

The Effects of Video Game and Pornography Use on Emerging Male Adults' Mental Health

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Declaration

‘I declare that this thesis that I have submitted to Dublin Business School for the award of BA (Hons) Psychology is the result of my own investigations, except where otherwise stated, where it is clearly acknowledged by references. Furthermore, this work has not been submitted for any other degree.’

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Abstract

Research has shown that in recent years, men are doing consistently worse in the fields of academia, employment, and social and romantic relationships. Concurrently, the pornography and video game industries have experienced an alarming exponential growth. Based on previous research, the current study united pornography and video game use under the overarching variable of ‘digital alternatives to real life’ and hypothesised that video game use and pornography use would negatively predict mental health in emerging male adults. A quantitative correlational online survey of 84 young adult men measured participants’ frequency of pornography and video game use, and measured their mental health using the PANAS scale, the Interaction Anxiousness Scale and the Flourishing Scale. Results indicated that a significant moderate correlation existed between pornography use and video game use. Multiple regressions indicated that video game and pornography use did not significantly predict mental health, although pornography use consistently emerged as the stronger predictor. Future experimental and longitudinal research is recommended to determine whether a causal relationship exists between pornography and video game use and mental health.

1. Introduction

“Young men are failing as never before – academically, socially and sexually” – Philip Zimbardo, 2015, p. 3.

A 2014 report by the Organisation for Economic Cooperation and Development (OECD) found that boys achieved lower pass rates, had poorer grades and had a higher chance of repeating school years than girls. In multiple Western countries, girls outperformed boys so consistently on reading tasks that they were considered to be 12-18 months ahead (OECD, 2009). In Ireland girls are significantly outperforming boys in the junior cert (McGrave, 2019) and in the leaving cert (O’Brien, 2018). The Irish unemployment rate among men between the ages of 19 and 24 more than doubled from 8.1% in 2006 to 18.9% in 2016 (*“Ireland and EU Employment Rate: 2006-2016”*, 2016). Additionally, from 2008-2019, the percentage of American men between 18-29 years of age who reported having no sex in the past year doubled to 23% (Ingraham, 2019) (no recent Irish data exists on the subject).

During this time period, the industries of video games (Koksal, 2019) and pornography (Naughton, 2018) have been experiencing an unprecedented rate of growth. Zimbardo and Coulombe (2015) postulated a causal relationship between the rise of pornography and video games and men’s current cultural slump. They argued that the overwhelming stimulation offered by pornography and video games leads to a reduction in motivation to perform important and necessary tasks (e.g. socialising, learning, developing romantic relationships, furthering a career), which may result in a decline in users’ mental health.

A 1962 study by Katz and Foulkes discussed the potential causes of the U.S. population’s recent escapism into mass media and concluded that alienation (defined as “the feeling of powerlessness or meaninglessness, or the feeling of ideological or social isolation” (Katz & Foulkes, 1962, p.380) was a significant causal factor. The current study makes a similar argument: video game and pornography use function as outlets for escapism that offer users supplementary satisfying and rewarding experiences. However, the supranormal stimulation offered by these services presents a danger of imparting a ‘narcotising’ effect on its users, incurring a negative feedback loop resulting in a reduction in motivation to perform necessary tasks, such as socialising or developing a romantic relationship.

Pornography and video games are increasingly occupying a central position in our culture. They are unique in offering their users a cyberspace that acts as what Atkinson and Rodgers (2015) describe as ‘zones of cultural exception’, in which societal norms and notions of morality are discarded and users engage in acts of an explicitly sexual and violent nature. Horton and Wohl (1956) coined the term ‘para-social interaction’ to depict forms of media that targeted an alienated and disillusioned audience, offering them counterfeit companionship through digital interaction and reinforcement. Horton and Wohl were referring to radio and cinema, yet their argument is increasingly applicable the more successfully systems of entertainment succeed in ensnaring their audience and eliciting their interaction and gratification.

Both pornography and video games employ calculated supranormal stimuli that are too overwhelming for the adaptive mechanisms we have evolved to navigate the less stimulating real world (de Alarcon et al, 2019). The combination of supranormal stimulation and what Cooper (2009) refers to as the ‘Triple-A Engine’ – affordability, accessibility and anonymity – has proven to be particularly detrimental to emerging male adults (Lau et al, 2018; Harper & Hodgins, 2016).

Zimbardo and Coulombe (2015) contended that pornography and video games can only satisfy the two uppermost needs in Maslow’s Hierarchy of Needs (self-actualisation and esteem). However, the recent emergence of popular close-knit online gaming communities on platforms such as *Discord*, *Twitch* or *Reddit* offer its users friendship, trust and acceptance in a community, fulfilling (in part at least) love and belonging needs.

The current study seeks to identify whether video game and pornography use have a negative relationship with emerging male adults’ mental health, by determining the extent to which pornography consumption and video game use predict social anxiety, negative affect and psychological wellbeing in male emerging adults.

1.1 Pornography

Online pornography is becoming increasingly popular in Western culture. 12% of all internet websites are pornographic in nature (Biasin and Zecca, 2009) and in the United States, 70% of men between 18-24 years of age visit a pornography site at least once a month (Weiss, 2019). In Ireland, 60% of teenage boys have been exposed to pornography before the age of 13 years, and 99% have been seen pornography before 18 years of age (Dawson, 2019).

Pornhub, one of the world's most popular pornographic websites, publishes usage statistics every year. The 2019 annual report revealed that there were 42 billion visits to *Pornhub* this year (up from 13 billion in 2013: a 323% increase) and that it would take 169 years to watch all the content uploaded in 2019 (1.36 million hours of content) ("*The 2019 year in review – Pornhub Insights*", 2019).

In the United Kingdom, 76% of *Pornhub* visitors are male ("*Gender distribution of Pornhub visitors*", 2017) and 98% of paying subscriptions are made by men (Google Analytics, 2017). Of the world's top 500 most visited websites, 24 are dedicated to pornography ("*Top 500 sites on the web*", 2020).

Pornography's stimulation of individuals' sexual arousal and satisfaction can be overwhelming for some individuals. Indeed, persistent pornography use has been observed to significantly reduce grey matter as a result of its supranormal stimulation of the brain's reward centre (Kühn, & Gallinat, 2014). The recent substantial increase in research on the topic is paralleled by the rise of such communications on a variety of popular platforms: on forums (forum.NoFap.com), websites (www.YourBrainOnPorn.com), books (*Man Disconnected: How Technology has Sabotaged what it Means to be Male*), public talks (*Escaping Porn Addiction* - Eli Nash on TEDx Talks) and countless YouTube videos (notable personalities who have weighed in on the subject include Jordan Peterson, Joe Rogan and Terry Crews). All of the above communications are the result of an observation of significant adverse effects produced by the consumption of pornography.

While pornography can allow individuals to explore fantasies in safety, it can rewire the reward circuitry in the brain, lead to desensitisation, arousal addiction, an inability to perform sexually, a decline in libido (Zimbardo & Coulombe, 2015), lowered academic performance

(Beyens et al, 2015) as well as lead to negative body and sexual self-perceptions (Doornwaard et al, 2014). The aforementioned decline in libido is best illustrated by the appearance of Japanese ‘herbivorous’ men, “*sōshoku-kei*” - young men who have no interest in pursuing a romantic or sexual relationship (Otagaki, 2009).

A major consequence of pornography’s successful adoption of the Triple-A Engine is that millennials and Generation Z are at risk of basing their sexuality on the world of hardcore pornography rather than real romantic relationships. This can lead to difficulties in their future sex lives and the development of a self-deprecating mindset (Zimbardo & Coulombe, 2015).

1.2 Males’ use of pornography

In *A billion Wicked Thoughts (2011)*, Agas and Gaddam argue that the reason males tend to use pornography more than females is due to the difference in the evolutionary development of sexual arousal between the sexes. Males developed an ‘or’ arousal, whereby a prospective mate’s single arousal cue would be enough to arouse them. This development allowed males to exploit opportunities for sex, thereby increasing their chance of gene propagation. Contrarily, females developed an ‘and’ arousal, whereby multiple arousal cues need to be present in order to result in arousal. Theoretically, this process would have led to the selection of the single ‘best’ mate with which to reproduce.

Evolutionary biology suggests that this distinction may be based on the amount of resources required to propagate their genes: the evolutionarily stable strategy (ESS) for males was mating with the maximal number of females due to the low amount of resources they needed to contribute for successful propagation. On the other hand, the ESS for females was reproducing with a single, ‘best-fit’ male due to the high cost of providing resources for their offspring (e.g. providing nutrition, affection and education).

In 2004, with the use of functional magnetic resonance imaging, Hamann et al demonstrated that when presented with identical visual sexual stimuli, the amygdala (which plays a role in the regulation of sexual behaviour (Baird et al, 2004)) and the hypothalamus (which plays

a role in sexual arousal (Brunnetti et al, 2008)) were activated significantly more strongly in males than in females. Indeed, in contrast to males, females show a tendency to prefer romantic over sexual stimuli (Thompson & O’Sullivan, 2012). The branching in the evolutionary development of sexual arousal is theorised to be responsible for males’ pronounced responsiveness to visual sexual stimuli.

Zimbardo and Coulombe (2015) concurred with Agas and Gaddam, and added that male brains tend to separate romance and sex, unlike females. They maintain that while females tend to get physically aroused by pornography, “they only get psychologically aroused when the ‘and’ threshold is met” (Zimbardo & Coulombe, 2015, p.15). Therefore, women tend to prefer Harlequin romances (that made up nearly 17% of fiction sales in 2012 (Raphel, 2014)) or erotic novels such as *Fifty Shades of Grey* (the *Fifty Shades of Grey* series has placed 1st, 2nd and 3rd in a list of the decade’s best-selling books (Alcorn, 2019)).

1.3 Video games

The video game industry is experiencing a growth and popularity that may be more significant than that of pornography: there are currently more than 2.5 billion gamers worldwide and the industry is estimated to be worth over 300 billion dollars by 2025 (Koksal, 2019). Jane McGonigal, director of game research and development at the Institute for the Future in Palo Alto, California, estimates that the average male will spend 10,000 hours playing video games by the time they reach 21 years of age (as cited in Zimbardo and Coulombe, 2015).

While video games have positive attributes (e.g. developing problem-solving skills and increasing computer literacy (Gee, 2007; Chuang & Chen, 2007)), excessive use in isolation may hinder social development and motivation to succeed (Zimbardo and Coulombe, 2015). Additionally, a study by Kimmig, Andringa & Derntl (2018) found that a small to moderate exposure of video games was enough to result in an increase in disinhibition.

Video games provide attractive alternate worlds that offer their users easy, risk-free, high-reward opportunities that can be more desirable and satisfying than their real lives. (Zimbardo &

Coulombe, 2015). For some users, this can lead to an overpowering of their reward systems, along with a side-lining and internalisation of important problems like social withdrawal (Holtz & Appel, 2011).

1.4 Males' use of video games

Video games tend to activate the reward regions of the brain in men more than in women (Hoeft et al, 2008). The study's researchers suggested that this was due to gender differences in reward prediction and learning reward value. An alternative – or perhaps complementary – explanation is offered by Zimbardo and Coulombe (2015), who argued that males turn to video games more than females because society tells them that their inner mental worlds – notably their sexual and aggressive instincts, to which these zones primarily appeal – are unacceptable and dangerous. Reality, for some young men, is not stimulating enough to compete with the supranormal stimulation offered by video games that explicitly target the fulfilment of their sexual and aggressive drives. In these cases, young men socially isolate themselves in these seductive worlds, at great cost to their academic, social, professional and sexual lives (Zimbardo & Coulombe, 2015).

The findings of Alexander's 'Rat Park' experiment in the 1970s provides support for this argument: an individual placed in an unstimulating environment will turn to supranormal stimuli significantly more than an individual in an appropriately stimulating environment.

1.5 Psychological Wellbeing

In Western cultures, children are often told from a young age that they can grow up to be anything they like. The moment in which they realise that what they can actually become in life is limited and controlled by a number of external factors (hereditary, socioeconomic, cultural etc.) and that something marvellous and amazing (e.g. finding worldwide fame and recognition) is unlikely to occur was coined 'the Great Disappointment' by Bly and Woodman (1999). Sax (2016)

argued that when males encounter the Great Disappointment, there is a tendency for them to fill the gap with video games.

The more an individual relies on pornography and video games for stimulation over that offered by their real lives, the less fulfilment, satisfaction and enjoyment they will derive from the latter (Zimbardo and Coulombe, 2015). These findings are corroborated by a 2015 study conducted by Breslau et al that found that problematic internet use (a category under which online pornography and video games both fall) has a significant positive relationship with depressed mood and decreased psychological wellbeing. Additionally, Twenge (2019) conducted a study whose results found a significant negative correlation between psychological wellbeing and digital media use.

1.6 Social anxiety

Zimbardo and Coulombe (2015) argued that social anxiety is both a cause and a result of pornography and video game use: young men feel socially anxious and as a result, increasingly turn to the worlds of video games and pornography instead of social interactions. This creates a self-perpetuating cycle of increasing social anxiety, pornography and video game use and decreasing social skills. This theory is evidenced by several studies that have demonstrated the correlation between an increase in time spent playing video games, an increase in social anxiety and a decrease in the quality of social relationships (e.g. Lo, Wang & Fang, 2005; Obeid et al, 2019; Peterka-Bonetta et al, 2019, Wilson, 2014). Additionally, Zimbardo and Coulombe's (2012) survey-based research found that problematic pornography users who ceased viewing pornography reported a significant reduction in social anxiety (increased ability to maintain eye contact, increased confidence, increased comfort in interacting with women).

1.7 Negative affect

A 2019 study determined that an increased exposure to online pornography resulted in an increase in depressive symptoms (Ma, 2019). This seems to be due to pornography's intensive stimulation of the brain's reward system, which has a substantial effect on the decision-making process (Kühn, & Gallinat, 2014). Sax (2007) demonstrated that when playing video games, blood is inhibited from accessing the dorsolateral prefrontal cortex, the region of the brain responsible for providing context for motivation and drive. This may lead to a decrease in the individual's ability to strike a balance between different areas of life and the corresponding negative affective consequences.

Additionally, pornography use was found to be correlated with higher delay discounting (Negash et al, 2016). The resulting increase in a present-hedonistic perspective leads to a decrease in motivation and has a positive relationship with unhealthy behaviour (Keough, Zimbardo & Boyd, 1999). Another study showed that individuals considered to have an internet gaming disorder showed significantly higher levels of negative affect, higher levels of impulsivity and lower resilience (Shin et al, 2019).

1.8 Limitations of past research

There is a distinct lack of available data on the effects of low to moderate use of pornography and video games. This is odd considering the findings of Hummer et al's (2010) study: participants exposed to just 30 minutes of a violent video game showed reduced activity in the prefrontal cortex, the region of the brain responsible for executive functioning and suppression of undesired thoughts and behaviours. The prefrontal cortex is also responsible for decision-making and impulse control and does not reach maturity until age 25 (Arain et al, 2013). This may partly account for younger people's inclination to play substantial amounts of video games in order to experience greater sensations of present stimulations, rewards and challenges.

Most of the research into the effects of pornography on young men has been conducted in order to determine whether pornography has an adverse effect on individuals' physical health or on the health of people around them (Wright, 2013): a large portion of past research has examined the effects of pornography on sexual aggression (e.g. Malamuth, Addison & Koss, 2000; Demaré, Briere & Lips, 1988) and on the prevalence of risky sexual behaviour following exposure to pornography (e.g. Træen & Daneback, 2013; Häggström-Nordin, Hanson & Tydén, 2005; Lim et al, 2017). More recently, however, a significant amount of research has been dedicated to the understanding of problematic use of/addiction to pornography (e.g. de Alarcón et al, 2019; Sniewski, Farvid & Carter, 2018). Very little research exists on the effects of moderate pornography use on individuals' mental health and even less research examines pornography in combination with video games.

1.9 Hypotheses

Based on previous research, the following hypotheses will be examined:

Hypothesis 1: Pornography consumption and video game use will influence negative affect.

Hypothesis 2: Pornography consumption and video game use will influence psychological wellbeing.

Hypothesis 3: Pornography consumption and video game use will influence social anxiety.

2. Methodology

2.1 Participants

Participation in the current study was entirely voluntary and anonymous, and participants received no incentive or remuneration for participation. The study's target population was males between 18-25 years of age.

A total of 84 participants (excluding three who did not provide consent) took part in the study, all of whom fit the study's criteria. The mode was 23 years of age, the mean was 22.68 years and the standard deviation was 1.79. Due to the study's online nature, not all participants were from Ireland, allowing for increased variance in culture and ethnicity.

The participants were invited to take part in an online self-report survey posted on social media (Facebook, WhatsApp, Twitter). Before beginning the survey, participants were informed that their participation was entirely voluntary and anonymous.

The study used a random purposive sampling technique to access the participants. Snowball sampling was also used by inviting participants to share the survey on their own social media.

2.2 Design

The study employed a correlational online survey methodology using homogeneous purposive random sampling, in which a digital questionnaire was distributed through a link on <https://forms.office.com>. A quantitative research method was employed by means of three multiple regressions that tested whether video game and pornography use had a relationship with negative affect, social anxiety and psychological wellbeing respectively. As well as identifying how the predictor variables combined related to each criterion variable, the study sought to identify which predictor variable's effect was the strongest and to what extent it related to the criterion variables separately.

The predictor variables were (i) number of hours in the past week a participant played video games, and (ii) the number of times in the past week the participant viewed pornographic material. The three criterion variables were (i) negative affect, (ii) social anxiety and (iii) psychological wellbeing.

The current study used a correlational design as it sought to determine whether pornography use and video game use predicted negative affect, psychological wellbeing and social anxiety.

2.3 Materials

The online questionnaire (Appendices B, C, D & E) included a demographic question, a question measuring the frequency of participants' pornography use and a question measuring the frequency of video game playtime. The questionnaire also included the following three standardised psychometric scales: the PANAS scale, the Interaction Anxiousness Scale and the Flourishing Scale.

Demographic Question: A demographic question measured participants' age in years on an 8-item Likert scale, ranging from 18-25 inclusive (Appendix B).

Frequency of Video Game Use Question: A question designed to measure the number of hours in the past week a given participant spent playing video games (Appendix B). Participants were asked to respond to the question using a 10-point Likert scale with answers ranging from 0-13+.

Frequency of Pornography Use Question: A question designed to measure the frequency with which participants viewed pornographic material in the past week (Appendix B). Participants were asked to respond to the question using the provided 10-point Likert scale, with answers ranging from 0-13+.

2.3.1 Positive and Negative Affect Schedule (PANAS)

The 20-item self-report PANAS scale (Appendix C), developed by Watson, Clark & Tellegen (1988), measures negative and positive affect. The PANAS provides ten positive words (e.g. “*enthusiastic*”, “*active*”, “*inspired*”) and ten negative words (e.g. “*distressed*”, “*scared*”, “*hostile*”), to which the participant is expected to respond using the provided 5-point Likert scale (1 = very slightly or not at all, to 5 = extremely) to indicate to what extent they felt that way in the past week.

The total score is calculated by finding the sum of the ten positive items and then the negative items for two separate scores. Scores range from 10-50 for both sets of items, and a higher score indicates more of the specified affect.

Watson, Clark and Tellegen (1988) found that the PANAS had excellent high reliability and internal consistency (Cronbach’s Alpha) for both positive affect ($\alpha = .86-.90$) and negative affect ($\alpha = .84-.87$). Test-retest reliability for the PANAS (1 week) was reported as .79 for positive affect and .81 for negative affect (Watson et al, 1988). The researchers also found that the PANAS is moderately correlated to the Hopkins Symptom Checklist (.74 for negative affect and -.19 for positive affect) and the Beck Depression Inventory (.65 for negative affect and -.29 for positive affect).

2.3.2 Interaction Anxiousness Scale (IAS)

The IAS (Appendix D), developed by Leary (1983), is a 15-item self-report measure of dispositional social anxiety. The scale provides 15 statements (e.g. “*I often feel nervous even in casual get-togethers*”, or “*parties often make me feel nervous and uncomfortable*”) to which participants are asked to respond using a 5-point Likert scale (1 = Not at all characteristic of me to 5 = extremely characteristic of me). The participant responds with the degree to which the statement describes them. Therefore, a higher score indicates a higher tendency to experience subjective anxiety. Possible scores range from 15-75.

To control for acquiescence, the IAS is also composed of 4 reversed items (statements describing subjective responses of calmness, e.g. “*I seldom feel anxious in social situations*”, or “*I usually feel relaxed around other people, especially people who are quite different from me*”). To calculate a Social Anxiety total, items 3, 6, 10 and 15 were reversed and added to the sum of the remaining items, as per the scale’s scoring instructions.

Leary and Kowalski (1993) found that the IAS had high internal consistency (Cronbach’s Alpha), where $\alpha = .87-.89$. Leary (1983) found that the IAS had a test-retest reliability (8 weeks) of .83. Additionally, the researchers found that the IAS correlates with Watson and Friend’s Social Avoidance and Distress (SAD) scale with $r = .71$.

2.3.3 Flourishing Scale (FS)

The Flourishing Scale (Appendix E) is an 8-item self-report measure of psychological wellbeing developed by Diener et al (2009). The scale provides 8 statements (e.g. “*I lead a purposeful and meaningful life*”, or “*people respect me*”), to which participants are asked to respond using the provided 7-point Likert scale (1=strongly disagree to 7=strongly disagree). The participant is asked to report the degree to which each statement applies to them. Therefore, a higher score indicates an individual with many psychological resources and strengths. To determine a Psychological Wellbeing total, the 8 items are summed. Possible scores range from 8-56.

Diener et al demonstrated that the scale had high internal consistency (Cronbach’s Alpha), where $\alpha = .86$, and it had a temporal stability (one month) of .71. Additionally, validity analyses found that the FS significantly positively correlated to the Satisfaction With Life Scale ($r = .67, p < .001$).

2.4 Procedure

After having been approved by the Dublin Business School's Ethics Committee, the survey was distributed on social media and data collection occurred between December 2019 and January 2020.

After clicking the relevant Microsoft Forms link, participants were directed to the information page (Appendix A), where, due to the study's lack of deception, participants were debriefed regarding the purpose of the study. Participants were informed that the study was being conducted as part of a final year assessment in a BA (Hons) in Psychology at Dublin Business School. They were further informed that participation was entirely voluntary and anonymous, and that by submitting the survey they were confirming that they were males between 18-25 years of age. Participants were informed that they had the right to withdraw from the study at any point up until the submission of their response.

Due to the sensitive nature of some of the survey's questions, participants were informed that contact information for support services was included on the 'thank you' page (Appendix F) to ease any potential distress. Participants were reassured that the questionnaire data was securely stored on a password protected computer.

Contact details for both the researcher and the supervisor were provided on the introduction page in case a participant required additional information regarding the study.

In order to begin responding to the survey, participants were required to check a box indicating informed consent. Participants then completed the survey, whose average time to complete (as measured by Microsoft Forms) was 06:48. Upon submission, participants were thanked for their response and provided with contact information for support services.

2.5 Ethical Considerations

The study received ethical approval from the Dublin Business School Ethics Committee and it complied with the Psychological Society of Ireland's 'Code of Professional Ethics' and its four overarching ethical principles: *Respect for the rights and dignity of the person*, *Competence*, *Responsibility* and *Integrity*. The risk of harm to participants and to the researcher was found to be low. However, participants were advised of the sensitive nature of some of the questions on the information page and contact details for support services were provided on the 'Thank you' sheet.

The information page informed participants of their rights with respect to anonymity, voluntary participation, confidentiality, right to withdraw and informed consent. Participants were also reassured that the submitted data would be securely stored.

2.6 Data analysis

Data was collected using a self-report questionnaire created on Microsoft Forms. Data was then retrieved from Microsoft Forms and exported to Microsoft Excel, where the 3 participants who did not consent were removed from the dataset. The data was then converted to a .spv file and imported to statistical software program SPSS (version 26), after which it was coded to allow for analysis.

Statistical significance was defined as $p < .05$. Data was checked for missing values errors and it was found that two participants did not adequately complete the *Interaction Anxiousness Scale*. Therefore, these two participants were removed from the data set exclusively for the calculation of social anxiety. Their data was, however, used for the calculation of negative affect and psychological wellbeing.

The PANAS, the IAS and the FS were computed following scale-specific scoring instructions. Cronbach's Alpha was used to determine reliability (internal consistency) and acceptable reliability was defined as $\alpha \geq .7$.

The hypotheses were tested using parametric statistics. All three hypotheses shared the same two predictor variables: (i) video game use and (ii) pornography consumption. The criterion variables for the three hypotheses were (i) negative affect, (ii) social anxiety and (iii) psychological wellbeing respectively. All three hypotheses were tested using multiple linear regression.

3. Results

3.1 Descriptive Statistics

The total number of respondents was $N = 87$. Of the 87 total participants, 3 did not provide consent and were subsequently removed from the dataset. The largest proportion of respondents were in the '23 years of age' bracket ($N = 28, 33\%$).

Table 1.

Descriptive statistics and reliability

Variable	Reliability (α)	Minimum	Maximum	Mean	SD
<i>PANAS scale</i>					
Negative Affect	.85	10	40	20.31	7.00
Positive Affect	.88	14	49	32.77	7.13
<i>IAS</i>					
Social Anxiety	.88	15	60	34.87	21.24
<i>FS</i>					
Psychological Wellbeing	.86	21	56	43.21	7.02

Note: α = Cronbach's alpha (reliability and internal consistency)

PANAS total scale range: 10-50. Positive and negative affect measured separately.

IAS total scale range: 15-75. Higher score indicates more social anxiety

FS total scale range: 8-56. Higher score indicates high levels of psychological wellbeing.

Table 1 presents descriptive statistics and reliability for the scales used in the current study. All scales showed high reliability (alphas ranging from .85-.88). Respondents reported higher

levels of positive affect ($\mu = 32.77$) than negative affect ($\mu = 20.31$). While the original implementation of the IAS by Leary and Kowalski (1991) obtained social anxiety means ranging from 38.6 to 40.6, the current study obtained a comparatively low social anxiety mean of 34.87. The mean psychological wellbeing score for the current study was 43.21, a similar result to a 2016 French study that tested the scale's validity ($\mu = 42.63$) (Villieux et al, 2016).

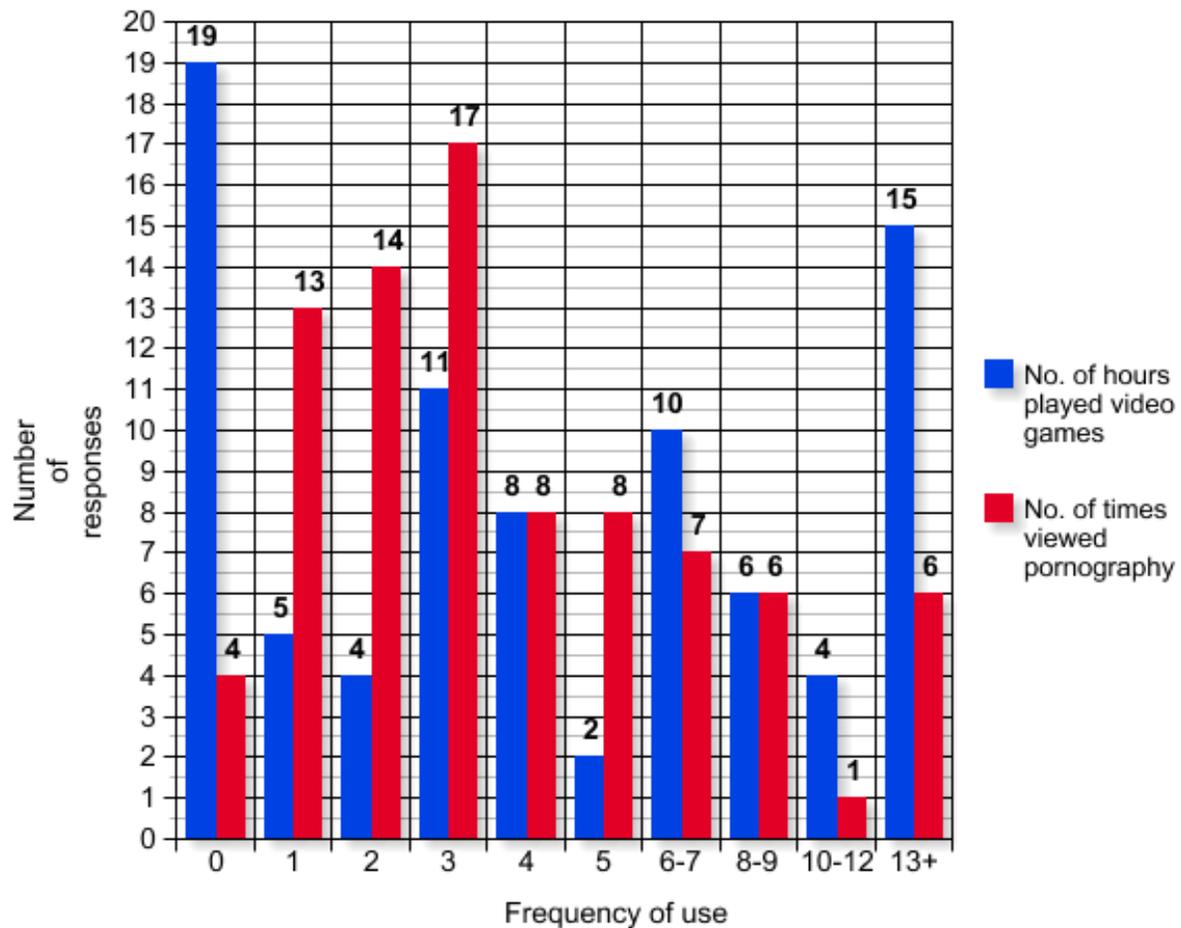


Figure 1.

Comparison of frequency of video game and pornography use in the past week.

Figure 1 presents the comparison of respondents' video game use and pornography use in the past week. While 19 (22.6%) respondents reported not having played video games in the past week, only 4 (4.8%) reported not having viewed pornographic material. Similarly, 15 (17.9%) respondents reported having played 13 or more hours of video games, in contrast to 6 (7.1%) who reported having viewed pornographic material 13 times or more. There was a more equal distribution of respondents across categories of pornography use than video game use, the latter providing a greater polarisation in its results.

3.2 Inferential Statistics

A Pearson's correlation found that a significant moderate positive correlation exists between the study's measures of pornography use and video game use ($r = .296$, $N = 84$, $p = .006$).

Table 2.

Correlation of Negative Affect, Social Anxiety and Psychological Wellbeing (Pearson's r)

	1	2	3
1. Negative Affect	1		
Sig.			
2. Social Anxiety	.25	1	
Sig.	$p = .030$		
3. Psychological Wellbeing	-.43	-.41	1
Sig.	$p < .001$	$p < .001$	

Table 2 presents the correlation of the three scales used in the study. Negative Affect and Social Anxiety have a low positive correlation, and Psychological Wellbeing is moderately negatively correlated with the other two measures.

Hypothesis 1: Video game and pornography consumption will influence negative affect.

Multiple regression requires a minimum of 15 participants per variable. Eighty-four participants took part in the current study, meeting the requirements for multiple regression.

Neither predictor variable correlated with the criterion variables above .3, and Cronbach's Alpha for the predictor variables was .46, indicating a low reliability. However, the other assumptions for multiple regression were met: the predictor variables were not correlated above .7; Tolerance was above .1 and VIF was below 10; The largest values for each variable were listed on different dimensions and the Mahalanobis distance was below the cut-off point. The data was normally distributed, and scatterplots indicated an insignificant negative relationship between video game use and negative affect, and an insignificant positive relationship between pornography use and negative affect.

The results of the regression indicated that the two predictors explained only 2% of the variance ($R^2 = .02$, $F(2, 75) = 1.78$, $p = .176$) in negative affect. It was found that neither video game use ($\beta = -.19$, $p = .103$, $CI [95\%] = -.91, .09$) nor pornography use ($\beta = .15$, $p = .195$, $CI [95\%] = -.23, 1.11$) significantly predicted negative affect, however, video game use was the stronger predictor. The null hypothesis was accepted.

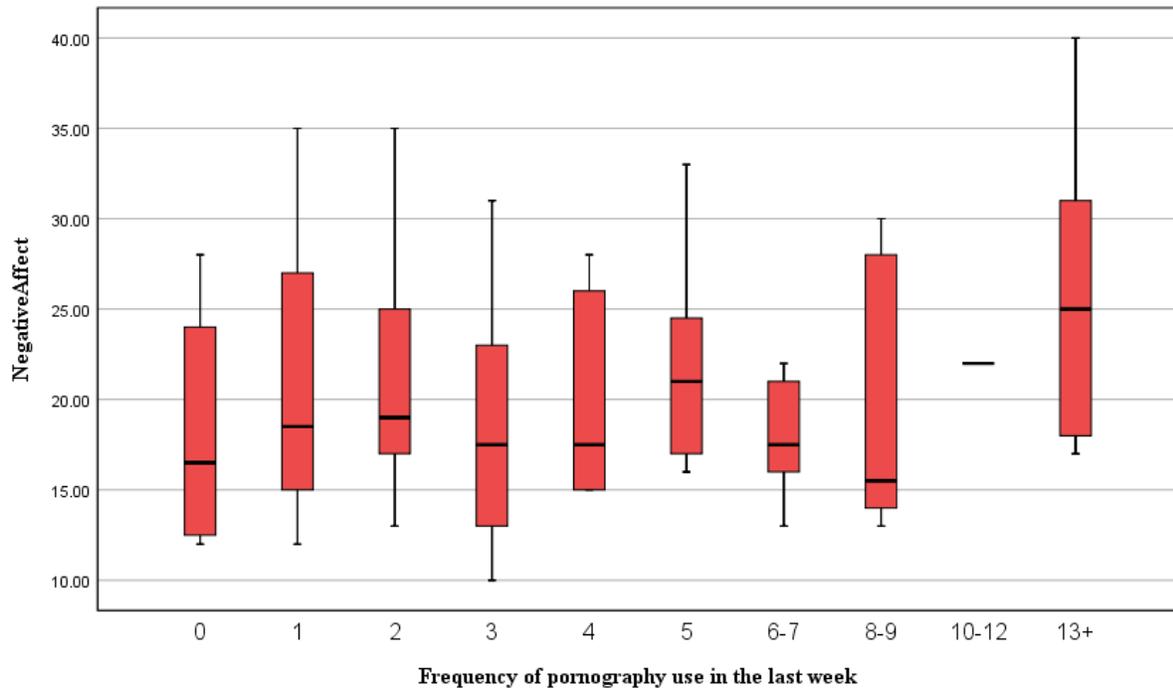


Figure 2.

Relationship between frequency of pornography use and negative affect score.

Figure 2 presents the insignificant positive relationship between frequency of pornography use and negative affect. Respondents who fell under the '13+' category showed a higher median and maximum negative affect value than other respondents.

Hypothesis 2: Video game and pornography consumption will influence social anxiety.

In the computation of social anxiety, two respondents were removed from the data set due to inadequate completion of the Interaction Anxiousness Scale. Therefore, the total number of valid responses used in the calculation of social anxiety was $N = 82$.

Neither predictor variable correlated with the criterion variables above .3, and Cronbach's Alpha for the predictor variables was .46, indicating a low reliability. However, the other assumptions for multiple regression were met: the predictor variables were not correlated above .7; Tolerance was above .1 and VIF was below 10; The largest values for each variable were listed on different dimensions and the Mahalanobis distance was below the cut-off point; The data was normally distributed and partial plots indicated an insignificant positive relationship between the predictor variables and social anxiety.

The results of the regression indicated that the two predictor variables explained only 2% of the variance ($R^2 = .02$, $F(2, 79) = 1.63$, $p = .203$) in social anxiety. It was found that neither video game use ($\beta = .06$, $p = .632$, $CI(95\%) = -.41, .67$) nor pornography use ($\beta = .18$, $p = .133$, $CI(95\%) = -.17, 1.25$) significantly predicted social anxiety. However, pornography use was the stronger predictor. The null hypothesis was accepted.

Hypothesis 3: Video game and pornography consumption will influence psychological wellbeing.

Neither predictor variable correlated with the criterion variables above .3, and Cronbach's Alpha for the predictor variables was .46, indicating a low reliability. However, the other assumptions for multiple regression were met: the predictor variables were not correlated above .7; Tolerance was above .1 and VIF was below 10; The largest values for each variable were listed on different dimensions and the Mahalanobis distance was below the cut-off point; The data was normally distributed and scatterplots showed a negative relationship between pornography use and psychological wellbeing, and no relationship between video game use and psychological wellbeing.

Table 3.

Regression model outcomes for psychological wellbeing.

Variable	N	Mean	SD	Beta β	P	t
<i>Psychological Wellbeing</i>						
Video game use	84	5.25	3.30	-.04	.704	-.38
Pornography use	84	4.69	2.46	-.17	.150	-1.45

The results of the regression indicated that the two predictor variables explained only 1% of the variance ($R^2 = .01$, $F(2, 81) = 1.42$, $p = .249$) in psychological wellbeing. It was found that neither video game use ($\beta = -.04$, $p = .704$, $CI [95\%] = -5.76, .39$) nor pornography use ($\beta = -.17$, $p = .150$, $CI [95\%] = -1.12, .18$) significantly predicted psychological wellbeing. However, pornography use was the stronger predictor. The null hypothesis was accepted.

Table 2 presents inferential statistics about the relationship between the predictor variables and psychological wellbeing.

Positive Affect

An additional multiple regression was conducted to determine whether pornography and video game use predicted positive affect.

Neither predictor variable correlated with the criterion variables above .3, and Cronbach's Alpha for the predictor variables was .46, indicating a low reliability. However, the other

assumptions for multiple regression were met: the predictor variables were not correlated above .7; Tolerance was above .1 and VIF was below 10; The largest values for each variable were listed on different dimensions and the Mahalanobis distance was below the cut-off point; The data was normally distributed and scatterplots indicated an insignificant negative relationship between pornography and video game use and positive affect.

The results of the regression indicated that the two predictor variables explained only 4% of the variance in positive affect ($R^2 = .04$, $F(2, 79) = 2.72$, $p = .072$). It was found that neither video game use ($\beta = -.10$, $p = .386$, $CI [95\%] = -.71, .28$) nor pornography use ($\beta = -.21$, $p = .076$, $CI [95\%] = -1.24, .06$) significantly predicted positive affect. However, pornography use was the stronger predictor.

4. Discussion

This section will discuss the findings of this study. It will provide possible explanations and relate the findings to previous research, as well as discuss methodological strengths and weaknesses. It will conclude by providing suggestions for future research.

4.1 Aim of Research

A significant body of research exists regarding the excessive use of pornography (e.g. Doornwaard et al, 2014, Zimbardo and Coulombe, 2015, Ma, 2019) or videogames (e.g. Lo, Wang and Fang, 2005, King et al, 2010, Poter et al, 2010, Griffiths & Meredith, 2009), but remarkably little exists on the effects of the combined use of these services. The current study regarded the use of pornography and video games as forms of escapism. Pursuing de Alarcon's (2019) premise that pornography and video games can theoretically be grouped under the overarching concept of 'digital alternatives to real life', the current exploratory study sought to determine whether the use of these digital alternatives produced a "narcotizing dysfunction" (Katz and Foulkes, 1962, p.385) that might be made evident by measures of negative affect, social anxiety and psychological wellbeing as a function of mental health in emerging male adults.

4.2 Summary of findings

Hypothesis 1: Video game and pornography consumption will influence negative affect.

The results of the regression indicated that there was no significant relationship between pornography use, video game use and negative affect ($R^2 = .02$). While pornography use had a positive relationship with negative affect ($\beta = .15$), video game use was found to have a negative relationship with negative affect ($\beta = -.19$). This suggests that the study was incorrect in grouping video games and pornography into a single category.

Hypothesis 2: Video game and pornography consumption will influence social anxiety.

The results of the regression indicated that there was no significant relationship between video game use, pornography use and social anxiety ($R^2 = .02$). Social anxiety was found to have a positive relationship with video game use ($\beta = .06$) and pornography consumption ($\beta = .18$).

Hypothesis 3: Video game and pornography consumption will influence Psychological wellbeing.

The results of the regression indicated that there was no significant relationship between video game use, pornography consumption and psychological wellbeing ($R^2 = .01$). Psychological wellbeing was found to have a small negative relationship with video game use ($\beta = -.04$) and with pornography consumption ($\beta = -.17$).

A measure of the PANAS' positive affect was also included to provide supplementary data about the sample population. The findings were similar to the results obtained from the previous three multiple regression analyses: pornography and video games did not significantly predict

positive affect, and pornography use had a more notable negative relationship with positive affect ($\beta = -.21$) than did video game use ($\beta = -.10$).

Surprisingly, only 4 out of 84 participants reported not having viewed pornographic content in the last week, highlighting the widespread prevalence of pornography use. A comparatively large proportion of participants reported not having played video games at all in the past week (19 (23%)).

The study hypothesised that pornography and video game use would have a linear negative relationship with mental health. This was not the case. However, while neither video game use nor pornography use significantly predicted mental health (as it was defined in the current study) in emerging male adults, pornography use consistently emerged as a stronger predictor, albeit relatively weak. This indicates a negative correlation between pornography use and mental health.

There are several possible interpretations of the study's results. Occam's razor suggests that the study was incorrect in its inference that video game and pornography use were inherently and objectively detrimental to the mental health of young male adults. The lack of past research on the effects of minimal and moderate use of video games and pornography imply that no such relationship has been observed. Should this argument prove correct, the adverse effects discussed in the literature review (e.g. Zimbardo and Coulombe, 2015, Doornwaard et al, 2019, Holtz and Appel, 2011) exist wholly as a result of overconsumption. It follows, therefore, that there should exist a subjective threshold after which continued use of video games and pornography elicits the manifestation of adverse effects.

An alternative explanation for the lack of significant relationships is that the study failed to control for all the relevant variables. The main limitations that may have contributed to this are discussed below.

4.3 Limitations

The current study may have failed to adequately control for potentially significant variables. In addition to the scales used to measure respondents' negative affect, social anxiety and psychological wellbeing, the study only controlled for an additional three variables: age, frequency of pornography use and frequency of video game use.

A distinction could have been made between different types of pornography, in order to determine whether exposure to more extreme forms of it would have had a more profound impact on mental health. Indeed, exposure to both violent and non-violent depictions of pornographic content have been demonstrated to result in mood disturbance (Semm and Radtke, 1990). The same principle can be applied to the type of video game a participant tended to play: a 2016 study by Park et al found that individuals who played Massively Multiplayer Online Role-Playing Games reported significantly higher social anxiety than individuals who played First Person Shooters or Real Time Strategy games.

An additional angle from which the question might have been addressed would have been asking participants at what age they had first been exposed to pornography, as past research suggests that exposure to pornography early in life predicts problematic adult pornography use (McGuinness, 2019).

Furthermore, the study could have included a measure of participants' romantic relationship status, as it is hypothesised that individuals in romantic relationships will tend to consume less pornography and spend less time playing video games.

Another of the study's potentially consequential limitations was an oversimplification of its understanding of mental health and the variables that define it. A correlation analysis found that the three scales that were used to measure mental health were only moderately correlated to one another (see table 2). This indicates that the study was incorrect in grouping these scales together. Moreover, neither predictor variable correlated with any of the criterion variables above the required .3 threshold, and Cronbach's Alpha for the predictor variables was only .46, indicating that the two predictors are not reliable representations of the targeted domain of behaviour.

Furthermore, the study's survey was lacking in temporal consistency: the IAS' and the FS' measurements imposed no temporal constraints, whereas the remaining measures (the PANAS, frequency of pornography use, frequency of video game use) measured data exclusively from the past week. Ideally, in order to maximise internal consistency, the study would have exclusively incorporated scales that measured general longitudinal data, rather than data from the last week.

Alternatively, this shortcoming could have been overcome with the addition of a component that would control for events or experiences that may have accounted for the results of the questions that measured data from the last week. The current study assumed a relationship between the predictor and criterion variables that may have been due to an entirely unrelated variable. For example, a participant may have scored highly in negative affect because they recently had an unpleasant experience, rather than as a result of their pornography and video game consumption.

Participants responded using predefined options in Likert scales, which may have encouraged them to respond in a ‘best-fit’ manner, rather than allowing them to provide an accurate reflection of their views. A qualitative aspect would have accounted for such shortcomings by allowing participants to share their experience more accurately and to express their personal views about video game and pornography use.

Snowball sampling was limited due to the apparent reluctance of participants to share the survey on their personal social media accounts, perhaps owing to the sensitive nature of the questions.

Finally, the lack of deception in combination with the high sensitivity of some of the questions in the current study means it may have fallen subject to the reactive effect: participants may have altered their responses due to the fact that they were being recorded.

4.4 Strengths

One of the study’s distinctive strengths is the novelty of the research. Surprisingly little research exists that measures the effects of low and moderate use of either pornography or video game use, and no research was found that examined the combined effects of pornography and video game use.

Another of the study’s strengths is that despite the personal and sensitive nature of the questions, 84 of the 87 total participants provided consent to taking part in the research. This is presumably due to the study’s confidential and anonymous online administration, which encouraged honest responses, while also significantly reducing potential discomfort that other

methods of administration (such as pen and paper) might have resulted in. In addition, the variance in the responses indicates that the sample population was a representative sample.

4.5 Future research

Recommendations for future research include the replication of the current study with the inclusion of its limitations.

Results of studies reporting a relationship between excessive pornography or video game use and poorer mental health (e.g. Kühn, & Gallinat, 2014; Holtz & Appel, 2011) have been unable to determine whether individuals with poorer mental health tend to use pornography and video games more often, or if increasingly using pornography and video games results in poorer mental health. The correlational nature of this study imposed the same restriction. Consequently, experimental research is recommended to determine a causal relationship.

The findings of Dawson et al (2019) (notably that 60% of Irish boys are exposed to pornography before the age of 13) in combination with the current study's findings regarding the continued pervasiveness of pornography use into early adulthood emphasise the need for a better understanding of the relationship between pornography use and mental health.

Further experimental and/or longitudinal research is called for to accurately determine whether a causal relationship exists between participants' mental health, video game use and pornography use. These research methods would allow for a more substantial ability to control for

relevant variables and, in turn, greatly reduce the likelihood of measures of participants' mental health being the result of unaccounted variables.

Alternatively, the inclusion of a qualitative aspect enquiring participants about whether they thought pornography and video game use were detrimental to their mental health, and whether their current affect is due to an unrelated event, might prove practical to controlling for extraneous variables.

4.6 Conclusion

The current study hypothesised that frequency of pornography and video game use had a negative linear relationship with emerging male adults' mental health. The study's results indicated that neither pornography use nor video game use were significant predictors, but pornography use was found to be a consistently stronger predictor. Recent research demonstrating the young age at which individuals are exposed to pornography in combination with the prevalence of pornography use among the emerging male adult sample testifies to the need of a better understanding of the relationship between pornography use and mental health.

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6. Appendices

Appendix A – Information Sheet

My name is Patrick Andropoulos and I am conducting research in the Dublin Business School Department of Psychology to assess the effects of pornography consumption and video game use on young men's mental health. This research is being conducted as part of my studies and will be submitted for examination. Should the study find any significant results, they may be presented, but at no point will any participant's data be identifiable or linked back to them.

You are invited to take part in this study if you are a male between the ages of 18 and 25. Participation involves completing and returning the attached anonymous survey. While the survey asks some questions that might cause some minor negative feelings, it has been used widely in research. If any of the questions do raise difficult feelings for you, contact information for support services are included on the final page.

Participation is completely voluntary, and you are not obliged to take part.

Participation is anonymous and confidential. Thus, responses cannot be attributed to any one participant. For this reason, it will not be possible to withdraw from participation after the questionnaire has been collected.

The questionnaires will be securely stored and data from the questionnaires stored on a password protected computer.

It is important that you understand that by completing and submitting the questionnaire you are confirming that you are a male between the ages of 18 and 25.

Should you require any further information about the research, please contact Patrick Andropoulos, or my supervisor.

Thank you for taking the time to complete this survey.

*Appendix B – Basic Information**Demographic Questions*

1. How old are you?
 - a. 18
 - b. 19
 - c. 20
 - d. 21
 - e. 22
 - f. 23
 - g. 24
 - h. 25

2. How many hours in the past week have you played video games (on a gaming console, mobile device, or computer)?
 - a. 0
 - b. 1
 - c. 2
 - d. 3
 - e. 4
 - f. 5
 - g. 6-7
 - h. 8-9
 - i. 10-12
 - j. 13+

3. Pornography is the depiction of erotic behaviour intended to cause sexual arousal. Based on this definition, how many times in the last week did you view pornographic material?
 - a. 0
 - b. 1
 - c. 2
 - d. 3
 - e. 4
 - f. 5
 - g. 6-7
 - h. 8-9
 - i. 10-12
 - j. 13+

Appendix C – The Positive and Negative Affect Schedule (PANAS) scale

This scale consists of a number of words that describe different feelings and emotions. Read each word and select the appropriate answer next to that word to indicate to what extent you have felt this way during the past week.

1 Very Slightly or Not at All

2 A little

3 Moderately

4 Quite a bit

5 Extremely

_____ 1. Interested

_____ 2. Distressed

_____ 3. Excited

_____ 4. Upset

_____ 5. Strong

_____ 6. Guilty

_____ 7. Scared

_____ 8. Hostile

_____ 9. Enthusiastic

_____ 10. Proud

_____ 11. Irritable

_____ 12. Alert

_____ 13. Ashamed

_____ 14. Inspired

_____ 15. Nervous

_____ 16. Determined

_____ 17. Attentive

_____ 18. Jittery

_____ 19. Active

_____ 20. Afraid

Appendix D – Interaction Anxiousness Scale (IAS)

Indicate how characteristic each of the following statements is of you according to the following scale:

1 = Not at all characteristic of me.

2 = Slightly characteristic of me.

3 = Moderately characteristic of me.

4 = Very characteristic of me.

5 = Extremely characteristic of me.

_____ 1.I often feel nervous even in casual get-togethers.

_____ 2.I usually feel comfortable when I'm in a group of people I don't know.

_____ 3.I am usually at ease when speaking to a member of the other sex.

_____ 4.I get nervous when I must talk to a teacher or a boss.

_____ 5.Parties often make me feel anxious and uncomfortable.

_____ 6.I am probably less shy in social interactions than most people.

_____ 7.I sometimes feel tense when talking to people of my own sex if I don't know them very well.

_____ 8.I would be nervous if I was being interviewed for a job.

_____ 9.I wish I had more confidence in social situations.

Appendix D - Continued

_____ 10. I seldom feel anxious in social situations.

_____ 11. In general, I am a shy person.

_____ 12. I often feel nervous when talking to an attractive member of the opposite sex.

_____ 13. I often feel nervous when calling someone I don't know very well on the telephone.

_____ 14. I get nervous when I speak to someone in a position of authority.

_____ 15. I usually feel relaxed around other people, even people who are quite different from me.

Appendix E – Flourishing Scale (FS)

Below are 8 statements with which you may agree or disagree. Using the 1–7 scale below, indicate your agreement with each item by indicating that response for each statement.

- 7 - Strongly agree
- 6 - Agree
- 5 - Slightly agree
- 4 - Neither agree nor disagree
- 3 - Slightly disagree
- 2 - Disagree
- 1 - Strongly disagree

____ I lead a purposeful and meaningful life

____ My social relationships are supportive and rewarding

____ I am engaged and interested in my daily activities

____ I actively contribute to the happiness and well-being of others

____ I am competent and capable in the activities that are important to me

____ I am a good person and live a good life

____ I am optimistic about my future

____ People respect me

Appendix F – Thank You Sheet and Support Information

Thank you for your answers. Your response has been recorded.

If you feel that answering this survey has raised some issues for you, please consider contacting some of the support services listed below, or speak to a friend, family member or professional.

Aware

The Aware support line: 1800 80 48 48

Available Monday-Sunday from 10AM-10PM.

Email for support at: supportmail@aware.ie

Samaritans

Call on: 116 123

Available 24 hours a day, 365 days a year. Free to call.

Email: jo@samaritans.org