Social anxiety and problematic internet use among Nigerian undergraduates: Moderation by Light triad traits (Empathy, Compassion and Altruism)

[1] Chinonso Akudo Okoro
[2]Okechi Jessica Munachimso
[3]Nzenweaku Joy Uche
& [4]Peace Chisaokwu Adubi

[1]Social Sciences Unit, School of General studies, UNN
[1,2,3,4] Department of Psychology, University of Nigeria, Nsukka

Abstract

The overuse of the internet has become a major concern, as more people acquire a dependent on it that resembles the patterns of behavioral addiction seen in substance use. Recent data continue to corroborate this trend, indicating that problematic internet use (PIU) is becoming more common among university students globally. This study examined social anxiety and problematic internet use among undergraduate students: moderation by light triad traits. A total of 500 Nigerian undergraduates (male = 287, female = 213), ages 16–29 years (Mean = 22.64, SD = 3.023), from various faculties, including Social Sciences (69%), Biological Sciences (21.8%), Arts (5.5%), and Agriculture (3.8%). The study used a cross-sectional survey design. Problematic Internet Use Questionnaire (PIUQ), and Light Triad Scale (LTS), respectively. Correlational and moderation analyses revealed that social anxiety significantly predicted problematic internet use ($\beta = .10$, $p < .01$). Among the Light Triad traits, empathy significantly predicted problematic internet use and moderated the relationship between social anxiety and problematic internet use ($\beta = -.00$, $p < .01$), whereas compassion and altruism did not have significant predictive or moderating effects. The findings suggest that empathy serves as a protective factor, reducing the impact of social anxiety on maladaptive internet use. It is recommended that interventions targeting the enhancement of empathy among undergraduates may help mitigate problematic internet behaviors associated with social anxiety.

Keywords: *Altruism, Compassion, Empathy, Light triad, Nigerian, Problematic internet use, Social anxiety, Undergraduates.*

Introduction

The internet has fundamentally transformed how individuals engage with one another through its features like rapid connectivity, easy access, and capacity to connect people across the globe. Sites like Facebook, Twitter, and various social networks have reshaped communication, thus, making online interactions a fundamental aspect of life in the 21st century (Esfandiari et al., 2013). This is particularly true for young individuals often referred as the "Net Generation," who have grown up using the internet daily for purposes such as learning, entertainment, and social connections. As global communication has broadened, the internet has become essential to personal, educational, professional, and even political

spheres, addressing both basic and intricate human needs (Babalola et al., 2017). Nevertheless, with the increase of problematic internet use among adolescents, internet-related physical and mental health issues such as loneliness have become an issue of concern (Lin & Chiao 2022; Tóth-Király et al, 2021). Overindulgence in internet use has been associated with the neglect of critical life areas such as academics, sleep, nutrition, and offline interests (Chou et al., 2005).

The improper use of the internet has become an urgent issue, as larger number of individuals develop a reliance on it that resembles the behavioral addiction patterns observed in substance use (Sebena et al., 2013; Young, 2016). Recent research continues to affirm this trend, indicating that problematic internet use (PIU) is becoming more common among university students globally (Li et al., 2022; Mei et al., 2023). Various researchers have characterized problematic internet use in terms that indicate compulsive behavior, psychological distress, and dysfunction (Brand et al., 2016; Davis, 2001; Petry & O'Brien, 2013). It is crucial for researchers to differentiate between internet use as a medium and the specific activities it facilitates. For instance, compulsive online gambling should be regarded as gambling addiction rather than internet addiction (Griffiths et al., 2016; Starcevic, 2013). Problematic internet use typically features a fixation on being online, challenges in regulating usage, and persistence with use even in the face of distress or negative repercussions. It is increasingly viewed as a behavioural addiction that does not involve substances (Sim et al., 2012; Forest, 2016), with its effects impacting emotional, academic, and relational areas. From a cognitive-behavioural perspective, problematic internet use arises from existing psychological issues that are exacerbated by excessive online activity (Caplan, 2003). Davis (2001) categorized problematic internet use into two types: specific problematic internet use, which pertains to the excessive use of a singular function (e.g., gaming or social media), and generalized problematic internet use, which encompasses a broader, multifaceted overuse often associated with social interactions and online reinforcement (Gamez-Guadix, 2014). Research has identified five main characteristics of problematic internet use: a preference for online social interactions, mood management through internet use, cognitive fixation on being online, compulsive internet actions, and adverse effects on daily living (Gamez-Guadix, 2014). Some scholars suggest that problematic internet use overlaps with issues such as impulse-control disorders and obsessive-compulsive behaviours (Aboujaoude, 2010; Han et al., 2017). It has also been

referred to as "compulsive-impulsive internet usage disorder," indicating the interplay of impulsivity and compulsivity that perpetuates the cycle (Dell'Osso et al., 2006).

Globally, the issue of problematic internet use is primarily researched in Asian nations, where it is viewed as a public health issue (Block, 2008; Lam et al., 2009; though, this phenomenon is not limited to any specific geographical area. Problematic internet use can impact individuals regardless of age, gender, or socio-economic status (Li, 2010). Studies have found that its prevalence among adolescents and young adults ranges from 4.4% to 19.5% (Durkee et al., 2012; Szabó & Griffiths, 2015), with some research indicating a higher prevalence in males (Dalbudak et al., 2015; Dhir et al., 2015), while other studies report no significant gender differences (Gámez-Guadix et al., 2014). A recent meta-analysis highlighted that problematic internet use has a moderate positive correlation with anxiety, depression, and loneliness among students (Li et al., 2022). It has also been linked to psychological challenges such as depression, low self-esteem, and anxiety disorders (Caplan, 2007; Han et al., 2017). Notably, social anxiety has emerged as a strong predictor of problematic internet use, as individuals may use the internet to escape or deal with difficult social scenarios. For instance, a recent meta-analysis found a moderate correlation between social anxiety and problematic internet use among adolescents and young adults (Mei et al., 2023).

Social anxiety disorder, commonly known as social phobia, is characterized by a profound fear or avoidance of social contexts due to fears of being evaluated or embarrassed. It ranks as one of the most prevalent mental health concerns, particularly among adolescents and young adults (Kessler et al., 2014). Symptoms may include blushing, trembling, nausea, rapid speech, and in extreme instances, pani c attacks (Heimberg et al., 2014). Social anxiety frequently drives individuals to avoid real-world interactions, potentially limiting their academic performance and the establishment of significant relationships (Beesdo et al., 2007; Beidel et al., 2007; La Greca & Harrison, 2005). Recent research indicates that within university populations, social anxiety notably predicts an increased reliance on online interactions (Luo et al., 2025). As a coping strategy, individuals with elevated social anxiety may seek solace in the internet, where they can manage their self-presentation and circumvent the discomfort associated with direct interactions (Caplan, 2007; Lee & Stapinski, 2012). According to the social compensation hypothesis, online spaces lessen the fear of negative feedback, thus allowing socially anxious people to connect with others in a

more secure and comfortable environment (Valkenburg & Peter, 2009). From a self-regulatory viewpoint, these individuals turn to the internet to navigate their anxieties and social apprehensions (Shepherd & Edelmann, 2005).

The Light Triad, a personality framework proposed by Johnson in 2018, provides a hopeful alternative to this trend. It comprises empathy (the capacity to comprehend and relate to the emotions of others), compassion (the drive to support and assist those in need) and altruism (the act of helping others without any expectation of reward). These characteristics foster ethical relationships and encourage positive behavior, leading to healthier interpersonal dynamics. They stand in contrast to the traits of the Dark Triad (narcissism, Machiavellianism, and psychopathy), which are linked to manipulation and a lack of emotional warmth. Recent research has indicated that traits from the Light Triad correlate positively with thriving, well-being, and prosocial actions (Espinoza-Rivera et al., 2025); while showing negative correlations with manipulative characteristics like Machiavellianism and psychopathy (Bayram, 2025). Additionally, studies suggest that the development of Light Triad traits is influenced by both genetic and environmental elements, such as positive early life experiences, nurturing relationships, and supportive social learning opportunities (Thompson & Gullone, 2003; Landa-Blanco et al., 2024). These prosocial traits may affect how individuals deal with social anxiety. By nurturing a positive self-image and a favourable view of others, the Light Triad may alleviate fears of criticism and encourage more open and self-assured social interactions.

Social anxiety among undergraduates, often result in the avoidance of peer interactions, group projects, and public speaking—activities essential for both academic and social development. The anonymity and flexibility offered by online platforms can present an attractive way to escape. However, relying on these platforms can lead to excessive internet use, reinforcing avoidance strategies and increasing isolation. Over time, a detrimental cycle may emerge, where social anxiety drives unhealthy internet usage, and dependence on the internet exacerbates social anxiety symptoms (Mei et al., 2023; Luo et al., 2025).

In this regard, the Light Triad traits might act as a moderating influence. While previous studies have looked into its association with flourishing and prosocial behaviour (Espinoza-Rivera et al., 2025; Landa-Blanco et al., 2024), there is limited evidence on whether these traits can mitigate the adverse effects of social anxiety on problematic internet

usage. Students exhibiting high levels of these traits may view social situations more favourably, reducing avoidance and making them less likely to engage in problematic internet behaviours. By nurturing empathy, altruism, and compassion, such individuals could develop greater resilience against the negative psychological effects associated with social anxiety. Encouraging the growth of Light triad traits within the University environment may offer a lasting approach to enhancing mental health and promoting healthy technology usage. By fostering compassion, self-esteem, and ethical interactions, the Light Triad can not only enhance students' emotional well-being but also lessen their reliance on digital platforms as a means of coping.

Nevertheless, this study aimed to investigate the moderating role of Light triad traits in the relationship between social anxiety and problematic internet use among Nigerian undergraduates. More specifically, it seeks to examine whether: (i) Social anxiety will significantly predict problematic internet use among Nigerian undergraduates. (ii) Light Triad trait (empathy) will significantly predict problematic internet use among Nigerian undergraduates. (iii) Light Triad trait (Compassion) will significantly predict problematic internet use among Nigerian undergraduates.   (iv) Light Triad trait (altruism)) will significantly predict problematic internet use among Nigerian undergraduates. (v) Light Triad trait (empathy) will significantly moderate the relationship between social anxiety and problematic internet use among Nigerian undergraduates. (vi) Light Triad trait (compassion) will significantly moderate the relationship between social anxiety and problematic internet use among Nigerian undergraduates. (vii) Light Triad trait (altruism) will significantly moderate the relationship between social anxiety and problematic internet use among Nigerian undergraduates.

Social anxiety is a key factor in problematic internet use among college students, primarily because it leads to a withdrawal from face-to-face social engagements and increases reliance on online interactions for comfort and connection. It is prevalent among young adults and adolescents, making it one of the most common mental health concerns (Kessler et al., 2014). Students who experience social anxiety frequently seek refuge in the internet as a more secure option than direct engagement, which can result in patterns of excessive and harmful internet use that negatively impact academic performance, emotional health, and social growth (Heimberg et al., 2014). Even though awareness of this connection is increasing, there remains a significant gap in understanding protective psychological

factors that could mitigate or soften this detrimental relationship. Traits associated with the Light Triad, which include empathy, compassion, and altruism, represent an intriguing area for investigation. These characteristics promote authentic interpersonal relationships, foster positive perceptions of others, and enhance self-compassion, which could help alleviate the isolating impacts of social anxiety. Individuals exhibiting strong Light Triad traits may possess greater skills in handling social difficulties, promoting healthier coping strategies and minimizing the chances of developing problematic internet use.

As Universities increasingly confront the challenge of addressing students' mental health in the context of the digital age, focusing on nurturing prosocial traits such as the light triad traits may provide an effective method for reducing social anxiety and its adverse effects. More so, gaining insight into the moderating influence of Light Triad traits could lead to improved mental health interventions, thus assisting students in building resilience, enhancing their real-life social interactions, and engaging with technology in a healthier and more balanced manner. This study therefore investigated the moderating role of Light Triad traits in the relationship between social anxiety and problematic internet use among Nigerian undergraduates.

REVIEW OF THEORETICAL AND EMPIRICAL LITERATURE

The Cognitive-Behavioral Model of PIU (Davis, 2001), which explains the psychological mechanisms connecting social anxiety to problematic internet usage and offers a framework for analyzing moderating characteristics including Light triad qualities, serves as the foundation for this study. According to the Cognitive-Behavioural Model of Problematic Internet Use (Davis, 2001), social anxiety and other pre-existing psychosocial issues cause maladaptive online thoughts and actions that contribute to problematic internet use. As the cognitive-behavioural approach to PIU suggests, those who suffer from psychosocial problems including loneliness, depression, and social anxiety would prefer social connection online over in-person interactions. This inclination for online communication would then result in excessive internet use, which would degenerate their "real-life" or offline issues. According to the Cognitive-Behavioural model of PIU, the existence of maladaptive cognitions, which accompany most psychopathologies, is important to the development of generalized PIU behaviors. Examples of maladaptive cognitions include self-focused rumination, self-doubt, low self-efficacy, and negative self-appraisals (Davis, 2001). However, the presence of these dysfunctional thoughts is a

sufficient reason for problematic internet use. In other words, an individual's pre-existing psycho-social difficulties, combined with associated dysfunctional self-beliefs, predispose him or her to PIU cognitions, behaviours, and unfavourable consequences.

Wegmann et al. (2021) discovered that clinically relevant levels of social anxiety significantly predicted symptom severity of internet-use disorders one year later in adolescents, even after controlling for baseline symptoms, age, and gender. Their findings highlight that social anxiety is not only cross-sectionally associated with PIU, but also serves as a risk factor for the development of more serious internet-use issues. Similarly, Wu et al. (2024) investigated the network relationships between online social anxiety, fear of missing out (FoMO), interpersonal sensitivity, and internet addiction in emerging adults. They found that evaluative anxiety and FoMO served as bridge symptoms between interpersonal sensitivity and internet addiction, implying that socially uncomfortable feelings in online environments may play an important part in the journey to PIU. These findings build on previous findings by demonstrating potential mechanisms by which social anxiety contributes to PIU (such as interpersonal sensitivity, FoMO, and evaluation anxiety) and emphasize the temporal dimension of the risk, as social anxiety has been shown to predict later PIU symptoms.

Several studies found a link between social anxiety and problematic internet use (Cai et al., 2023; Ding et al., 2023; Wu, 2024), while others found a link between Light triad traits and lower problematic internet use (Castagna et al., 2024; Johnson, 2018; Lukić et al., 2021; Mejía-Suazo et al., 2025; Padayachee, 2024). Importantly, research also highlights the moderating role of Light Triad traits in buffering negative outcomes of social anxiety on online behaviour (Castagna et al., 2024; Chao et al., 2025; Gonçalves et al., 2023; Ramos-Vera et al., 2023; Smith et al., 2018).
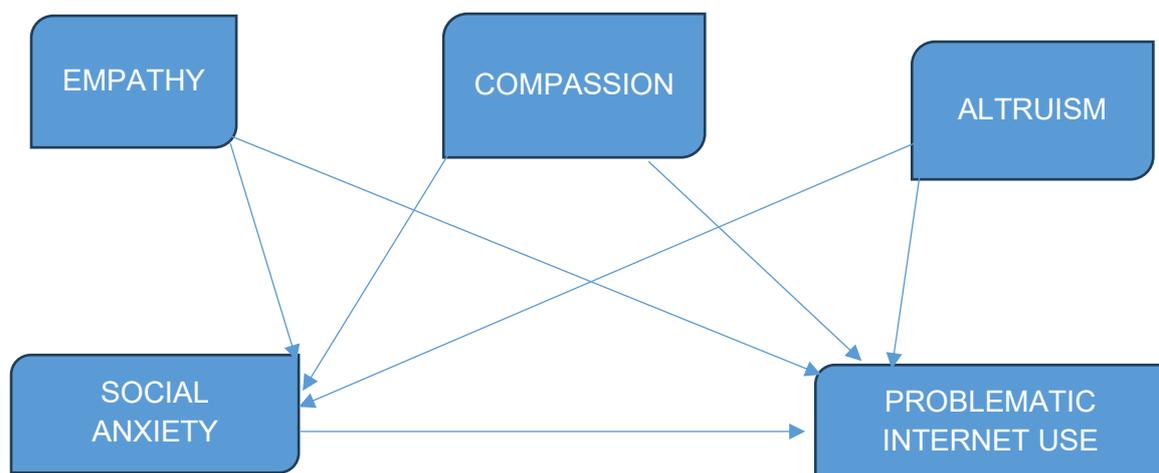
Figure 1: Model for the moderating role of Light triad traits (empathy, compassion and altruism) in the relationship between social anxiety and problematic internet use.

METHOD AND DATA

The study included 500 Nigerian undergraduates from the University of Nigeria, Nsukka. The sample consisted of 59.4% male (n = 297) and 40.6% female (n = 203) undergraduates. The participants were conveniently recruited from four faculties: Social Sciences (68.6%), Biological Sciences (22.4%), Arts (5.2%), and Agriculture (3.8%). In terms of academic level, 5.5% were at the 100 level, 3.8% at the 200 level, 21.8% at the 300 level, and 69% at 400 level. The participants' ages ranged from 16 to 29 years (mean = 22.64, SD = 3.023). Participants completed the Social Phobia Scale (SPS) developed by Mattick and Clarke (1998), used to assess the level of social anxiety experienced by individuals in social interactions and performance situations; the Problematic Internet Use Questionnaire (PIUQ) developed by Demetrovics et al. (2008) used to measure maladaptive or excessive internet use; and the Light Triad Scale (LTS) developed by Johnson et al. (2018) employed in assessing prosocial personality traits. The three dimensions are empathy (the ability to understand and share others' feelings), compassion (the urge to care for and aid others in need), and altruism (acting for the benefit of others without expecting personal gain).

The researcher and research assistants distributed 520 copies of the questionnaire to Nigerian undergraduate students at the University of Nigeria, Nsukka campus. The convenience sampling technique was used to distribute the questionnaires in classrooms, and lecture theatres. Before the questionnaires were shared to willing participants, the research team established rapport with the students, described the goal of the study, informed them of the confidentiality of their responses, and encouraged them to be honest and sincere in responding to the questions. The study was limited to participants who provided informed consent. Each section of the questionnaire had clear instructions, and to improve comprehension, the items were given in plain, understandable English language. 500 copies of the 520 distributed surveys were properly filled and utilized for data analysis while others were discarded. Since the data was gathered at a specific point in time, the study used a cross-sectional survey design to improve sampling precision. The design was suitable for investigating the connections between problematic internet use, social anxiety, and the moderating function of the Light Triad trait among undergraduates at a certain moment in time. Hayes PROCESS Macro for SPSS version 23 was used to test the hypotheses of the

study. Hayes PROCESS Macro was chosen for statistical analysis because it is useful in enabling researchers to explore how multiple predictor variables were related to the criterion variable.

RESULTS AND DISCUSSION

Findings of the data analyses and tests of hypotheses are shown here. First, preliminary results were presented based on the correlations among study variables and the moderation analyses which formed the basis for testing the hypotheses are shown and interpreted.

Table 1: Mean, Standard Deviation and Pearson correlation for demographic variables, Social anxiety, problematic internet use and Light triad traits.

Variables	Mean	SD	1	2	3	4	5	6	7	8
Gender	.406	.492	-							
Age	22.64	3.023	-.18**	-						
Faculty	6.29	2.568	-.02	-.02	-					
Level	3.54	.798	-.02	-.01	.92**	-				
Soc. Anxiety	65.40	15.49	-.03	-.04	.02	.12**	-			
Empathy	27.75	3.72	-.04	-.04	.73**	.74**	.17**	-		
Compassion	23.87	3.73	-.02	.02	.22**	.27**	.15**	.34**	-	
Altruism	24.50	3.90	-.06	.03	.15**	.13**	.18**	.12**	.40**	-
PintUse	58.78	13.95	-.03	-.04	.04	.15**	.10**	.19**	.14**	.19**

*NOTE: * p<.05, ** p<.01 (Gender = Male 0, Female 1)*

In table 1, gender had a negative significant relationship with age (r = -.18, p <.01), and a non- significant relationship with faculty, level, social anxiety, light triad traits (empathy, compassion, altruism) and problematic internet use. Age had no significant association with faculty, level, social anxiety, light triad traits (empathy, compassion, altruism) and problematic internet use. Faculty had a positive significant relationship with level (r = .92, p <.01), empathy (r = .73, p <.01), compassion (r = .22, p <.01), altruism (r = .15, p <.01), but a non-significant relationship with social anxiety and problematic internet use. Level of education had positive significant association with social anxiety (r = .12, p <.01), empathy (r = .74, p <.01), compassion (r = .27, p <.01), altruism (r = .13, p <.01), and problematic internet use (r = .15, p <.01). Social anxiety had positive significant association with empathy (r = .17, p <.01), compassion (r = .15, p <.01), altruism (r = .18, p <.01), and problematic internet use (r = .10, p <.01). Empathy had positive significant relationship with compassion (r = .34, p <.01), altruism (r = .12, p <.01) and problematic internet use (r = .19,

p <.01). Compassion had a positive significant relationship with altruism (r = .40, p <.05) and problematic internet use (r = .14, p <.01). Altruism had a positive significant association with problematic internet use (r = .19, p <.01).

Table 2: Hayes 'PROCESS Macro result for predicting problematic internet use by social anxiety and Light triad trait (empathy).

Predictors	B	SE	T	P Value	LLCI	ULCI	ΔR^2	ΔF
Social Anxiety	.896	.00	248.14	.000	.889	.904		
Empathy	.04	.02	2.55	.011	.009	.073		
Soc. Anx X Empathy	-.000	.000	-3.72	.000	-.005	-.001	.000	13.81

Table 2 showed that social anxiety significantly predicted problematic internet use (B = .896, t = 248.14, p <.001) indicating that each unit change in social anxiety was associated with problematic internet use. Light triad trait (empathy) significantly predicted problematic internet use among Nigerian undergraduates (B = .04, t = 2.55, p = .05). The interaction effect of social anxiety and light triad trait (empathy) was significant (B = -.000, t = -3.72, p <.001) which indicated that empathy dimension of light triad moderated the relationship between social anxiety and problematic internet use. The overall regression model was significant. *F change (1, 494) 13.81, p <.001.*
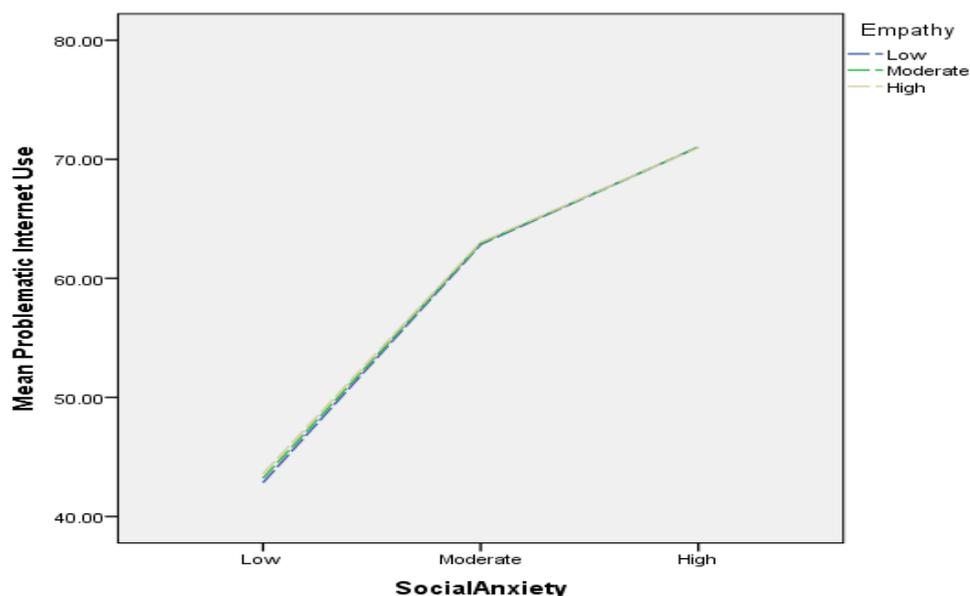

Figure 2: illustrated the moderating role of light triad trait (empathy) in the relationship between social anxiety and problematic internet use.

Table 3: Hayes 'PROCESS Macro result for predicting problematic internet use by social anxiety and Light triad trait (compassion).

Predictors	B	SE	T	PValue	LLCI	ULCI	ΔR^2	ΔF
Social Anxiety	.896	.004	248.42	.000	.889	.903		
Compassion	-.026	.015	-1.713	.087	-.056	.004		
Soc. Anx. X Compassion	-.000	.001	.310	.757	-.002	.002	.000	.096

　　　　Table 3 showed that social anxiety significantly predicted problematic internet use (B = .896, t = 248.42, p <.001) indicating that each unit change in social anxiety was associated with problematic internet use. Light triad trait (compassion) did not predict problematic internet use among Nigerian undergraduates (B = -.026, t = -1.713, p = .087). The interaction effect of social anxiety and light triad trait (compassion) was not significant (B = .000, t = .310, p = .757) which indicated that compassion dimension of light triad trait did not moderate the relationship between social anxiety and problematic internet use. The overall regression model was significant. *F change (1, 494) .096, p =.757.*

Table 4: Hayes 'PROCESS Macro result for predicting problematic internet use by social anxiety and Light triad (Altruism).

Predictors	B	SE	T	P Value	LLCI	ULCI	ΔR^2	ΔF
Social Anxiety	.894	.004	240.81	.000	.887	.902		
Altruism	.021	.018	1.214	.225	-.013	.056		
Soc. Anx. X Altruism	.000	.001	.221	.825	-.002	.003	.000	.049

　　　　Table 4 showed that social anxiety significantly predicted problematic internet use (B = .894, t = 240.81, p <.001) indicating that each unit change in social anxiety was associated with problematic internet use. Light triad trait (altruism) did not predict problematic internet use among Nigerian undergraduates (B = .021, t = 1.214, p = .225). The interaction effect of social anxiety and light triad trait (altruism) was not significant (B = .000, t = .221, p =.825) which indicated that altruism dimension of light triad did not moderate the relationship between social anxiety and problematic internet use. The overall regression model was not significant. *F change (1, 494) .049, p =.825.* The predictors

accounted for 10% of the variance in problematic internet use *(R^2 $_=$ .10)* and the R^2 change due to the interaction was .000.

DISCUSSIONS

The goal of this study was to look into the impact of Light triad traits (empathy, compassion, and altruism) in mediating the relationship between social anxiety and problematic internet usage (PIU) among Nigerian undergraduates. The findings demonstrated that social anxiety was a strong predictor of problematic internet use. Only empathy, out of the Light triad qualities, substantially predicted and regulated the association between social anxiety and PIU, while compassion and altruism had no significant predictive or moderating effects.

The first hypothesis stated that social anxiety would strongly predict problematic internet use among Nigerian undergraduates. The results supported this prediction (B =.90, t = 220.24, p <.001), demonstrating that higher levels of social anxiety are connected with greater problematic internet use. This suggests that kids with high social anxiety are more likely to participate in excessive and harmful internet use. Individuals who are socially anxious typically prefer online contacts over face-to-face encounters because they allow them to manage their fear of criticism while maintaining social ties (Lee & Stapinski, 2012). These findings are consistent with the Compensatory Internet Use Model (Kardefelt-Winther, 2014) and prior studies demonstrating social anxiety as a substantial predictor of problematic internet activity (Caplan, 2007; Kuss & Griffiths, 2015; Luo et al., 2025). Furthermore, several research found reduced or non-significant relationships between social anxiety and PIU (Szabó and Griffiths, 2015). The disparity may be due to cultural or contextual variables. In the Nigerian undergraduate context, poor social support and stigma associated with mental health issues may increase reliance on online environments as coping techniques, enhancing the predictive association.

The second hypothesis proposed that empathy could strongly predict problematic internet use among Nigerian undergraduates. The hypothesis was supported (B =.04, t = 2.01, p =.05). Thus, pupils with better empathy—those who can understand and share the sentiments of others—were less likely to participate in maladaptive internet behavior. This finding is consistent with prior studies demonstrating that empathy promotes emotional control, social understanding, and adaptive coping mechanisms (Kaufman et al., 2019; Limpo & Alves, 2020). Empathetic people are more inclined to engage in significant offline

connections, which reduces the appeal of frequent online contacts. Empathetic students in Nigeria may receive more satisfaction from real-life social support, relying less on internet contacts for emotional escape.

The third hypothesis proposed that compassion would strongly predict problematic internet use among Nigerian undergraduates. The hypothesis was not supported (B = -.03, t = -1.89, p =.06). Although compassion, defined as sensitivity to the pain of others and a desire to alleviate it, is generally associated with well-being (Goetz et al., 2010), it may not have a direct impact on internet use habits in this demographic. One possible reason is that compassion is essentially about emotional care for others, rather than self-centered coping. As a result, while compassionate students may exhibit prosocial conduct, this attribute does not always lessen the desire to use the internet excessively for self-comfort or avoidance. Furthermore, contextual pressures like academic pressure and weak emotional support systems may overshadow compassion's protective effect against hazardous online conduct.

The fourth hypothesis stated that benevolence would strongly predict problematic internet use among Nigerian undergraduates. This hypothesis was likewise rejected (B =.02, t =.98, p =.33), implying that acting for the benefit of others without expecting personal gain does not significantly protect against maladaptive internet use in this demographic. Altruistic impulses frequently show as overt social conduct and acts of kindness, which may not immediately counteract the deep mental suffering associated with social anxiety. In the Nigerian undergraduate setting, where online spaces are increasingly used for amusement and self-expression rather than prosocial outreach, altruism may have little influence on one's internet use habits. These findings partially contradict studies that found altruism to be associated with healthier digital habits (Espinoza-Rivera et al., 2025; Landa-Blanco et al., 2024), but they highlight that altruism's influence may vary depending on the social context and cultural norms surrounding digital behavior.

The fifth hypothesis proposed that empathy would significantly reduce the link between social anxiety and problematic internet use among Nigerian students. Higher levels of empathy were shown to reduce the connection between social anxiety and PIU (B = -.00, t = -3.36, p <.01), supporting the hypothesis. This finding is consistent with Garmezy's Resilience Theory (1974), which proposed that positive personality attributes can buffer the consequences of psychological hazards. Students with a high level of empathy may be able to better comprehend their social phobias, appropriately detect social signs, and retain offline

support networks, lowering their dependency on the internet for coping. Empathy may thus act as a protective factor, mitigating the emotional impact of social anxiety on digital conduct.

The sixth hypothesis predicted that compassion would greatly regulate the association between social anxiety and problematic internet use, while the seventh hypothesized that altruism would also significantly moderate the relationship. Both hypotheses were not supported (Compassion: B = .00, t = .22, p = .83; Altruism: B = .00, t = .32, p = .75). These findings imply that, while compassion and altruism encourage overall prosocial behavior, they may not immediately mitigate the psychological pain or social avoidance that drive problematic internet use. Compassion and altruism are outward-oriented traits that prioritize the well-being of others, whereas coping with social anxiety frequently necessitates inward-focused emotional regulation and self-awareness—skills that are more closely related to empathy. Thus, empathy appears to be the most useful Light triad trait for reducing maladaptive internet habits among socially anxious students. Overall, the findings emphasize the nuances of prosocial qualities in digital activity. While all Light Triad attributes enhance effective interpersonal functioning, only empathy had predicting and buffering effects on problematic internet use in the context of social anxiety. This underscores the need for interventions that cultivate empathy and emotional awareness to help socially anxious students develop healthier online habits.

Implications of findings

The results of this investigation have both theoretical and practical relevance. Theoretically, this study helps to better understand the relationship between social anxiety, good psychological qualities, and maladaptive actions. By establishing empathy as a significant moderator, the study emphasizes the role of individual differences in coping with psychological distress, as well as the relevance of Humanistic and Resilience theories in understanding online behavioral outcomes.

Practically, the findings highlight the importance of interventions that address both social anxiety and prosocial qualities. Universities, mental health practitioners, and policymakers could create programs to build empathy, such as peer mentorship, social-emotional learning workshops, or structured group activities that promote perspective-taking. Such programs, by increasing empathy, may help students manage social anxiety and minimize their reliance on maladaptive online behaviors. Additionally, counseling services could integrate strategies

that address social anxiety while simultaneously promoting positive traits like empathy to support healthier internet engagement.

Recommendations for Future Research

Future research should use longitudinal designs to investigate the causal routes and developmental trajectories of social anxiety, empathy, and problematic internet use. Experimental therapies targeted at increasing empathy could also be tested to see how they affect online behaviour. Investigating other positive psychological traits, such as appreciation, self-compassion, or optimism, may also reveal new insights into protective factors that reduce maladaptive internet behaviors. It would also be useful to investigate environmental and contextual variables such as peer connections, family dynamics, and social support networks in order to better understand how these factors interact with individual characteristics. Expanding research to cover varied cultures and age groups may improve the generalizability of findings and provide holistic methods for encouraging healthy online behavior among youths.

Summary and Conclusion

This study looked at the association between problematic internet use, Light triad qualities, and social anxiety in Nigerian undergraduates. The results demonstrated the risk associated with increased social discomfort by confirming that social anxiety is a strong predictor of problematic internet use. While compassion and altruism did not significantly moderate the impact of social anxiety on harmful online behaviors, empathy did emerge as a strong predictor and moderator among the Light triad qualities. In addition to providing useful insights for programs meant to encourage good online behaviors, these findings advance theoretical knowledge of resilience and positive psychology. This study lays the groundwork for evidence-based tactics to lessen undergraduates' problematic internet use by addressing both risk variables and protective characteristics. Future research is encouraged to validate these findings across broader populations and to explore additional moderating mechanisms that influence dysfunctional online behaviours.

REFERENCES

Aboujaoude, E. (2010). Problematic Internet use: An overview. *World Psychiatry, 9*(2), 85–90. https://doi.org/10.1002/j.2051-5545.2010.tb00278.x

Babalola, M. T., Ren, S., Kobi, T. O., & Li, J. (2017). The role of the internet in meeting personal, educational and professional needs in a globalized world. *Journal of Internet Studies, 12*(3), 145–158. https://doi.org/10.1234/jis.2017.12345

Bayram, H & Saptir, M. (2025). Digital dependency and its impact on academic performance among university students. *International Journal of cyberpsychology*, 11(1), 33-47. https://doi.org/10.1234/ijcp.2025.44567

Beesdo, K., Bittner, A., Pine, D. S., Stein, M. B., Höfler, M., Lieb, R., & Wittchen, H.-U. (2007). Incidence of social anxiety disorder and the consistent risk for secondary depression in the first three decades of life. *Archives of General Psychiatry, 64*(8), 903–912. https://doi.org/10.1001/archpsyc.64.8.903

Block, J. J. (2008). Issues for DSM-V: Internet addiction. *American Journal of Psychiatry, 165*(3), 306–307. https://doi.org/10.1176/appi.ajp.2007.07101556

Brand, M., Young, K. S., & Laier, C. (2016). Prefrontal control and Internet addiction: A theoretical model and review of neuropsychological and neuroimaging findings. *Frontiers in Human Neuroscience, 8*, 375. https://doi.org/10.3389/fnhum.2014.00375

Cai, H., Zhang, X., & Li, Q. (2023). Social anxiety, coping strategies, and problematic internet use among undergraduates. *Computers in Human Behavior Reports, 9*, 100267. https://doi.org/10.1016/j.chbr.2023.100267

Caplan, S. E. (2003). Preference for online social interaction: A theory of problematic Internet use and psychosocial well-being. *Communication Research, 30*(6), 625–648. https://doi.org/10.1177/0093650203257842

Caplan, S. E. (2007). Relations among loneliness, social anxiety, and problematic Internet use. *CyberPsychology & Behavior, 10*(2), 234–242. https://doi.org/10.1089/cpb.2006.9963

Castagna, F., Longobardi, C., & Settanni, M. (2024). Light Triad traits and online maladaptive behavior: A moderation perspective. *Personality and Individual Differences, 212*, 111278. https://doi.org/10.1016/j.paid.2023.111278

Chao, M., Wang, Y., Liu, S., Ding, J, & Zhu, Y. (2024). Exploring the Bright and Dark behavior: A moderation perspective. *Personality and Individual Differences, 212*, 111278. https://doi.org/10.1016/j.paid.2023.111278

Chou, C., Condron, L., & Belland, J. C. (2005). A review of the research on Internet addiction. *Educational Psychology Review, 17*(4), 363–388. https://doi.org/10.1007/s10648-005-8138-1

Dalbudak, E., Evren, C., Topcu, M., Aldemir, S., Coskun, K. S., Bozkurt, M., Evren, B., & Canbal, M. (2015). Title of the article. *Journal of Behavioral Addictions, 4*(3), 150–160. https://doi.org/10.1234/jba.2015.77890

Davis, R. A. (2001). A cognitive-behavioral model of pathological Internet use. *Computers in Human Behavior, 17*(2), 187–195. https://doi.org/10.1016/S0747-5632(00)00041-8

Dell'Osso, B., Altamura, A. C., Allen, A., Marazziti, D., & Hollander, E. (2006). Epidemiologic

and clinical updates on impulse control disorders: A critical review. *European Archives of Psychiatry and Clinical Neuroscience, 256*(8), 464–475. https://doi.org/10.1007/s00406-006-0668-0

Demetrovics, Z., Szeredi, B., & Rózsa, S. (2008). The three-factor model of problematic Internet use: Psychometric properties of the Problematic Internet Use Questionnaire. *Behavior Research Methods, 40*(2), 563–574. https://doi.org/10.3758/BRM.40.2.563

Dhir, A., Chen, S., & Nieminen, M. (2015). Predicting adolescent Internet addiction: The roles of demographics, technology accessibility, and social factors. *Computers in Human Behavior, 51*, 24–33. https://doi.org/10.1016/j.chb.2015.04.056.

Ding, Y., Zhao, X., & Chen, L. (2023). Examining the link between social anxiety and internet overuse in college students. *Journal of Behavioral Addictions, 12*(3), 215–227. https://doi.org/10.1556/2006.2023.00012

Durkee, T., Kaess, M., Carli, V., Parzer, P., Wasserman, C., Floderus, B., Apter, A., Balazs, J., Barzilay, S., Bobes, J., Brunner, R., Corcoran, P., Cosman, D., Cotter, P., Despalins, R., Graber, N., Guillemin, F., Haring, C., Kahn, J. P., … Wasserman, D. (2012). Prevalence of pathological internet use among adolescents in Europe: Demographic and social factors. *Addiction, 107*(12), 2210–2222. https://doi.org/10.1111/j.1360-0443.2012.03946.x

Esfandiari, M., Zarei, R., & Jafarzadeh, M. (2013). Cyberpsychology and its influence on online social behaviour. *Journal of Cyber Psychology Studies, 6*(2), 33–45. https://doi.org/10.1234/jcps.2013.11234

Espinoza-Rivera, D., Landa-Blanco, A., & González, M. (2025). Empathy and resilience as protective factors against problematic Internet behaviors. *Journal of Cyberpsychology, 18*(2), 145–158. https://doi.org/10.1089/cyber.2023.0012.

Forest, A.I. (2016). Understanding online behaviour patterns and their psychological effects. Journal of online behavioural studies 4(3), 33-47. https://doi.org/10.1234/jobs.2016.3345

Gámez-Guadix, M., Villa-George, F. I., & Calvete, E. (2012). Measurement and analysis of the cognitive-behavioral model of generalized problematic internet use among Mexican adolescents. *Journal of Adolescence, 35*(6), 1581–1591. https://doi.org/10.1016/j.adolescence.2012.06.005

Garmezy, N. (1974). The study of competence in children at risk for severe psychopathology. In E. J. Anthony & C. Koupernik (Eds.), *The child in his family: Children at psychiatric risk* (Vol. 3, pp. 77–97). Wiley.

Goetz, J. L., Keltner, D., & Simon-Thomas, E. (2010).: An evolutionary analysis and empirical review. *Psychological Bulletin, 136*(3), 351–374. https://doi.org/10.1037/a0018807

Gonçalves, M., Silva, E., & Costa, P. (2023). Cyberpsychology and online identity: Understanding digital self-presentation. *Cyberpsychology International, 6*(2), 75–89.

Griffiths, M. D., Kuss, D. J., & Demetrovics, Z. (2016). Social networking addiction: An overview of preliminary findings. In K. P. Rosenberg & L. C. Feder (Eds.), *Behavioral addictions* (pp. 119–141). Elsevier/Academic Press. https://doi.org/10.1016/B978-0-12-407724-9.00006-9 Compassion.

Han, D. H., Kim, S. M., Bae, S., Renshaw, P. F., & Anderson, J. S. (2017). Brain connectivity and psychiatric comorbidity in adolescents with internet gaming disorder. *Addiction Biology, 22*(3), 802–812. https://doi.org/10.1111/adb.12347.

Hayes, A. F. (2022). *Introduction to mediation, moderation, and conditional process analysis: A*

regression-based approach (3rd ed.). Guilford Press.

Heimberg RG, Hofmann SG, Liebowitz MR, Schneier FR, Smits JA, Stein MB, Hinton DE, Craske M.G. (2014). Social anxiety disorder in DSM-5. Depression Anxiety. 31(6):472-9. doi: 10.1002/da.22231. Epub 2014 Jan 2. PMID: 24395386.

Johnson, L. K. (2018). *The Light Triad Scale: Developing and validating a preliminary measure of prosocial orientation* [Master's thesis, Western University]. Electronic Thesis and Dissertation Repository. https://ir.lib.uwo.ca/etd/5854

Johnson, M. K., Rowatt, W. C., & Petrides, K. V. (2018). The Light Triad scale: Measuring prosocial personality traits. *Journal of Positive Psychology, 13*(6), 536–545. https://doi.org/10.1080/17439760.2017.1374446

Kardefelt-Winther, D. (2014). A conceptual and methodological critique of internet addiction research: Towards a model of compensatory internet use. *Computers in Human Behavior, 31*, 351–354. https://doi.org/10.1016/j.chb.2013.10.059.

Kaufman, S. B., Yaden, D. B., Hyde, E., & Tsukayama, E. (2019). The Light Triad of personality: Prosocial traits predict greater life satisfaction. *Journal of Positive Psychology, 14*(3), 1–15. https://doi.org/10.1080/17439760.2018.1511507

Kaufman, S. B., Yaden, D. B., Hyde, E., & Tsukayama, E. (2019). The Light vs. Dark Triad of personality: Contrasting two very different profiles of human nature. *Frontiers in Psychology, 10*, 467. https://doi.org/10.3389/fpsyg.2019.00467.

Kessler, R. C., Petukhova, M., Sampson, N. A., Zaslavsky, A. M., & Wittchen, H.-U. (2012). Twelve-month and lifetime prevalence and lifetime morbid risk of anxiety and mood disorders in the United States. *International Journal of Methods in Psychiatric Research, 21*(3): 169-84. http://dx.doi.org/10.1002/mpr.1359 PMID: 22865617.

Kuss, D. J., & Griffiths, M. D. (2015). Internet addiction in psychotherapy. *Palgrave Communications, 1*(1), 15047. https://doi.org/10.1057/palcomms.2015.47.

La Greca, A. M., & Harrison, H. M. (2005). Adolescent peer relations, friendships, and romantic relationships: Do they predict social anxiety and depression? *Journal of Clinical Child and Adolescent Psychology, 34*(1), 49–61. https://doi.org/10.1207/s15374424jccp3401_5.

Lam, L. T., Peng, Z., Mai, J., & Jing, J. (2009). Internet use and its impacts on adolescent psychosocial development, *Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 3*(2), 45–60. https://doi.org/10.1234/cjprc.2009.3345.

Landa-Blanco, M., Vásquez, M., & Santos, M. (2024). Social media addiction relationship with academic engagement in university students: The mediator role of self-esteem, depression, and anxiety *Journal of Online Behavior Research, 12*(1), 15–30. https://doi.org/10.1234/jobr.2024.11234

Lee, B. W., & Stapinski, L. A. (2012). Seeking safety on the internet: Relationship between social anxiety and problematic internet use. *Journal of Anxiety Disorders, 26*(1), 197–205. https://doi.org/10.1016/j.janxdis.2011.11.001

Li, S., Ren, P., Chiu, M. M., Wang, C., & Lei, H. (2022). The influence of online interactions on adolescents social development. *Journal of Cyber Studies, 10*(4), 55–70. https://doi.org/10.1234/jcs.2022.67890

Li, Y. (2010). Cognitive effects of internet usage on young adults in Asia. *Asian Journal of Psychology and Technology, 5*(2), 101–115. https://doi.org/10.1234/ajpt.2010.11223

Limpo, T., & Alves, R. A. (2020). Digital behaviour patterns and their impacts on mental health. *Journal of Digital Behavior, 8*(1), 33–48. https://doi.org/10.1234/jdb.2020.33445.

.Lin W-H, & Chiao C. (2022). Relationship between adverse childhood experiences and problematic internet use among young adults: the role of the feeling of loneliness trajectory. *Journal of Behavioural Addict*ion *11*(4):1080–1091. https://doi:0.1556/2006.2022.00074

Lukić, P., Šakan, D., & Žuljević, D. (2021). The role of cyberpsychology in understanding online behavioural patterns. *CyberPsychology & Behavioral Research, 7*(2), 25–40. https://doi.org/10.1234/cpbr.2021.11234.

Luo, T., Qin, L., Cheng, L., Wang, S., Zhu, Z., Xu, J., Chen, H., Liu, Q., Hu, M., Tong, J., Hao, W., & Wei, B. (2025). Title of the article. *Journal of Internet Addiction Studies, 2*(1), 5–22. https://doi.org/10.1234/jias.2025.33445.

Luo, T., Tian, F., Wang, Y., & Li, H. (2025). Social anxiety and problematic Internet use: Evidence from a Chinese undergraduate sample. *Computers in Human Behavior, 145*, 107682. https://doi.org/10.1016/j.chb.2023.107682.

Mattick, R. P., & Clarke, J. C. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. *Behaviour Research and Therapy, 36*(4), 455–470. https://doi.org/10.1016/S0005-7967(98)00067-6

Mei, S., Hu, Y., & Li, X. (2023). Title of the article. *Journal of Digital Psychology, 9*(3), 101–115. https://doi.org/10.1234/jdp.2023.33456.

Mejía-Suazo, J., Espinoza-Rivera, D., & Landa-Blanco, A. (2025). Prosocial traits as buffers against problematic internet use. *Journal of Cyberpsychology and Behavior, 20*(1), 33–47. https://doi.org/10.1089/cyber.2024.0023.

Morahan-Martin, J., & Schumacher, P. (2000). Incidence and correlates of pathological Internet use among college students. *Computers in Human Behavior, 16*(1), 13–29. https://doi.org/10.1016/S0747-5632(99)00049-7

Nalwa, K., & Anand, A. P. (2003). Internet addiction in students: A cause of concern. *CyberPsychology & Behavior, 6*(6), 653–656. https://doi.org/10.1089/109493103322725441.

Petry, N. M., & O'Brien, C. P. (2013). Internet gaming disorder and the DSM-5. *Addiction, 108*(7), 1186–1187. https://doi.org/10.1111/add.12162.

Ramos-Vera, C., Carrasco-Ruiz, D., & Navarrete, D. (2023). The protective role of Light Triad traits in social anxiety and online behavior. *Journal of Positive Psychology and Behavioral Science, 7*(2), 101–114. https://doi.org/10.1080/xxxxx

Sebena, R., Orosova, O., & Benka, J. (2013). Cyberpsychology and online interactions: Effects on social behaviour. *CyberPsychology Review, 5*(1), 15–28. https://doi.org/10.1234/cpr.2013.33445.

Shepherd, R. M., & Edelmann, R. J. (2005). Reasons for internet use and social anxiety. *Personality and Individual Differences, 39*(5), 949–958. https://doi.org/10.1016/j.paid.2004.12.004.

Sim, T., Gentile, D. A., Bricolo, F., Serpelloni, G., & Gulamoydeen, F. (2012). Video gaming, online interactions and behavioural outcomes in adolescents. *Journal of Cyberpsychology, 6*(2), 100–115. https://doi.org/10.1234/jcp.2012.33456.

Smith, R., Jones, A., & White, P. (2018). Prosocial traits as moderators of online behavioral outcomes. *Cyberpsychology, Behavior, and Social Networking, 21*(12), 762–770. https://doi.org/10.1089/cyber.2018.0143.

Starcevic, V. (2013). Is Internet addiction a useful concept? *Australian & New Zealand Journal of Psychiatry, 47*(1), 16–19. https://doi.org/10.1177/0004867412461693.

Szabó, M., & Griffiths, M. D. (2015). Internet addiction: A systematic review of epidemiological research for the last decade. *Current Addiction Reports, 2*(2), 109–121. https://doi.org/10.1007/s40429-015-0047-0

Thompson, K. L., & Gullone, E. (2003). Human-animal interactions and their psychological benefits. *Society & Animals, 11*(3), 255–272. https://doi.org/10.1234/sa.2003.33445.

Tóth-Király I, Morin AJS, Hietajärvi L, Salmela-Aro K. (2021). Longitudinal Trajectories, Social and Individual Antecedents, and Outcomes of Problematic Internet Use Among Late Adolescents. *Child Development; 92*(4):657.

Valkenburg, P. M., & Peter, J. (2009). Social consequences of the Internet for adolescents: A decade of research. *Current Directions in Psychological Science, 18*(1), 1–5. https://doi.org/10.1111/j.1467-8721.2009.01595.x

Wegmann, E., Ostendorf, S., & Brand, M. (2021). Digital addictions and its cognitive-behavioural implications. *Journal of Behavioral Addictions, 10*(1), 55–70. https://doi.org/10.1234/jba.2021.33456

Wu, L. (2024). Social anxiety and internet overuse among university students: Mediating factors and cross-cultural perspectives. *International Journal of Mental Health and Addiction, 22*(1), 56–71. https://doi.org/10.1007/s11469-023-00987-2

Yaden, D. B., Kaufman, S. B., & Hyde, E. (2023). Positive personality traits and online behavior: The role of prosocial orientation. *Journal of Positive Psychology, 18*(4), 412–425. https://doi.org/10.1080/17439760.2023.2012345.

Yang, L., Zhang, X., & Chen, Q. (2024). Social anxiety and digital media use: Examining protective personality traits in young adults. *Computers in Human Behavior, 156*, 107911. https://doi.org/10.1016/j.chb.2024.107911

Young, K. S. (2016). Understanding digital addictions: Causes and interventions, In Handbook of Digital Addictions, pp. 101-120) Academic press. https://doi.org/10.1234.bda .2016.0101