse effects on overall wellbeing as not all digital engagements are the same (Tutar & Turhan, 2023). For example, someone using their mobile phone to listen to a 10-minute online meditation audio recording may be affected differently than someone using their mobile phone to scroll through social media for 10-minutes (Begin et al., 2022). We fail to understand the value, whether positive or negative, of certain *types* of digital leisure engagement.

Digital Leisure and Mental Health

In modern society, technology and leisure time have become more closely connected than ever (Tutar & Turhan, 2023). New technologies, such as mobile and interactive screen media, are now ingrained in our daily lives making leisure time and leisure increasingly intertwined (Muppalla et al., 2023). These technologies have revolutionized learning and communication, but research indicates that screen usage could have serious adverse effects on children's chronic health, making this a critical public health concern (Muppalla et al., 2023). Recent research has suggested that children aged 8–12 years old spend an average of four to six hours a day on their devices with this number increasing to nine hours per day for teenagers (Xu et al., 2023). Not only has average daily usage increased, but the age at which youth engage with media on a regular basis has fallen as well (Muppalla et al., 2023). In 1970, children began engaging with media on a regular basis at four years old, but in present day, regular usage begins at only four months (Muppalla et al., 2023).

The debate around the psychological impacts of screen time usage remains a pressing and regular feature of societal conversation (Kaye et al., 2020). Concerns regarding screen time usage have become so extreme that the US Department of Health has issued a key disease prevention objective and provided recommendations for screen time limitations as one of its national health improvement priorities (Sigman, 2014). Furthermore, the World Health Organization has projected that depression will be the leading cause of disease burden by the year 2030 and growing evidence suggests that a sedentary lifestyle is an important risk factor of depression among adults (Madhav et al., 2017; World Health Organization, 2011). Previous studies have shown that screen time-based sedentary behavior influences mental health, such as sleep problems, anxiety disorders, and depression (Wang et al., 2019). While anxiety and

depression have become a new public health threat, healthcare professionals should seek the tools to combat and resolve this growing crisis (Insel, 2023). The field of recreational therapy may be a new treatment approach to address this new technological phenomenon (Mumcu et al., 2021).

Digital Leisure and the Role of Recreational Therapy

Recreational therapy (RT), also known as therapeutic recreation, is defined by the National Council for Therapeutic Recreation Certification as “a systematic process that utilizes recreation and other activity-based interventions to address the assessed needs of individuals with illnesses and/or disabling conditions, as a means to psychological and physical health, recovery and well-being” (National Council for Therapeutic Recreation Certification, n.d.). The foundation of the RT profession was built upon the therapeutic value of recreation and leisure experiences (Carter & Van Andel, 2020). Leisure, an important aspect of human life, provides individuals with opportunities to engage in activities that offer pleasure, relaxation, and satisfaction outside of work and other responsibilities (Tutar & Turhan, 2023). Changes in the organization and experience of leisure activities and periods of leisure history have frequently been driven by technological developments influencing both access and experience (Bryce, 2001). Computer technology and the internet are important locations of digital leisure, as they create new spaces for leisure participation (Bryce, 2001). However, these virtual spaces represent a change in both leisure activities and experiences, which in-turn, have implications for the societal and individual experience of leisure, health, and well-being (Bryce, 2001).

While disparity between the equality of mental and physical health care still exists, the idea that people with mental health, including depression, often require more than medical care needs to be considered (Insel, 2023). The field of RT may contribute a unique role in the

treatment of mental health as a direct outcome of screen time usage, as the very foundation of RT lies in providing leisure/recreational services based on individuals' interests and lifestyle, ultimately resulting in improved functioning and quality of life (Hoss & Armstrong, 2016). RT interventions have been described as empowering, helping clients increase connections within their communities, find meaning and purpose, and develop a positive personal identity (Ariss et al., 2019).

With the increasing cases of digital dependency/addictive screen time behavior, new behavior management approaches and countermeasures continue to develop (Nakshine et al., 2022). Behavior approaches consist of tracking daily screen time usage data, sharing information regarding the negative effects of high screen time, support group sessions (sharing with others who are also aiming to limit screen time usage), app timers/limits, bedtime and grayscale mode (setting to make decrease screens' visual appeal and serve as a bedtime reminder), focus mode (setting that temporarily lock selected apps), and calendar reminders (Rana & Khushi, 2024). These methods have all been used and found to modify smartphone dependence and addictive screen time behaviors that negatively impact overall health and wellbeing (Rana & Khushi, 2024). It remains an increasingly critical issue for health professionals, including recreational therapists (RTs), to fully understand the scope and impact of excessive digital leisure from an assessment and treatment perspective. While typically within the field of RT, leisure is often seen with a myopic focus on the benefits and “goodness” of leisure and recreation, it is imperative for RTs to fully recognize the potential negative impacts of excessive and addictive leisure. RTs often uses behavior management techniques to change negative, addictive, and/or excessive behaviors such as substance abuse, eating disorders, or self-abusive actions, so it is inherently necessary for the field of RT to fully understand and prepare for the continued growth

of this potential obsession (Keesmaat, n.d.). However, there is a current gap in the research surrounding the limitation, impact, and treatment of digital dependency/addictive screen time behavior through RT. This study serves to provide an initial attempt in providing clarity and understanding of the relationship between screen time and depressive symptoms, and the specific role of RT in combatting and implementing treatment for excessive digital leisure.

Purpose and Research Questions

This study examined a potential relationship between screen time and depressive symptoms in college students and identified and discussed gaps in current knowledge. Furthermore, this research sheds light on the outcomes and implications of screen time offering insights into the relationship between mobile screen time usage and depression within the unique context of the collegiate experience. The research questions included:

RQ1: Is there a relationship between mobile screen time and the severity of depressive symptoms in college students?

RQ2: When controlling demographic factors such as gender, age, and academic year of study, what is the association between screen-related categories (social, entertainment, productivity and finance, utilities, travel, creativity, shopping and food, information and reading, education, health and fitness, games, and other) and the severity of depression symptoms in college students?

Methods

Study Design

This study utilized a retrospective correlational design (De Sanctis et al., 2022). A self-administered survey was used to assess depression and mobile screen time usage in participants. While screen time can be represented in multiple digital platforms, it must be emphasized that screen time data collected in this study were representative of only *mobile* screen time usage. While research suggests screen time can affect multiple health outcomes (Twenge & Campbell, 2018), this study only collected and analyzed the potential *relationship* between mobile screen time usage and depression.

Setting

This study was conducted at a public university in the southeastern United States. This research setting was an ideal environment for collecting research for this study because it included a diverse and inclusive community of college students, allowing for ample opportunity to collect a wide range of demographics and perspectives. The combination of diverse community and location made this setting a prime destination to conduct impactful research. A convenience sampling technique was used to gain participants in this research.

Sample

The primary target population were college students who owned and used iPhones as their mobile phone. Participants met the following required criteria for inclusion in the study: (a) completion of an informed consent via the Qualtrics survey instrument, (b) current enrollment as a college student in at the university research setting, and (c) used an iPhone as their primary mobile phone. It should be noted that participation was limited to iPhone users as it helped ease data tracking, data collection, and consistency of information across participants. To be able to

adequately evaluate the data collected, the research team set a goal of obtaining a minimum of 30 responses, as it is often suggested that a sample size of 30 often produces an approximately normal sampling distribution for the sample mean from a non-normal distribution (Islam, 2018).

Data Collection

After gaining approval from the University's Institutional Review Board (IRB) (See Appendix A), informational flyers (See Appendix B) were distributed throughout the research setting campus and posted in high student traffic areas (e.g., University Library, Main Campus Student Health Center, etc.) and shared with faculty and university employees to distribute to students. All participants provided consent embedded within the survey to participate in the study before being permitted to complete the survey instrument. All participants completed the survey independently without any assistance from the primary researcher or research team. The survey was created in and administered through the Qualtrics website (*Qualtrics*, 2023). Qualtrics is a web-based software that enables users to create surveys and generate reports based on data collected (*Qualtrics*, 2023). No incentive was offered nor given to participants who completed the survey, and it took an estimated two to five minutes to complete. As a preventative measure to limit missing data, responses were required for all survey items to enable survey submission (*Qualtrics*, 2023). A description of each data section in the survey follows.

Measurement of Depression and Mental Health

The Patient Health Questionnaire (PHQ-9) (Kroenke et al., 2001)

Depression was measured using the Patient Health Questionnaire (PHQ-9) (See Appendix C) which is a nine-item depression short version derived from the full Patient Health

Questionnaire (Kroenke et al., 2001). The nine items include the experience of pleasure, feeling down, sleep disruption, energy levels, appetite, feeling a failure, trouble concentrating, speaking slowly or being fidgety and having negative thoughts around suicide or self-harm over the previous two weeks, and can be self-administered or administered by a clinician (*The Patient Health Questionnaire (PHQ-9)- Overview*, 1999). The PHQ-9 is easily scored by the clinician, is half the length of many other depression measures, has comparable sensitivity and specificity, and consists of the actual nine diagnostic criteria of depressive disorders (Kroenke et al., 2001). While the instrument can serve as both a diagnostic and screening tool (Kroenke et al., 2001), the PHQ-9 was only utilized in this study as a screening tool and no diagnoses were made following participant completion.

Validity

The PHQ-9 has established evidence of validity in patients with depressive disorder, as well as criterion and construct validity as both a diagnostic and severity measure (Kroenke & Spitzer, 2002; Sun et al., 2020). Evidence of construct validity, often defined as the extent to which an instrument accurately assesses the construct or latent attribute that it is intended to measure (APA, n.d.-a), was assessed when compared to the 20-item Short Form General Health Survey (Kroenke et al., 2001). More specifically, evidence of criterion validity, defined as the evaluation of a measure based on its relationship to a specific and well-defined criterion (APA, n.d.-b), was provided in a comparison with mental health professional interviews of a sample of 580 patients (Kroenke et al., 2001).

Reliability

The PHQ-9 has been thoroughly tested in patients for evidence of reliability or internal consistency (Carroll et al., 2020; Zuithoff et al., 2010). Internal consistency estimates relate to

item homogeneity or the degree to which test items jointly measure the same construct (Henson, 2001). Cronbach's alpha is a widely used statistical method to measure reliability, as it estimates the internal consistency between items in a test (Christmann & Van Aelst, 2006). Evidence of internal PHQ-9 reliability was reported in two studies including the PHQ Primary Care Study ($\alpha = 0.86$) and the PHQ Ob-Gyn Study ($\alpha = 0.86$) (Kroenke et al., 2001). From these two studies (Kroenke et al., 2001), some evidence of test-retest and inter-rater reliability of the PHQ-9 was also provided as the correlation ($r = .84$) between the PHQ-9 completed by the respondent in the clinic and the mental health professional within 48 hours of each other was relatively high and the mean scores were nearly identical (5.08 vs. 5.03).

Scoring

Respondents were asked to rate each of the items on a scale of 0 to 3 on the basis of how much a symptom had bothered them over the last two weeks (0=not at all, 1=several days, 2=more than half the days, 3=nearly every day) (Manea et al., 2015) (See Appendix D). After participants completed scoring the nine items, each scoring column (i.e., Column 1= Several days; Column 2= More than half the days; Column 3= Nearly every day) was summed and then the column totals were summed for a total PHQ-9 score and interpretation (see Table 1).

Table 1

PHQ-9 Scoring Interpretation

Total Score	Depression Severity
1-4	Minimal depression
5-9	Mild depression
10-14	Moderate depression
15-19	Moderately severe depression
20-27	Severe depression

Note: From Stanford Medicine. (1999). *Patient Health Questionnaire (PHQ-9)*.

Screen Time Usage

Screen time usage was included in the Qualtrics survey platform and used as a continuous variable to compare with the depression/depressive symptoms (See Appendix E). When submitting screen time usage data within the survey instrument, participants were asked to submit a screenshot displaying the time from their device rather than self-reporting transposed numbers to reduce the possibility of reporting errors and respondent bias, as some participants may not accurately self-report their average time spent on their device. Specific instructions were included within the survey instrument guiding participants on how to locate the screen time average and screen time categories within their iPhone settings (See Appendix F). Within iPhone settings, a weekly average of screen time usage is automatically calculated for users (*“Get started with screen time on iPhone,”* n.d.). The iPhone calculation is presented in hours and minutes but was recalculated post-data collection by the primary researcher to total minutes (e.g., converting 2h and 30m to 150m) to permit data analysis. Participants were asked to submit the iPhone categories in which their screen time is denominated (See Appendix G). On Apple products, screen time is automatically organized and categorized into screen time categories including social networking, games, productivity, entertainment, creativity, health & fitness, education, and utilities (*“Get started with screen time on iPhone,”* n.d.). Apps are categorized by app developers within Apple’s App Store, and categories are selected based on the app’s main function or subject matter (*“Categories and Discoverability - App Store,”* n.d.) (See Appendix H). It should be noted that iPhones measure and maintain an average screen time usage across all days of the week, including weekends, but data collection resets on Sunday. Because participants submitted their screen time on different days other than Sunday, a full seven-day reporting period was not consistently included in submitted data. To accommodate the varied number of

days reported, this variable was calculated as a daily average of screen time (total minutes divided by number of days in reporting period) to provide consistent reporting data across the sample, regardless of how many days were included in a participant's response. The number of reported days within each participant's submission was also added as a variable to determine whether the number of days reported was a confounding variable.

Demographics

Demographic factors were carefully selected and included in this study as all were measurable, interpretable, and potentially influential to the relationship between screen time use and mental health in the study (Garg, 2016). Participant demographics collected in this study included age, gender, and academic year of study (i.e., freshman, sophomore, graduate student). Several sociodemographic factors including age, gender, education, marital status, and income have consistently been identified as demographic factors influencing and explaining the variability in the prevalence of depression (Akhtar-Danesh & Landeen, 2007). Collecting demographics provided a better understanding of the sample and a more accurate interpretation of results to a broader population. No identifiable information was collected regarding participants to promote confidentiality and honest responses from participants.

Data Analysis

To prepare for data analysis, data collected from the Qualtrics survey was downloaded, cleaned, and then entered into the IBM SPSS (Statistical Package for the Social Sciences) Statistics software. All quantitative data were analyzed using IBM SPSS version 29. Although missing data were not initially anticipated (as question responses are mandatory for completion and submission of the survey), missing data from screen time usage and screen time categories were present due to participant image submission errors. Although this question design (i.e.,

having participants submit a screenshot) resulted in submission errors and missing data omission, the contrary (having participants self-report data) may have resulted in falsified responses. In the missing data item cases, two probabilities were the cause; Firstly, if a participant submitted the correct average daily screen time screenshot, but the incorrect screen time categories screenshot resulting in missing data for all screen time categories. Secondly, missing data were seen in individual participant responses for various screen time categories. This type of missing data was anticipated, as it was expected that not all participants use all the various screen time categories. All missing data items were not included in the data analysis. This decision was made by the primary researcher in hopes of mitigating unprovable assumptions and improving data validity and reliability (National Research Council, Division of Behavioral and Social Sciences and Education, Committee on National Statistics, Panel on Handling Missing Data in Clinical Trials, 2010). Participant demographic data was compiled and reported. A descriptive analysis of the data was performed to produce a mean, median, and range of the data, and highlight any outliers within the data. A Pearson correlation coefficient (r) correlation test was performed to examine measure for significant relationships between all experimental variables. Upon significant relationships between demographic variables, average daily screen time, and the summed depression scores, the researcher planned to conduct a linear regression test and control for any confounding relationships of demographic variables in the screen time-depression relationship.

Results

A total of 148 surveys were submitted by participants but contained numerous errors in image submission for the average daily screen time and screen time categories items thus resulting in the deletion of 63 survey responses. The final sample (N) included a total of 85 usable surveys. The following sections include analysis of results.

Demographics

The final sample ($N = 85$) indicated that the majority of participants were female (64.7%), either a sophomore (31.8%) or a junior (31.8%), and the average age of participants was 20.84. This sample aligns with the university's demographics as indicated in the most recent demographic data published by the university. The university's fall of 2024 undergraduate class included 12,467 female students (58.1%) and 8,978 male students (41.9%) (UNC System Office Census Data, 2024). Refer to Tables 2-4 for further respondent demographics.

Table 2

Academic Year of Study Frequencies

	Frequency	Percent	Valid Percent	Cumulative Percent
Freshman	10	11.8	11.8	11.8
Sophomore	27	31.8	31.8	43.5
Junior	27	31.8	31.8	75.3
Senior	16	18.8	18.8	94.1
Graduate Student	5	5.9	5.9	100.0
Total	85	100.0	100.0	

Table 3*Gender Frequencies*

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	30	35.3	35.3	35.3
Female	55	64.7	64.7	100.0
Total	85	100.0	100.0	

Table 4*Age Descriptives*

	N	Range	Minimum	Maximum	Mean
Age	85	17	18	35	20.84

Confounding Relationships

To better understand the potential confounding relationships between extraneous variables and the dependent variable (i.e., depression symptoms), correlations were conducted to examine potential relationships. Results indicated a statistically significant relationship between (1) year of study and total PHQ score ($r = .220, p = .043$), (2) gender and total PHQ score ($r = .230, p = .034$), and (3) year of study and average daily screen time ($r = -.263, p = .015$). These data findings indicated that (1) a higher year of study equated to a higher total PHQ score (increased depressive symptoms), (2) female college students had a higher total PHQ score than male college students, and (3) a higher year of study equated to less average daily mobile screen time usage. These findings were consistent with literature, supporting the idea that these findings were both valid and reliable (Lindsey et al., 2009; Mahmoud et al., 2012; Weissman & Klerman, 1985).

An independent sample t-test was performed between participant responses included in final data analysis ($N = 85$) and participant responses not included ($N = 63$) in final data analysis

due to missing data or incomplete responses. This data analysis was performed to examine non-response bias from participants, ensuring that participants who did not correctly and/or fully complete the survey did not significantly differ from participants who did correctly and fully complete the survey. From the five dependent variables (age, gender, year of study, total PHQ-9 score, and average daily screen time usage), only two, age ($p < .001$) and total PHQ score ($p < .05$) were deemed significantly different. The mean age for participants who did not correctly and/or fully complete the survey was 24.83, while the mean age for participants who did correctly and fully complete the survey was 20.84. It should also be noted that while the total PHQ-9 score means between the included and non-included responses differed (included responses mean PHQ-9 = 5.1294 vs. non-included responses mean PHQ-9 score = 7.5000), but both were within the same “mild depression” category within the PHQ-9 rating scale. The significant difference ($p < .05$) in PHQ-9 scores among those included and non-included participants did not change the diagnostic category of depression and therefore was still considered valid in the final interpretation of results.

Relationship of Screen Time Usage and Depression

Research question one inquired if there was a relationship between mobile screen usage and the severity of depressive symptoms in college students. Correlational analysis was conducted and indicated that the relationship between total PHQ scores and average daily mobile screen time was non-significant ($r = .005$, $p = .964$). Therefore, the results suggested that mobile screen usage and depression were *not* related in this study. It should also be noted that correlational analysis was conducted between the number of days reported and total PHQ score and resulted in no significant relationship between these two variables. See Table 5 for specific relationships.

Table 5*Demographics, Total PHQ-9 Score, and Average Daily Screen Time Correlations*

		Age	Gender	Year of Study	Total PHQ	Average Daily Screen Time
Age	Pearson Correlation	1	-.063	.452**	.166	-.164
	Sig. (2-tailed)		.567	<.001	.128	.134
	N	85	85	85	85	85
Gender	Pearson Correlation	-.063	1	.243*	.230*	-.157
	Sig. (2-tailed)	.567		.025	.034	.152
	N	85	85	85	85	85
Year of Study	Pearson Correlation	.452**	.243*	1	.220*	-.263*
	Sig. (2-tailed)	<.001	.025		.043	.015
	N	85	85	85	85	85
Total PHQ	Pearson Correlation	.166	.230*	.220*	1	.005
	Sig. (2-tailed)	.128	.034	.043		.964
	N	85	85	85	85	85
Average Daily Screen Time	Pearson Correlation	-.164	-.157	-.263*	.005	1
	Sig. (2-tailed)	.134	.152	.015	.964	
	N	85	85	85	85	85

** . Correlation is significant at the 0.1 level (2-tailed).

* . Correlation is significant at the 0.5 level (2-tailed).

Screen Category Use and Depression

Research question two examined the association between screen-related categories (social, entertainment, productivity & finance, utilities, travel, creativity, shopping & food, information & reading, education, health & fitness, games, and other) and the severity of depression symptoms in college students when controlling demographic factors such as gender, age, and academic year of study. Upon significant relationships between demographic variables, average daily screen time, and the summed depression scores, the researcher planned to conduct a linear regression test and control for any confounding relationships of demographic variables in the screen time-depression relationship, but because there was not a significant relationship between total PHQ scores and daily average mobile screen time ($r = .005$, $p = .964$), there was no statistical rationale to run this data analysis. However, the researcher felt it may be beneficial to further examine categories of screen time usage to better understand results. From further examination of this correlational data, a significant relationship was found between the average

creativity screen time category (i.e., Camera app, Photos app, etc.) and total PHQ score ($r = .392$, $p = .020$). This finding indicates that the more a participant used a creatively categorized app on their mobile phone, the more severe depressive symptoms they demonstrated. See Table 6 and 7 for specific relationships and descriptives.

Table 6

Demographics and Screen Time Categories Correlations

		Social Ag	Enter Avg	Produ Avg	Utili Avg	Travel Avg	Creat Avg	Shop Avg	Info Avg	Educ Avg	Health Avg	Game Avg	Other Avg
Age	Pearson Correlation	-.195	-.095	.411**	-.018	-.060	.372*	.089	.042	-.174	-.317	-.257	.021
	Sig. (2-tailed)	.204	.561	.006	.935	.786	.028	.654	.830	.334	.315	.420	.908
	N	44	40	44	23	23	35	28	29	33	12	12	32
Gender	Pearson Correlation	.049	-.347*	.018	.079	-.007	.169	.181	.054	.170	.062	-.250	-.055
	Sig. (2-tailed)	.752	.028	.906	.719	.975	.331	.358	.779	.345	.848	.434	.767
	N	44	40	44	23	23	35	28	29	33	12	12	32
Year of Study	Pearson Correlation	-.163	-.188	-.147	.025	.127	.239	.308	.215	-.298	-.122	-.170	.054
	Sig. (2-tailed)	.292	.245	.341	.908	.564	.167	.110	.262	.092	.705	.597	.769
	N	44	40	44	23	23	35	28	29	33	12	12	32
Total PHQ	Pearson Correlation	.147	.221	.215	.066	.136	.392*	.079	.114	.022	-.259	-.005	.054
	Sig. (2-tailed)	.340	.170	.160	.766	.535	.020	.690	.557	.902	.415	.989	.770
	N	44	40	44	23	23	35	28	29	33	12	12	32
Average Daily Screen Time	Pearson Correlation	.562**	.364*	.284	.269	-.040	.277	.094	.130	.636**	-.354	.741**	.288
	Sig. (2-tailed)	<.001	.021	.062	.214	.855	.107	.634	.500	<.001	.259	.006	.110
	N	44	40	44	23	23	35	28	29	33	12	12	32

**. Correlation is significant at the 0.1 level (2-tailed).

*. Correlation is significant at the 0.5 level (2-tailed).

Table 7

Screen Time Category Descriptives

	N	Minimum	Maximum	Mean	Std. Deviation
Social	44	32.00	2936.00	745.5682	683.10895
Entertainment	40	1.00	3703.00	336.8500	769.29903
Productivity & Finance	44	1.00	756.00	107.0227	172.47305
Utilites	23	1.00	401.00	52.8261	82.33339
Travel	23	1.00	214.00	41.5652	47.00757
Creativity	35	1.00	174.00	40.7429	46.37782
Shopping & Food	28	1.00	241.00	31.4643	51.09866
Information & Reading	29	1.00	411.00	35.0345	84.20107
Education	33	1.00	416.00	41.4545	85.97096
Games	12	1.00	568.00	117.0833	158.62389
Health & Fitness	12	1.00	141.00	24.8333	41.76522
Other	32	1.00	223.00	55.1562	62.79157

Other Significant Findings

The lack of a significant relationship between mobile screen time and depression was unexpected, differentiated from originally anticipated results, and contradictory with previous research (Deyo et al., 2024; Galvin et al., 2022; Li et al., 2020), but still resulted in valuable data leading to further discussions and potential research regarding college students. Data indicated that among 85 participants, the average daily time spent on a mobile phone was 399.45 minutes, or 6.66 hours and the average total PHQ-9 score was 5.1294, which according to the PHQ-9 scoring table, lands in the mild depression severity category (See Table 8). Both numbers, while not included in research question one, highlight concerns and further questions regarding college students' mental health and well-being, and the increasingly high dependency on daily mobile devices. These concerns and questions are further examined within the discussion portion of this manuscript.

Table 8

Total PHQ and Average Daily Screen Time Descriptives

	N	Range	Minimum	Maximum	Mean
Total PHQ	85	20.00	0.00	20.00	5.1294
Average Daily Screen Time	85	965.00	85.00	1050.00	399.4471

Discussion

This study examined the potential relationship between mobile screen time and the severity of depression/depressive symptoms in college students and the association between screen-related categories and the severity of depression symptoms in college students. Analysis of data found that both research questions were *not* statistically significant. The following section includes detailed possible methodological implications that may have influenced results. While some data yielded what was found to be contradictory to previous assumptions and current literature, important issues and questions remain unanswered for future clinical practice and research.

Limitations

Some limitations were discovered throughout this research study, resulting in various methodological challenges. Future research will benefit from avoiding or adapting to these listed limitations.

Study/Survey Instrument Design Issues

Limitations of the research study included the study design and survey instrument design issues. This retrospective correlational designed study utilized a self-administered survey that was used to assess depression and mobile screen time usage in participants. The survey instrument included a measurement instrument, the PHQ-9, which measured the severity of depressive symptoms in participants. The PHQ-9 measures depressive symptom criteria present within the past two weeks from survey completion (Kroenke et al., 2001). Screen time usage data were also collected from screenshots of iPhone settings submitted by participants. The screen time data collected in these photos were representative of a single week's worth of screen time

usage. This discrepancy in measuring time (2 weeks for PHQ-9 vs. 1 week for screen time daily use average) may have impacted reliability and validity of the findings.

Secondly, iPhones measure and maintain an *average* screen time usage across all days of the week, but it was determined *after* the start of data collection that data reset on each Sunday. To explain further, the reporting period varied across participants and the number of days included within the data collection was dependent on what day of the week the survey was completed on (e.g., participant A completed the survey on Wednesday and had 4 days of data collection vs. participant B completed the survey on Saturday and had 7 days of data collection). While adjustments were made to calculate daily average to accommodate this iPhone recording limitation, this unforeseen data collection setting may have further impacted results.

The time of survey distribution may have potentially limited participation and participant responses, as the survey was opened and distributed throughout the Spring semester within the month of March (March 5th – March 30th). March may not have been the optimal time for survey distribution, as midterm exams and Spring Break (no classes for one week) occurred during this time. Motivation to complete the survey may have been decreased due to the pressing time of the semester and the survey may not have reached as many participants due to the absence of classes for a week, resulting in less students on campus, less students checking their email, etc.

Lastly, before data analysis could begin, participant responses had to be sorted, and missing data had to be noted. A total of 148 surveys were submitted by participants but despite having a “forced answer” indicated in survey and specific screen shot submission instructions to prevent errors, the dataset contained numerous errors in image submission for the average daily screen time and screen time categories items (i.e., participants did not follow survey image submission instructions), thus resulting in deletion of 63 survey responses. Missing data items

were not included within data analysis. The final sample (N) had a total size of 85 usable surveys. It is unclear why there were so many errors in image submission for both the average daily screen time and screen time categories items, but it can be surmised that the written instructions were disregarded for being too lengthy or unclear. Future research should consider emphasizing and potentially piloting submission instructions to limit errors and missing data.

Key Findings

Participants of this study reported mobile screen time usage, mobile screen time usage categories, and depressive symptoms. The analysis of data found no statistically significant correlation between average daily screen time usage and depressive symptoms. Although depressive symptoms were not statistically correlated with average daily screen time usage, the reported data is alarming and should be noted. In 85 participants, the average daily time spent on a mobile phone was 399.45 minutes, or 6.66 hours, and the average total PHQ-9 score was 5.1294 suggesting an overall “mild” depression severity category. It is clear from this data that mobile screen time usage is a central point in college students' lives, and while the assumption typically is that screen time isolates us from reality, the opposite, antithetical to depression, may also be occurring. Understanding the point of when mobile screen time usage is productive vs. when it is damaging will provide valuable insight into this ideology. Further research is necessary to better understand the contradicting values/implications of mobile screen time usage as well as the causation of high depressive symptoms in college students. From both the literature and results of this study, two major emerging themes developed that are worthy of further discussion: (1) High dependency and addiction to mobile phones and (2) Depression severity among college students.

Theme 1: High Dependency and Addiction to Mobile Phones

It is no secret that mobile phones have become a central and integral part of human life in (Smith et al., 2011). However, the value or quality of mobile screen time usage varies and is essentially determined by each specific user. This study did not provide definitive answers as to why screen time usage was so high and said effects of high screen time usage may not be definitive, but contrary and extremely complex. Drawing conclusions on the impact of the digital world on mental well-being is extremely difficult, making causation difficult to establish (Nowland et al., 2018). The idea of screen time usage as a double-edged sword is commonly presented throughout literature (Nowland et al., 2018). When screen time and the internet is used to enhance existing relationships and create new social connections, it is often viewed as a useful tool. Contrarily, when screens are used to escape reality and withdraw from social interaction, negative feelings such as feelings of loneliness and social withdrawal are often increased (Nowland et al., 2018). Conducting research collecting qualitative data regarding the specific feelings associated with mobile screen time usage must be done to provide further insight into the quality of mobile screen time, the feelings associated with mobile screen time, and how mobile screen time is experienced and even valued by others. For example, within the literature, qualitative research regarding screen time usage perspective and effects have been examined through participant interviews (Geurts et al., 2022), participant journal logs/media diaries (Mascheroni & Zaffaroni, 2025), and other methods of qualitative meta-synthesis (Minges et al., 2015). Considering other data collection may have captured the true digital user experience that may not be collected in more traditional quantitative methods.

The increased usage of mobile phones by college students may also have connections to various health and psychosocial factors. Kuang-Tsan and Fu-Yuan (2017) found that cell phone

usage among college students was significantly related ($p < .01$) to various determinants of life stress (e.g., academic, interpersonal relationships, family life, self-career, and love-affair). Further analysis indicated that love-affair stress ($p < .001$) and academic stress ($p < .05$) were predictive of smart phone addition. Kuang-Tsan and Fu-Yuan (2017) suggested that college students may have used their mobile phones as a substitute for social support as a coping mechanism for these life stresses. This research suggests that college students do perceive some value in the mobile phone as a mechanism to cope with campus-related stress.

Measuring the value of mobile phone usage is more complicated than ever (Han et al., 2013). The mobile phone and subsequent mobile phone application industries have created a commercially competitive advantage to eliminate many other media products such as the camera, calendar organizer, physical activity measurement device (e.g., step counters), heart rate monitors, music devices, and traditional entertainment viewing on televisions (Szyjewski & Fabisiak, 2018). This commercialization has very effectively created an industry market where the mobile phone is essential, if not critical, to functioning in and fully engaging in the human experience, especially college students (Szyjewski & Fabisiak, 2018). As the rest of the world considers the presence of mobile phone “addiction,” researchers should also highlight the inconsistent meanings and values to mobile phone users as usage has been demonstrated to *not* always have a significant relationship ($p > .05$) with life satisfaction (Kuang-Tsan & Fu-Yuan, 2017). Regardless, depression, mental health, and well-being remain a pressing issue on college campuses, and researchers should continue to seek answers.

Theme 2: Depression Severity Among College Students

Research studies on the prevalence of depression/depression symptoms in college students have been rapidly emerging and only increasing with more alarming statistics within the

post-pandemic era (Coughenour et al., 2021; ElBarazi & Tikamdas, 2025; Luo et al., 2024). Data has indicated an astounding 48.9% prevalence of depression among college students, and it is clear that something is causing high rates of depressive symptoms/depression in college students (Luo et al., 2024). This study found that college students in this study were in the “mild depression” category. It should be noted that while the PHQ-9 severity category remained within the “mild depression” category, those participants not included in the analysis (due to missing responses ($N = 63$)), did have slightly higher PHQ-9 scores. Thus indicating, the average PHQ-9 score may have been higher if those responses were included in the data analysis. While the cause of depression in college students may not be mobile screen time usage alone, the cause and/or contributing factors must be further researched.

Literature suggests potential causes/influencing factors on the increasingly high prevalence of depression in college students. Firstly, the use of social networking sites (SNS) has been negatively associated with self-esteem and positively associated with Fear of Missing Out (FoMO) (Leung et al., 2021). Alsunni and Latif (2021) found a relationship between social media investment and anxiety ($r = 0.71$; $p < 0.001$) and depression/anxiety ($r = 0.72$; $p = 0.003$) in college students. In this study, the most used screen time category was in-fact the “social” category, thus supporting the idea that increased usage of social media increases the probability of depression in college students. The lack of consistency in this study with previous research may suggest the need for a new measurement of digital engagement beyond just mobile phone usage.

Lack of adequate resources may also be a contributing factor to increasingly high numbers of campus depression. Between 2009 and 2015 alone, the total number of students seeking assistance from college/university counseling centers increased by 30%, while

enrollment in counseling services only increased by 6% (Reilly, 2018). Furthermore, campus counseling centers report inadequate staff to deal with the increased demand for services, which has resulted in waitlists and session limits (Xiao et al., 2017). Rosenthal and Wilson (2008) found that over three-quarters of university students with significant mental distress did not receive counseling and that lack of knowledge/understanding of available resources on campus may also play a role. With these alarming numbers of campus depression, it is vital that students are well informed about mental health resources on and off campus, and that student mental health is well understood to ensure students access the support for their need while attending college (Cage et al., 2020).

Financial stressors have also been attributed as a potential cause of depression within college students, as the high cost of living is making it harder for working college students to manage school, work, and a social life (Pusher, 2024). In a survey conducted by Studocu (2023), around 55% of college students in the United States said inflation and economic factors negatively impacted their mental health. According to the U.S. Bureau of Labor Statistics (2025), from January 2023 to January 2024, the cost of groceries, increased 1.2 percentage points, and rent increased by 6.1 percentage points. Furthermore, the rising cost of a college education was found to be associated with increased credit card debt as student loans were not adequate in adequately providing for all the costs associated with attending college (Lyons, 2004). These consistent and increasing life stressors may certainly play a significant role in the increasing depression among college students (Kuang-Tsan & Fu-Yuan, 2017). Therefore, University employees (e.g., financial planners, educators, counselors) should be aware of the potential factors impacting students' financial mental health, as collaborating with professionals would be

greatly beneficial in lowering financial anxiety and increasing financial satisfaction and well-being (Archuleta et al., 2013).

Implications for Future Research

After completing this research study, important issues and questions arise and remain for practice and future research. Firstly, due to the average total PHQ-9 score, future research on possible causes, effects, and prevention methods must be done. The data collected in this study implies that mobile screen time usage is not related to depressive symptoms, but the question remains: What is? Secondly, due to the high amount of average daily time spent on a mobile phone, future research is needed regarding mobile screen time usage. This research supports the idea that it is difficult, if not impossible, to determine the importance or value of recreational activities (mobile screen time usage) explicitly, as everyone experiences and values it differently.

The lack of significant findings in this study may also suggest differences among how college students use mobile phones. Researchers may wish to continue to conceptualize mobile phone addiction and attempt to remove the single value-laden attribute of time spent using mobile phones. The Smart Phone Mobile Phone Addiction Scale (MPAS) was developed to capture characteristics of smart phone addiction but fails to definitively define addiction or provide a diagnostic criterion of addictive mobile phone usage (Hong et al., 2012). Cholz (2012) also developed the Mobile Phone Dependence (TMD) Scale to capture one's dependency on their mobile phone. Both measurement instruments aim to capture the psychological dependency on one's mobile phone beyond time duration. Further attempts to measure this may be better captured through qualitative methods to examine the user experience and values related to how and why individuals are using their mobile phones.

Investigating the relationship between depression and mobile screen time usage alone may be too broad of a task. Investigating various, more specific cognitive functions (i.e., social skills, productivity, memory, attention span) may provide valuable data and prove to be valuable research towards determining the effects of mobile screen time usage on cognitive function in college students. Furthermore, investigating various specific feelings commonly associated with depression (i.e., loneliness, sadness, hopelessness, loss of interest) may provide valuable data and prove to be valuable research towards determining the effects of mobile screen time usage on the overall mental well-being in college students. Finally, this study focused only on the use of the mobile phone, but we certainly know that “screen time” is a much broader platform in today’s society (e.g., television, computers, video games) and may require a more sophisticated measurement approach.

Implications for Practice

From not only the data yielded in this research study, but the ever-advancing technological state of the world, it can be inferred that digital media and technology are here to stay (Caparrotta, 2013). Results of this and other studies provide many practitioner implications as digital media and technology continue to evolve and RTs will need to consider the implications of technology and specifically digital media as both a potential disorder *and* a treatment option (Kokorelias et al., 2024).

The first challenge includes the ability to differentiate and measure the impacts of digital media. As mentioned earlier, finding valid and reliable measurement methods to capture digital media addiction should be considered. Health care practitioners have commonly held a negative connotation around mobile phones' usage, but this perception does consider the possible values and/or needs met through usage per individual. There seems to be a distinctive line of

productive/unproductive use of the mobile phone and measuring the elements that lead to negative and destructive mental health conditions remain a critical need. RTs should go beyond the simple measurement of frequency and duration of the mobile phone as a recreation and leisure activity. A more valuable approach would be to consider using both quantitative and qualitative measurement approaches that focus more on the *dependency* that leads to negative life consequences (Choliz, 2012; Hong et al., 2012).

Finally, the inevitable growth of technology provides the need for RTs to consider the therapeutic potential of digital media and digital media as a therapeutic approach (Nelson & Isaacs, 2020) and platform (Loy et al., 2023). Rather than attempting to eliminate dependency on or addictive behaviors related to screen time solely through usage reduction strategies, RTs must instead focus on fostering healthy relationships with screen time and digital media indulgence. While overdependence on digital media and technology can lead to negative effects, it has been demonstrated that technology can provide multiple therapeutic interventions to help treat health outcomes (Kokorelias et al., 2024; Nelson & Issacs, 2020). This may also include the behavioral approach of promoting the use of applications that support well-being, educating individuals on recommended and developmentally appropriate screen time limits, implementing strategies that mitigate addictive behaviors, etc. By encouraging mindful and purposeful technology use, RTs can guide individuals toward sustainable or “healthy” digital habits. Adopting a philosophy of “joining them, not fighting them” acknowledges the pervasive role of technology and emphasizes the importance of integration over avoidance in therapeutic practice.

Conclusion

With the near ubiquitous presence of mobile screen time usage in college students' daily lives, it is now the most pressing time to consider a relationship between mobile screen time usage and depressive symptoms (Nowland et al., 2018). While there were few to no significant correlations found between (1) mobile screen time usage and depressive symptoms and (2) demographic variables and depressive symptoms in this study, valuable information regarding mobile screen time usage and depression in college students was produced and presented.

Findings found in this study support the idea that both depressive symptoms in college students and daily mobile screen time usage of college students are alarmingly high, and future research is suggested to help explain these high numbers.

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SECTION II: EXTENDED LITERATURE REVIEW

Impact and Mental Health Treatment of Depression

Depression, as defined by the National Institute of Mental Health (2024), is a common but serious mood disorder that causes severe symptoms that affect how a person feels, thinks, and handles daily activities, such as sleeping, eating, or working. Symptoms include, but are not limited to, feelings of sadness, emptiness, or hopelessness, angry outbursts, irritability or frustration, loss of interest or pleasure in most or all normal activities, sleep disturbances, tiredness and lack of energy, reduced appetite, anxiety, slowed thinking, feelings of worthlessness or guilt, trouble concentrating, frequent or recurrent thoughts of death, suicidal thoughts, suicide attempts or suicide, and unexplained physical problems (Mayo Clinic, 2022). Risk factors for depression can include personal or family history of depression and major negative life changes trauma, or stress (National Institute of Mental Health, 2024).

Studies of depressive disorders have stressed the importance of mortality and morbidity associated with depression. Lépine and Briley (2011) suggested that the mortality risk for suicide in depressed patients is more than 20-fold greater than in the general population. Beyond the United States, suicide presents a serious public health concern at the international level resulting in over 700,000 deaths per year, ranking as the fourth leading cause among young adults worldwide (Bertuccio et al., 2024; Värnik et al., 2009; World Health Organization, 2021). In 2019 alone, 703,000 lives were lost to suicide, equating to one death by suicide every 45 seconds and suicide rates are only continuing to rise (World Health Organization, 2021). Between 2000 and 2018, the United States suicide rate increased 35%, thus contributing to the subsequent decrease in US life expectancy (Martínez-Alés et al., 2022). In addition to suicide deaths,

suicidal ideation (i.e., thinking about and planning suicide) and non-fatal suicide attempts are prevalent in the college student population (Li et al., 2020; Uchida & Uchida, 2017).

Students' mental health and well-being are not only important in their own right, but also as a factor contributing to society's overall well-being (Bhujade, 2017). College students are in a unique and special period of life where they grow from adolescence to adulthood consequently learning and making many important life lessons and decisions (Lei et al., 2016). During this phase, students face the challenges of identity and role transformation and more diversification and complexity from families and institutions (Liu et al., 2022). Similarly, these college students may experience the "persistence, exacerbation, or first onset of mental health and substance use problems while possibly receiving no or inadequate treatment" (Pedrelli et al., 2015, pg. 503). In recent years, the prevalence of depression among college students has gradually increased, even exceeding that of the general public, which has become a global phenomenon (Liu et al., 2022). Because of this new public health threat, the general well-being of society has expedited an examination of the factors related to our mental health outcomes (Insel, 2023).

Mental Health and the Role of Recreational Therapy

Although the use of recreational activities to boost health can be traced back to the 1850s, recreational therapy as an official form of therapy only became recognized at the beginning of the 20th century (Cipriano, 1995). Recreational therapy (RT) differs from related disciplines as it focuses on enhancing functioning within the physical, social, cognitive, emotional, and spiritual domains (*About Recreational Therapy*, n.d.). RTs treat and help maintain/improve the physical, mental, and emotional well-being of their clients by seeking to reduce depression, stress, and anxiety, recover basic motor functioning and reasoning abilities, build confidence, and socialize effectively (National Council for Therapeutic Recreation Certification, n.d.). RT is provided

throughout a variety of settings, including but not limited to: “inpatient and outpatient physical rehabilitation, inpatient and outpatient mental health, skilled nursing facilities and assisted living, adult day programs, park and recreation, adapted sports programs, acute care hospitals, pediatric hospitals and programs and school systems (*About Recreational Therapy*, n.d.).

RTs utilize the therapeutic process for treating clients, otherwise known as the APIED process. The process involves "assessment of an individual's needs and functioning, planning of interventions, implementation of services, evaluation of interventions and client progress and documentation (APIED) of services provided” (*About Recreational Therapy*, n.d.). Research and literature indicate that RT proves to be beneficial and “provides a variety of positive health outcomes for individuals of all ages with physical disabilities, older adults, individuals with psychiatric disorders, pediatric patients, youth at risk and people with developmental disabilities or brain injuries (*About Recreational Therapy*, n.d.). RT as a treatment for various psychiatric conditions has been utilized for decades and is considered an important part of rehabilitation as participation in recreation increases cognitive ability and social and communication skills among clients with mental health disorders (Jagannathan et al., 2022). As RT continues to demonstrate therapeutic value in supporting various mental health conditions, the evolving landscape of leisure, most specifically digital leisure, raises important questions about how technology-driven recreation impacts mental and physical well-being and whether it can serve similar therapeutic purposes or, conversely, contribute to mental health challenges.

Digital Leisure

Leisure can be defined as “a relatively freely chosen humanistic activity and its accompanying experiences and emotions (e.g., enjoyment and happiness) that can potentially make one's life more enriched and meaningful” (Iwasaki et al., 2010, pg. 485). And although the

term leisure is often interchangeably used with the term recreation, recreation is defined as activities or experiences that occur during one's free time and span across a wide spectrum of activities (Hurd & Anderson, 2011). One end of the recreation spectrum includes activities that society deems inherently "good" or socially acceptable, while the opposite end holds untraditional, deviant, or "taboo" activities (Hurd & Anderson, 2011). These socially unacceptable recreation activities, otherwise known as "purple recreation," may include substance use, vandalism, excessive gambling, and/or any other activities that can cause harm to oneself, others, or society (Curtis, 1979; Hurd & Anderson, 2011; Wright, 2009). However, when one's chosen leisure or recreation activity begins to resemble deviant or taboo behavior, the quality of the activity's enrichment and meaningfulness comes into question (Curtis, 1988; McLean & Hurd, 2012; Stebbins, 1997; Williams & Walker, 2006; Wright, 2009). While participating in leisure and recreation activities often promotes mental health benefits (Takiguchi et al., 2023), the opposite effect may result from participation in purple recreation. The growth of digital leisure usage has brought into the question of whether excessive usage can perpetuate it becoming purple leisure within society.

Digital leisure is defined as "the time spent by individuals using digital tools and platforms for entertainment, recreation, acquiring knowledge, communication, socialization, and escaping from a negative mood state during their free time" (Tutar & Turhan, 2023, pg. 16). Digital leisure presents a vast array of new opportunities to play, learn, get informed, and become entertained (Lupton 2016). Digital leisure activities include, but are not limited to, watching television, engaging with computers, mobile phones, and the internet (e.g., online chatting, gaming, building virtual connections/friendships, joining virtual spaces, socializing in virtual environments), and playing video games (Tutar & Turhan, 2023). While these activities

may certainly provide positive benefits, the amount and type of digital engagement may bear adverse effects on overall wellbeing as not all digital engagements are the same (Tutar & Turhan, 2023). For example, someone using their mobile phone to listen to a 10-minute online meditation audio recording may be affected differently than someone using their mobile phone to scroll through social media for 10-minutes (Begin et al., 2022). We fail to understand the value, whether positive or negative, of certain *types* of digital leisure engagement.

Digital Leisure and Mental Health

In modern society, technology and leisure time have become more closely connected than ever (Tutar & Turhan, 2023). New technologies, such as mobile and interactive screen media, are now ingrained in our daily lives making leisure time and leisure increasingly intertwined (Muppalla et al., 2023). These technologies have revolutionized learning and communication, but research indicates that screen usage may have serious adverse effects on children's chronic health, making this a critical public health concern (Muppalla et al., 2023). Recent research has suggested that children aged 8–12 years old spend an average of four to six hours a day on their devices with this number increasing to nine hours per day for teenagers (Xu et al., 2023). Not only has average daily usage increased, but the age at which youth engage with media on a regular basis has fallen as well (Muppalla et al., 2023). In 1970, children began engaging with media on a regular basis at four years old, but in present day, regular usage can begin at only four months (Muppalla et al., 2023).

The debate around the psychological impacts of screen time usage remains a pressing and regular feature of societal conversation (Kaye et al., 2020). Concerns regarding screen time usage have become so extreme that the US Department of Health has issued a key disease prevention objective and provided recommendations for screen time limitations as one of its

national health improvement priorities (Sigman, 2014). Furthermore, the World Health Organization has projected that depression will be the leading cause of disease burden by the year 2030 and growing evidence suggests that a sedentary lifestyle is an important risk factor of depression among adults (Madhav et al., 2017; World Health Organization, 2011). Previous studies have shown that screen time-based sedentary behavior influences mental health, such as sleep problems, anxiety disorders, and depression (Wang et al., 2019). While anxiety and depression have become a new public health threat, healthcare professionals should seek the tools to combat and resolve this growing crisis (Insel, 2023). The field of recreational therapy may be a new treatment approach to address this new technological phenomenon (Mumcu et al., 2021).

Digital Leisure and the Role of Recreational Therapy

Recreational therapy (RT), also known as therapeutic recreation, is defined by the National Council for Therapeutic Recreation Certification as “a systematic process that utilizes recreation and other activity-based interventions to address the assessed needs of individuals with illnesses and/or disabling conditions, as a means to psychological and physical health, recovery and well-being” (National Council for Therapeutic Recreation Certification, n.d.). The foundation of the RT profession was built upon the therapeutic value of recreation and leisure experiences (Carter & Van Andel, 2020). Leisure, an important aspect of human life, provides individuals with opportunities to engage in activities that offer pleasure, relaxation, and satisfaction outside of work and other responsibilities (Tutar & Turhan, 2023). Changes in the organization and experience of leisure activities and periods of leisure history have frequently been driven by technological developments influencing both access and experience (Bryce, 2001). Computer technology and the internet are important locations of digital leisure, as they

create new spaces for leisure participation (Bryce, 2001). However, these virtual spaces represent a change in both leisure activities and experiences, which in-turn, have implications for the societal and individual experience of leisure, health, and well-being (Bryce, 2001).

While disparity between the equality of mental and physical health care still exists, the idea that people with mental health, including depression, often require more than medical care needs to be considered (Insel, 2023). The field of RT may contribute a unique role in the treatment of mental health as a direct outcome of screen time usage, as the very foundation of RT lies in providing leisure/recreational services based on individuals' interests and lifestyle, ultimately resulting in improved functioning and quality of life (Hoss & Armstrong, 2016). RT interventions have been described as empowering, helping clients increase connections within their communities, find meaning and purpose, and develop a positive personal identity (Ariss et al., 2019).

With the increasing cases of digital dependency/addictive screen time behavior, new behavior management approaches and countermeasures continue to develop (Nakshine et al., 2022). Behavior approaches consist of tracking daily screen time usage data, sharing information regarding the negative effects of high screen time, support group sessions (sharing with others who are also aiming to limit screen time usage), app timers/limits, bedtime and grayscale mode (setting to make decrease screens' visual appeal and serve as a bedtime reminder), focus mode (setting that temporarily locks selected apps), and calendar reminders (Rana & Khushi, 2024). These methods have all been used and found to modify smartphone dependence and addictive screen time behaviors that negatively impact overall health and wellbeing (Rana & Khushi, 2024). It remains an increasingly critical issue for health professionals, including recreational therapists (RTs), to fully understand the scope and impact of excessive digital leisure from an

assessment and treatment perspective. While typically within the field of RT leisure is often seen with a myopic focus on the benefits and “goodness” of leisure and recreation, it is imperative for RTs to fully recognize the potential negative impacts of excessive and addictive leisure. RT often uses behavior management techniques to change negative, addictive, and/or excessive behaviors such as substance abuse, eating disorders, or self-abusive actions, so it is inherently necessary for the field of RT to fully understand and prepare for the continued growth of this potential obsession (Keesmaat, n.d.) However, there is a current gap in the research surrounding the limitation, impact, and treatment of digital dependency/addictive screen time behavior through RT. This study serves to provide an initial attempt in providing clarity and understanding of the relationship between screen time and depressive symptoms, and the specific role of RT in combatting and implementing treatment for excessive digital leisure.

EXTENDED DISCUSSION

This study examined the potential relationship between mobile screen time and the severity of depression/depressive symptoms in college students and the association between screen-related categories and the severity of depression symptoms in college students. Analysis of data found that both research questions were *not* statistically significant. The following section includes detailed possible methodological implications that may have influenced results. While some data yielded what was found to be contradictory to previous assumptions and current literature, important issues and questions remain unanswered for future clinical practice and research.

Limitations

Some limitations were discovered throughout this research study, resulting in various methodological challenges. Future research will benefit from avoiding or adapting to these listed limitations.

Study/Survey Instrument Design Issues

Limitations of the research study included the study design and survey instrument design issues. This retrospective correlational designed study utilized a self-administered survey that was used to assess depression and mobile screen time usage in participants. The survey instrument included a measurement instrument, the PHQ-9, which measured the severity of depressive symptoms in participants. The PHQ-9 measures depressive symptom criteria present within the past two weeks from survey completion (Kroenke et al., 2001). Screen time usage data were also collected from screenshots of iPhone settings submitted by participants. The screen time data collected in these photos were representative of a single week's worth of screen time

usage. This discrepancy in measuring time (2 weeks for PHQ-9 vs. 1 week for screen time daily use average) may have impacted reliability and validity of the findings.

Secondly, iPhones measure and maintain an *average* screen time usage across all days of the week, but it was determined *after* the start of data collection that data reset on each Sunday. To explain further, the reporting period varied across participants and the number of days included within the data collection was dependent on what day of the week the survey was completed on (e.g., participant A completed the survey on Wednesday and had 4 days of data collection vs. participant B completed the survey on Saturday and had 7 days of data collection). While adjustments were made to calculate daily average to accommodate this iPhone recording limitation, this unforeseen data collection setting may have further impacted the results.

The time of survey distribution may have potentially limited participation and participant responses, as the survey was opened and distributed throughout the Spring semester within the month of March (March 5th – March 30th). March may not have been the optimal time for survey distribution, as midterm exams and Spring Break (no classes for one week) occurred during this time. Motivation to complete the survey may have been decreased due to the pressing time of the semester and the survey may not have reached as many participants due to the absence of classes for a week, resulting in less students on campus, less students checking their email, etc.

Lastly, before data analysis could begin, participant responses had to be sorted, and missing data had to be noted. A total of 148 surveys were submitted by participants but despite having a “forced answer” indicated in survey and specific screen shot submission instructions to prevent errors, the dataset contained numerous errors in image submission for the average daily screen time and screen time categories items (i.e., participants did not follow survey image submission instructions), thus resulting in deletion of 63 survey responses. Missing data items

were not included within data analysis. The final sample (N) had a total size of 85 usable surveys. It is unclear why there were so many errors in image submission for both the average daily screen time and screen time categories items, but it can be surmised that the written instructions were disregarded for being too lengthy or unclear. Future research should consider emphasizing and potentially piloting submission instructions to limit errors and missing data.

Key Findings

Participants of this study reported mobile screen time usage, mobile screen time usage categories, and depressive symptoms. The analysis of data found no statistically significant correlation between average daily screen time usage and depressive symptoms. Although depressive symptoms were not statistically correlated with average daily screen time usage, the reported data is alarming and should be noted. In 85 participants, the average daily time spent on a mobile phone was 399.45 minutes, or 6.66 hours, and the average total PHQ-9 score was 5.1294 suggesting an overall “mild” depression severity category. It is clear from this data that mobile screen time usage is a central point in college students' lives, and while the assumption typically is that screen time isolates us from reality, the opposite, antithetical to depression, may also be occurring. Understanding the point of when mobile screen time usage is productive vs. when it is damaging will provide valuable insight into this ideology. Further research is necessary to better understand the contradicting values/implications of mobile screen time usage as well as the causation of high depressive symptoms in college students. From both the literature and results of this study, two major emerging themes developed that are worthy of further discussion: (1) High dependency and addiction to mobile phones and (2) Depression severity among college students.

Theme 1: High Dependency and Addiction to Mobile Phones

It is no secret that mobile phones have become a central and integral part of human life (Smith et al., 2011). However, the value or quality of mobile screen time usage varies and is essentially determined by each specific user. This study did not provide definitive answers as to why screen time usage was so high and said effects of high screen time usage may not be definitive, but contrary and extremely complex. Drawing conclusions on the impact of the digital world on mental well-being is extremely difficult, making causation difficult to establish (Nowland et al., 2018). The idea of screen time usage as a double-edged sword is commonly presented throughout literature (Nowland et al., 2018). When screen time and the internet is used to enhance existing relationships and create new social connections, it is often viewed as a useful tool. Contrarily, when screens are used to escape reality and withdraw from social interaction, negative feelings such as feelings of loneliness and social withdrawal are often increased (Nowland et al., 2018). Conducting research collecting qualitative data regarding the specific feelings associated with mobile screen time usage must be done to provide further insight into the quality of mobile screen time, the feelings associated with mobile screen time, and how mobile screen time is experienced and even valued by others. For example, within the literature, qualitative research regarding screen time usage perspective and effects have been examined through participant interviews (Geurts et al., 2022), participant journal logs/media diaries (Mascheroni & Zaffaroni, 2025), and other methods of qualitative meta-synthesis (Minges et al., 2015). Considering other data collection may have captured the true digital user experience that may not be collected in more traditional quantitative methods.

The increased usage of mobile phones by college students may also have connections to various health and psychosocial factors. Kuang-Tsan and Fu-Yuan (2017) found that cell phone

usage among college students was significantly related ($p < .01$) to various determinants of life stress (e.g., academic, interpersonal relationships, family life, self-career, and love-affair). Further analysis indicated that love-affair stress ($p < .001$) and academic stress ($p < .05$) were predictive of smart phone addition. Kuang-Tsan and Fu-Yuan (2017) suggested that college students may have used their mobile phones as a substitute for social support as a coping mechanism for these life stresses. This research suggests that college students do perceive some value in the mobile phone as a mechanism to cope with campus-related stress.

Measuring the value of mobile phone usage is more complicated than ever (Han et al., 2013). The mobile phone and subsequent mobile phone application industries have created a commercially competitive advantage to eliminate many other media products such as the camera, calendar organizer, physical activity measurement device (e.g., step counters), heart rate monitors, music devices, and traditional entertainment viewing on televisions (Szyjewski & Fabisiak, 2018). This commercialization has very effectively created an industry market where the mobile phone is essential, if not critical, to functioning in and fully engaging in the human experience, especially college students (Szyjewski & Fabisiak, 2018). As the rest of the world considers the presence of mobile phone “addiction,” researchers should also highlight the inconsistent meanings and values to mobile phone users as usage has been demonstrated to *not* always have a significant relationship ($p > .05$) with life satisfaction (Kuang-Tsan & Fu-Yuan, 2017). Regardless, depression, mental health, and well-being remain a pressing issue on college campuses, and researchers should continue to seek answers.

Theme 2: Depression Severity Among College Students

Research studies on the prevalence of depression/depression symptoms in college students have been rapidly emerging and only increasing with more alarming statistics within the

post-pandemic era (Coughenour et al., 2021; ElBarazi & Tikamdas, 2025; Luo et al., 2024). Data has indicated an astounding 48.9% prevalence of depression among college students, and it is clear that something is causing high rates of depressive symptoms/depression in college students (Luo et al., 2024). While that cause may not be mobile screen time usage alone, the cause and/or contributing factors must be further researched.

Literature suggests potential causes/influencing factors on the increasingly high prevalence of depression in college students. Firstly, the use of social networking sites (SNS) has been negatively associated with self-esteem and positively associated with Fear of Missing Out (FoMO) (Leung et al., 2021). Alsunni and Latif (2021) found a relationship between social media investment and anxiety ($r = 0.71$; $p < 0.001$) and depression/anxiety ($r = 0.72$; $p = 0.003$) in college students. In this study, the most used screen time category was in-fact the “social” category, thus supporting the idea that increased usage of social media increases the probability of depression in college students. The lack of consistency in this study with previous research may suggest the need for a new measurement of digital engagement beyond just mobile phone usage.

Lack of adequate resources may also be a contributing factor to increasingly high numbers of campus depression. Between 2009 and 2015 alone, the total number of students seeking assistance from college/university counseling centers increased by 30%, while enrollment in counseling services only increased by 6% (Reilly, 2018). Furthermore, campus counseling centers report inadequate staff to deal with the increased demand for services, which has resulted in waitlists and session limits (Xiao et al., 2017). Rosenthal and Wilson (2008) found that over three-quarters of university students with significant mental distress did not receive counseling and that lack of knowledge/understanding of available resources on campus

may also play a role. With these alarming numbers of campus depression, it is vital that students are well informed about mental health resources on and off campus, and that student mental health is well understood to ensure students access the support for their need while attending college (Cage et al., 2020).

Financial stressors have also been attributed as a potential cause of depression within college students, as the high cost of living is making it harder for working college students to manage school, work, and a social life (Pusher, 2024). In a survey conducted by Studocu (2023), around 55% of college students in the United States said inflation and economic factors negatively impacted their mental health. According to the U.S. Bureau of Labor Statistics (2025), from January 2023 to January 2024, the cost of groceries, increased 1.2 percentage points, and rent increased by 6.1 percentage points. Furthermore, the rising cost of a college education was found to be associated with increased credit card debt as student loans were not adequate in adequately providing for all the costs associated with attending college (Lyons, 2004). These consistent and increasing life stressors may certainly play a significant role in the increasing depression among college students (Kuang-Tsan & Fu-Yuan, 2017). Therefore, University employees (e.g., financial planners, educators, counselors) should be aware of the potential factors impacting students' financial mental health, as collaborating with professionals would be greatly beneficial in lowering financial anxiety and increasing financial satisfaction and well-being (Archuleta et al., 2013).

Implications for Future Research

After completing this research study, important issues and questions arise and remain for practice and future research. Firstly, due to the average total PHQ-9 score, future research on possible causes, effects, and prevention methods must be done. The data collected in this study

implies that mobile screen time usage is not related to depressive symptoms, but the question remains: What is? Secondly, due to the high amount of average daily time spent on a mobile phone, future research is needed regarding mobile screen time usage. This research supports the idea that it is difficult, if not impossible, to determine the importance or value of recreational activities (mobile screen time usage) explicitly, as everyone experiences and values it differently.

The lack of significant findings in this study may also suggest differences among college students use mobile phones. Researchers may wish to continue to conceptualize mobile phone addiction and attempt to remove the single value-laden attribute of time spent using mobile phones. The Smart Phone Mobile Phone Addiction Scale (MPASa; Hong et al., 2012) was developed to capture characteristics of smart phone addiction but fails to definitively define addiction or provide a diagnostic criterion of addictive mobile phone usage. Cholz (2012) also developed the Mobile Phone Dependence (TMD) Scale to capture one's dependency on their mobile phone. Both measurement instruments aim to capture the psychological dependency on one's mobile phone beyond time duration. Further attempts to measure this may even be better captured through qualitative methods to examine the user experience and values related to how and why individuals are using their mobile phones.

Investigating the relationship between depression and mobile screen time usage alone may be too broad of a task. Investigating various, more specific cognitive functions (i.e., social skills, productivity, memory, attention span) may provide valuable data and prove to be valuable research towards determining the effects of mobile screen time usage on cognitive function in college students. Furthermore, investigating various specific feelings commonly associated with depression (i.e., loneliness, sadness, hopelessness, loss of interest) may provide valuable data and prove to be valuable research towards determining the effects of mobile screen time usage on the

overall mental well-being in college students. Finally, this study focused only on the use of the mobile phone, but we certainly know that “screen time” is a much broader platform in today’s society (e.g., television, computers, video games) and may require a more sophisticated measurement approach.

Implications for Practice

From not only the data yielded in this research study, but the ever-advancing technological state of the world, it can be inferred that digital media and technology are here to stay (Caparrotta, 2013). Results of this and other studies provide many practitioner implications as digital media and technology continue to evolve and RTs will need to consider the implications of technology and specifically digital media as both a potential disorder *and* a treatment option (Kokorelias et al., 2024).

The first challenge includes the ability to differentiate and measure the impacts of digital media. As mentioned earlier, finding valid and reliable measurement methods to capture digital media addiction should be considered. Health care practitioners have commonly held a negative connotation around mobile phones' usage, but this perception does consider the possible values and/or needs met through usage per individual. There seems to be a distinctive line of productive/unproductive use of the mobile phone and measuring the elements that lead to negative and destructive mental health conditions remain a critical need. RTs should go beyond the simple measurement of frequency and duration of the mobile phone as a recreation and leisure activity. A more valuable approach would be to consider using both quantitative and qualitative measurement approaches that focus more on the *dependency* that leads to negative life consequences (Choliz, 2012; Hong et al., 2012).

Finally, the inevitable growth of technology provides the need for RTs to consider the therapeutic potential of digital media and digital media as a therapeutic approach (Nelson & Isaacs, 2020) and platform (Loy et al., 2023). Rather than attempting to eliminate dependency on or addictive behaviors related to screen time solely through usage reduction strategies, RTs must instead focus on fostering healthy relationships with screen time and digital media indulgence. While overdependence on digital media and technology can lead to negative effects, it has been demonstrated that technology can provide multiple therapeutic interventions to help treat health outcomes (Kokorelias et al., 2024; Nelson & Issacs, 2020). This may also include the behavioral approach of promoting the use of applications that support well-being, educating individuals on recommended and developmentally appropriate screen time limits, implementing strategies that mitigate addictive behaviors, etc. By encouraging mindful and purposeful technology use, RTs can guide individuals toward sustainable or “healthy” digital habits. Adopting a philosophy of “joining them, not fighting them” acknowledges the pervasive role of technology and emphasizes the importance of integration over avoidance in therapeutic practice.

Higher Education and Mental Health

Because this study solely focused on the mental health of a college student population, ideas surrounding RT services on university campuses arise. The high prevalence of depression on college campuses provides an opportunity to consider both the cause and solution. First, while this study did not provide a direct link to the impact of high screen times on depression, there remains a concern if there might be a link (Li et al., 2022). Therefore, the idea of educational/training courses offered to university staff and students specifically surrounding the importance of healthy screen time behaviors and the implications of excessive/addictive use of screen time is given. Courses/trainings on the awareness of screen time and addictive behaviors

may help staff and students to become more knowledgeable, and more specifically how to identify and mitigate excessive/addictive screen time behaviors, ways to reduce excessive screen time, strategies for setting healthy screen time habits, how to use screen time in a healthy way, healthy screen time applications and how to use them, the effects of positive vs. negative screen time usage, etc. Various courses/trainings can be found online surrounding screen time usage already (Smith et al., 2014), so making a university-specific course/training should not prove to be difficult to address potential connections between screen time and depression.

The other issue related to the prevalence of mental health on college campuses is the treatment and intervention for such rising numbers of cases among students. Recreation and physical activity have been found to be effective at treating or moderating the effects of depression (Nagata et al., 2020). RTs often treat individuals with depression, and it makes logical sense that RTs could easily provide programs to help curtail the rising rates of depression on college campuses. RTs commonly use treatment interventions such as leisure education, stress management, physical activity/exercise, and individual counseling to help clients deal with depression and mental health (Lam et al., 2017). The implementation of RT in higher education settings may be a new scope of service considering the escalating instances of mental health and depression issues.

Implications for RT Practice

While disparity between the equality of mental and physical health care still exists, the idea that people with mental health, including depression, often require more than medical care needs to be considered (Insel, 2023). The field of RT may contribute a unique role in the treatment of mental health as a direct outcome of screen time usage, as the very foundation of RT lies in providing leisure/recreational services based on individuals' interests and lifestyle,

ultimately resulting in improved functioning and quality of life (Hoss & Armstrong, 2016). RT interventions have been described as empowering, helping clients increase connections within their communities, find meaning and purpose, and develop a positive personal identity (Ariss et al., 2019).

With the increasing cases of digital dependency/addictive screen time behavior, new behavior management approaches and countermeasures continue to develop (Nakshine et al., 2022). Behavior approaches consist of tracking daily screen time usage data, sharing information regarding the negative effects of high screen time, support group sessions (sharing with others who are also aiming to limit screen time usage), app timers/limits, bedtime and grayscale mode (setting to make decrease screens' visual appeal and serve as a bedtime reminder), focus mode (setting that temporarily locks selected apps), and calendar reminders (Rana & Khushi, 2024). These methods have all been used and found to modify smartphone dependence and addictive screen time behaviors that negatively impact overall health and wellbeing (Rana & Khushi, 2024). It remains an increasingly critical issue for health professionals, including recreational therapists (RTs), to fully understand the scope and impact of excessive digital leisure from an assessment and treatment perspective. While typically within the field of RT leisure is often seen with a myopic focus on the benefits and “goodness” of leisure and recreation, it is imperative for RTs to fully recognize the potential negative impacts of excessive and addictive leisure. RT often uses behavior management techniques to change negative, addictive, and/or excessive behaviors such as substance abuse, eating disorders, or self-abusive actions, so it is inherently necessary for the field of RT to fully understand and prepare for the continued growth of this potential obsession (Keesmaat, n.d.) However, there is a current gap in the research surrounding the limitation, impact, and treatment of digital dependency/addictive screen time behavior through

RT. This study serves to provide an initial attempt in providing clarity and understanding of the relationship between screen time and depressive symptoms, and the specific role of RT in combatting and implementing treatment for excessive digital leisure.

The scope of RT practice is wide, encapsulating individuals of all age groups, in a large variety of settings, with a wide range of diagnoses (*About Recreational Therapy*, n.d.). RTs are uniquely positioned to address the growing concern of excessive screen time usage, particularly its effects on mental, physical, and social well-being. As screen time usage continues to rise across all ages and populations, it seems logical to imagine a connection to issues such as anxiety, depression, sedentary behavior, and diminished face-to-face interactions (Twenge et al., 2018; Stiglic & Viner, 2019). RT professionals can play a critical role in offering alternative, health-promoting interventions that incorporate leisure education, behavioral activation, and nature-based interventions to replace or reduce screen time with meaningful engagement. For example, RTs may guide participants in developing an awareness of their digital habits and thus introducing balanced routines through structured strategies, usage limits, and plans.

Finally, as mentioned earlier, RT has long attempted to treat those with depression and mental health issues (Nagata et al., 2020). RTs often utilize interventions such as adventure therapy, expressive arts, and social skill-building groups to counteract the isolating effects of digital overuse (*About Recreational Therapy*, n.d.). Furthermore, RTs should consider including a new focus in programs that advocate include digital wellness education, particularly among youth and individuals with developmental or mental health disorders who may be more vulnerable to problematic screen use (Domoff et al., 2020). This enhancement of services not only expands the scope of RT but reinforces the profession's role in promoting holistic well-being in the digital age

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Appendix A: Institutional Review Board (IRB) Approval Letter



EAST CAROLINA UNIVERSITY

University & Medical Center Institutional Review Board

Willis Building · Mail Stop 682

600 Moye Boulevard · Greenville, NC 27834

Office 252-744-2914 · Fax 252-744-2284

rede.ecu.edu/umcib/

Notification of Initial Approval: Expedited

From: Social/Behavioral IRB

To: [Casey Weidner](#)

CC: [David Loy](#)

Date: 3/5/2025

Re: [UMCIRB 25-000143](#)

Mobile Screen Time and Depression

I am pleased to inform you that your Expedited Application was approved. Approval of the study and any consent form(s) occurred on 3/4/2025. The research study is eligible for review under expedited category # 7. The Chairperson (or designee) deemed this study no more than minimal risk.

As the Principal Investigator you are explicitly responsible for the conduct of all aspects of this study and must adhere to all reporting requirements for the study. Your responsibilities include but are not limited to:

1. Ensuring changes to the approved research (including the UMCIRB approved consent document) are initiated only after UMCIRB review and approval except when necessary to eliminate an apparent immediate hazard to the participant. All changes (e.g. a change in procedure, number of participants, personnel, study locations, new recruitment materials, study instruments, etc.) must be prospectively reviewed and approved by the UMCIRB before they are implemented;
2. Where informed consent has not been waived by the UMCIRB, ensuring that only valid versions of the UMCIRB approved, date-stamped informed consent document(s) are used for obtaining informed consent (consent documents with the IRB approval date stamp are found under the Documents tab in the ePIRATE study workspace);
3. Promptly reporting to the UMCIRB all unanticipated problems involving risks to participants and others;
4. Submission of a final report application to the UMCIRB prior to the expected end date provided in the IRB application in order to document human research activity has ended and to provide a timepoint in which to base document retention; and
5. Submission of an amendment to extend the expected end date if the study is not expected to be completed by that date. The amendment should be submitted 30 days prior to the UMCIRB approved expected end date or as soon as the Investigator is aware that the study will not be completed by that date.

The approval includes the following items:

Name	Description
End of Survey Message & Survey Preview Link.docx	Surveys and Questionnaires
Example of Screen Time Usage Screenshots.docx	Additional Items
Information Flyer Recruitment.png	Recruitment Documents/Scripts
Instructions on Locating and Submitting Screen Time Usage Within iPhone Settings.docx	Additional Items
IRB Weidner Final Proposal.docx	Study Protocol or Grant Application
Revised Informed Consent for Qualtrics Survey Respondents (1).docx	Consent Forms
Weidner Thesis Final Qualtrics (2).pdf	Surveys and Questionnaires
Weidner Thesis Qualtrics Survey	Surveys and Questionnaires

For research studies where a waiver or alteration of HIPAA Authorization has been approved, the IRB states that each of the waiver criteria in 45 CFR 164.512(i)(1)(i)(A) and (2)(i) through (v) have been met. Additionally, the elements of PHI to be collected as described in items 1 and 2 of the Application for Waiver of Authorization have been determined to be the minimal necessary for the specified research.

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

IRB00000705 East Carolina U IRB #1 (Biomedical) IORG0000418

IRB000003781 East Carolina U IRB #2 (Behavioral/SS) IORG0000418

Appendix B: Informational Flyer

SURVEY RESEARCH PARTICIPANTS NEEDED!

STUDY PURPOSE: To examine the potential relationship between mobile screen time usage and depression in college students.



INCLUSION CRITERIA:

- a) must be currently enrolled as a college student at East Carolina University (ECU)
- b) must have and use an iPhone as their mobile phone

SCAN HERE FOR SURVEY!



Any Questions?

Please Contact:

Casey Weidner, LRT, CTRS, CARSS I

weidnerc19@students.ecu.edu

East Carolina University, Recreation

Sciences Department

UMCIRB 25-000143

Appendix C: The Patient Health Questionnaire (PHQ-9) Instrument

PATIENT HEALTH QUESTIONNAIRE (PHQ-9)

ID #: _____ **DATE:** _____

Over the last 2 weeks, how often have you been bothered by any of the following problems?
(use "✓" to indicate your answer)

	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed. Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead, or of hurting yourself	0	1	2	3

add columns + +

(Healthcare professional: For interpretation of TOTAL, TOTAL:
please refer to accompanying scoring card).

10. If you checked off *any* problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all _____

Somewhat difficult _____

Very difficult _____

Extremely difficult _____

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A2663B 10-04-2005

Stanford Medicine. (1999). *Patient Health Questionnaire (PHQ-9)*.

https://med.stanford.edu/fastlab/research/imapp/msrs/_jcr_content/main/accordion/accordion_content3/download_256324296/file.res/PHQ9%20id%20date%2008.03.pdf

Appendix D: The Patient Health Questionnaire (PHQ-9) Instrument Scoring

PHQ-9 Patient Depression Questionnaire

For initial diagnosis:

1. Patient completes PHQ-9 Quick Depression Assessment.
2. If there are at least 4 ✓s in the shaded section (including Questions #1 and #2), consider a depressive disorder. Add score to determine severity.

Consider Major Depressive Disorder

- if there are at least 5 ✓s in the shaded section (one of which corresponds to Question #1 or #2)

Consider Other Depressive Disorder

- if there are 2-4 ✓s in the shaded section (one of which corresponds to Question #1 or #2)

Note: Since the questionnaire relies on patient self-report, all responses should be verified by the clinician, and a definitive diagnosis is made on clinical grounds taking into account how well the patient understood the questionnaire, as well as other relevant information from the patient.

Diagnoses of Major Depressive Disorder or Other Depressive Disorder also require impairment of social, occupational, or other important areas of functioning (Question #10) and ruling out normal bereavement, a history of a Manic Episode (Bipolar Disorder), and a physical disorder, medication, or other drug as the biological cause of the depressive symptoms.

To monitor severity over time for newly diagnosed patients or patients in current treatment for depression:

1. Patients may complete questionnaires at baseline and at regular intervals (eg, every 2 weeks) at home and bring them in at their next appointment for scoring or they may complete the questionnaire during each scheduled appointment.
2. Add up ✓s by column. For every ✓: Several days = 1 More than half the days = 2 Nearly every day = 3
3. Add together column scores to get a TOTAL score.
4. Refer to the accompanying **PHQ-9 Scoring Box** to interpret the TOTAL score.
5. Results may be included in patient files to assist you in setting up a treatment goal, determining degree of response, as well as guiding treatment intervention.

Scoring: add up all checked boxes on PHQ-9

For every ✓ Not at all = 0; Several days = 1;
More than half the days = 2; Nearly every day = 3

Interpretation of Total Score

Total Score	Depression Severity
1-4	Minimal depression
5-9	Mild depression
10-14	Moderate depression
15-19	Moderately severe depression
20-27	Severe depression

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A2662B 10-04-2005

Stanford Medicine. (1999). *Patient Health Questionnaire (PHQ-9)*.

https://med.stanford.edu/fastlab/research/imapp/msrs/_jcr_content/main/accordion/accordion_n_content3/download_256324296/file.res/PHQ9%20id%20date%2008.03.pdf

Appendix E: Survey Instrument

The Relationship Between Mobile Screen Time and Depression in College Students

Start of Block:

Q1 Please review the informed consent before beginning survey: Informed Consent for Qualtrics Survey Respondents After reviewing the informed consent, do you agree to participate in this survey?

- ☐ Yes, I agree to participate in this survey. (1)
- ☐ No, I do not agree to participate in this survey. (2)

Skip To: End of Survey If Please review the informed consent before beginning survey: Informed Consent for Qualtrics Survey... = No, I do not agree to participate in this survey.

Q2 Are you currently enrolled as a college student?

- ☐ Yes, I am currently enrolled as a college student. (1)
- ☐ No, I am not currently enrolled as a college student. (2)

Skip To: End of Survey If Are you currently enrolled as a college student? = No, I am not currently enrolled as a college student.

Q3 What is your current academic year of study?

- ☐ Freshman (1)
 - ☐ Sophomore (2)
 - ☐ Junior (3)
 - ☐ Senior (4)
 - ☐ Graduate Student (5)
 - ☐ Doctorate Student (6)
-

Q4 What is your current age?

Q5 What is your gender?

- ☐ Male (1)
 - ☐ Female (2)
 - ☐ Non-binary / third gender (3)
 - ☐ Prefer not to say (4)
-

Q6 Please submit a screenshot of your average weekly screen time here. **Please view an example screenshot here:** Average Weekly Screen Time Screenshot Example

Instructions: 1. Go to settings > Screen Time 2. Tap “See All App & Website Activity” 3. Take a screenshot of this page ***Crop the image to ONLY include daily average screen time data*** 4. Submit the **CROPPED** screenshot here.

Q7 Please submit a screenshot of your average weekly screen time categories here. **Please view an example screenshot here:** Screen Time Categories Example Screenshot

Instructions: 1. Go to settings > Screen Time 2. Tap “See All App & Website Activity” 3. Locate the “MOST USED” section (directly below the “LIMITS” section) 4. Tap “SHOW CATEGORIES” (If “Show More” is an option, tap to display all categories) 5. Take a screenshot of this page

Crop image to ONLY include screen time categories data 6. Submit the CROPPED screenshot here.

Q10 Over the past 2 weeks, how often have you been bothered by any of the following problems?

	Not At all (0)	Several Days (1)	More Than Half the Days (2)	Nearly Every Day (3)
Little interest or pleasure in doing things (1)	☐	☐	☐	☐
Feeling down, depressed or (2)	☐	☐	☐	☐
Trouble falling asleep, staying asleep, or sleeping too much (3)	☐	☐	☐	☐
Feeling tired or having little energy (4)	☐	☐	☐	☐
Poor appetite or overeating (5)	☐	☐	☐	☐
Feeling bad about yourself - or that you're a failure or have let yourself or your family down (6)	☐	☐	☐	☐
Trouble concentrating on things, such as reading the newspaper or watching television (7)	☐	☐	☐	☐
Moving or speaking so slowly that other people could have noticed. Or, the opposite - being so fidgety or restless that you have been moving around a lot more than usual (8)	☐	☐	☐	☐

Thoughts that
you would be
better off dead or
of hurting
yourself in some
way (9)

○

○

○

○

End of Block:

Appendix F: Instructions on Locating and Submitting Screen Time Usage and Categories

Within iPhone Settings

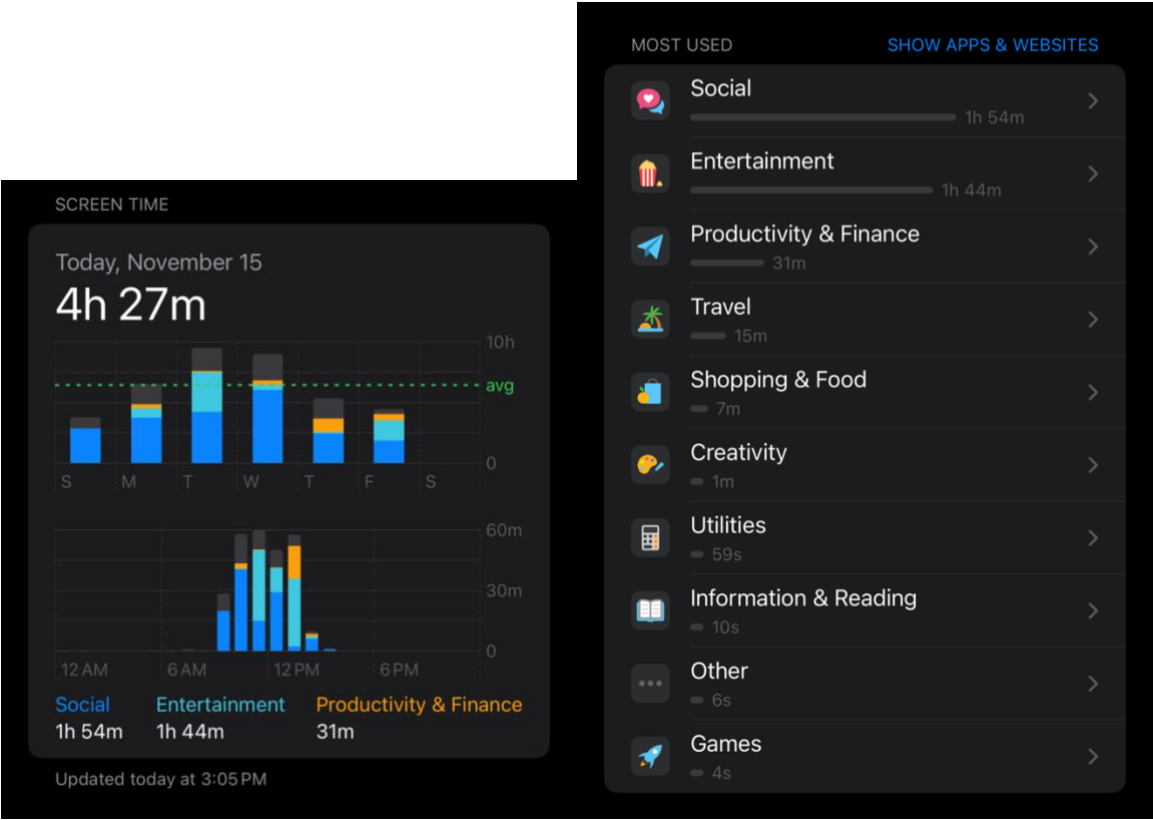
Instructions for Submitting a Screenshot of your Average Weekly Screen Time:

1. Go to settings > Screen Time
2. Tap “See All App & Website Activity”
3. Take a screenshot of this page ***Crop the image to ONLY include daily average screen time data***
4. Submit the CROPPED screenshot

Instructions for Submitting a Screenshot of your Average Weekly Screen Time Categories:

1. Go to settings > Screen Time
2. Tap “See All App & Website Activity”
3. Locate the “MOST USED” section (directly below the “LIMITS” section)
4. Tap “SHOW CATEGORIES” (If “Show More” is an option, tap to display all categories)
5. Take a screenshot of this page ***Crop image to ONLY include screen time categories data***
6. Submit the CROPPED screenshot

Appendix G: Example of Screen Time Usage Screenshot



Appendix H: Screen Time App Category Denominations



Books

Apps that provide extensive interactivity for content that is traditionally offered in printed form. If you're planning a more traditional reading experience, you may want to look at publishing an iBook instead.

For example: stories, comics, eReaders, coffee table books, graphic novels.



Business

Apps that assist with running a business or provide a means to collaborate, edit, or share content.

For example: document management (PDFs, scanning, file viewing/editing), VoIP telephony, dictation, remote desktop, job search resources, customer resource management, collaboration, enterprise resource planning, point of sale.



Developer Tools

Apps that provide tools for app development, management, and distribution.

For example: coding, testing, debugging, workflow management, text and code editing.



Education

Apps that provide an interactive learning experience on a specific skill or subject.

For example: arithmetic, alphabet, writing, early learning and special education, solar system, vocabulary, colors, language learning, standardized test prep, geography, school portals, pet training, astronomy, crafts.



Entertainment

Apps that are interactive and designed to entertain and inform the user, and which contain audio, visual, or other content.

For example: television, movies, second screens, fan clubs, theatre, ringtones, voice manipulation, ticketing services, art creation.



Finance

Apps that perform financial transactions or assist the user with business or personal financial matters.

For example: personal financial management, mobile banking, investment, bill reminders, budgets, debt management, tax, small business finance, insurance.



Food & Drink

Apps that provide recommendations, instruction, or critique related to the preparation, consumption, or review of food or beverages.

For example: recipe collections, cooking guides, restaurant reviews, celebrity chefs/recipes, dietary & food allergy, alcohol reviews, brewery guides, international cuisine.



Games

Apps that provide single or multiplayer interactive activities for entertainment purposes.

For example: action, adventure, board, card, family, music, puzzle, racing, role playing, simulation, sports, strategy.



Graphics & Design

Apps that provide tools for art, design, and graphics creation.

For example: vector graphic design, image editing, drawing and illustration.



Medical

Apps that are focused on medical education, information management, or health reference for patients or healthcare professionals.

For example: skeletal, muscular, anatomy, medical record-keeping, diseases, symptom reference, companion devices (blood pressure, pulse, and so on), health tracking.



Music

Apps that are for discovering, listening to, recording, performing, or composing music, and that are interactive in nature.

For example: music creation, radio, education, sound editing, music discovery, composition, lyric writing, band and recording artists, music videos and concerts, concert ticketing.



Navigation

Apps that provide information to help a user travel to a physical location.

For example: driving assistance, walking assistance, topographical maps, maritime, pilot log/assistance, oceanic tides, road atlas, fuel finders, public transit maps.



News

Apps that provide information about current events or developments in areas of interest such as politics, entertainment, business, science, technology, and so on. Choose News if your app serves content via newsreader or digest format, or if your app is for a digital-first or broadcast-first media outlet with frequent content updates.

For example: television, video, radio, or online news outlets or programs, RSS readers.



Photo & Video

Apps that assist in capturing, editing, managing, storing, or sharing photos and videos.

For example: capture, editing, special effects, sharing, imaging, printing, greeting card creation, manuals.



Productivity

Apps that make a specific process or task more organized or efficient.

For example: task management, calendar management, translation, note taking, printing, password management, cloud storage, email clients, flow chart generators, audio dictation, simulation, data viewing.



Reference

Apps that assist the user in accessing or retrieving information.

For example: atlas, dictionary, thesaurus, quotations, encyclopedias, general research, animals, law, religion, how-to, politics.



Safari Extensions

Apps that offer extensions to help enhance and customize the web browsing experience on Safari.

For example: content bookmarkers, password managers, adblockers, savings finders.



Shopping

Apps that support the purchase of consumer goods or materially enhance the shopping experience.

For example: commerce, marketplace, coupon, product review, apps with Apple Pay.



Health & Fitness

Apps related to healthy living, including stress management, fitness, and recreational activities.

For example: yoga, muscle diagrams, workout tracking, running, cycling, stress management, pregnancy, meditation, weight loss, pilates, acupuncture/acupressure, Eastern/Chinese medicine.



Lifestyle

Apps relating to a general-interest subject matter or service.

For example: real estate, crafts, hobbies, parenting, fashion, home improvement.



Kids (iOS and iPadOS only)

Apps designed specifically for children ages 11 and under. Age-appropriate apps must be placed in one of three age bands based on their primary audience: 5 and under, 6–8, or 9–11.

For example: age-appropriate games, interactive stories, educational materials, magazines.



Magazines & Newspapers

Apps that offer auto-renewing subscriptions to magazine or newspaper content. Choose Magazines & Newspapers if you deliver content using an issue-based strategy or are producing interactive versions of a printed periodical.

For example: newspapers, magazines, other recurring periodicals.



Social Networking

Apps that connect people by means of text, voice, photo, or video. Apps that contribute to community development.

For example: interpersonal connections, text messaging, voice messaging, video communication, photo & video sharing, dating, blogs, special interest communities, companion apps for traditional social networking services.



Sports

Apps related to professional, amateur, collegiate, or recreational sporting activities.

For example: fantasy sports companions, college teams/conference, professional teams/leagues, athletes, score trackers, instruction, sports news.



Travel

Apps that assist the user with any aspect of travel, such as planning, purchasing, or tracking.

For example: flight tracking, multi-time clocks, city guides, hotel/rental car/air fare shopping, vacation planning, public transportation, travel rewards.



Utilities

Apps that enable the user to solve a problem or complete a specific task.

For example: calculators (standard, tip, financial), clocks, measurement, time, web browsing, flashlights, screen locks, barcode scanners, unit conversion tools, password management, remote controls.



Weather

Apps that provide forecasts, alerts, and information related to weather conditions.

For example: radar, forecast, storms, tides, severe weather, local weather.