

THE RELATIONSHIP BETWEEN SMARTPHONE USE, SOCIAL SUPPORT, AND MENTAL HEALTH IN COLLEGIATE STUDENT-ATHLETES

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July 2024

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ABSTRACT

Smartphones have become increasingly prevalent in today's society. Additionally, there has been a rise in mental health problems, particularly among collegiate student-athletes, where 21-33% report depressive symptoms and 28-40% report anxiety symptoms (Cox et al., 2017; Davoren & Hwang, 2014; Glascock & Poliakova, n.d.; H. Li et al., 2017). Previous research has linked elevated smartphone use to the presence of these mental health issues (Barry et al., 2022; Dobrea & Pasarelu, 2016), yet little is known about potential mediators in this relationship. Perceived social support emerges as a potential mediator, as collegiate student-athletes often rely on informal support during mental health challenges (Habeeb et al., 2022). Moreover, athletes who report having more social support from informal sources (i.e., teammates and friends) also report fewer depression and anxiety symptoms (Hagiwara et al., 2021). However, smartphones may hinder the creation of social support networks (Przybylski & Weinstein, 2013), potentially exacerbating mental health problems among collegiate student-athletes. **PURPOSE:** The purpose of this study was to gain a better understanding of the underlying factors of the mental health problems collegiate student-athletes experience by examining perceived social support as a mediator in the relationship between smartphone use and mental health problems. **METHODS:**

A sample of 101 collegiate student-athletes (32 males and 69 females) completed a survey measuring demographic factors, smartphone use (i.e., total screen time, social media screen time, and social media use during daily activities), perceived social support (i.e., esteem, emotional, informational, and tangible), and mental health (i.e., depression symptoms, anxiety symptoms, and stress). **RESULTS:** Bivariate correlations revealed a significant association between total screen time and depressive symptoms ($r = .24, p < .05$), while perceived social support was inversely related to mental health problems ($r = -.26, p < .01$). However, there were no significant relationships observed between any variable of smartphone use and perceived social support, including its subscales (i.e., esteem, emotional, informational, and tangible support) and perceived social support did not mediate the relationship between smartphone use and mental health problems. **CONCLUSION:** In line with previous research, the present study suggests that collegiate student-athletes with greater smartphone use are more likely to experience depressive symptoms. Additionally, when they perceive higher levels of social support, they tend to experience fewer mental health problems, including depressive and anxiety symptoms. These findings provide valuable insights for collegiate student-athletes and their athletic support staff, highlighting the importance of educating them about the detrimental effects of smartphone use on mental health, specifically depressive symptoms, and the potential benefits of creating strong social support circles to reduce mental health problems.

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A Thesis

Presented to the Faculty of the Department of Kinesiology
East Carolina University

In Partial Fulfillment of the Requirements for the Degree
Master of Science in Kinesiology
Sport and Exercise Psychology Concentration

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July 2024

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DEDICATION

I dedicate my thesis to my family. To my parents, who have supported me in every venture I have taken so far in my life and never stopped believing in me. To my brother, who has pushed me to be a better version of myself each and every day. I love you all and I appreciate you more than you will ever realize.

I dedicate my thesis to my previous teammates and coach. To my coaches, I hope to eventually have even just have the influence you had on me with my athletes. To my teammates, I truly would not be where I am today without the countless hours in the hurt locker, along with your friendship and support.

ACKNOWLEDGMENTS

I would like to thank Dr. Nick Murray for his support and guidance throughout the past two years at East Carolina University. He challenged me with more than I thought I can handle and had made me a stronger student, researcher, and person because of it.

Additionally, I would like to thank Dr. Moore and Dr. Habeeb for being great committee members throughout the process. I wish I would have gotten you both involved a little more than I did, but I appreciate your eagerness to help me whenever I reached out. Without you two, I am not sure I would have found a thesis I was truly interested in.

Next, I would like to thank my Sport and Exercise cohort. You all made this experience much more enjoyable. I wish you all the best of luck in the future and I cannot wait to see what you all do.

Lastly, I want to thank Coni and Colin for provided me with great friendships and support along the way. Through all the pool, basketball, and pickleball, we have become close and while I know you probably only listened to about half the things I said, I appreciate you both for being there for me.

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CHAPTER 1: INTRODUCTION

Smartphones are ubiquitous in today's society. In 2022, it was estimated 6.6 billion people, or 85% of the world population, have a smartphone (Taylor, 2023). This is up 49.89% since 2017 when around 4.4 billion people had a smartphone. This upwards trajectory is expected to continue as it is estimated that 7.7 billion people will have a smartphone in 2028. For reference, that is more smartphone users than the current world population. Along with being a smartphone user comes the amount of time spent on the phone. Research has found that on average, people spend around five hours a day on their phone (Annie, 2022). This includes any time a person is interacting with their phone (i.e., scrolling on social media, streaming videos, talking on the phone, etc.) and is better known as screen time. Given that people are generally awake for 16 hours a day, this means people are spending nearly a third of every day on their phones. This rapid growth in smartphone users and amount of time users spend on smartphones leads us to believe there must be a lot of pros and cons to this technology.

One of the biggest draws of a smartphone is its ability to connect individuals with their family and friends regardless of their physical location. Research has shown that individuals believe smartphones have allowed them to connect with others worldwide (Mieczakowski et al., 2011). Smartphones have made it easier for people to send text messages and make phone calls thus making long-distance communication more convenient and accessible. Additionally, it provides access to social media platforms, which have consistently gained popularity as one of the primary uses of a smartphone. This might be because not only do they provide an additional means of communication outside of texting and calling, but it also allows people to provide various forms of updates, opinions, and thoughts through pictures, videos, blog posts, etc. Furthermore, it gives people the opportunity to view and follow along with information based on their interests, whether

that be friends, family, sports teams, celebrities, news outlets, etc. (Ma, 2018). Due to the benefits social media has to offer and the easy accessibility, social media platforms are attracting copious amounts of audiences with Facebook, Instagram, and X, previously known as Twitter, each having 2.96 billion, over 2 billion, and 450 million users, respectively (Aslam, 2023c, 2023a, 2023b). Furthermore, research has also found that those with social media accounts are spending 2.5 hours a day on these apps (GWI, 2019), accounting for half the time people are on their smartphones. In summary, smartphones have revolutionized communication by bridging physical distances, facilitating diverse forms of interaction through text, calls, and social media, and providing access to a wide array of information and content. The ever-growing popularity of social media platforms underscores the pivotal role they play in connecting individuals worldwide. However, it is worth investigating the cons that may arise, as understanding these potential drawbacks is essential for making informed decisions about our smartphone usage and for developing strategies to mitigate negative impacts on our mental health and daily lives.

Unfortunately, these benefits seen with smartphones, along with their easy accessibility and dependencies, can have a potential for negative effects. One of these problems that may arise is smartphone addiction (Wu et al., 2016). Researchers have defined smartphone addiction as a condition characterized by individuals losing control over their smartphone usage habits (Jeong & Lee, 2015) to the extent that smartphone use becomes a harmful activity (Wonjun, 2013). One study found an alarming prevalence rate of 97.8% of collegiate students experience smartphone addiction (Mosalanejad et al., 2019). These results aligned with previous studies that found similar prevalence rates. As for the harmful effects of smartphone addiction, Safa and Majeed (2020) found smartphone addiction to be highly correlated with lower levels of well-being, specifically increased loneliness and decreased quality of life. Additionally, another study found mobile phone

addiction to be positively associated with depression and anxiety (Yang et al., 2019). However, research suggests that these negative effects are also seen in individuals who do not have a smartphone addiction but still spend considerable amounts of time on their smartphone. For instance, it has been seen that high amounts of screen time are also associated with increased depression and anxiety symptoms and decreased well-being (Lin et al., 2016). The negative impact of smartphone use on mental health is a pressing concern that warrants further investigation.

Moreover, the relationship between smartphone usage and its associated negative effects on mental health are not isolated phenomena but are part of a broader pattern of technology-related challenges in today's society. As our reliance on digital devices continues to grow, it becomes increasingly important to explore their impact on various aspects of our lives, including mental health. Understanding the intersection of technology use and mental health is a complex issue with implications for different populations. One population that may interact with smartphone usage in different ways are collegiate student-athletes whom face unique pressures and demands, which requires further investigation (Strauss, 2021). Therefore, it is essential to recognize the specific challenges faced by collegiate student-athletes that may impact the influence smartphones have on their mental health.

Collegiate student-athletes, while sharing many of the advantages and drawbacks of smartphone technology with the wider population, encounter additional stressors and demands that can amplify the impact of smartphone use on their mental health. In general, a growing body of research suggests that the prevalence of mental health issues among collegiate student-athletes are notably high, with 21-33% of collegiate student-athletes dealing with depressive symptoms and 28-40% dealing with anxiety symptoms (Cox et al., 2017; Davoren & Hwang, 2014; H. Li et al., 2017). These rates are equivalent and, in some cases, higher than those of the general public,

suggesting collegiate student-athletes may be more susceptible to mental health problems (Watson & Kissinger, 2007). Given these findings, researchers have sought to examine how collegiate student-athletes cope with these mental health problems.

It is seen that collegiate student-athletes place significant reliance on informal help-seeking and social support as vital coping mechanisms during periods of lower mental health. This reliance is exemplified in several studies. For example, Gulliver et al. (2012) conducted a qualitative study that highlights social support, defined as “an exchange of resources between at least two individuals perceived by the provider or the recipient to be intended to enhance the well-being of the recipient” (Shumaker & Brownell, 1984, p. 11), as a primary facilitator of help-seeking among elite athletes. Similarly, research by Habeeb et al. (2022) emphasized that collegiate athletes often turn to informal sources of assistance when dealing with mental health challenges and other life conflicts. Essentially, athletes depend on informal help and social support to bolster their mental health. Consequently, research has revealed that individuals with higher levels of social support report lower levels of depressive and anxiety symptoms (Hagiwara et al., 2017), along with higher resilience (Sahin-Baltacı & Karataş, 2015) and better sleep (Pea et al., 2012). In light of the crucial role that social support plays in the mental health of collegiate athletes, it is essential to examine any roadblocks or barriers that might impact these key support networks.

Social support across various dimensions has been harmed due to phone usage. Specifically, elevated screen time has been consistently linked to diminished feelings of social support (Cooray, 2020; Lissak, 2018; Wu et al., 2016). In addition, elevated screen time has also led people to feel a sense of lower quality interpersonal relationships, lower peer belongingness, lower social cohesion, and lower trust development (Abbasi & Alghamdi, 2017; Christensen, 2018; Przybylski & Weinstein, 2013; Shensa et al., 2016). Researchers believe these detrimental

effects on social support may be toward individuals perceived social support due to the phenomenon called “phubbing.” Haigh (2015) characterized phubbing as the act of focusing on one’s smartphone at the expense of social interactions. Phubbing has shown a positive association with smartphone addiction (Chotpitayasunondh & Douglas, 2016) and higher phone use (Karadağ et al., 2015).

With the rise in smartphone usage, phubbing has become increasingly normalized, with participants in the study conducted by Chotpitayasunondh and Douglas (2016) reporting that they view it has become an acceptable behavior and acknowledged that they are more likely to partake in phubbing after observing others doing it. Furthermore, phubbing has adverse effects for face-to-face interactions (Nazir, 2020). Nazir found face-to-face interactions are important for meaningful conversations and building strong social support networks. When participants in their study used their phones during in-person interactions, they became distracted and disengaged, leading to lower levels of empathic concern reported during these conversations. In sum, elevated levels of smartphone use have a negative impact on social relationships, and more specifically social support, a primary coping mechanism in collegiate student-athletes.

Some research has been done examining this relationship between smartphone use, social support, and mental health. For instance, Li et al. (2017) examined the relationship between mobile phone addiction, social support, depression, and positive affect in a sample of 1,346 adolescents. Firstly, they found that social support and positive emotions can lower levels of depression among adolescents suffering from mobile phone addiction. Additionally, social support contributed to positive emotions and mobile phone addiction, which then reduced depression levels through a mediation relationship. Another study examined this relationship through time spent on social media, quality of relationships, and emotional well-being. Moreover, Christensen (2018)

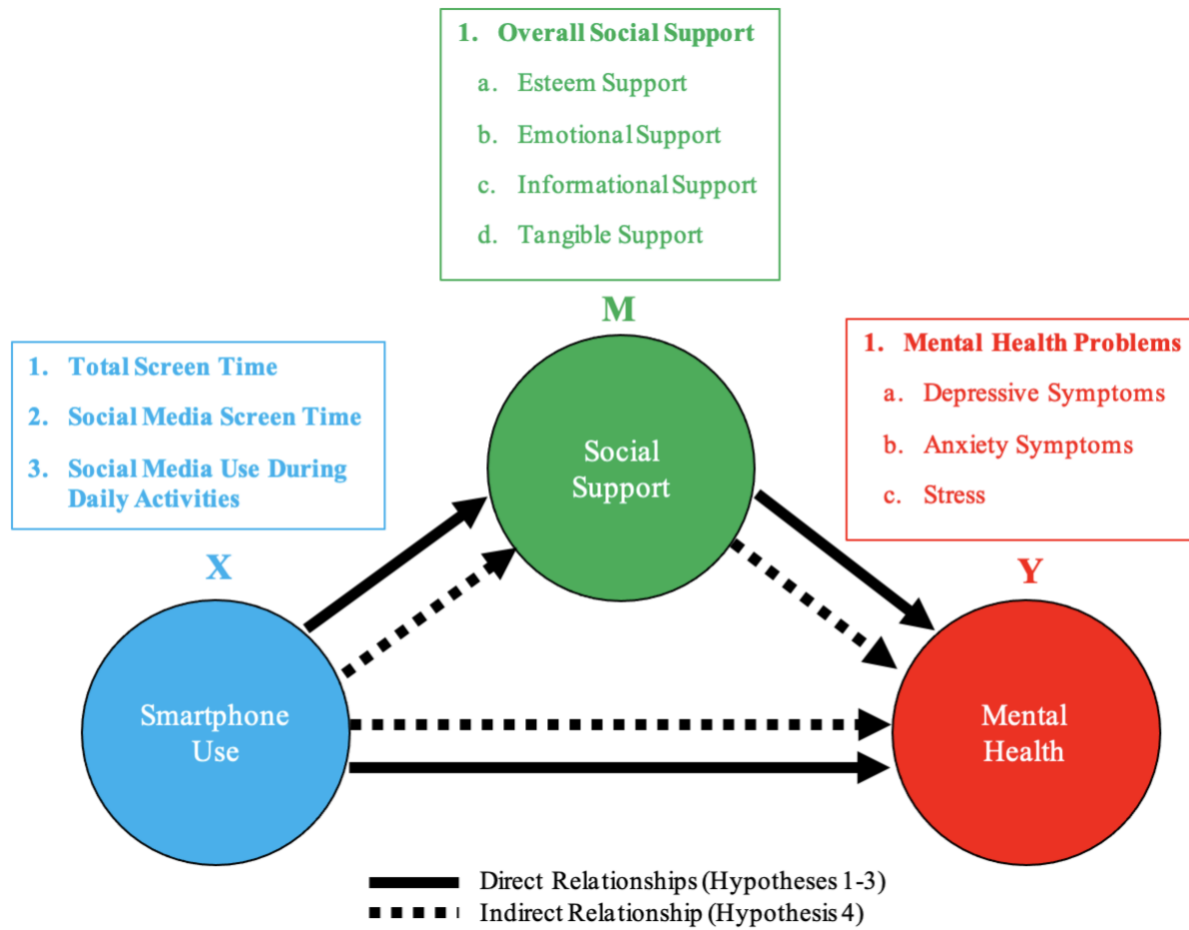
investigated emotional well-being as a mediator in the relationship between time spent on social media and quality of interpersonal relationships. The results revealed that emotional well-being acted as a mediator in that as someone spent more time on social media, their well-being decreased, contributing to a decrease in quality of interpersonal relationships. While this study did not directly examine social support and mental health, it focused instead on assessing them through the lens of interpersonal relationship quality and emotional well-being. Nonetheless, there seems to be an evident relationship between smartphone use, social support, and mental health. Despite this, these studies have failed to acknowledge and examine social support as a mediator. In addition, there has been no such study to my knowledge, examining these relationships in collegiate student-athletes.

A recently published article from Barry et al. (2022) investigated the association between social media engagement and factors related to mental health in 1120 National Collegiate Athletic Association (NCAA) Division 1 student-athletes. The participants provided demographics, a photo of their screen and social media use, and completed surveys on their social media engagement, social media interference and/or enhancement, protective behavioral strategies, depression, anxiety, stress, self-esteem, physical appearance comparison, sleep dissatisfaction, feeling of missing out (FoMO), loneliness, life satisfaction, and inattention. The results found that the collegiate student-athletes spend just over three and a half hours a day on their phone, with social media time taking up over two hours of that. In opposition to other research, this study did not find a significant relationship between screen time or social media time and factors of mental health. However, it was seen that the use of social media during daily activities had a significantly negative effect on mental health. Therefore, given the research done showing the negative effects of

smartphone use in social settings on social support, I believe social support may be the mediator in the relationship between smartphone use and mental health in collegiate student-athletes.

The purpose of this study is to investigate the relationship between smartphone use, social support, and mental health in collegiate student-athletes. Given the high prevalence of mental health problems in this population, it is worth investigating the factors that contribute to them. After examining prior research, it is hypothesized that (1) smartphone use will be negatively associated with perceived social support and (2) positively associated with the presence of mental health problems. Additionally, (3) perceived social support is hypothesized to have a negative association with the presence of mental health problems. Finally, it is hypothesized that (4) perceived social support will serve as a mediating factor in the relationship between smartphone use and mental health problems. Moreover, higher levels of smartphone use will lead to lower levels of social support, leading to lower mental health levels. Figure 1 displays the overview of the study with the concepts, tested variables, and hypothesized direction. The results from this study will offer further insight into mental health among collegiate student-athletes. Additionally, it will provide collegiate student-athletes and collegiate athletic departments with further evidence on the negative side of smartphone use in the hope it will lead to more protective behaviors that can be studied and evaluated by other researchers in future studies.

Figure 1. *Overview of Study with Concepts and Tested Variables*



CHAPTER 2: LITERATURE REVIEW

This literature review dives into the prevalence of mental health issues among collegiate student-athletes, while also exploring their connection with smartphone use and social support. Additionally, it introduces a mediation model that examines how smartphone use may negatively impact mental health through its effect on social support. We will discuss the direct associations between each element to provide a rationale for this specific direction. Our study contributes to existing research by examining these direct relationships between smartphone use, social support, and mental health further, while shedding light on the sources of worsened mental health. Understanding these pathways will enable researchers to develop preventive behavior strategies that can be shared with coaches, athletic departments, and the collegiate student-athletes themselves to safeguard their mental health, particularly in relation to potential negative influences like smartphone use.

Prevalence of Mental Health Problems in Collegiate Athletes

Understanding the mental health continuum, as explained by Keyes (2002), is vital for appreciating the interplay between psychological well-being and the prevalence of mental health problems. Keyes emphasizes that individuals who experience flourishing mental health are less likely to encounter mental health problems, as they possess effective coping mechanisms, resilience, and a positive outlook on life. Conversely, those with lower levels of psychological well-being face an increased risk of developing mental health problems due to challenges in managing negative emotions, self-esteem issues, and stressors. Recognizing this continuum underscores the importance of promoting positive mental well-being as a preventive measure against mental health problems, advocating for supportive environments, coping strategies, and reducing the stigma surrounding mental health. Furthermore, given the significant prevalence of

mental health issues among college-age individuals, particularly student-athletes, understanding and addressing the unique stressors they face is crucial for combating the presence of mental health problems.

According to data from the National Institute of Mental Health, approximately 8.4% of adults aged 18 or older experienced a depressive episode, and 19.1% had an anxiety disorder within the past year (Mental Health by the Numbers, 2022). Moreover, individuals between the ages of 18 and 25 years old experienced the highest prevalence of depression at 17.0%, with 22.3% reporting anxiety disorders. This age group coincides with that of the college-age group which is worth noting considering the college period is recognized as a vulnerable phase for mental health issues. The American College Health Association reports that over 30% of college students exhibit significant signs of depression (American College Health Association, 2023).

One subset of the young adult population that is worth investigating is college student-athletes, which consists of 520,470 individuals across over 1,000 colleges and universities according to the latest NCAA report (NCAA, 2022b). Collegiate student-athletes may be especially susceptible to stressors associated with mental health challenges, such as disordered eating, sleep disturbances, poor body image, or substance abuse (Beiter et al., 2015; Stock & Levine, 2016; Storch et al., 2005). Therefore, given that a substantial number of student-athletes continue to participate in their respective sports while dealing with signs, symptoms, and known risks factors associated with the depression and anxiety, there is a compelling need for understanding the underlying factors that may contribute either positively or negatively towards the prevalence of these mental health issues within this specific population.

As established, the college years coincide with a phase of life where young adults face a substantial array of challenges and changes. These challenges encompass academic pressures,

social demands, adapting to newfound independence, and financial burdens (Aquilina, 2013; Humphrey et al., 2000; Paule & Gilson, 2010). However, student athletes face additional commitments and challenges that extend beyond the typical college experience. They invest a significant amount of time in sport-related activities, including practices, training sessions, meetings, travel, and competitions (Davis et al., 2013; Humphrey et al., 2000; Hyatt & Kavazis, 2019; López De Subijana et al., 2015). These responsibilities, when coupled with the common stressors of college life, heighten the risk of both physical and mental health issues for collegiate athletes (Li et al., 2017; Moreland et al., 2018). These unique stressors make it crucial to examine the prevalence of mental health problems among collegiate athletes.

One mental health problem that has been examined is depression. Depression is characterized by persistent feelings of sadness, emptiness, loss of interest or pleasures in daily activities, and are associated with low energy, lack of concentration and self-worth, along with eating and sleeping problems (Ormel et al., 2019). Although it is commonly believed that student-athletes, due to the culture of athletes, are protected from mental health issues such as depression (NCAA, 2005), research shows that these conditions are quite prevalent among student-athletes. For example, a study completed by Cox et al. (2017), which included 950 NCAA Division I athletes, revealed that 33.2% of the student-athletes indicated experiencing symptoms of depression. Furthermore, research consistently highlights gender differences in the prevalence of depression among collegiate student-athletes. Wolanin et al. (2016), discovered that 28.1% of female athletes reported clinical levels of depression, compared to 17.5% of males, indicating that female athletes are 1.8 times more likely to exhibit clinically relevant symptoms. Similarly, Yang et al. (2007) found that female athletes were 1.3 times more likely to experience depressive symptoms compared to their male counterparts. In light of these findings, it becomes evident that

addressing the factors contributing to the high prevalence of depression among student-athletes is a critical step in promoting their mental health.

Aside from previously highlighted additional time commitments student-athletes face, they also experience other challenges compared to non-athletes. For instance, aerobic exercise has commonly been seen to decrease depressive symptoms in individuals with mild to moderate depression (Morgan et al., 1987). However, in student-athletes, aerobic exercise can lead to the development of mood disorders during periods of overtraining (Morgan et al., 2019; Nixdorf et al., 2016). Allocco (2021) conducted an in-depth review on overtraining and consistently found that it causes a range of injuries in athletes. These injuries cause athletes to be more susceptible to additional trauma and stress (Bianco, 2001; Covassin et al., 2014). Furthermore, injuries can take away athletes' sports any time from a day, a week, a month, a year, forever, and anywhere in between. A review completed by Park et al. (2023) revealed that injuries were associated with worse mental health in the athletes. Furthermore, it was seen that athlete-identity was a mediator between injuries and mental health with athletes having stronger athlete identity bearing an elevated risk for more depressive symptoms. It is believed this is due to athletes putting too much of their identity into their sport, and when they are injured, they have decreased levels of self-worth. In summary, the unique challenges faced by student-athletes, including the complexities surrounding exercise-induced mood disorders and the profound impact of injuries on both physical and mental health, underscore the need for a comprehensive understanding of the mental health landscape within this specific population.

This distinctive challenge in the lives of student-athletes not only induces depressive symptoms but can also lead to various types of anxiety. Anxiety is widely recognized as a response to perceived stressful or threatening situations, often causing significant disruptions to daily

activities and performances (Craske & Stein, 2016). It encompasses two key forms: trait anxiety, which is a fundamental aspect of a person's disposition, and state anxiety, a transient reaction to specific stress-inducing events (Spielberger et al., 1983). For example, athletes frequently encounter state anxiety in high-pressure scenarios such as a free throw at the end of a basketball game or a field goal to win a football game, whereas trait anxiety reflects a general predisposition towards anxiety regarding uncertain outcomes. Therefore, simply put, trait anxiety occurs more in the moment, while state anxiety persists over time. Moreover, Stull (2014) wrote in an NCAA publication that anxiety disorders are the most common psychiatric problems in student-athletes and that following an injury, performance anxiety, panic disorder, and phobic anxiety are more likely to be sports-related. Furthermore, research findings suggest that elevated trait anxiety levels may contribute to an increase in state anxiety during performance (Horikawa & Yagi, 2012). Additionally, a study done by Yang et al. (2007) conducted surveys to examine the prevalence of symptoms of anxiety in competitive collegiate student-athletes. This study surveyed 257 Division I student-athletes across thirteen sports, including six male and six female teams. The results of this study showed that 35.1% of the student-athletes who participated in this survey indicated symptoms of state anxiety, and 35.6% indicated symptoms of trait anxiety. To further understand the prevalence of anxiety in collegiate athletes, Li et al. (2021) examined general anxiety disorder (GAD) symptoms in collegiate athletes. The results indicated a prevalence rate of 22% for GAD. This suggests that one in every five collegiate athletes may be experiencing GAD. Additionally, like depression, researchers have found gender differences in the prevalence of anxiety. For instance, Davoren and Hwang (2014) surveyed 19,733 student-athletes over a four-year period and found that 48% of females reported feelings of anxiety, compared to 31% of males. Similarly the NCAA conducted a survey and found that females athletes consistently reported feeling

overwhelming anxiety at near or above double the rate of male athletes (NCAA, 2022). In conclusion, the additional challenges faced by student-athletes not only give rise to depressive symptoms but also encompass various forms of anxiety, affecting their daily lives and performance.

This discussion of mental health challenges serves as a segue into the broader landscape of mental health in athletics, extending beyond anxiety and depression to encompass eating disorders, a notable concern within the athletic community (Greenleaf et al., 2009). Findings from studies indicate that female athletes are more susceptible to developing eating disorders, with a significantly higher prevalence compared to the general population (Saunders & Eaton, 2018). While the typical prevalence of eating disorders among females in the general population remains below 8%, rates among female athletes range from 14% to 19%, emphasizing the importance of addressing mental health concerns in this specific demographic (Greenleaf et al., 2009). Furthermore, Sanford-Martens et al. (2005) conducted a study involving a sample of 489 participants, including 325 current NCAA Division I student-athletes from various sports. Their findings revealed that females exhibited higher levels of eating disorder behaviors and symptoms compared to males. However, nonathletes had higher scores for eating disorder diagnostic criteria and symptoms than athletes. Despite this, 18% of student-athletes in the study still exhibited symptoms of eating disorders, highlighting the continued prevalence of this form of mental illness among student-athletes.

This comprehensive understanding of mental health challenges in the realm of athletics spanning depression, anxiety, and stress, lays the foundation for an exploration of the factors contributing to these issues and underscores the urgency of tailored interventions and support systems for student-athletes. Moreover, in our examination of the factors influencing mental health

among student-athletes, it is imperative to consider the impact of modern technology and smartphone usage, which has emerged as a significant contributor to the complexities of mental health in this population.

Mental Health and Smartphone Use

With the advancements and increased prevalence of smartphones and smartphone use, researchers have begun to study some of the negative impacts they have on society. Research has indicated that smartphones can negatively impact mental health. Several researchers have found that high amounts of screen time and along with the most popular use for a smartphone, social media use, are positively associated with depression and anxiety and negatively associated with overall well-being in collegiate athletes (Christensen, 2018; Lin et al., 2016). Screen time is best defined as the amount of time spent and the diverse activities performed online using digital devices (DataReportal, 2020). This information is important to acknowledge as DesClouds et al. (2018) found collegiate athletes are spending around 4.5 hours a day on their phones, or 31.7 hours a week. Moreover, a survey completed by 1373 NCAA student athletes showed that 97% have a Facebook account, 84% have a Twitter account, 89% have an Instagram account, and 93% have a Snapchat account (DeShazo, 2016). These findings suggest that athletes are spending a considerable amount of time on their smartphones as well as a high majority of them are present on social media. Additionally, with the introduction of the Name, Image, Likeness (NIL) into the NCAA, it is likely these numbers will only go up as collegiate athletes aim to gain exposure and financial benefits via social media. Therefore, considering the prevalence of smartphone use and the possibility for increased usage along with the overarching negative implications found with increased screen time and social media use, researchers have sought to investigate smartphone use and its relationship with various aspects of mental health as a whole.

Two of the biggest ways researchers have investigated smartphone use and its relationship with mental health is via screen time and social media use, given most screen time is on social media and the negative effects seen from it. Fatima et al. (2019), conducted a study aimed at gaining a wide overview between anxiety and social media use. In the study, they surveyed 100 individuals aged between 17 and 25 years old. The surveys resulted in 57% of users saying they mainly used social media for entertainment and 47% spent over 8 hours per day on social media. Furthermore, the study found that 40% of users experienced anxiety symptoms when they were unable to access social media, and 38% of participants preferred communicating with others through social media. These findings demonstrate that a dependence on social media is forming which can lead to feelings of anxiety.

This dependence on smartphones and social media has been studied to understand the negative effects that arise in coincidence of anxiety. One of these problems that may arise is smartphone addiction (Wu et al., 2016). Smartphone addiction has been characterized by researchers as individuals losing control over their smartphone use to the extent it becomes a harmful activity (Jeong & Lee, 2015; Wonjun, 2013). Considering that 40% of individuals experiences anxiety symptoms when they are unable to research social media with the definition of smartphone addiction created by researchers, it suggests that those 40% of individuals are experiencing smartphone addiction. However, one study found an alarming prevalence rate of 97.8% of collegiate students experience smartphone addiction (Mosalanejad et al., 2019). While this rate is considerably higher than the 40%, it aligns with previous studies examining the prevalence of smartphone addiction. As stated, anxiety is one of the negative effects of smartphone addiction, which was also seen in a study conducted by Yang et al. (2019), that saw smartphone addiction was positively associated with anxiety and depression. Additionally, researchers have

found that smartphone addiction is highly correlated with lower levels of well-being; specifically increased loneliness, and decreased quality of life (Safa & Majeed, 2020). Moreover, high levels of screen time, one component of smartphone addiction, is associated with increased depression and anxiety symptoms, along with decreased well-being (Lin et al., 2016). Therefore, the findings of these studies suggest that dependences and smartphone addictions through increased screen time and social media use are not only present but have detrimental implications to the mental health of individuals.

Many studies have been done focusing on the effects of social media on anxiety and depression. The Royal Society for Public Health (2017) found that frequent social media use is linked to psychological distress, including anxiety and depression. Similarly, Vannucci et al. (2017) discovered that higher daily social media use is associated with greater dispositional anxiety symptoms and a higher likelihood of having an anxiety disorder among emerging adults in the US. In congruence, Dobrean and Pasarelu (2016) also reported that using social media for more than two hours per day can lead to higher psychological distress, such as anxiety and depression. One study found that a major contributing factor linking social media use to anxiety and depression is the tendency to frequently compare oneself with others on social media platforms (Seabrook et al., 2016). Building upon extensive research highlighting the detrimental effects of social media on mental health, it is evident that the negative consequences of excessive social media use extend beyond anxiety and depression. As we explore social media platforms and their associations with mental health, we gain a more nuanced understanding of the intricate relationships between these factors.

Continuing our examination of the multifaceted impact of social media on mental health, we now turn out focus on the distinct ways in which specific social media platforms. For example,

Instagram and Facebook, shade individuals' self-perception, self-esteem, and overall psychological well-being. According to a survey conducted by Ramzan et al. (2019) on 240 young males and females, Instagram was used by many participants as a means to compare themselves with others. The study also revealed that about 50% of the respondents believed that social media anxiety disorder is possible. These findings suggest that social media users are aware of the potential negative impacts on their mental health, but still engage in it. Another study conducted by Faraon and Kaipainen (2014) revealed that self-esteem was negatively associated with Facebook use. As the time spent on Facebook increases, the levels of self-esteem decrease. A similar study from Barthorpe et al. (2020) found that greater amount of time spent on social media was associated with lower self-esteem, a higher presence of depressive symptoms, and in conclusion, these studies underscore the profound influence of specific social media platforms on individuals' self-perception, self-esteem, and overall psychological well-being. The evidence presented here not only highlights the prevalence of social media usage for social comparison but also emphasizes the growing awareness among users of the potential detrimental effects on their mental health. Moreover, the concerning associations between prolonged social media engagement and adverse outcomes, such as lower self-esteem, increased depressive symptoms, and an elevated risk of self-harm, shed light on the complex and multifaceted relationship between our digital lives and mental health.

While the majority of studies have primarily investigated the relationship between social media and general anxiety symptoms, recent inquiries have directed their attention to how platforms like Facebook, Twitter, and Instagram might affect athletes' anxiety levels before and during competition, also known as performance anxiety. For example, Encel et al. (2017) examined the effects of social media use, specifically Facebook, prior to and during competition

on sport anxiety. The findings of this study were that in the two hours leading up to competition, 68.1% of athletes were active on Facebook. Another finding was that the time spent on Facebook was positively correlated with sport anxiety. Additionally, it was seen push notifications were a predictor in this relationship. Moreover, Naegeli (2020) employed a three-phase study to explore the influence of fan engagement through social media on performance anxiety in twelve NCAA Division I male athletes. Data collection was done through questionnaires, mentions from Twitter users, and interviews. The researchers in this study suggests fan engagement through social media does have an influence on performance anxiety in male, NCAA Division I student athletes. However, athletes commonly identified their cognitive anxiety and self-confidence were harmed. These findings were supported by Gao et al. (2021), who examined the link between recreational screen time and college student-athletes' anxieties. When analyzing the data, they broke recreational screen time into four separate groups based on recreational screen time hours a day: less than two, between two and three, between three and five and more than five. It was seen that all four levels had significantly high levels of dispositional anxiety but when athletes spent more than three hours a day on recreational screen time, they experienced significantly more pre-competition anxiety. These studies suggest that athletes' screen time and/or social media at various stages prior to sport performance can induce sport performance anxiety.

In addition to anxiety, screen time and social media have an impact on depression. Lin et al. (2016) completed a survey with 1,787 young adults examining the association between social media and depression. They found a strong significant association between social media use and depression. This research finding is further supported by Brunborg and Andreas (2019), who found there to be a correlation between time spent on social media and depression. However, according to Liu et al. (2016), this relationship between screen time and depressive symptoms may be a

nonlinear dose response relationship. Liu et al. suggested that a little screen time is favorable as depressive symptoms decreased when screen time went from zero to one hour but after one hour the depressive symptoms begin to rise as screen time rises. Regardless, researchers have acknowledged the positive association between screen time and social media use with depression and begun to investigate underlying factors that may contribute.

Research has also sought to examine the various sources of depression from social media use. In the Ramzan et al. (2019) study, they found comparison to others on social media to be a major source of depression. Additionally, a study was conducted by Santarossa and Woodruff (2017) to investigate the relationships between the time spent on social media and body image, eating behaviors, and self-esteem. The study surveyed 160 participants, and data from 147 individuals were analyzed. The results of this study supported the findings of Spraggins (2009), who investigated impacts of social media on 367 collegiate students. Both findings suggested that excessive use of social media is associated with decreased self-esteem, happiness, life satisfaction, increased depression, and loneliness. Additionally, it revealed participants felt lower levels of body satisfaction the more time they spent looking at their own social media profile, looking at photos on others' profiles, and looking at post/comments on others. Barry et al. (2017) strengthened these findings when they found fear of missing out (FoMO) and loneliness are positively related with screen time and depression. In addition, Barry and Wong (2020) also found elevated levels of FoMO to be associated with low levels of self-esteem and loneliness. Moreover, this relationship was strengthened when participants had greater social media activity. Fundamentally, these results should make sense. If one is on social media, they are susceptible to seeing their friends (teammates) out doing an activity without them. This would elicit feelings of missing out, which in turn would make them feel lonely and have lower self-esteem. While it appears comparison,

FoMO, loneliness, and self-esteem are some contributors to depression from social media, there is more research suggesting additional mediators in this relationship.

Social media has also been seen to negatively impact sleep and self-esteem; both of which have been linked to depression. A study conducted by Woods and Scott (2016) investigated the relationship between social media use and sleep quality, finding a significant correlation between nighttime use of social media and lower self-esteem. While the overall use of social media was also linked to poorer sleep quality, the study found that nighttime use was more strongly associated with poor sleep. Therefore, screen time and social media use negatively impacts sleep which may play into the negative relationship between social media use and depressions.

The connection between social media use, sleep patterns, and their consequences on mental health is multifaceted and extends beyond its impact on depression alone. For instance, a study conducted by Cooray (2020) examined the relationships between screen time, sleep, and both positive and negative aspects of well-being. It was found that depressive and anxiety symptoms were positively correlated with screen time and negatively correlated with sleep. Additionally, it was found that optimism and life satisfaction were both negatively correlated with screen time and positively correlated with sleep. Furthermore, Benitez and Gunstad (2012) conducted a study on 67 undergraduate students from a midwestern university to investigate the relationship between sleep quality and depression. The study found that poor sleep quality was associated with higher levels of depression and anxiety. Even healthy young adults who did not exhibit prior symptoms of depression or anxiety experienced slight decreases in attention due to poor sleep quality. Considering all these findings, there is ample evidence demonstrating sleep is a mediator in the relationship between mental health and social media use. Moreover, the negative effects of social

media on sleep, which, in turn, can impact cognitive functioning and increase the risk of depression and anxiety.

The research above provides a significant rationale that smartphone use, particularly concerning screen time and social media engagement, on the mental health of collegiate athletes. This detrimental influence extends to various facets of mental health, including but not limited to depressive and anxiety symptoms, stress, self-esteem, loneliness, life satisfaction, and FoMO. Furthermore, it is essential to recognize that the connection between smartphone use and mental health is not necessarily a direct one, as researchers have identified sleep as a mediator in this relationship. This revelation opens the door to the possibility of additional mediators that help bridge the gap between smartphone use and mental health. Among these potential mediators, we propose that interpersonal relations, specifically social support, could be a significant factor, given its established associations with both smartphone use and mental health outcomes.

Phone Use and Social Relationships

Smartphones allow for interpersonal relationships to take place both online and offline. The accessibility and convenience of smartphones offers the ability to stay in touch with friends and family. A report from Pew Center Research found that approximately 33% of individuals believe smartphones significantly improved their relationships with friends, while 23% say they have greatly enhanced their connections with family members (Kennedy et al., 2008). However, research by Christensen (2018) examined the influence of screen time and social media on offline interpersonal relationships and found that the more time individuals were on social media, the quality of their relationships decreased. These findings were reinforced in a study completed by Paulich et al. (2021) which found a negative association between screen time and quality of peer

relationships. These findings suggest that while smartphones may be beneficial for offline connections, they may be detrimental to in-person interpersonal relationships.

Research has found there to be many aspects of social relationships that may be harmed from screen time and social media. One example is emotional support, which has been characterized as demonstrating empathy and displaying genuine concern for someone else (Langford et al., 1997). Shensa et al. (2016) found in a sample of 1,796 US adults ages 19-32 that as social media use increased, perceived emotional support decreased. Another aspect of social relationships that may be harmed by screen time and social media use increase is social cohesion (Abbasi & Alghamdi, 2017; Zulaikha & Abdullah, 2019). Social cohesion is commonly recognized in research as the level of social cooperation and unity within a group and reflected in the attitudes and actions of its members (Moustakas, 2023). Therefore, high cohesion is marked by strong social bonds, a positive emotional connection among individuals and a clear emphasis on the mental health of those involved. In addition, a study done by (Przybylski & Weinstein, 2013) examined the presence of a smartphone rather than the use of one during human interactions. The researchers found the presence of a smartphone lead individuals to have feelings of distrust, lack of empathy, and overall lower quality of relationships. These findings suggest one factor that may play a role in the impacts of screen time and social media on social relationships is the use during interactions with others.

“Phubbing” is a concept coined by Haigh (2015) that means “the act of snubbing others in social interactions and instead focusing on one’s smartphone.” Research on phubbing has been on the rise, reflecting its growing prevalence. Chotpitayasunondh & Douglas (2016) have observed an increase in phubbing, attributing it to both personal behavior and what individuals witness in others. Their findings also underscore the predictive relationship between phubbing and

smartphone addiction, an issue we have previously recognized for its adverse impact on mental health. Furthermore, Nazir's (2020) study delved into the impact of phubbing on social interactions, revealing its detrimental effect on communication, particularly by diminishing the quality of face-to-face interactions. This phenomenon aligns with the concept of "telecocooning" established in a 2005 study, which argued that mobile phones could erode the quality of interpersonal relationships by diverting individuals from in-person exchanges and potentially diminishing the art of face-to-face-interaction (Habuchi, 2005). In light of these findings, it becomes evident that phubbing poses a threat towards individuals' interpersonal relationships and mental health through the deterioration of face-to-face interactions.

Throughout human history, face-to-face interactions have played a central role in communication. However, with the advent of internet-based communication researchers have investigated whether it could serve as a viable replacement (Flaherty et al., 1998). The findings indicated internet-based communication is not a functional alternative. This is unfortunate considering face-to-face communication has been associated with numerous positive outcomes, including social success, increased feelings of normalcy, reduced conflict, decreased loneliness, and improved sleep (Hinds & Bailey, 2003; Pea et al., 2012). Furthermore, Chasombat (2014) conducted a study revealing that social media usage correlated with reduced face-to-face communication, as individuals with perceived lower social skills tended to avoid in-person interactions. Jin and Park (2013) explored this relationship through the social skills deficit hypothesis, surveying 374 adults. Their results confirmed an inverse relationship between involvement in face-to-face communication and feelings of loneliness, a previously identified aspect of well-being. Reduced involvement in face-to-face communication was linked increased

feelings of loneliness, while increased face-to-face interactions were associated with lower levels of loneliness.

To address these challenges, various interventions have been designed to promote the positive influence of face-to-face communication. For instance, Przybylski & Weinstein (2013) conducted two experiments to assess the quality of social interactions in the presence of smartphones. In the first experiment, 74 young adults were randomly assigned to either a 'phone absent' or 'phone present' condition while engaging in a discussion about an interesting recent event. Participants in the 'phone present' group had a nondescript smartphone resting nearby, while the 'phone absent' group had a notebook instead. Measures of relationship quality, partner closeness, and positive affect were used. The results revealed that the presence of a phone led to lower reported relationship quality and reduced feelings of closeness. The second experiment aimed to determine whether the meaningfulness of the conversation played a role in these outcomes. It involved 68 participants randomly assigned to one of four groups: 'casual conversation and phone absent,' 'casual conversation and phone present,' 'meaningful conversation and phone absent,' and 'meaningful conversation and phone present.' While both 'phone present' groups had the same setup the difference was in the type of conversation they had. Participants in the 'casual conversation' group discussed their thoughts on plastic holiday trees, while those in the 'meaningful conversation' group shared their most significant events from the past year. The experiment measured relationship quality, partner trust, and partner empathy. The results echoed those of the first experiment, with participants reporting lower relationship quality, less partner trust, and reduced perceived empathy in the presence of a smartphone. However, when the conversation was meaningful, the presence of a smartphone further diminished partner trust and perceived empathy. These findings were corroborated by Misra et al. (2016), who replicated

the study with similar results. In summary, these findings suggest that the mere present of a smartphone, regardless of its use can act as a distracting element during face-to-face communication, potentially harming relationships.

It appears that smartphones can be detrimental to interpersonal relationships due to their distracting nature, diverting one's attention away from the social interactions taking place around them. In the qualitative portion of the Christensen's (2018) study, participants commonly cited that the most negative effect of social media was that it distracts users from engaging in face-to-face interactions or other activities. In a study done by DesClouds and Durand-Bush (2021) involving 21 Canadian student-athletes revealed that these individuals perceived their smartphones as sources of distraction and disengagement. They admitted that their smartphones often led them to engage in "absent-minded, non-task-specific thinking or behaviour," whether actively using an app, merely having a phone present, or even just thinking about their phones. This distraction contributed to feelings of disengagement, especially when they saw their teammates, coaches, friends, and family using their phones. In such cases, athletes reported experiencing lower levels of team cohesion and social support. These findings strongly suggest that smartphone use can reduce face-to-face interaction, ultimately diminishing team cohesion and social support in sports settings.

When considering cohesion and support, it is important to note that research has highlighted the impact of negative social interactions on athletes. In a longitudinal design study conducted by DeFreese and Smith (2014), which examined social interactions and perceived social support as potential mediators of the temporal stress–burnout and burnout–well-being relationships in a sample of 465 NCAA student-athletes, findings revealed that negative interactions were associated with lower levels of perceived social support. Furthermore, it was

observed that low social support was linked to low levels of overall well-being. Collectively, these findings emphasize that negative interactions lead to athletes experiencing reduced levels of social support, ultimately resulting in adverse effects on their mental health.

In summary, the findings presented in this section offer substantial evidence supporting the notion that smartphones can have detrimental effects on interpersonal relationships. This trend may be attributed to the increasing prevalence and cultural acceptance of phubbing, where individuals divert their attention to their phones when they should be engaged with those around them. This distraction and disengagement, as suggested by research, contribute to several negative outcomes when face-to-face communication is compromised, including a decline in quality of interpersonal relationships, reduced trust, decreased cohesion, and diminished social support. Moreover, certain studies have indicated that when smartphones disrupt these components of interpersonal relationships, there are subsequent negative impacts on mental health. However, it's important to note that existing research predominately focuses on the relationship between smartphones and interpersonal relationships components, leaving a gap in understanding whether interpersonal relationships mediate the connection between smartphone use and mental health. Fortunately, a substantial body of research has already established the significant link between interpersonal relationships and mental health, specifically in student-athletes.

Social Support and Mental Health

Damaging interpersonal relationships can play a significant role in the mental health of collegiate athletes. As humans, having positive and significant interpersonal relationships is a crucial component to a healthy life (Baumeister & Leary, 1995). Having these relationships provides people with a sense of belonging. When people lack a sense of belonging, they begin to suffer from more mental and physical illnesses and may be susceptible to behavioral problems,

such as suicide (Baumeister & Leary, 1995). However, social belongingness is just one way to examine social relationships. This makes examining social relationships so complex, as researchers have examined them through a plethora of concepts and measures. For this reason, Oyanedel and Paez (2021) conducted a review to explore the several concepts used to report social relationships and how they relate to well-being. These concepts included social cohesion (the strength of social bonds and social equality within social networks), social integration (the extent individuals participate in a variety of social relationships), social support (the extent in which a person is connected within a social network and/or the satisfactory reception and/or availability of support), social capital (the networks of relationships among people in a particular society), social identification (the extent individuals identify themselves as part of a given group), and relatedness (the extent a person feels personally accepted, respected, included, and supported by others in the social group). They found that each concept, outside of social capital, had a negative relationship with well-being. This suggests that a lack of relationships negatively impacts mental health. Given the diverse ways to measure social relationships, pinpointing the exact concept to measure can be challenging. However, within the collegiate student-athletes population, research indicates social support may be one of the more crucial concepts for their mental health.

Social support was defined by Shumaker and Brownell (1984) as ‘an exchange of resources between at least two individuals perceived by the provider or the recipient to be intended to enhance the well-being of the recipient.’ Collegiate student-athletes inherently cultivate strong social support networks, including relationships with teammates, coaches, medical staff, and other resources provided by the athletic department (Armstrong & Oomen-Early, 2009). Researchers in the field of sport psychology have highlighted social support as an integral role in athletes’ mental

health (Kristiansen & Roberts, 2010; Lu & Hsu, 2013). One reason for this may be due to the role social support plays in the help-seeking tendencies of collegiate student-athletes.

Social support plays a crucial role in facilitating help-seeking behavior among collegiate athletes. Gulliver et al. (2012) completed a qualitative study with 15 elite athletes between the ages 16- and 23-years old, inquiring what these athletes perceive as barriers and facilitators to help-seeking for common mental health problems. They identified stigma, difficulties in expressing emotion, and lack of problem awareness as the main barriers in seeking help. Conversely, education and awareness of mental health issues and services, social support, and encouragement from others were found to be the biggest facilitators. Researchers have continued to examine the barriers and facilitators to help-seeking in athletes and have consistently highlighted social support as a major starting point in the help-seeking process (King et al., 2023; O’Keeffe et al., 2022). These findings suggest that while there are barriers exist, social support can help student-athletes overcome these obstacles and seek help. However, the role of social support does not stop here.

Not only does social support facilitate help-seeking among collegiate student-athletes, but when they do seek help for mental health problems, they predominantly turn to their social support circles. Wahto et al. (2016) found that collegiate student-athletes are more likely to confide in a close friend or relative before seeking help from a professional. Similarly, Habeeb et al. (2022) investigated the organizational factors that impact an athlete’s willingness to seek help and how these factors predict help seeking. In a survey of 474 student-athletes, they found that athletes were most likely to seek help from informal sources: a partner (88.6%), family member (88.2%), and a teammate (81.9%). These results align with the Chen (2013), who also highlighted partners, family members, and teammates as the primary sources athletes would turn to for help in times of distress. In sum, these findings provide evidence that social support improves collegiate student-athletes’

chances of seeking help and that it is their social support circle they turn to when they need help. However, it is important to evaluate the effectiveness of social support when it comes to dealing with mental health problems.

The effectiveness of social support in enhancing the mental health and well-being of collegiate student-athlete is well-documented. Graupensperger et al. (2020) conducted a study examining how social support, connectedness, and changes to athletic identity was associated with mental health in a sample of 234 NCAA student-athletes. They found that student-athletes with higher perceived social support reported more connectedness with teammates and less dissolution of their athletic identity leading to lower levels of mental health problems. Similarly, Sullivan et al. (2020) investigated the link between social support and depressive symptoms in 238 NCAA Division I collegiate athletes. They found that higher levels of social support were correlated with fewer depressive symptoms. Building on these insights, Fogaca (2021) implemented a randomized waitlist control 8-week intervention with 88 NCAA Division I collegiate-athletes focused teaching coping skills and increasing social support within their teams. Following the intervention, they found that the individuals in the intervention group experienced significant improvements in their coping skills and significant decreases in their anxiety levels. These findings highlight how not only is social support effective in improving mental health-related outcomes but that interventions can be implemented by instructors and coaches to effectively improve the social support within a team.

To deepen our understanding of how social support influence mental health, it is essential to examine the various types of social support and how individuals may rely on them differently. Cutrona and Suhr (1992) identified four key types of social support: emotional, esteem, informational, and tangible support. Emotional support involves providing empathy, compassion,

and validation of feelings, helping individuals feel understood and cared for during challenging times. Esteem support focuses on boosting individuals' self-esteem and confidence, offering praise, encouragement, and recognition of their strengths and accomplishments, which can enhance their sense of self-worth and resilience. Informational support consists of providing advice, guidance, and information to help individuals navigate specific situations or problems effectively, empowering them with knowledge and resources to make informed decisions. Lastly, tangible support involves offering practical assistance, such as financial aid, transportation, or physical help with tasks, which can alleviate stress and enhance individuals' ability to cope with their circumstances. Recognizing and utilizing these different forms of support can contribute to more comprehensive and effective approaches in meeting individuals' needs and improving their mental health.

Researchers have investigated how different types of social support relate to the mental health of collegiate athletes, particularly during injury. As previously mentioned, athletes are more susceptible to injuries than non-athletes and these injuries introduce additional stress and trauma into their lives. Covassin et al. (2014) conducted a study on feelings of social support in a sample consisting of 126 Division I student-athletes that had either experienced a concussion or some orthopaedic injury. It was seen that both groups relied on the same top three group of people. Athletes with concussions relied on emotional support from family 89% of the time, friends 78% and teammates 65%. Athletes with orthopaedic injuries relied on their family for emotional support 87% of the time, friends 84% and teammates 65%. In addition, Bianco (2001) found that athletes generally tend to seek emotional support from family and friends, whereas they look to individuals with relevant expertise, such as coaches or medical professionals, for informational support, according to observations. Furthermore, Malinauskas (2010) obtained a sample of 123 collegiate

athletes to examine the relationships between injuries, social support, perception of stress and life satisfaction. The results suggest that overall social support mediates the relationships between injuries, perceived stress, and life satisfaction. Moreover, the social relationships these athletes had determined how much the stress impacted their life satisfaction. These findings suggest that through the help from athletes' social support circle, they can help alleviate additional stressors in their lives that may harm their mental health.

Research consistently emphasizes the positive impact of interpersonal relationships on mental health. In the context of sports, social support has emerged as a key factor influencing the mental health of student-athletes. Student-athletes often identify social support as a primary facilitator to seek help during periods of diminished mental health. In addition, when student-athletes seek help it comes from their social support circles (i.e., teammates, friends, family, and coaches). Furthermore, the higher levels of social support a student-athlete perceives, the greater their mental health. Therefore, any lifestyle choice that diminishes social support can consequently harm their mental health. As previously highlighted, smartphone use is one such lifestyle choice that has been linked to negative effects on social relationships. However, it is unclear how if smartphone use negatively impacts the perceptions of social support among collegiate student-athletes.

Conclusion

The purpose of this literature review was to investigate the prevalence of mental health issues among collegiate student-athletes and the contributing factors. As highlighted in this review, researchers have identified a direct negative association between smartphone use and various aspects of mental health, including depression, anxiety, and stress. Moreover, inappropriate smartphone use tendencies have been linked to lower levels of perceived social support, a critical

factor in help-seeking behaviors among student-athletes facing mental health challenges. Despite these observed direct connections between smartphone use, social support, and mental health, there exists a notable gap in the literature: there is no known research examining the impact of smartphone use on the mental health of student-athletes through the mediation of social support. By exploring this indirect relationship, researchers and practitioners can gain valuable insights into the pathways through which smartphone use affects mental health, ultimately working towards strategies to mitigate these negative impacts.

CHAPTER 3: METHODS

Participants

The population of this study included young adult (18 to 25 years old) collegiate student-athletes competing in the NCAA (National Collegiate Athletic Association) and the NAIA (National Association of Intercollegiate Athletics) within the United States. Based on a Monte Carlo power analysis for indirect effects ($\alpha = .05$, $\beta = .20$), the study needed 260 participants to test for a moderately small effect (Schoemann et al., 2017). To achieve this, the goal was to recruit 300 participants, accounting for potential participants who may not fully complete each measure or complete the survey a second time, thereby contributing to reaching the significant threshold of 260 participants.

Sample Characteristics

In total, 208 participants started the online survey. However, 107 were excluded from the analysis due to incomplete responses ($n = 104$) and failure to meet inclusion criteria ($n = 3$). To be included, the participants had to complete both the measures of perceived social support and mental health along with completing at least one of the measures for smartphone use. This meant that 101 participants were included in the analysis.

The sample included male ($n = 39$, 38.6%) and female ($n = 62$, 61.4%) participants with an age range of 18-24 ($M_{\text{Age}} = 20.4$ years, $SD_{\text{Age}} = 1.57$). The sample included participants that identified as 81.2% White or Caucasian, 9.9% African American or Black, 5.0% Two or More Races, 3.0% Hispanic or Latino, and one participant did not wish to specify their race and ethnicity. Participants competed in the NCAA Division I ($n = 58$, 57.4%), NCAA Division II ($n = 21$, 20.8%), NCAA Division III ($n = 10$, 9.9%), and NAIA ($n = 12$, 11.9%). Participants also indicated the sports in which they compete, these included cross country/track & field ($n = 29$), track & field

($n = 17$), soccer ($n = 12$), volleyball ($n = 10$), softball ($n = 7$), baseball ($n = 7$), football ($n = 5$), basketball ($n = 4$), tennis ($n = 3$), swimming & diving ($n = 3$), ice hockey ($n = 3$), and golf ($n = 1$). Participants identified being in their 1st year (25.7%), 2nd year (19.8%), 3rd year (22.8%), 4th year (10.9%), 5th year (14.9%), and 6th year (5.9%) of college. At the time of data collection, 62.4% of participants reported that their sport was currently in-season ($n = 63$), while 37.6% reported being out-of-season. Lastly, when asked if they were currently injured, participants indicated yes ($n = 20$, 19.8%) and no ($n = 81$, 80.2%). Basic sample characteristics are displayed in Tables 1 and 2 (See Appendix A for *Full Sample Characteristics*).

Table 1. *Sample Characteristics (Gender and Race/Ethnicity)*

		<i>N</i>	%
Gender	Female	62	61.4%
	Male	39	38.6%
Race/Ethnicity	African American or Black	10	9.9%
	Hispanic or Latino	3	3.0%
	Two or More Races	5	5.0%
	Did not specify	1	1.0%
	White or Caucasian	82	81.2%

Table 2. *Sample Characteristics (Age)*

		<i>N</i>	%	<i>Mean (SD)</i>
Age	18	11	10.9%	20.4 (1.7)
	19	30	29.7%	
	20	15	14.9%	
	21	16	15.8%	
	22	13	12.9%	
	23	13	12.9%	
	24	3	3.0%	

Measures

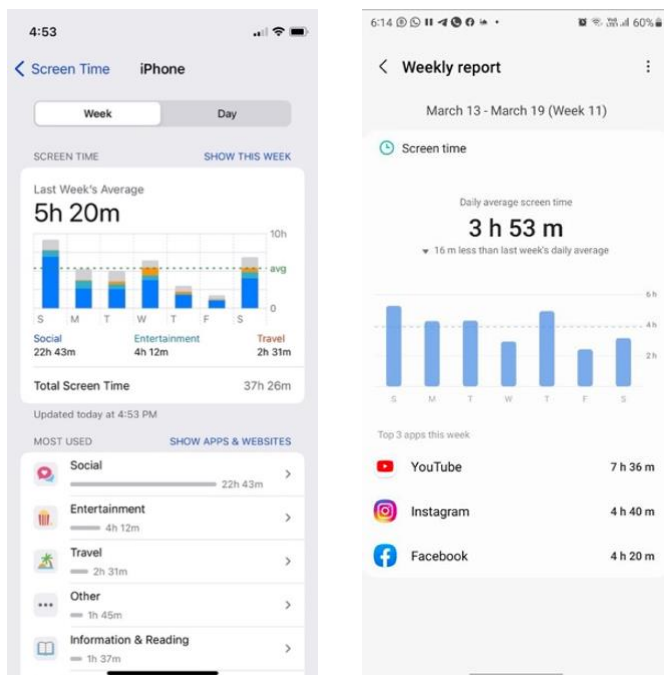
Demographic Questions

A demographic questionnaire was completed to gather basic demographic information including age, gender, race/ethnicity, year in college, athletic division, sport, in-season vs. out-of-season, and injury status.

Screen Time and Social Media Screen Time

Participants were requested to provide a screenshot of their previous weeks screen time report from their smartphone. Examples of these screenshots are shown in Figure 2. The provided screenshots displayed the average screen time per day for the previous week. The screen time spent on social media applications was identified by the “social” category within the report. The average daily total screen time and the calculate social media screen time for each participant were used for all analyses (See Appendix B for *Instructions*).

Figure 2. *Examples of Screen Time Screenshots*



Note: Example of the left is an iPhone report and on the right is an Android Report

Social Media Use During Daily Activities

The assessment of participants' social media usage during daily activities was measured using the 9-item Social Media Use During Daily Activities-Student-Athletes Questionnaire. This questionnaire, adapted from Barry et al. (2022), employed a 4-point Likert-scale (ranging from "Never" to "Almost Always") to gauge the frequency of social media use during various daily activities (e.g., "I'm on social media during... (e.g., ...class, ...outings with friends, ...in the 15 minutes before I go to sleep)"). This measurement focused on discerning the contexts in which participants utilized their smartphones rather than simply quantifying the duration of use. Such an approach offered valuable insights into whether the detrimental effects of smartphone usage resulted from the total time spent or the specific circumstances in which that time is allocated. Higher scores represented more time spent on social media during daily activities. Barry et al. (2022), reported an acceptable level of reliability ($\alpha = .78$) for the Social Media Use During Daily Activities-Student-Athletes Questionnaire (See Appendix C for *Social Media Use During Daily Activities-Student-Athletes Questionnaire*).

Perceived Social Support

To assess the level of perceived social support that athletes received from their teammates, the Perceived Available Support in Sport Questionnaire (PASS-Q; Freeman et al., 2011) was utilized. The PASS-Q is a 16-item questionnaire designed for use across all sports to measure the availability of social support. It assessed four distinct dimensions of social support, including emotional, esteem, informational, and tangible support, through a Likert-scale with four response options (1-not at all; 4-extremely so). Each item was introduced with the stem sentence, "If needed, to what extent would someone..." and was grouped into the four different subscales to assess the different forms of social support provided by teammates. For example, the emotional support

subscale included an item that reads, "If needed, to what extent would someone care for you," the esteem support subscale included an item that will read, "If needed, to what extent would someone reinforce the positives," the informational support subscale included items such as, "If needed, to what extent would someone give constructive criticism," and the tangible support subscale included items like, "If needed, to what extent would someone do things for you at competitions/matches." Each subscale was summed to create a total perceived social support score, along with scored separately to assess for any differences in the types of social support. Both of which were used in the analysis to indicate the level of perceived available social support, with a higher score indicating greater perceived available social support. The reliability levels of the PASS-Q are acceptable, ranging between $\alpha = .84$ to $.92$ for the individual scales (Freeman et al., 2011; See Appendix D for *Perceived Available Support in Sport Questionnaire*).

Mental Health

The Depression Anxiety Stress Scale-10 (DASS-10; Halford & Frost, 2021) was utilized to assess the presence of mental health problems through depressive symptoms, anxiety symptoms, and stress experienced over the past week. The DASS-10 is a 10-item questionnaire shortened and derived from the original DASS-42 questionnaire (Lovibond & Lovibond, 1995). It consists of three subscales: depression, anxiety, and stress. All questions were answered using a 4-point Likert scale: (1-Did not apply to me; 4-Applied to me very much). The depression subscale consisted of four questions and an example for an item within the depression subscale is, "I felt down-hearted and blue," whereas the anxiety subscale consisted of three questions, containing items such as, "I was worried about situations in which I might panic and make a fool of myself," and the stress subscale also had three questions, which consisted of items like, "I found it hard to wind down." Depression, anxiety, and stress were examined individually and collectively to measure mental

health. Higher scores indicated greater presence of depression, anxiety, and stress, respectively during the week. Each subscale had acceptable levels of consistency (i.e., anxiety: $\alpha = .74$, stress: .83, depression .91; Barry et al., 2022; see Appendix E for *Depression Anxiety Stress Scale*).

Design and Study Procedure

After obtaining approval from the Institutional Review Board (IRB), participants were recruited using various methods. At first, participants were informed about their opportunity to take part in a research study focused on smartphone use, social support, and mental health via word of mouth and a flyer posted on social media (i.e., Instagram, Facebook, X, and LinkedIn). Secondly, to ensure a wide range of participants were made aware of the study, a random college generator was paired with a random sport generator, to contact over 200 head coaches via email. Two-days following the email, the coaches were called to ensure they received the email. Of those contacted, three said they would share with their teams.

The data collection incorporated a repeated-measures design involving two time points, two weeks apart to examine the presence of a mediation relationship. At the first time point, the participants completed the 10-minute survey created in Qualtrics on their phone or computer. To start the survey, the general purpose and procedure of the study were outlined to the participants before they indicated their consent by typing in their initials followed by the last four digits of their phone number, clicking “Agree,” and proceeding forward with the survey. The survey then included demographics, a place for them to import a screenshot of their weekly screen time report (with instructions) and questions on social media use, perceived social support, and mental health. Additionally, their email was obtained to contact them about participating in and completing the second portion of the study. Email triggers in Qualtrics were used to contact the participants two

weeks after the completion of the initial survey. If they still had not completed the second portion after three weeks, they were sent one last email as a final reminder.

For the second round, participants were asked to re-enter their initials and the last four digits of their phone number to match surveys and ensure accurate analysis before completing the same survey from the first time point, aside from the demographics (in-season vs. out-of-season and injury status were kept as we anticipated these could have changed and played a role in the relationships examined in this study).

Data Analysis

Descriptive statistics were used to determine means, standard deviations, and ranges for sample's demographics and all research variables (i.e., smartphone use, perceived social support, and mental health). Bivariate correlations were conducted between smartphone use, perceived social support, and presence of mental health problems from Timepoint 1 to examine Hypotheses 1-3. Prior to conducting these correlations, reliability was examined for each measure. To test Hypothesis 4, a simple mediation model was used with bootstrapping conducted via PROCESS v4.2 in SPSS22. Three models were run, to investigate the indirect effects each measure of smartphone use (i.e., total screen time, social media screen time, and social media during daily activities, X) on presence of mental health problems (Y) through the mediation of perceived social support (M). To measure the magnitude of the Betas (β), the R^2 values for effect sizes were examined. To interpret the strength of correlations (r), the results considered Cohen and Wills (1985) guidelines that suggest $r = 0.10$, $r = 0.30$, and $r = 0.50$ should be viewed as indicators of small, medium, and large magnitudes, respectively. All statistical analyses were performed using SPSS.

CHAPTER 4: RESULTS

Preliminary Analysis

Of the 101 participants, sixty-three submitted a screenshot displaying their total screen time with social media screen time, and an additional twenty submitted a screenshot displaying their total screen time without their social media screen time. For the analysis, pairwise deletion was used in these circumstances.

Descriptive Results

Prior to completing the main analysis, tests for reliability were conducted for each questionnaire used. The internal consistency, 95% confidence intervals, skewness, and kurtosis are all reported in Table 3. The sample reported skewness ranging from $-.98$ to $.73$ meaning that the data was slightly skewed left in some cases and right in others. 9 to 1.08). The skewness and kurtosis values were considered acceptable and deemed not problematic. Internal consistency is a measure used to determine the degree of homogeneity or correlation between test items/measures. In this study, Cronbach's alpha were utilized to assess the reliability of each measure, adhering to the common recommendation by methodologists for an α coefficient above $.65$ (Taber, 2018), with all alphas presented in Table 3 meeting this reliability threshold.

Table 3. *Internal Consistency, Skewness, and Kurtosis*

Variable	α	95% CI		Skew	Kurtosis
		Lower	Upper		
Smartphone Use During Daily Activities	.77	.69	.83	-.06	.39
Perceived Social Support	.95	.93	.96	-.98	1.08
Mental Health	.86	.82	.90	.72	.40

Additionally, descriptive statistics (see Table 4) were examined for all the variables. The means, standard deviations, and ranges are displayed within the tables. On average, participants had over 6.2 hours of screen time per day (Range .20 to 12.93 hours). Average screen time specifically on social media applications was 3.2 hours (Range .95 to 7.71 hours), which accounts for just over half the total amount of time spent on their phone per day. The sample reported relatively high levels of total perceived social support with an average of 3.11 (Range 1-4) on a scale of 1-4. This was also seen with the participants reporting relatively high levels on each of the social support subscales (emotional, esteem, informational, and tangible) as averages were between 3.05 and 3.25. Participants also reported moderately low presence of mental health problems with an average of 1.79 (Range 1-3.4) on a scale of 1-4. As for each of the mental health subscales, the participants reported moderately low levels of depression, anxiety, and stress with averages of 1.71, 1.71, and 1.97 respectively.

Table 4. *Descriptive Statistics for All Variables*

Variable	N	M (SD)	Range
Total Screen Time	83	6.24 (2.46)	.20-12.93
SM Screen Time	63	3.23 (1.31)	.95-7.71
SM in Daily Activities	101	2.36 (0.46)	1-3.4
Perceived Social Support	101	3.11 (0.65)	1-4
Emotional Support	101	3.25 (0.74)	1-4
Esteem Support	101	3.05 (0.72)	1-4
Informational Support	101	3.17 (0.70)	1-4
Tangible Support	101	2.96 (0.74)	1-4
Mental Health	101	1.79 (0.54)	1-3.4
Depression	101	1.71 (0.55)	1-3.5
Anxiety	101	1.71 (0.67)	1-4
Stress	101	1.97 (0.65)	1-3.67

Note: Total Screen Time and Social Media Screen Time are from screenshots of participants' devices indicating their average daily screen time. All other variables are based on self-reports.

Correlations

Bivariate correlations for all the variables were calculated to examine the first three hypotheses and are displayed in Table 5. Between each of the smartphone use measurements, a near-zero association was revealed between social media screen time and social media during daily activities ($r = .04$), a moderately small correlation between total screen time and social media during daily activities ($r = .23$; $p < .05$) and a strong association between total screen time and social media screen time ($r = .61$, $p < .01$). Within social support, very strong significant relationships were found between perceived social support and each of the subscales (ranging from $r = .88$ to $r = .90$), as well as strong significant relationships between each subscale variable (ranging from $r = .73$ to $r = .75$). Concerning mental health, very strong significant relationships were observed between mental health and each subscale (ranging from $r = .87$ to $r = .88$), with strong significant relationships among the subscale variables (ranging from $r = .62$ to $r = .68$).

Table 5. *Bivariate Correlations*

	1	2	3	4	5	6	7	8	9	10	11	12
1. Total Screen Time	--											
2. SM Screen Time	.61**	--										
3. SM in Daily Activities	.23*	.04	--									
4. Perceived Social Support	-.06	-.02	.11	--								
5. Emotional Support	-.10	-.09	.13	.89**	--							
6. Esteem Support	-.15	-.09	.10	.89**	.73**	--						
7. Informational Support	.04	.07	.13	.88**	.73**	.74**	--					
8. Tangible Support	-.01	.05	.02	.90**	.73**	.73**	.75**	--				
9. Mental Health	.19	.09	.15	-.26**	-.20**	-.24*	-.20*	-.28**	--			
10. Depression	.24*	.06	.15	-.29**	-.21*	-.31**	-.21*	-.30**	.87**	--		
11. Anxiety	.12	.06	.10	-.23**	-.21*	-.19	-.15	-.26**	.88**	.62**	--	
12. Stress	.11	.11	.12	-.15	-.10	-.10	-.16	-.18	.87**	.62**	.68**	--

Note: total screen time and social media screen time were available for 83 and 63 participants, respectively. SM= social media. Bold indicates main scales.

** $p < .01$

* $p < .05$

Hypothesis 1

For Hypothesis 1, correlations were used to examine the relationship between smartphone use variables and measures of perceived social support. Total screen time and social media screen time showed similar, non-significant associations with perceived social support and each subscale. These associations were small and negative for perceived social support ($r = -.06$ and $-.02$, respectively), emotional support ($r = -.10$ and $-.09$, respectively), and esteem support ($r = -.15$ and $-.09$, respectively). Additionally, for esteem informational support and tangible support, a small positive to near zero-association was observed with total screen time ($r = .04$ and $r = -.01$) and social media screen time ($r = .07$ and $r = .05$).

On the other hand, social media use during daily activities differed from screen time and social media screen time in its association with perceived social support. It displayed low positive correlations for each measure (i.e., perceived social support ($r = .11$), emotional support ($r = .13$), esteem support ($r = .10$), informational support ($r = .12$), and tangible support ($r = .02$)), however, these correlations were still non-significant. These inconsistent results and small associations indicate that smartphone use does not predict perceived social support among collegiate student-athletes and therefore, does not support Hypothesis 1.

Hypothesis 2

Hypothesis 2 was examined using the correlations between the variables of smartphone use and those of mental health. Total screen time and depressive symptoms was the only statistically significant relationship, with a moderately positive association ($r = .24, p < .01$). Total screen time had a stronger association with mental health in comparison to social media screen time ($r = .19$ and $r = .09$, respectively). Furthermore, total screen time had small to moderately positive, non-significant, associations with stress ($r = .11$) and anxiety ($r = .12$), while social media

screen time had small non-significant associations with each subscale (ranging from $r = .06$ to $r = .11$). Social media during daily activities had a slightly stronger association than social media screen time with small to moderately positive correlations with depression ($r = .15$), anxiety ($r = .10$), and stress ($r = .12$) and an overall correlation of ($r = .15$) with mental health. These results partially support Hypothesis 2, as elevated levels of total screen time were significantly associated with depressive symptoms.

Hypothesis 3

In examining Hypothesis 3, the correlation analysis revealed a consistent and apparent trend in the associations between perceived social support and mental health. Firstly, perceived social support demonstrated a significant, moderately negative association with overall mental health ($r = -.26, p < .01$). Moreover, as one perceives more available social support, they experience fewer mental health problems. Secondly, perceived social support had significant, moderately negative association with the subscale measures for depression ($r = -.29, p < .01$), and anxiety ($r = -.23, p < .01$), while a slightly smaller and non-significant association was seen with stress ($r = -.15$). Each type of social support also showed these similar significant, moderately negative associations with mental health and its subscales. Notably, depression had the greatest association with emotional ($r = -.21, p < .05$), esteem ($r = -.31, p < .01$), informational ($r = -.21, p < .05$), and tangible support ($r = -.30, p < .01$). Similarly, anxiety showed significant, moderately negative associations with each type of social support (i.e., emotional: $r = -.21, p < .01$; esteem: $r = -.19$; informational: $r = -.15$; tangible: $r = -.26, p < .01$). Stress displayed the smallest associations with each type of social support, with low non-significant correlations (i.e., emotional: $r = -.10$; esteem: $r = -.10$; informational: $r = -.16$; tangible: $r = -.18$). These findings support Hypothesis 3,

revealing that collegiate student-athletes with higher levels of perceived social support, regardless of the type, report lower levels of mental health problems, particularly depression and anxiety.

Indirect Effect (Mediation Analysis)

Hypothesis 4

Due to the lack of participants needed for the power analysis, an indirect effect analysis was conducted with the data at Timepoint 1 to test Hypothesis 4. Three separate indirect models were conducted, one for each measure of smartphone use (i.e., total screen time, social media screen time, and smartphone use during daily activities). Furthermore, the significance of these indirect effects was tested using bootstrapping procedures. Upon completion of 5,000 bootstrapped samples, there was not a statistically significant indirect effect for any of the models examining perceived social support as a mediator between smartphone use and mental health (total screen time ($E = .01, (-.014, .033)$), social media screen time ($E = .00, (-.044, .046)$), and social media during daily activities ($E = -.03, (-.118, .042)$)). All other paths in each model were also not statistically significant, aside from the B path. The relationship between perceived social support and mental health, was statistically significant in each model (total screen time ($E = -.29, p = .001, R^2 = 13.3\%$), social media screen time ($E = -.39, p < .001, R^2 = 22.4\%$), and social media during daily activities ($E = -.23, p = .005, R^2 = 7.5\%$)). Nonetheless, the models do not support Hypothesis 4. The indirect and direct effects can be seen in Tables 6-8.

Table 6. *Indirect and Direct Effects for Total Screen Time*

Indirect and Direct Effects for Total Screen Time							
Type	Effect	Estimate	SE	95% CI		p	R ²
				Lower	Upper		
Total	Total Screen Time --> Mental Health	.04	.02	-.007	.084	.09	3.4%
Indirect	Total Screen Time --> Perceived Social Support --> Mental Health	.01	.01	-.014	.033	-	-
A Path	Total Screen Time --> Perceived Social Support	-.02	.03	-.073	.042	.59	0.4%
B Path	Perceived Social Support --> Mental Health	-.29	.08	-.454	-.129	.00	13.3%
Direct	Total Screen Time --> Mental Health	.03	.02	-.008	.077	.11	3.4%

Note: Indirect effect has a bootstrapped SE and 95% CI

Table 7. Indirect and Direct Effects for Social Media Screen Time

Indirect and Direct Effects for Social Media Screen Time							
Type	Effect	Estimate	SE	95% CI		p	R ²
				Lower	Upper		
Total	SM Screen Time --> Mental Health	.03	.05	-.054	.130	.48	0.8%
Indirect	SM Screen Time --> Perceived Social Support --> Mental Health	.00	.02	-.044	.046	-	-
A Path	SM Screen Time --> Perceived Social Support	-.01	.06	-.124	.109	.89	0.0%
B Path	Perceived Social Support --> Mental Health	-.39	.09	-.577	-.203	.00	22.4%
Direct	SM Screen Time --> Mental Health	.03	.04	-.054	.116	.47	0.8%

Note: Indirect effect has a bootstrapped SE and 95% CI

Table 8. Indirect and Direct Effects for Social Media Use During Daily Activities

Indirect and Direct Effects for Social Media Use During Daily Activities							
Type	Effect	Estimate	SE	95% CI		p	R ²
				Lower	Upper		
Total	SM in Daily Activities --> Mental Health	.17	.12	-.057	.399	.14	2.2%
Indirect	SM in Daily Activities --> Perceived Social Support --> Mental Health	-.03	.04	-.118	.042	-	-
A Path	SM in Daily Activities --> Perceived Social Support	.15	.14	-.131	.426	.30	1.1%
B Path	Perceived Social Support --> Mental Health	-.23	.08	-.386	-.070	.01	7.5%
Direct	SM in Daily Activities --> Mental Health	.20	.11	-.017	.426	.07	2.2%

Note: Indirect effect has a bootstrapped SE and 95% CI

Exploratory Results

Time 2 Sample Characteristics

Sixty-six participants started the second portion of the survey. Of those sixty-six, twenty-five were removed due to multiple submissions ($n = 10$), incomplete responses ($n = 10$), or failure to meet inclusion criteria and timepoint one ($n = 1$). This left us with a sample of 43 participants that completed the survey at both timepoints. This sample consisted of females ($n = 32$) and males ($n = 11$). Furthermore, the participants completed the second survey, an average of 22.7 days ($SD = 10.64$, Range = 14–52) after submitting the first survey. All other sample characteristics can be found in Appendix F.

Time 2 Mean Differences

As stated, there were not enough participants who completed both time points for a proper mediation analysis. However, mean differences were calculated using Paired-Samples T-tests, to evaluate the consistency of these test variables over time. There were no significant differences in

any variable between T1 and T2, and they each displayed moderately strong correlations between each time point (ranging from .49 to .67). These findings display that there are little to no changes in one's smartphone use, perceived social support, and presence of mental health problems within this given time range of two to seven weeks. The results displaying the mean, mean differences, and correlations for each variable across mean can be seen in Table 9.

Table 9. *Paired Samples Statistics Across Time*

	Time	N	Paired Differences					Paired Samples Correlations	
			M	SD	M Difference	SD	p-value	r	p-value
Screen Time	T1	40	5.83	2.27	0.34	1.96	0.28	0.61	<.001
	T2		5.49	2.14					
SM Screen Time	T1	32	3.33	1.49	0.10	1.35	0.69	0.57	<.001
	T2		3.23	1.44					
SM in Daily Activities	T1	43	2.33	0.40	0.00	0.43	1.00	0.56	<.001
	T2		2.33	0.49					
Perceived Social Support	T1	43	3.11	0.55	-0.07	0.44	0.33	0.67	<.001
	T2		3.17	0.54					
Emotional Support	T1	43	3.23	0.59	-0.07	0.53	0.39	0.59	<.001
	T2		3.30	0.57					
Esteem Support	T1	43	3.10	0.65	-0.07	0.56	0.42	0.58	<.001
	T2		3.17	0.56					
Informational Support	T1	43	3.19	0.66	0.00	0.61	1.00	0.55	<.001
	T2		3.19	0.62					
Tangible Support	T1	43	2.91	0.67	-0.13	0.57	0.15	0.67	<.001
	T2		3.03	0.72					
Mental Health	T1	43	1.82	0.45	-0.01	0.45	0.89	0.61	<.001
	T2		1.83	0.55					
Depression	T1	43	1.76	0.46	-0.01	0.50	0.88	0.59	<.001
	T2		1.77	0.61					
Anxiety	T1	43	1.71	0.63	-0.04	0.70	0.72	0.49	<.001
	T2		1.74	0.75					
Stress	T1	43	2.01	0.57	0.02	0.56	0.79	0.54	<.001
	T2		1.98	0.59					

Gender Differences

Given the consistent mental health differences seen in research between men and women collegiate student-athletes, a post-hoc analysis was completed to examine for any gender differences. Firstly, independent samples t-tests were conducted to determine the differences in mean scores for each variable between females and males. The results (displayed in Table 10) showed that the males ($M = 6.88$, $SD = 2.77$), although non-significant, recorded higher levels of

total screen time ($t(81) = -1.86, p = .07, d = .41$) than the females ($M = 5.85, SD = 2.19$). Furthermore, there were no significant differences between males and females for any variable of smartphone use. Additionally, there were no significant differences between gender seen for perceived social or any of the subscales. However, there were significant differences seen in the mental health variables, aside from depression, between genders. Females ($M = 1.92, SD = 0.57$) reported significantly higher levels of mental health problems ($t(97.5) = 3.62, p < .001, d = .72$) than males ($M = 1.57, SD = 0.40$). Females ($M = 1.89, SD = 0.71$) also reported significantly higher levels of anxiety symptoms ($t(99) = 4.17, p < .001, d = .81$) than males ($M = 1.41, SD = 0.45$). This trend continued with stress, where females ($M = 2.15, SD = 0.66$), reported significantly higher levels of stress ($t(95.2) = 4.08, p < .001, d = .80$). These results supported previous literature and indicated that females have higher levels of mental health problems than males (Davoren & Hwang, 2014).

Table 10. *Group Statistics and Independent Samples T-Test for Gender*

Group Statistics and Independent Samples T-Test for Gender										
	Gender	N	M	SD	M Difference	SD	t	df	p-value	Cohen's d
Screen Time	Female	52	5.85	2.19	-1.02	0.55	-1.86	81.0	0.07	0.41
	Male	31	6.88	2.77						
SM Screen Time	Female	42	3.30	1.45	0.21	0.35	0.60	61.0	0.55	0.17
	Male	21	3.09	1.01						
SM in Daily Activities	Female	62	2.40	0.39	0.97	0.10	0.95	61.6	0.35	0.21
	Male	39	2.30	0.56						
Perceived Social Support	Female	62	3.15	0.63	0.10	0.13	0.74	99.0	0.46	0.16
	Male	39	3.05	0.68						
Emotional Support	Female	62	3.35	0.66	0.27	0.15	1.84	99.0	0.07	0.36
	Male	39	3.08	0.83						
Esteem Support	Female	62	3.13	0.71	0.19	0.15	1.29	99.0	0.20	0.26
	Male	39	2.94	0.73						
Informational Support	Female	62	3.19	0.71	0.03	0.14	0.22	99.0	0.83	0.06
	Male	39	3.15	0.70						
Tangible Support	Female	62	2.92	0.75	-0.10	0.15	-0.66	99.0	0.51	0.14
	Male	39	3.02	0.73						
Mental Health	Female	62	1.92	0.57	0.35	0.10	3.62	97.5	<.001	0.72
	Male	39	1.57	0.40						
Depression	Female	62	1.77	0.59	0.15	0.11	1.38	99.0	0.17	0.28
	Male	39	1.62	0.48						
Anxiety	Female	62	1.89	0.71	0.48	0.12	4.17	99.0	<.001	0.81
	Male	39	1.41	0.45						
Stress	Female	62	2.15	0.66	0.48	0.12	4.08	95.2	<.001	0.80
	Male	39	1.68	0.50						

Notes: Levene's Test for Equality Variances revealed sig. values <.05 for SM in Daily Activities, Mental Health, Anxiety, and Stress. Therefore, the equal variance not assumed values were used for these variables.

Next, correlation analyses were run to explore any notable differences in gender and variable correlations. The results showed that smartphone use appears to have different associations with perceived social support and mental health across the two genders. Moreover, total screen time for males had a small to moderately negative association with perceived social support ($r = -.15$), emotional support ($r = -.15$), and esteem support ($r = -.34$). Whereas in females, total screen time has a near-zero positive association with perceived social support ($r = .02$), emotional support ($r = .02$), and esteem support ($r = .01$). Although non-significant, these correlations suggest that males may align more with Hypothesis 1, in that high smartphone use, specifically high levels of total screen time, is associated with lower levels of perceived social support.

Alternatively, for social media use during daily activities, had a very small negative to very small positive associations with perceived social support ($r = -.02$), emotional support ($r = .07$), esteem support ($r = -.06$), and information support ($r = .04$) in females, but a small to moderately positive association with perceived social support ($r = .22$), emotional support ($r = .15$), esteem support ($r = .26$), and informational support ($r = .24$) in males. In this case, the correlations display higher prevalence social media use during daily activities is associated with higher levels of perceived social support in male collegiate student-athletes. rises, perceived social support. While none of these correlations are significant, these results suggest the presence of a gender difference in the association of smartphone use and perceived social support.

The gender differences for total screen time and mental health are also notable. The results showed that total screen time for males has a significant and moderately positive association with mental health ($r = .44, p < .05$) and anxiety ($r = .50, p < .01$) but in females it has a non-significant, small positive association with mental health ($r = .15$) and a non-significant, near-zero positive

association with anxiety ($r = .02$). Additionally, the association between total screen time with depression and stress is stronger in males ($r = .35$ and $r = .29$) than females ($r = .22$ and $r = .12$). This trend is also observed when examining the context of smartphone use through social media use during daily activities. For males, social media use during daily activities has a moderately positive association with mental health ($r = .21$), depression ($r = .23$) and stress ($r = .29$). In females, social media use during daily activities had a small positive correlation with mental health ($r = .08$), depression ($r = .09$), and stress ($r = .05$). However, none of these relationships with social media use during daily activities were statistically significant for either gender. Nonetheless, these results suggest smartphone use, specifically total screen time and social media during daily activities, has a stronger and more positive association with the presence of mental health problems.

Gender differences were also seen in examining the bivariate correlations between perceived social support and mental health. Notably, males tended to have a stronger negative association between each perceived social support measure and each mental health measure. This was seen in perceived social support with mental health (males; $r = -.41, p < .01$; females; $r = -.25, p < .05$), depression (males; $r = -.31$; females; $r = -.30, p < .05$), anxiety (males; $r = -.41, p < .01$; females; $r = -.23$), and stress (males; $r = -.33, p < .05$; females; $r = -.12$). This stronger negative association was also seen between emotional support and mental health (males; $r = -.41, p < .05$; females; $r = -.22$), anxiety (males; $r = -.45, p < .01$; females; $r = -.24$), and stress (males; $r = -.37, p < .05$; females; $r = -.07$). The trend of stronger negative associations in males continued with esteem support and mental health (males; $r = -.49, p < .01$; females; $r = -.21$), depression (males; $r = -.45, p < .01$; females; $r = -.27, p < .05$), anxiety (males; $r = -.47, p < .01$; females; $r = -.18$), and stress (males; $r = -.31$; females; $r = -.09$). Informational support, in males, also had a stronger

negative association with mental health (males; $r = -.30$; females; $r = -.19$), anxiety (males; $r = -.29$; females; $r = -.13$), and stress (males; $r = -.28$; females; $r = -.13$). Lastly, it was seen males had a stronger negative association for tangible support and stress (males; $r = -.23$; females; $r = -.13$).

In sum, these results indicate there are possible gender differences found in the relationships between smartphone use, perceived social support, and mental health. All other correlations can be seen in Table 11.

Table 11. *Bivariate Correlations by Gender*

	Gender	1	2	3	4	5	6	7	8	9	10	11	12
1. Total Screen Time	Female	--											
	Male												
2. SM Screen Time	Female	.69**											
	Male	.47**	--										
3. SM in Daily Activities	Female	.24	.10										
	Male	.22	-.09	--									
4. Perceived Social Support	Female	.02	.01	-.02									
	Male	-.15	-.11	.22	--								
5. Emotional Support	Female	.02	-.08	.07	.86**								
	Male	-.15	-.19	.15	.94**	--							
6. Esteem Support	Female	.01	-.10	-.06	.89**	.69**							
	Male	-.34	-.09	.26	.90**	.77**	--						
7. Informational Support	Female	.09	.10	.04	.89**	.66**	.73**						
	Male	.02	-.03	.24	.92**	.86**	.76**	--					
8. Tangible Support	Female	-.03	.09	-.10	.92**	.74**	.74**	.76**					
	Male	-.01	-.06	.17	.90**	.80**	.76**	.73**	--				
9. Mental Health	Female	.15	.07	.08	-.25*	-.22	-.21	-.19	-.27*				
	Male	.44*	.10	.21	-.41**	-.41*	-.49**	-.30	-.31	--			
10. Depression	Female	.22	.08	.09	-.30*	-.25*	-.27*	-.22*	-.31*	.89**			
	Male	.35	.00	.23	-.31	-.24	-.45**	-.20	-.26	.86**	--		
11. Anxiety	Female	.02	.06	.06	-.23	-.24	-.18	-.13	-.25	.89**	.68**		
	Male	.50**	-.02	.00	-.41**	-.45**	-.47**	-.29	-.29	.78**	.43**	--	
12. Stress	Female	.12	.05	.00	-.12	-.07	-.09	-.13	-.13	.85**	.62**	.65**	
	Male	.29	.25	.26	-.33*	-.37*	-.31	-.28	-.23	.88**	.61**	.62**	--

Note: total screen time were available for 52 females and 31 males. SM Screen time was available for 42 females and 21 males. SM = social media. Bold indicates main scales.

** $p < .01$

* $p < .05$

CHAPTER 5: DISCUSSION

Although previous studies have explored the individual associations between smartphone use, social support, and mental health, few studies have simultaneously examined these factors within the context of collegiate student-athletes. Thus, the aim of this study was to further explore these connections and investigate the potential mediating role of social support in the relationship between smartphone use and mental health among collegiate student-athletes. Building off prior research, it was hypothesized that higher levels of smartphone use would be associated with lower perceptions of social support, consequently leading to the presence of more mental health problems. The results indicated a significant positive relationship between total screen time and depressive symptoms, along with significant negative relationships with perceived social support and mental health. However, smartphone use had no significant association with perceived social support, and perceived social support did not mediate the relationship between smartphone use and mental health problems. The following discussion will elaborate on these results in comparison to existing literature, identify areas of future research, and outline implications and conclusions drawn from this study.

Key Findings and Theoretical Implications

Hypothesis 1

In Hypothesis 1, I anticipated a negative relationship between various measures of smartphone use (i.e., total screen time, social media screen time, and smartphone use during daily activities) and perceived social support, as well as its subscales including emotional support, esteem support, informational support, and tangible support. The analysis did not yield statistically significant relationships between these variables. Nonetheless, the strength and direction of several correlations, such as those between total screen time and perceived social support, emotional

support, and esteem support, as well as between social media screen time and emotional support and esteem support, were consistent with previous research findings (ranging from $r = -.09$ to $-.18$), which found them statistically significant (Christensen, 2018; Yang et al., 2023). These results suggest there may exist a small relationship between screen time and social media screen time with social support. It appears that collegiate student-athletes who have elevated screen times may perceive lower levels of social support.

In opposition to total screen time and social media screen time, social media use during daily activities had a small positive correlation with perceived social support and each subscale. This measure was intended to assess the context of smartphone use rather than sheer quantity. This unexpected finding suggests that higher levels of social media use during daily activities may be associated with greater perceived social support among collegiate student-athletes. This result contrasts with prior research indicating that smartphone use during social interactions diminishes relationship quality, closeness, and trust (Misra et al., 2016; Nazir, 2020; Przybylski & Weinstein, 2013), and may impede the development of social support networks through its distractive nature (Christensen, 2018). However, one explanation for this inconsistency could be that previous research has primarily focused on non-athletes. In a qualitative study conducted to examine the impacts of Twitter on student-athletes, the researchers found that Twitter fostered support among teammates, with athletes using social media to offer motivation and encouragement through positive messages, even in the face of negative interactions (David et al., 2018). Similarly, researchers from another qualitative study concluded that social media may be beneficial in facilitating conversations, providing access to support networks, and enhancing social connections (Vaingankar et al., 2022). Therefore, the findings of this study challenge previous research on non-athletes by suggesting that one's perceived social support increases with higher social media use

during daily activities. However, it also raises the possibility that this relationship may differ within the collegiate student-athlete population, highlighting the need for future investigation.

Hypothesis 2

Hypothesis 2, which hypothesized that smartphone use variables (i.e., total screen time, social media screen time, and smartphone use during daily activities) would have a positive association with mental health symptoms, as well as the subscales, including depression, anxiety, and stress symptoms, was partially supported. The analysis revealed one statistically significant finding: a moderate positive correlation between total screen time and depressive symptoms. Although not reaching statistical significance, total screen time also exhibited moderately small positive correlations with overall mental health symptoms and symptoms of anxiety and stress. While slightly smaller correlation, social media screen time showed comparable correlation with mental health symptoms and each subscale. These results align with existing literature, which consistently demonstrate a positive correlation between smartphone use and mental health problems (Barthorpe et al., 2020; Brunborg & Andreas, 2019; Lin et al., 2016). For example, Barthorpe et al. (2020) found a significant association between prolonged smartphone use and heightened levels of depressive symptoms, consistent with the moderate positive correlation found between total screen time and depressive symptoms in this study. Additionally, Brunborg and Andreas (2019) conducted a repeated-measures study and found that increases in social media screen time were associated with increases in depressive symptoms, further supporting this study's findings. These consistent findings suggest that the more time individuals spend on their phone, the more likely they are to experience depressive symptoms. To expand on this, recent research suggests that greater emphasis should be placed on examining the context in which individuals engage in smartphone use.

In line with total screen time and social media screen time, the findings regarding social media use during daily activities demonstrated similar, yet non-statistically significant, positive correlations with mental health symptoms, and each subscale. Additionally, these positive correlations between social media use during daily activities and depressive, anxiety, and stress symptoms are comparable in strength to the significant findings reported in the Barry et al. (2022) study, which introduced the Social Media Use During Daily Activities Scale. This suggests that the impact of smartphone use on mental health may not be solely determined by the quantity of use, but also by the context in which the smartphone is used. For instance, according to this scale, those who frequently use a smartphone more during class, meals, homework, or social interactions with teammates may be more likely to deal with mental health problems. However, due to the limited research and the non-significant results in this study, alongside the potential negative impact individuals' mental health, future researchers should aim to further investigate the appropriate and inappropriate times for smartphone use. Understanding when smartphone use is more detrimental can provide valuable insights into developing PBS to reduce its harmful effects on mental health.

Hypothesis 3

As hypothesized, social support exhibited a statistically significant and moderately negative association with mental health symptoms, confirming and extending prior research within the collegiate student-athlete population. Moreover, this emphasizes the critical role of social support among collegiate student-athletes, as those experiencing higher levels of perceived also report lower levels of mental health studies. The examination of this connection began in previous studies that investigated the help-seeking tendencies of collegiate student-athletes, revealing that positive relationships and social support can significantly influence their willingness to seek help

for mental health problems (Gulliver et al., 2012; Rickwood et al., 2007). Subsequent research aimed to identify the sources from which these athletes seek support, commonly finding that they turn to individuals within their social support circles (Chen, 2013; Habeeb et al., 2022). Recognizing the tendency of collegiate student-athletes to seek help when they perceive higher levels of social support, particularly from within their immediate informal networks, underscores the critical need to assess the effectiveness. Therefore, the findings in this study further highlight the potential effectiveness of social support in dealing with mental health problems and align with prior research that has found the same relationship with lower levels on mental health problems when perceived social support is higher (Li et al., 2017; Mikesell et al., 2023). In sum, these findings, taken with previous research, suggest the importance of cultivating strong social support networks for collegiate student-athletes to not only facilitate their help-seeking behaviors for mental health problems, but also ultimately lower the presence of mental health problems.

Hypothesis 4

This study aimed to advance existing research by exploring a directional relationship between smartphone use, social support, and mental health. Considering the previously highlighted relationship on the help-seeking tendencies among collegiate student-athletes, who often rely on social support during the presence of mental health problems, it seemed plausible that social support predicts mental health problems. Additionally, previous intervention studies have demonstrated that smartphones can negatively impact social relationships, potentially hindering social support networks (Misra et al., 2016; Przybylski & Weinstein, 2013). Thus, it was hypothesized that social support would mediate the relationship between smartphone use and mental health problems. Specifically, increased smartphone use among collegiate student-athletes

would diminish their social support networks, resulting in greater presence of mental health problems.

Although limitations in sample size and follow-up rate prevented the study from conducting a true mediation analysis, none of the indirect effect models examining the pathways from smartphone use to perceived social support to mental health problems (i.e., total screen time → perceived social support → mental health problems, social media screen time → perceived social support → mental health problems, and social media during daily activities → perceived social support → mental health problems) yielded statistically significant results. Therefore, social support does not appear to be a mediator between smartphone use and mental health. Nevertheless, the direct path between perceived social support and mental health displayed a statistically significant and moderately negative estimate across all models. In conclusion, the findings did not support Hypothesis 4, suggesting that smartphone use does not necessarily lead to mental health problems through its impact on social support. However, the significant negative relationship between perceived social support and mental health problems aligns with the established findings from Hypothesis 3 and prior research, to highlight the critical role of social support in coping with mental health challenges among collegiate student-athletes (Li et al., 2017; Mikesell et al., 2023).

Exploratory Findings

Even though a formal mediation analysis was unable to be conducted due to limitations in participant retention across timepoints, a paired-samples t-tests was performed for the participants that completed both timepoints to determine the stability of these variables over time. Results revealed no significant differences in smartphone use, perceived social support, or mental health problems between the initial (T1) and follow-up (T2) assessments. These findings suggest that within the timeframe of two to seven weeks, there were minimal fluctuations in participants'

smartphone use, perceived social support, and mental health status. This stability underscores the consistency of these constructs within our sample and provides valuable insight into the longitudinal dynamics of these factors among collegiate student-athletes. Furthermore, the lack of change over time suggests that interventions targeting these variables may need to be implemented to facilitate significant change.

While also not an original aim for this study, a post-hoc analyses was conducted to investigate potential gender disparities in the relationships between smartphone use, perceived social support, and mental health problems among collegiate student-athletes. Drawing upon established literature, gender has been identified as a significant factor influencing mental health outcomes, with females commonly reporting higher levels of psychological distress compared to males (Davoren & Hwang, 2014; Mihajlovic et al., 2021; Rice et al., 2019). More specifically, the (NCAA, 2022) found that females athletes consistently reported feeling overwhelming anxiety at near or above double the rate male athletes did across three separate seasons. Another study found that female collegiate student-athletes were 1.5 times more likely to experience symptoms of depression compared to male collegiate student-athletes (Yang et al., 2007). In alignment with this trend, the analysis revealed that females exhibited significantly elevated levels of mental health problems, anxiety symptoms, and stress, reaffirming the existence of these gender-based disparities.

To further explore these gender-based disparities, the study looked at the differences in correlations between smartphone use, social support, and mental health across males and females. This exploration of the associations revealed nuanced gender-specific patterns. While both genders demonstrated correlations between smartphone use and mental health, the strength and direction of these associations were noticeably different. For males, total screen time exhibited notably

stronger positive associations with mental health problems compared to females. This finding aligns with existing research suggesting that excessive smartphone use may serve as a risk factor for mental health issues, particularly among male athletes (Walton et al., 2021). However, researchers have also found smartphone use, specifically social media use, negatively impacts body satisfaction and mood in female athletes (Prichard et al., 2020). Moreover, Daniels (2009) concluded it is the content female athletes see on their feeds that illicit the negative effects. Therefore, more research should examine the role gender plays in the relationship between smartphone use and mental health in collegiate student-athletes along with the differences in content.

Interestingly, the analysis also revealed gender-specific variations in the relationship between smartphone use and perceived social support. While females displayed near-zero or very small positive associations between total screen time and perceived social support, males exhibited negative associations, indicating potential differences in how collegiate student-athletes of different genders utilize and perceive social support networks in the context of smartphone use. This underscores the need examine the differences in smartphone use and the relationship it has with social support across genders.

Lastly, the examination of the associations between perceived social support and mental health outcomes sheds a light on distinct coping mechanisms across genders. Males tended to demonstrate stronger negative associations between perceived social support and mental health problems, suggesting that social support networks may play a more significant role in buffering against mental health problems among male collegiate student-athletes. This observation resonates with previous research by (Yang et al., 2010), who found that while male collegiate athletes reported having more available social support than their female counterparts, females expressed

greater satisfaction with the support they received. Interestingly, this study noted a slight, albeit statistically non-significant, difference in perceived social support levels between genders, yet males exhibited a more pronounced negative association between social support and mental health problems. These findings emphasize the importance of considering not only the quantity but also the quality of social support in mitigating mental health problems among collegiate student-athletes. It suggests that interventions or workshops aimed at enhancing the quality of social support provided to teammates during times of mental health struggles may be particularly beneficial. By fostering supportive environments and nurturing meaningful connections, collegiate student-athletes can play a pivotal role in promoting mental health among their teammates.

In summary, this study contributes valuable insights into the gender-specific dynamics of smartphone use, perceived social support, and mental health among collegiate student-athletes. Furthermore, the presence of these gender-based disparities, suggests potential support for the proposed mediation model within the male collegiate student-athlete population. However, more research, along with a greater sample size is needed to test this model. Nevertheless, by shining light on these differences, this research lays the groundwork for future studies to dive deeper into the mechanisms underlying gender disparities in mental health outcomes and design targeted interventions aimed at improving mental health by tailoring to the unique needs of male and female collegiate student-athletes.

Strengths and Limitations

Several limitations must be acknowledged within this study. Firstly, a true mediation analysis could not be conducted due to sample size constraints and difficulty in reaching the required participants determined by the power analysis for a moderate effect size. Instead, an indirect effect analysis was performed using the first timepoint results to explore whether social

support mediates the relationship between smartphone use and mental health. Therefore, since this study employed a cross-sectional design, it is important to note that causality cannot be inferred from the observed relationships between smartphone use, social support, and mental health. Longitudinal studies would be beneficial in examining causal pathways among these variables. Additionally, the smaller sample size may have led to some of the correlations being non-statistically significant, yet similar in magnitude to previous research. Secondly, the study sample lacked diversity in terms of racial representation and sports distribution, with a predominant white population (81.2%) and a disproportionate representation of sports with 45.5% participating in cross country and/or track & field athletes. Therefore, caution should be exercised in generalizing the findings to all collegiate student-athletes. Also, when considering generalizability, it is important to recognize that this sample reported lower levels of mental health problems and there is a potential for different strengths in relationships to be seen in collegiate-student athletes that are experiencing higher levels of mental health problems. Lastly, data collection occurred over a wide timeframe (early January to end of March), encompassing various academic and athletic periods. Factors such as midterms, conference and national championships, spring break, and other off-season breaks may have influenced participants' stress levels, smartphone use patterns, and mental health outcomes, potentially confounding the results. However, our exploratory analysis examining the stability of these measures over time, suggest there is little to no change in these values throughout the semester.

Beyond these limitations, this study also had some key strengths. The first strength worth acknowledging is that this is the first study examining smartphone use with social support and mental health among collegiate student-athletes. Building off this, even though the sample size reduced the statistical power, there were a lot of statistically significant results that were consistent

with prior research. This provides further support of the relationships existing between smartphone use, social support, and mental health. Another notable strength of this study was the objective measures employed for assessing smartphone use. Instead relying solely on self-reported data for total screen time and social media screen time, a method shown to be unreliable by Parry et al. (2021), this study had participants upload screenshots capturing their actual usage, thus ensuring accurate measurements.

Implications and Future Research

This study offers valuable insights for future research endeavors and potential real-world applications. Further investigation should dive into the underlying mechanisms shaping the relationship between smartphone use, social support, and mental health outcomes. This could involve exploring variables such as, the context or the nature of content consumed during smartphone use, the quality of social interactions facilitated through smartphones, and individual differences in susceptibility to mental health issues exacerbated by smartphone use. Moreover, the gender-specific patterns observed in our exploratory findings warrant closer examination to better understand these relationships. Such insights could inform targeted interventions aimed at mitigating the potential negative impacts of excessive smartphone use on mental health and creating effective social support networks within the collegiate student-athlete population. Additionally, future research should explore the effectiveness of implementing various PBS, such as app limits and scheduled "do not disturb" times, that were seen in some screenshots provided by participants. Rahmillah et al. (2023) also suggested individuals turn their screen into grayscale to decrease attractiveness, consequently decreasing overall screen time. By implementing these strategies, researchers can assess causal relationships and evaluate their impact on reducing

smartphone use, enhancing perceived social support, and reducing the prevalence of mental health problems among collegiate student-athletes.

The findings not only offer avenues for further research but also carry practical implications for collegiate athletic departments, coaches, and athletes. Given the observed positive associations between smartphone use and mental health problems, as well as the negative associations between perceived social support and mental health problems, it becomes imperative for athletes to proactively engage in building positive social support systems while maintaining awareness of their smartphone use patterns. Similarly, athletic departments and coaches should foster environments that prioritize the cultivation of strong social support networks.

Conclusion

To our knowledge, this study stands as the first to investigate social support as a mediator in the relationship between smartphone use and mental health, while also exploring their bivariate connections. Our primary aim was to shed light on the potential negative effects of smartphone usage and underscore the significance of strong social support networks. In conclusion, our findings indicate that social support does not mediate the relationship between smartphone use and mental health problems. However, it did find that individuals with higher levels of smartphone use, particularly in terms of total screen time, tended to report dealing with mental health problems, specifically depressive symptoms. Additionally, those who perceived more available social support tended to report experiencing fewer mental health problems. In sum, these insights can guide future research endeavors, including interventions utilizing PBS. Furthermore, these results offer valuable information for athletes, coaches, and athletic staff, alerting them to potential risks to mental health among collegiate student-athletes, such as excessive smartphone use and insufficient social support.

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Appendix A

FULL SAMPLE CHARACTERISTICS

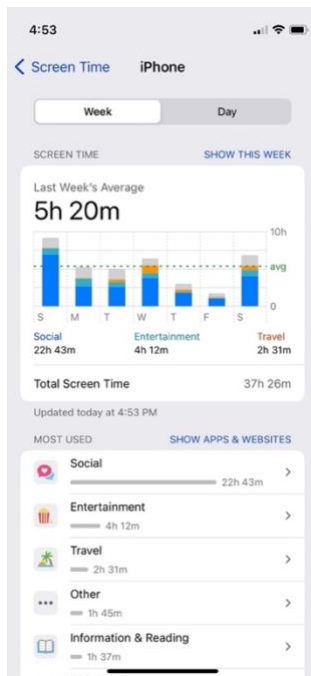
<i>Sample Characteristics</i>		<i>N</i>	<i>%</i>	<i>Mean</i>	<i>SD</i>
Gender	Female	62	61.4%		
	Male	39	38.6%		
Age		18	11	10.9%	20.4
		19	30	29.7%	
		20	15	14.9%	
		21	16	15.8%	
		22	13	12.9%	
		23	13	12.9%	
		24	3	3.0%	
Race/Ethnicity	White or Caucasian	82	81.2%		
	African American or Black	10	9.9%		
	Two or More Races	5	5.0%		
	Hispanic or Latino	3	3.0%		
	Unknown	1	1.0%		
Year	1st	26	25.7%	2.9	1.6
	2nd	20	19.8%		
	3rd	23	22.8%		
	4th	11	10.9%		
	5th	15	14.9%		
	6th	6	5.9%		
Division	NCAA Division I	58	57.4%		
	NCAA Division II	21	20.8%		
	NCAA Division III	10	9.9%		
	NAIA	12	11.9%		
Sport(s)	Cross Country, Track and Field	29	28.7%		
	Track and Field	17	16.8%		
	Soccer	12	11.9%		
	Volleyball	10	9.9%		
	Softball	7	6.9%		
	Baseball	7	6.9%		
	Football	5	5.0%		
	Basketball	4	4.0%		
	Tennis	3	3.0%		
	Swimming and Diving	3	3.0%		
	Ice Hockey	3	3.0%		
	Golf	1	1.0%		
Season	In-season	63	62.4%		
	Out-of-season	38	37.6%		
Injury Status	Healthy	81	80.2%		
	Injured	20	19.8%		

Appendix B

INSTRUCTIONS FOR REPORTING SCREEN TIME REPORT

For iPhone:

1. Go to Settings  > Screen Time.
2. Tap See All App Activity, then tap Devices to select which device you want to see usage for.
3. Tap Week to see a summary of your weekly use.
4. Swipe left on the graph to view last week's report.
5. Tap Show Categories to see most used.
6. Screenshot and upload here.



For Android:

1. Go to Settings > Digital Wellbeing and parental controls.
2. Tap on Weekly Report Button



3. Screenshot and upload here



Appendix C

SOCIAL MEDIA USE DURING DAILY ACTIVITIES - STUDENT-ATHLETES

QUESTIONNAIRE

Barry et al. (2022)

For the following items, please use the following scale:

1 = Never 2 = Sometimes 3 = Often 4 = Always

- 1) I'm on social media in the 15 minutes after I wake up.
- 2) I'm on social media while eating meals.
- 3) I'm on social media during class.
- 4) I'm on social media in the 15 minutes before practice/competition.
- 5) I'm on social media in the 15 minutes after practice/competition.
- 6) I'm on social media while studying/doing homework.
- 7) I'm on social media during meetings.
- 8) I'm on social media during outings with friends.
- 9) I'm on social media in the 15 minutes before I go to sleep

Appendix D

PERCIEVED AVAILABLE SUPPORT IN SPORT QUESTIONNAIRE

(Freeman et al., 2011)

“If needed, to what extent would someone...” (Emotional Support)	Not At All (1)	Very Little (2)	To some extent (3)	Extremely So (4)
provide you with comfort and security				
always be there for you				
care for you				
show concern for you				
“If needed, to what extent would someone...” (Esteem Support)	Not At All (1)	Very Little (2)	To some extent (3)	Extremely So (4)
reinforce the positives				
enhance your self-esteem				
instill you with the confidence to deal with pressure				
boost your sense of competence				
“If needed, to what extent would someone...” (Informational Support)	Not At All (1)	Very Little (2)	To some extent (3)	Extremely So (4)
give you constructive criticism				

give you tactical advice				
give you advice about performing in competitive situations				
give you advice when you're performing poorly				
"If needed, to what extent would someone..." (Tangible Support)	Not At All (1)	Very Little (2)	To some extent (3)	Extremely So (4)
help with travel to training and matches				
help with tasks to leave you free to concentrate				
do things for you at competitions/matches				
help you organize and plan their competitions/matches				

Appendix E

DEPRESSION ANXIETY STRESS SCALE

(Halford & Frost, 2021)

DASS10

Please read each statement and circle a number 1, 2, 3, or 4 which indicates how much the statement applied to you *over the past week*. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

1. Did not apply to me at all
2. Applied to me to some degree, or some of the time
3. Applied to me to a considerable degree, or a good part of time
4. Applied to me very much, or most of the time

Depression	Did not apply to me at all (1)	Applied to me to some degree (2)	Applied to me to a considerable degree (3)	Applied to me very much (4)
I couldn't seem to experience any positive feeling at all.				
I found it difficult to work up the initiative to do things.				
I felt that I had nothing to look forward to.				
I felt down-hearted and blue.				
Anxiety	Did not apply to me at all (1)	Applied to me to some degree (2)	Applied to me to a considerable degree (3)	Applied to me very much (4)
I was worried about situations in which I might panic and make a fool of myself.				
I felt I was close to panic.				
I felt scared without any good reason.				

Stress	Did not apply to me at all (1)	Applied to me to some degree (2)	Applied to me to a considerable degree (3)	Applied to me very much (4)
I tended to over-react to situations.				
I found it difficult to relax.				
I was intolerant of anything that kept me from getting on with what I was doing.				

Appendix F

TIME 2 SAMPLE CHARACTERISTICS

		<i>N</i>	<i>%</i>	<i>Mean</i>	<i>SD</i>
Gender	Female	32	74.4%		
	Male	11	25.6%		
Age	18	5	11.6%	21.7	1.9
	19	10	23.3%		
	20	6	14.0%		
	21	5	11.6%		
	22	7	16.3%		
	23	7	16.3%		
	24	3	7.0%		
	25	0	0.0%		
Race/Ethnicity	White or Caucasian	37	86.0%		
	Two or More Races	2	4.7%		
	African American or Black	2	4.7%		
	Unknown	1	2.3%		
	Hispanic or Latino	1	2.3%		
Year	1st	10	23.3%	3.2	1.7
	2nd	7	16.3%		
	3rd	9	20.9%		
	4th	4	9.3%		
	5th	8	18.6%		
	6th	5	11.6%		
Division	NCAA Division I	22	51.2%		
	NCAA Division II	11	25.6%		
	NCAA Division III	7	16.3%		
	NAIA	3	7.0%		
Sport(s)	Cross Country, Track and Field	13	30.2%		
	Track and Field	9	20.9%		
	Volleyball	6	14.0%		
	Soccer	6	14.0%		
	Swimming and Diving	2	4.7%		
	Softball	2	4.7%		
	Basketball	2	4.7%		
	Golf	1	2.3%		
	Football	1	2.3%		
	Baseball	1	2.3%		
	Tennis	0	0.0%		
	Ice Hockey	0	0.0%		
T2 Season	In-season	23	53.5%		
	Out-of-season	20	46.5%		
T2 Injury Status	Healthy	35	81.4%		
	Injured	8	18.6%		

Appendix G

IRB EXEMPTION CERTIFICATION



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/umcirm/

Notification of Exempt Certification

From: Social/Behavioral IRB
To: [Trent Hohenstreiter](#)
CC: [Nicholas Murray](#)
Date: 12/21/2023
Re: [UMCIRB 23-002409](#)
SMARTPHONE USE IMPACT ON SOCIAL SUPPORT AND MENTAL HEALTH

I am pleased to inform you that your research submission has been certified as exempt on 12/21/2023. This study is eligible for Exempt Certification under category # 2AB.

It is your responsibility to ensure that this research is conducted in the manner reported in your application and/or protocol, as well as being consistent with the ethical principles of the Belmont Report and your profession.

This research study does not require any additional interaction with the UMCIRB unless there are proposed changes to this study. Any change, prior to implementing that change, must be submitted to the UMCIRB for review and approval. The UMCIRB will determine if the change impacts the eligibility of the research for exempt status. If more substantive review is required, you will be notified within five business days.

Document	Description
Demographics(0.01)	Surveys and Questionnaires
Exempt Research Consent(0.01)	Consent Forms
Flyer for Social Media, Text, and Email(0.01)	Recruitment Documents/Scripts
IRB Thesis(0.01)	Study Protocol or Grant Application
Mental Health(0.01)	Surveys and Questionnaires
Perceived Social Support(0.01)	Surveys and Questionnaires
Recruitment Messages(0.01)	Recruitment Documents/Scripts
Screenshot Instructions(0.01)	Surveys and Questionnaires
Social Media During Daily Activities(0.01)	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.