Original Research Article

Effects of Death Anxiety on Social Media Addiction and Internet Gaming Disorder: Roles of Fear of Missing Out and Self-Esteem

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Abstract
Despite the extensive literature on risk factors for digital addictions, it is surprising that death anxiety (DA) has not been examined as a potential risk factor, given its transdiagnostic nature for various psychological disorders. This study investigated the effect of DA on social media addiction (SMA) and internet gaming disorder (IGD) and examined whether these relationships were mediated by fear of missing out (FOMO) and moderated by self-esteem. Participants were 178 (53.93% females) social media and gaming users, aged between 18 and 84 years. They completed instruments assessing DA, FOMO, self-esteem, SMA, and IGD. Results revealed that the relationship between DA and SMA was partially mediated by FOMO but not moderated by self-esteem. In addition, the relationship between DA and IGD was not mediated by FOMO but was moderated by self-esteem. Specifically, DA predicted higher levels of IGD when self-esteem levels were low and average, but not at high levels of self-esteem. These findings broaden current understanding of digital addictions by accounting for the role of death-related fears and mechanisms that may contribute to the development and maintenance of SMA and IGD.

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Despite extensive research on digital addictions, literature examining the influence of death anxiety (DA) on social media addiction (SMA) and internet gaming disorder (IGD) is scarce. This gap is significant given that DA, a transdiagnostic construct underlying psychopathology (Iverach et al., 2014), may predispose individuals to digital addictions. In addition, fear of missing out (FOMO) was associated with DA (Naidu & Chew, 2024) and increased risk of SMA and IGD (Fabris et al., 2020; Y. Wang et al., 2024). Similarly, self-esteem, which buffers against mortality concerns, may significantly affect the relationship between DA and digital addictions. However, these factors have yet to be examined in a model. This study addressed this gap by exploring how DA contributes to SMA and IGD, and examining the possible mediating and moderating effects of FOMO and self-esteem, respectively.

Digital Addictions

Social Media Addiction

SMA is the preoccupation with online social platforms and a compulsion to invest excessive resources, resulting in compromised functioning and health (Andreassen, 2015). Although SMA is not an official disorder within the *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition-text revision (DSM-5-TR; American Psychiatric Association, 2022), its symptoms are comparable to those of chemical and behavioral addictions (Andreassen, 2015). Core symptoms of SMA include salience (e.g., preoccupation with social media by the individual), mood modification (e.g., using social media to experience positive moods), tolerance (e.g., spending more time on social media to achieve the former effects), withdrawal symptoms (e.g., unpleasant moods when the use of social media is reduced), conflict (e.g., conflict with partner due to the excessive use of social media), and relapse (e.g., using social media again after stopping for a period of time; Griffiths, 2005). Given its maladaptive dependency features, this study conceptualizes SMA as embodying addictive properties (Andreassen, 2015; Sommantico et al., 2023). Negative consequences of SMA include poorer sleep quality, reduced academic engagement and performance (Al-Samarraie et al., 2022; Krishnan & Chew, 2024; Zhuang et al., 2023), and poorer work quality (Ibrahim et al., 2022).

Internet Gaming Disorder

Unlike SMA, IGD is officially recognized in the *International Classification of Diseases*, 11th edition (ICD-11; World Health Organization, 2022) and is listed in the DSM-5-TR as a condition for further study (American Psychiatric Association, 2022). The diagnostic criteria include (a) preoccupation with internet games, (b) mood-related withdrawal symptoms, (c) increased tolerance and need for gaming, (d) difficulties controlling gaming, (e) reduced interest in other hobbies, (f) persistent gaming despite negative repercussions, (g) intentional falsehood about gaming time, and (h) mood modification, with (i) significant impact on functioning. Negative consequences of IGD include poorer decision-making, academic performance, and occupational performance (Düll et al., 2024; Ko et al., 2017; H. R. Wang et al., 2018), and depression, anxiety, and sleep issues (Chew et al., 2025; Tsui & Cheng, 2021). Given the consequences of SMA and IGD, it is important to understand their risk factors using Brand et al.'s (2016) Interaction of Person-Effect-Cognition-Execution (I-PACE) model.

Risk Factors of Digital Addictions

The I-PACE model is widely used to understand the development and maintenance of addictions (Brand et al., 2016; Dempsey et al., 2019; Ioannidis et al., 2019; Liu et al., 2024). It operates on the premise that internet addictions emerge from interactions between (a) predisposing factors, (b) affective and cognitive responses, and (c) executive functions (Brand et al., 2019). *Predisposing factors* are core characteristics that increase vulnerability to SMA and IGD (e.g., psychopathology; Brand et al., 2019). Predisposing factors interact with environmental triggers to elicit *affective and cognitive responses* such as FOMO (Stanciu & Calugar, 2022; Y. Wang et al., 2024). This engenders a desire to regulate through social media or gaming (Brand et al., 2016; H. Y. Wang & Cheng, 2022). In addition, *executive functioning* deficits and impaired inhibitory control exacerbate SMA and IGD symptoms (Brand et al., 2019; Wegmann et al., 2020). In essence, the interplay of core characteristics, cognitive, and regulatory factors diminishes control over one's social media and gaming use (Brand et al., 2019). Despite the comprehensive I-PACE framework, Brand et al. (2016) encouraged further research into other features contributing to internet-related addictions. It might be worthwhile to examine DA as a predisposing factor of SMA and IGD, given that DA is a transdiagnostic construct underpinning psychopathology (Iverach et al., 2014).

Death Anxiety

DA occurs when the awareness of mortality negates happiness and triggers apprehension and anxiety (Yalom, 2008). DA is conceptualized as a transdiagnostic construct that contributes to psychopathology (Iverach et al., 2014; Maxfield et al., 2014). For instance, the DSM-5-TR identifies fear of dying as a hallmark presentation for panic disorder (American Psychiatric Association, 2022). Furthermore, individuals with illness anxiety disorder exhibit a persistent fear of acquiring serious health issues, and addressing their fear of death alleviates their symptoms (Iverach et al., 2014). Greater consideration of DA may enhance the treatment efficacy of psychopathology and reduce a revolving door phenomenon where individuals present with different mental health conditions across their lifespan because the underlying DA was inadequately addressed (Iverach et al., 2014).

The terror management theory (TMT) provides an understanding of how DA is regulated using a tripartite security system through pursuing a sense of continuity beyond death (Greenberg et al., 1986; Hart et al., 2005). First, adhering to _cultural worldviews_, defined as shared values within larger institutions, promotes a sense of immortality as one belongs to communities that outlive oneself (Greenberg et al., 2014). Second, living up to cultural worldviews fosters _self-esteem_ where one feels worthy of symbolic protection from death through their contributions and legacies (Greenberg et al., 1986; Lifshin et al., 2017). This protection was linked to reduced anxiety and physiological arousal in response to reminders of mortality (Bassett, 2007; Menzies & Menzies, 2023). Finally, _close relationships_ offer protection against DA and provide opportunities to share legacies with important others (Hart et al., 2005).

DA and Digital Addictions

Studies have found a positive relationship between DA and SMA (Feng et al., 2023; Harley, 2019; Kumpasoğlu et al., 2021). From the TMT perspective, social media allows individuals to maintain digital footprints and relationships that buffer against DA, thereby preserving one's identity posthumously (Harley, 2019; Partouche-Sebban, 2016). Moreover, social media offers distraction (Feng et al., 2023) and an escape from reality (Sun & Zhang, 2021). Studies have also found a positive relationship between death and gaming. First, McAllister and Ruggill (2018) postulated that computer games are where death and play interact. In games, death is depicted in a muted form that never crosses actual mortality (i.e., the avatar of the gamer dies but not the gamer). This is seen through mechanisms like revivals, respawning, and

permadeath (Melnic & Melnic, 2018). According to TMT, gaming serves as a defense against death by depicting it as predictable and relatively inconsequential compared to actual death (McAllister & Ruggill, 2018). Second, an experimental study by Chew and Ayu (2023) found that DA motivated gaming behavior. Specifically, participants who were reminded of death played a game longer than their counterparts in the control condition. By playing the game longer, these participants earned more game points, boosting their self-esteem, which, in turn, acted as a buffer against DA. While these studies shed insights on the positive correlations between DA and gaming, they predominantly focused on general gaming rather than conditions such as IGD. Overall, DA, as a transdiagnostic construct, could influence SMA and IGD by functioning as a *predisposing factor* within the I-PACE model (Brand et al., 2019). To further elucidate this relationship, it would be beneficial to explore additional variables, such as FOMO and self-esteem, which could serve as *cognitive responses* and *predisposing factors*, respectively.

FOMO as a Mediator

FOMO is the persistent fear and anxiety of missing out on rewarding events, information, or experiences that others are engaging in (Fabris et al., 2020; Przybylski et al., 2013) and could explain the mechanism through which DA and digital addictions are related. Currently, it appears that Naidu and Chew's (2024) study is the only one that has examined the relationship between DA and FOMO. DA and FOMO seem to be conceptually related since they both pertain to (a) concerns about missing out if they do not act quickly within a finite lifespan, (b) a sense of uncertainty, and (c) the desire to stay continually connected with others. Indeed, the study found a strong positive correlation between DA and FOMO, and found that reminders of death led to higher FOMO scores, especially among those with low self-esteem.

Next, the relationship between FOMO and digital addictions has been studied. FOMO is widely recognized as a contributing factor to SMA (Fabris et al., 2020; Sommantico et al., 2023). Individuals with FOMO compulsively check and update social media to avoid becoming irrelevant (Talan et al., 2024), missing out (Sommantico et al., 2023), facing online neglect, and maintaining a socially desirable online presence (Zhu & Xiong, 2022). Unsurprisingly, such behaviors are associated with SMA (Fabris et al., 2020; Putri et al., 2023; Zhu & Xiong, 2022). These findings are consistent with Partouche-Sebban's (2016) study, where DA predicted Facebook use, as users obtained a sense of control through social surveillance (e.g., obtaining up-to-date information about others). FOMO is also a maladaptive cognitive response that begets IGD (Li et al., 2021; Stanciu & Calugar, 2022; Y. Wang

et al., 2022). The FOMO on rewarding game experiences (i.e., rewards, unity in guilds, and leveling up) increases craving toward gaming, leading to an increase in gaming duration and higher risk of IGD (Duman & Ozkara, 2021; Freire & Santos, 2021; Li et al., 2021; Y. Wang et al., 2022).

Self-Esteem as a Moderator

According to the I-PACE model, self-esteem is a core characteristic that moderates the level of susceptibility to SMA and IGD (Brand et al., 2016). This is aligned with the TMT perspective, where self-esteem buffers against DA (Greenberg et al., 1986). In addition, self-esteem is negatively associated with SMA (Andreassen et al., 2017; Hawi & Samaha, 2017) and IGD (Bansal & Kranti, 2022; Kavanagh et al., 2024). Increased vulnerability to SMA was found among social media users with lower self-esteem as they curate a socially desirable digital persona (e.g., based on cultural worldviews) to harvest likes and shares (Hatun & Türk Kurtça, 2023), leading to an increase in self-esteem (Sommantico et al., 2023). Interestingly, Zhao et al. (2022) found that anxiety canceled out the effects of self-esteem on SMA, which indicated that SMA was driven by the desire to alleviate anxiety rather than the need for a boost in self-esteem. Similarly, leveling up and strengthening avatars allows gamers to earn recognition and respect within the gaming guild and community (Kavanagh et al., 2024). Although this enhances self-esteem, there is also an increased risk of maladaptive over-reliance on gaming (Bansal & Kranti, 2022).

Taken together, the extant literature has explored the relationships between DA, FOMO, self-esteem, SMA, and IGD. First, DA is positively correlated with SMA and gaming (Chew & Ayu, 2023; Feng et al., 2023). Second, DA is positively correlated with FOMO (Naidu & Chew, 2024). Third, FOMO is positively correlated with SMA and IGD (Fabris et al., 2020; Y. Wang et al., 2022). Finally, self-esteem is negatively associated with SMA and IGD (Hatun & Türk Kurtça, 2023; Kavanagh et al., 2024). However, despite these findings, no study has yet integrated these variables into a single model to explore the interplay of these factors, leaving a gap to be addressed.

The Current Study

The current study aimed to address the research gap by exploring the impact of DA on SMA and IGD, with FOMO as a mediator and self-esteem as a moderator. First, it was hypothesized that DA is positively correlated with SMA and/or IGD (H1). Second, it was hypothesized that the effect of DA on SMA is mediated by FOMO and moderated by self-esteem (H2). Finally, it was hypothesized that the effect of DA on IGD is mediated by FOMO and moderated by self-esteem (H3).

Methods

Participants

Convenience and snowball sampling were used to recruit participants who were fluent in English, at least 18 years old, and had access to the internet. Of the 203 participants recruited, only 178 responses were analyzed, as 24 did not complete the relevant questionnaires. Participants' age ranged from 18 to 84 years ($M = 34.3$, $SD = 12.9$). Participants indicated whether they (a) used social media only, (b) played games only, or (c) used social media and played games in the past year. This resulted in overlapping groups, as there were participants who used social media and played games. Hence, the data were further sorted into two groups—(a) social media group ($n = 171$; age: $M = 34.1$, $SD = 12.7$, range from 18 to 84; 53.8% females) and (b) gaming group ($n = 107$, age: $M = 32.3$, $SD = 11.8$, range from 18 to 84; 44.9% females).

Measures

Death Anxiety Beliefs and Behaviors Scale. The 18-item DABBS (Menzies et al., 2022) was administered to measure three domains of DA—Affect (e.g., "*Death frightens me*"; four items; $\alpha = .94$), Beliefs (e.g., "*My death will be a painful experience*"; seven items; $\alpha = .83$), and Behaviors (e.g., "*[Avoid] thinking about myself dying*; seven items"; $\alpha = .87$). The overall scale had an excellent internal consistency of .90. Responses were indicated on five-point Likert scales—*strongly disagree* to *strongly agree* [Affect subscale], *never have the thought* to *always have the thought* [Beliefs subscale], and *never avoid* to *always avoid* [Behavior subscale]. Scores were summed for each subscale. Higher scores indicated higher DA levels. The total possible scores ranged between 18 and 89. Excellent discriminant validity was demonstrated with a clinical cutoff score of 55, indicating problematic DA (Menzies et al., 2022).

Fear of Missing Out Scale. FOMO on personally meaningful experiences, social events, and conversations was measured using Przybylski et al.'s (2013) 10-item Fear of Missing Out Scale (FOMOS; e.g., "*I fear others have more rewarding experiences than me*"). It is a unidimensional scale with an excellent internal consistency of .90. FOMOS was positively correlated with social media engagement, demonstrating construct validity (Przybylski et al., 2013). Responses anchored on a five-point Likert scale (*not at all true of me* to *extremely true of me*). Summation of all responses provided a total score that ranged between 10 and 50. Higher scores indicated higher levels of FOMO (Przybylski et al., 2013).

Rosenberg Self-Esteem Scale. The Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965) is a unidimensional, robust scale widely used to assess self-esteem via positive and negative self-impressions (Huang & Dong, 2012; Rosenberg, 1965). In a comparison study by Baranik et al. (2008), the internal consistency of the RSES on a Singaporean sample was good ($\alpha = .83$). Responses were rated on a four-point Likert scale (*strongly agree* to *strongly disagree*). Of the 10 items, five were positively worded (e.g., "*I take a positive attitude toward myself*"), and the remaining five items were negatively worded and reverse-scored (e.g., "*I certainly feel useless at times*"). Responses were summed to derive a total score that ranged from 10 to 40. Higher scores indicated higher levels of self-esteem.

Bergen Social Media Addiction Scale. The unidimensional six-item Bergen Social Media Addiction Scale (BSMAS) (Andreassen et al., 2016) was administered to measure SMA (e.g., "*You use social media in order to forget about personal problems*"). The BSMAS demonstrated good internal consistency with a Cronbach's alpha of .82 at baseline and .86 after a 3-month follow-up (Chen et al., 2020). Participants indicated responses on a five-point Likert scale that ranges from *very rarely* to *very often*. Higher scores suggested a greater risk of SMA. The possible total scores ranged from 6 to 30.

Internet Gaming Disorder Scale—Short Form. Internet gaming addiction was assessed using the Internet Gaming Disorder Scale—Short Form (IGDS-SF9; Pontes & Griffiths, 2015). This unidimensional tool contains items that cover all nine diagnostic criteria for IGD as stated in the DSM-5-TR (e.g., "*Do you systematically fail when trying to control or cease your gaming activity?*"). Excellent internal consistency of the IGDS-SF9 was noted in Chen et al.'s (2020) psychometric paper with a Cronbach's alpha of .92 at baseline and after a 3-month follow-up. Responses were indicated on a five-point Likert scale ranging from *never* to *rarely, sometimes* to *often*, and *very often*. Higher scores reflect higher levels of internet gaming addiction, with possible total scores ranging from 9 to 45.

Procedure

Participants were presented with an information sheet containing information on the research study, eligibility criteria, anonymity of data, and hotlines to mental health services before they indicated consent to participate. This was followed by a demographic form with relevant fields—age, gender, nationality, social media, and gaming use. All participants completed the DABBS (Menzies et al., 2022), FOMOS (Przybylski et al., 2013), and RSES

(Rosenberg, 1965). In addition, the social media group completed the BSMAS (Andreassen et al., 2016) and the gaming group completed the IGDS-SF9 (Pontes & Griffiths, 2015). The measures were hosted on an online survey software, Qualtrics, with a randomized order of administration to minimize order effects. Lastly, a debrief sheet was presented to provide participants with a general idea of the study's aims and hypothesized findings. The procedure was approved by the university's Human Research Ethics Committee before commencement of the study.

Results

Results were analyzed using the IBM Corp. (2023) Statistical Package for the Social Sciences SPSS version 29 and Hayes' PROCESS macro version 4.2 (Hayes, 2018). Inspections of Durbin-Watson, scatterplots, and normal probability plots indicated that assumptions of independence of observations, linearity, and normality were not violated, respectively. In addition, the variance inflation factor values revealed no multicollinearity in the data. Lastly, a comparison of the Mahalanobis distance to a chi-square distribution revealed no multivariate outliers. Table 1 displays the descriptives, Cronbach's alpha, and correlations between variables. Positive intercorrelations were found between DA, FOMO, SMA, and IGD, while self-esteem was negatively correlated with FOMO, SMA, and IGD. Instruments used in the study yielded good to excellent alpha values (Cronbach's alpha of at least .86).

To examine the size and direction of the linear relationships between DA and digital addictions—SMA and IGD, bivariate Pearson's product–moment correlation coefficients (r) were conducted. First, the bivariate correlation between DA and SMA was moderate and positive, $r(176) = .45$, $p < .001$. A small effect size was noted ($r^2 = .20$), which indicated that only 20.25% of the variability in DA scores was predicted by variability in SMA scores. Second, the bivariate correlation between DA and IGD was moderate and positive, $r(104) = .48$, $p < .001$. The effect size, $r^2 = .23$, was small, where 23.04% of the variability in DA scores was predicted by variability in IGD scores.
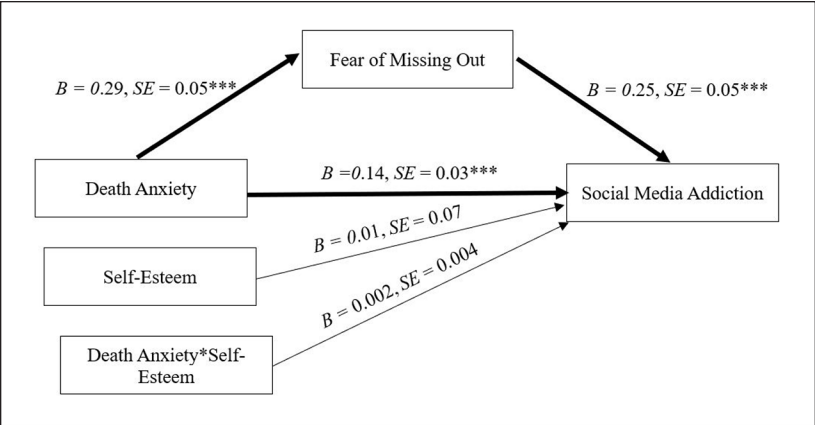
Moderation and Mediation Analyses

Next, Hayes's (2018) PROCESS Macro Model 5 was conducted twice to examine SMA and IGD separately. Both analyses were performed using 5,000 bootstrap samples, a heteroscedasticity-consistent standard error and covariance matrix estimator, and DA and self-esteem scores mean-centered (Hayes, 2018).

Table 1. Descriptive Statistics, Bivariate Pearson's Product–Moment Correlations, and Cronbach's Alpha for the Variables.

| Variable	M (SD)	Cronbach's alpha	Potential range	Actual range	1	2	3	4	5
1. Death anxiety	44.2 (11.7)	.89	18–89	19–82	—				
2. Fear of missing out	28.5 (6.1)	.90	10–50	10–48	.46***	—			
3. Self-esteem	19.7 (7.8)	.92	10–40	14–40	-.42***	-.59***	—		
4. Social media addiction	14.5 (5.3)	.86	6–30	6–29	.45***	.48***	-.31***	—	
5. Internet gaming disorder	18.2 (6.6)	.88	9–45	9–41	.48***	.43***	-.55***	.45***	—

***p < .001.

Figure 1. Statistical diagram for moderation and mediation analyses of social media addiction.
Note. Bolded lines represent significant pathways.
***$p < .001$.

Social Media Group. The Model 5 statistical diagram for SMA is presented in Figure 1. For the overall model, DA, FOMO, self-esteem, and the interaction between DA and self-esteem significantly accounted for 30.26% of the variance in SMA, $F(4,169)=21.06$, $p<.001$.

Mediation analysis revealed that DA significantly predicted FOMO, $B=0.29$, $SE=0.05$, $t(169)=0.15$, $p<.001$, 95% CI [0.18, 0.39]. This model accounted for 18.51% of variance in FOMO scores, $r^2=.18$, $F(1,169)=29.03$, $p<.001$. Closer inspection of the findings revealed a positive and significant conditional direct effect of DA on SMA ($B=0.14$, $SE=0.03$, $t(169)=4.06$, $p<.001$, 95% CI [0.07, 0.21]). Independently, FOMO scores also significantly predicted SMA, $B=0.25$, $SE=0.05$, $t(166)=4.77$, $p<.001$, 95% CI [0.15, 0.36]. The indirect effect of DA on SMA through FOMO was positive and significant while controlling for the effects of self-esteem ($B=0.07$, BootSE$=0.02$, 95%, BootCI [0.04, 0.11]).

Next, self-esteem did not significantly moderate the relationship between DA and SMA when controlling for FOMO and self-esteem, $B=0.01$, $SE=0.07$, $t(166)=0.15$, $p=.88$, 95% CI [−0.12, 0.14]. In addition, the interaction between DA and self-esteem did not account for a significant change in the amount of variance in SMA, $\Delta R^2=.001$, $\Delta F(1,166)=0.28$, $p=.60$. Overall, the relationship between DA and SMA was partially mediated by FOMO, but not moderated by self-esteem.
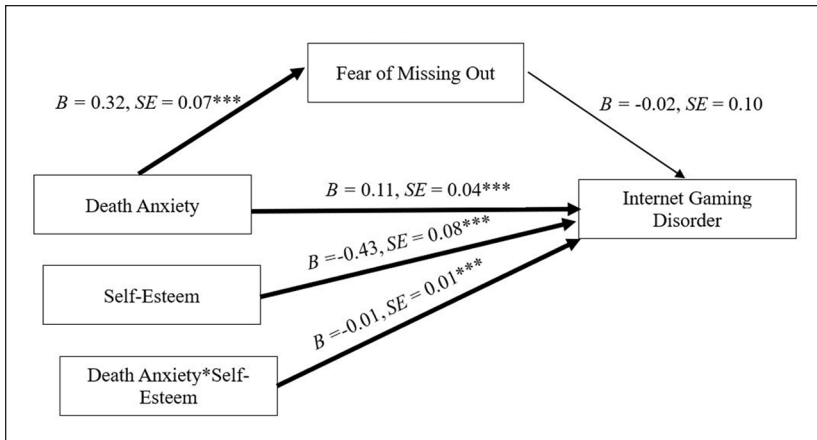
Figure 2. Statistical diagram for moderation and mediation analyses of internet gaming disorder.
*Note.* Bolded lines represent significant pathways.
***$p < .001$.

Gaming Group. The Model 5 statistical diagram for IGD is presented in Figure 2. In the overall model, the predictors DA, FOMO, self-esteem, and the interaction between DA and self-esteem significantly accounted for 40.14% of the variance in IGD, $F(4,101) = 15.81$, $p < .001$.

The mediation analysis revealed that DA significantly predicted FOMO, $B = 0.32$, $SE = 0.07$, $t(104) = 4.8$, $p < .001$, 95% CI [0.19, 0.45]. This model accounted for 25.41% of variance in FOMO scores, $F(1,104) = 23.12$, $p < .001$. The conditional direct effect of DA on IGD was significant, $B = 0.11$, $SE = 0.04$, $t(101) = 2.63$, $p = .009$, 95% CI [0.03, 0.20]. Next, FOMO scores did not significantly predict IGD when DA, self-esteem, and the interaction terms were controlled ($B = -0.02$, $SE = 0.10$, $t(101) = -0.21$, $p = .84$, 95% CI [−0.21, 0.17]). The indirect effect of DA on IGD through FOMO was nonsignificant while controlling for other variables, $B = -0.01$, BootSE $= 0.03$, 95% BootCI [−0.07, 0.05].

The moderating role of self-esteem on DA and IGD was negative and significant, $B = -0.43$, $t(101) = -5.16$, $p < .001$, 95% CI [−0.59, −0.26]. The interaction between DA and self-esteem accounted for a significant change in the amount of variance in IGD, $\Delta R^2 = .03$, $\Delta F(1,101) = 6.47$, $p = .01$. Inspections of the slope analysis illustrated the conditional direct effects of DA on IGD at varying self-esteem levels (see Figure 3). At low levels of self-esteem ($-1SD$), the effect of DA on IGD was significant ($B = 0.20$, $SE = 0.06$,
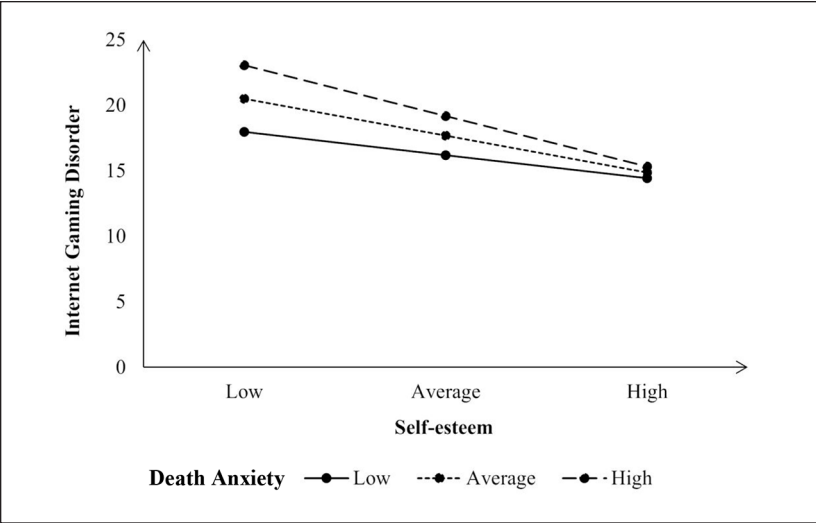
Figure 3. Relationship between death anxiety and internet gaming disorder at different levels of self-esteem.

$t(101)=3.23$, $p=.002$, 95% CI [0.08, 0.32]). This effect remained significant at average levels of self-esteem ($B=0.11$ $SE=0.04$, $t(101)=2.63$, $p=.009$, 95% CI [0.03, 0.20]). However, at high levels of self-esteem ($+1SD$), the effect of DA on IGD was non-significant ($B=0.03$, $SE=0.46$, $t(101)=0.74$, $p=.46$, 95% CI [−0.06, 0.13]). Overall, the relationship between DA and IGD was not mediated by FOMO but moderated by self-esteem. Specifically, DA predicted higher levels of IGD when self-esteem was low and average, but not at high levels of self-esteem.

Discussion

Results of the present study supported the hypothesis that DA predicted SMA and IGD (H1). There was partial support for H2, as the effect of DA on SMA was mediated by FOMO but not moderated by self-esteem. Furthermore, partial support was observed for H3, as the effect of DA on IGD was not mediated by FOMO but moderated by self-esteem. The following sections discuss these findings and their broader implications.

First, DA was found to be positively correlated with SMA and IGD. This was consistent with findings from Partouche-Sebban (2016), which indicated that higher levels of DA were associated with increased Facebook use as the

platform allowed for social surveillance to regulate social inclusion and extend social networking. From the TMT perspective, leaving one's online legacy and digital footprints buffers against death-related existential fears (Harley, 2019). Furthermore, curating online personas that align with the wider cultural worldviews (e.g., religious beliefs) mitigates DA (Partouche-Sebban, 2016). Similarly, gamers were found to play for longer periods of time when primed with mortality (Chew & Ayu, 2023). Taken together, present findings supported the consideration of DA as a transdiagnostic construct that underpins psychopathology (Iverach et al., 2014). Furthermore, DA may serve as a core characteristic that increases vulnerability to SMA and IGD within Brand et al.'s (2019) I-PACE model.

Second, the relationship between DA and SMA was found to be partially mediated by FOMO but not moderated by self-esteem. The mediating role of FOMO was consistent with past studies, which gathered that death was the ultimate form of missing out on experiences (Naidu & Chew, 2024) and that FOMO was a contributing factor to SMA (Fabris et al., 2020). This can be explained using TMT (Greenberg et al., 1986), where DA prompts individuals to engage in FOMO-driven actions. This served as a distraction or active pursuit of activities and connections to achieve symbolic immortality beyond physical death (Naidu & Chew, 2024). In the context of SMA, this pursuit entails maintaining a continuous online presence to leave digital footprints for preservation of legacy posthumously (Harley, 2019), maintaining close relationships, and obtaining updated information to remain relevant (Partouche-Sebban, 2016). Some ways that social media encourages social comparison include using TikTok or Instagram to monitor interesting experiences that others engaged in (e.g., popular holiday destinations, or appetizing food). In doing so, the fears of irrelevance and missing out on meaningful life events due to mortality are alleviated. Overall, the findings are aligned with the premise of Brand et al.'s (2019) I-PACE model, where predisposing factors (i.e., DA) interact with affective and cognitive responses (i.e., FOMO) to beget problematic social media use.

Next, self-esteem was not a moderator of DA and SMA when FOMO was controlled. This was contrary to predictions grounded in TMT research where self-esteem assuaged DA (Hart et al., 2005), and to literature that self-esteem buffered SMA (Hatun & Türk Kurtça, 2023). However, this was somewhat aligned with Zhao et al.'s (2022) findings that general anxiety canceled out the buffering effects of self-esteem on SMA. In the current context, the psychological distress of DA may have compelled users to excessively use social media as a means to alleviate overwhelming DA, rather than to boost self-esteem through curating socially desirable identities or receiving positive online feedback. Furthermore, the present findings might be explained by the

motivations of social media use. Social media platforms are often used to fulfill relational needs. Regardless of self-esteem levels, the need for close relationships might prompt individuals to cope with DA through social media use. Close relationships, another buffer postulated by TMT research (Hart et al., 2005), might better moderate the DA-SMA relationship. Future research is encouraged to explore the nuances of how DA predicts SMA while accounting for the intricacies of social media platforms (i.e., motivations of using social media and the presence or absence of close relationships as a buffer).

Third, the relationship between DA and IGD was not mediated by FOMO but moderated by self-esteem. Closer examination of interaction effects revealed that DA predicted higher levels of IGD when self-esteem was low and average, but not at high levels. Contrary to predictions, FOMO was not a mediator, despite past literature linking DA to heightened FOMO (Naidu & Chew, 2024), and FOMO to increased IGD (Y. Wang et al., 2022). Present findings suggested that IGD was less associated with staying updated on gaming experiences or missing out on game rewards and relationships. Rather, IGD was closely linked to coping with DA through distraction and desensitization to mortality (McAllister & Ruggill, 2018) and seeking symbolic achievements in games (Kavanagh et al., 2024). These findings might shed insight into the role of gaming motivations. H. Y. Wang and Cheng (2022) found weak to moderate correlations between social motivations (i.e., socialization, relationships, or teamwork) and IGD. Given that social relationships are central to FOMO, it could explain the non-significant FOMO-IGD relationship in the present study. Conversely, stronger correlations were observed between achievement motivations (i.e., advancement, mastery of skills, and outcompeting others) and IGD (H. Y. Wang & Cheng, 2022). Seeking achievement and leveling up in gameplay enhanced self-esteem (Bansal & Kranti, 2022), which might align with the moderating effects observed in this study. Future research could explore specific gaming motivations as mediating pathways of the DA-IGD relationship. Understanding these dynamics can inform interventions to address the underlying motivations linked to IGD in the context of DA.

Lastly, self-esteem moderated the effect of DA on IGD. When self-esteem was low to average, gamers with high DA were more vulnerable to IGD as they relied more on gaming to seek achievement, recognition from gaming communities, and escape from death-related fears. Applying the TMT perspective to gaming, players derive a sense of achievement and self-esteem by meeting valuable and respected goals shared by guild members, such as leveling up or strengthening avatars (Kavanagh et al., 2024). Contrastingly, there were no significant differences in the impact of DA on IGD when

self-esteem was high (i.e., presence of a buffering effect). Essentially, this group had a reduced need to accrue game achievements to enhance self-esteem to cope with DA.

A limitation of this study lies in the way that participants were categorized. There was an overlap in participants as those who engaged in both social media and gaming were sorted into both SMA and IGD analyses. This limited the amount of inference drawn on whether such participants present with distinct psychological or behavioral patterns, compared to those who exclusively used one or the other. Future research may consider examining these groups independently. Another limitation was the lack of information gathered about the platforms. Social media platforms and games have different mechanics or features that influence the DA-SMA and DA-IGD relationships. For instance, Facebook may appeal to individuals with higher DA levels as it is used for social surveillance and preservation of experiences and legacy (Partouche-Sebban, 2016). This might differ from other platforms like X (formerly Twitter), where less emphasis is placed on maintaining relationships, but rather on public posting (Alhabash et al., 2024) or obtaining real-time updates on current affairs that may concern mortality or survival (e.g., news on COVID-19 or elections). In the context of IGD, games with clear affiliations with death (e.g., permadeath or instant death) were postulated to influence DA (McAllister & Ruggill, 2018). Conversely, other games that are narrative-driven, exploration-based, or puzzle-based do not consist of any element of death. Distinguishing between features or genres of social media platforms and games in future research allows for greater insight into how DA might present differently across genres and mechanics.

Limitations notwithstanding, the current study broadens the research landscape of digital addictions by highlighting that DA is a broader transdiagnostic risk factor across SMA and IGD. Addressing DA in therapeutic interventions may mitigate the revolving door phenomenon described by Iverach et al. (2014), where patients continuously present with various psychological conditions across time due to insufficient focus on underlying DA. At present, the predisposing and perpetuating factors explored in Brand et al.'s (2019) I-PACE model appear to be generalized across digital addictions. Although SMA and IGD fall into the category of digital addictions, the differential pathways found in this study clarified the nuances and intricacies of social media use and gaming. Clinically, this has implications in enhancing conceptualizations and developing intervention plans for SMA and IGD. Specifically, SMA is driven by the existentially rooted need to feel connected, remembered, and valued by close ones, communities, or larger social institutions to cope with existential distress. In contrast to SMA, where relational needs were fulfilled via social media, self-esteem was more central in

buffering IGD as gaming provided avenues for achievement and status with lasting records in the virtual world. Clinicians and researchers may derive a more nuanced understanding and treatment of the SMA and IGD. Using an eclectic approach to incorporate existential interventions into the usual repertoire of cognitive-behavioral therapy and mindfulness-based therapy may provide holistic care for patients. On a system level, public health sectors are encouraged to promote healthier alternatives for establishing social connections and achievement-building avenues, and provide psychoeducation on the repercussions of DA and digital addictions.

Overall, this study sheds insight into the role of DA as a risk factor for digital addictions. Mortality concerns may increase vulnerability to SMA and IGD, albeit via different psychological factors. Social media analysis revealed that individuals with high DA tended to fear social exclusion or irrelevancy, which, in turn, exacerbated SMA levels. The lack of moderating effect by self-esteem suggested the presence of other moderators that further moderated the DA-SMA relationship. By contrast, gaming analysis indicated that DA compelled individuals to game compulsively in search of achievement and mastery to boost self-esteem and assuage mortality concerns. FOMO was less central to IGD as gamers were less concerned about keeping updated with others. This emphasizes the need to shift from one-size-fits-all approaches toward tailored conceptualizations and interventions to account for platform-specific contexts.

Author Contributions

Chun Ying Averly Foo: Conceptualization, Methodology, Formal Analysis, Writing—Original Draft, Writing—Review & Editing.
Peter K. H. Chew: Conceptualization. Methodology, Writing—Review & Editing, Supervision.

Declaration of Conflicting Interests

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Ethics Approval

The study was approved by James Cook University's Human Research Ethics Committee (Approval number: H9370).

Consent to Participate

Participants provided their informed consent to participate in the study.

Consent for Publication

Participants provided their informed consent to publish the study.

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Data Availability

The data are available upon request.

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