Examining the Relationship between Social Gaming, Social Anxiety and Social Functioning.

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Abstract

Introduction: This research study aims to examine the relationship between active social gaming and social anxiety and additionally, social functioning, to investigate if social gaming has positive effects on outcomes.

Methods: A sample population of active social gamers (*N* = 88; *Males* = 56; 63.6%, *Females* = 32; 36.4%) was obtained online through non-probability convenience and snowball sampling. Participants completed the 39-item Competitive and Cooperative Presence in Gaming Questionnaire (CCPIG; Hudson & Cairns, 2014), the 24-item Liebowitz Social Anxiety Scale (LSAS-SR; Liebowitz, 1987), the Social Functioning Questionnaire (SFQ; Tyrer et al., 2005) eight-item, and also self-reported demographics and gaming behaviours.

Results: Pearson's Correlation and Multiple Linear Regression analyses indicated that that level of social gaming was not correlated with or a significant predictor of lower social anxiety symptoms or higher levels of social functioning.

Conclusion: Results also suggest that despite the lack of research studies showing promise for digital interventions for the treatment of social anxiety, there is further research required in this area to see if there is an effect between social anxiety symptoms and social gaming. Furthermore, preliminary correlations between social gaming and age have indicated that there may be an additional factor involved that may predict a stronger link between social gaming and social anxiety in different age groups. Implications and limitations of the study are discussed.

TABLE OF CONTENTS

Introduction

This research study aims to examine the relationship between active social gaming and social anxiety and, additionally, social functioning, to investigate if social gaming has positive effects on outcomes. Additionally, this study looks to investigate if this social platform can be proposed as the basis for a new technology-based intervention.

Social Anxiety

Social Anxiety is a prevalent mental disorder (SAD) that affects social situations and causes feelings of embarrassment or humiliation (American Psychiatric Association, 2013). These feelings expressed through fear and anxiety can be exhibited in an individual when exposed to situations such as social interaction, being observed, or performing in front of others. The symptoms experienced through these feelings can affect an individual's sensations, thoughts, behaviours, and emotions. Causes of social anxiety disorder have been attributed to several factors including, inherited traits, brain structure, and environment (American Psychiatric Association, 2013). As a disease burden, the annual cost to the EU is estimated at €74.4 billion, and associated implications are employment, productivity, social spending and healthcare (Alonso et al., 2018). The lifetime prevalence of social anxiety disorder is measured at 4.0% across all countries, with lowest measurements in low-middle income countries (Africa, Eastern Mediterranean), and highest measurements in high-income countries (Americas, Western Pacific). The early onset age of SAD ranges from middle-late adolescence to the middle '40s (Stein et al., 2017). Treatment options for social anxiety disorder have traditionally focused on lifestyle, therapies, and drug treatments (American Psychiatric Association, 2013). An area of research where there is a lack of coverage is on the positive effects of active social gaming concerning social anxiety and social functioning. Given the growing numbers of individuals experiencing symptoms of social anxiety and its

effects on their everyday lives (Lee & Leeson, 2015), it is important that as a society, investment is made into new ways to delivery treatments, while taking into account advancements in technological platforms.

Social Gaming

In 2018, the total consumer spend (US) on the computer video games industry was $43.3bn. Further statistics state that 65% of adults (*Male*: 54%, *Female*: 46%) play video games, 63% play at least three hours or more a week, and play with others, with the average player age of 33 years old (Entertainment Software Association., 2019). The attraction of gaming in adults has been found to have a positive effect on their lives, with 79% of gamers experiencing mental stimulation, and 78% experiencing relaxation and stress relief (Entertainment Software Association., 2019). Existing research literature on this topic has focused on the negative effects of gaming, such as violence and addiction, with less emphasis placed on the positive effects such as prosocial behaviours (Greitemeyer & Osswald, 2010) and cognitive development (Granic, Lobel, & Engels, 2014).

Social Gaming is the activity of playing online games with other members of the same online group through multi-player gaming platforms, allowing for social interaction between players (Kowert, Domahidi, Festl & Quandt, 2014). Unlike traditional game playing methods, online gaming offers social environments where cooperation and friendship develop in the pursuit of gaming goals (Domahidi, Festl & Quandt, 2014). With worldwide usage figures of two billion users, video gameplay as a platform for social gaming has shown to have positive benefits in areas such as psychological functioning (von der Heiden, Braun, Müller & Egloff, 2019). Statistics show that the social element in gaming promotes cooperative and competitive gameplay, with over 75% of householders engaging in social game-play (Entertainment Software Association., 2019). The growth of participation through

the development of the genre of massively multiplayer online games (MMORPGs) specifically designed to encourage interactions amongst players and promote social activities within gaming platforms continues to amass an attraction of hundreds of thousands of players (Zhang & Kaufman, 2015). With existing research tending to focus on the younger population in gaming, the benefits for older adults participation on this genre has shown to promote social interaction which benefits off-line relationships (Zhang & Kaufman, 2015).

There has been extensive research has been carried out in the area of computer games, whist primarily on concern-focused studies aimed at the potential negative effects, specifically aggression, social isolation and overuse (von der Heiden, Braun, Müller & Egloff, 2019), there has been a shift to study the more positive effects, such as motivational models (Przybylski, Rigby, & Ryan, 2010), and cognition (Spence & Feng, 2010).

Social Functioning

Social Functioning is the ability for an individual to interact with their environment and how they cope with their roles relating to work, social and family situations. In essence, it is a range of skills to help the initiation and maintenance of long-term relationships, and individual psychological well-being (Sanmartín et al., 2018). The social benefits of gaming differ from the perceived stereotypical view that anyone who plays games is an introverted, inept and isolated individual (Granic, Lobel, & Engels, 2014). These perceptions have been challenged by Granic, Lobel, & Engels (2014), who studied the benefits of playing computer video games. Given the social nature of today's virtual communities, games like World of Warcraft, a fantasy game set in a virtual world boasting over players 12 million subscribers, the need to connect with individuals and groups to aid and enhance game participation can increase social skills and regulate behaviour. These social gaming applications may have a positive effect on peer and family relations outside of the gaming environment. Further study

results have shown that co-operative play compared to competitive play can have long-term benefits on social inclusion in offline group situations (Zhang & Kaufman, 2015). In this study, Zhang & Kaufman (2015) investigated older adults' social interactions in massively multiplayer online games (MMORPGs). Research into this age group has mainly focused on the younger population, so it was important to gain insight into the older demographic population and understand their experiences and motivations. Adults (*n* = 354) aged 55 years and above completed an online questionnaire measured by the Online Gaming Motivation Scale, social interactions within gameplay, and challenges. Results from this study have found that the more advanced players became, the higher the levels of social interaction were reported as part of their gaming experience. Participants interaction (87%) were classed as advanced players and 30-40% of their time as spent on social interactions. Additionally, the results show that participation in MMORPGs can enhance existing life relationships and provide opportunities to form meaningful virtual friendships.

Greitemeyer & Osswald (2010) sought to provide another viewpoint on the perceived negative social effects of playing computer games. Their studies on the effects of prosocial video games have found that people who play prosocial games have shown prosocial tendencies in real-life. This research has chosen to challenge this perspective that the social effects of playing video games do not always result in a negative outcome. For this study, Greitemeyer & Osswald (2010) conducted an experiment with forty-four participants (*Male* = 20; *Female* = 34), aged between 19 to 43 years, to investigate if playing a prosocial game, compared to an aggressive game, increased helping behaviour. Participants were in an experimental setting, and after playing both games, they were tested on a controlled gesture intervention to see if they assisted in helping others (prosocial act), for example, to pick up purposely over turned pencils onto the floor by the researcher. Once this intervention was completed, the participants then completed a Positive and Negative Affect Schedule

(PANAS) questionnaire to record their experience. Based on the overall results of the experiment, 67% of the participants completed a prosocial act, compared to the control groups (Aggressive = 28%) (*Neutral* = 33%) who did not. The researchers concluded that video games with prosocial content could improve social interactions.

Social Gaming and Social Anxiety

Individuals who suffer from SAD have a higher perception of the internet and gaming as being a safe environment to engage in, resulting in reduced psychological distress from the absence of face-to-face interactions, and a preference for a virtual presence, with social benefits of safe social interaction in gameplay (Lee & Leeson, 2015). Alternative treatments for SAD have focused on technology-assisted digital interventions, such as computer-assisted, internet-based, and virtual reality. Recent research in the area of digital interventions for SAD has examined these three areas to understand which format is more acceptable to individuals.

Kampmann, Emmelkamp & Morina (2016) conducted a meta-analysis into technology-assisted interventions for social anxiety disorder interventions for adults (*n* = 2991) incorporating 37 randomised control trials (RCTs) examining three technological methods of delivery -

1. Internet Cognitive Behavioural Therapy (ICBT) – Changing avoidance behaviours to adaptive changes in thinking, feeling and behaving.
2. Virtual Reality Exposure Therapy (VRET) – Exposure to virtual social situations simulated in controlled environments.
3. Cognitive Bias Modification (CBM) – Modifying environmental threat bias through repeated cognitive tasks.

Researchers calculated aggregated effect sizes for each control group, with specific results on the effect of digital interventions for the treatment of social anxiety disorder showing that ICBT (g = 0.84) and VRET (g = 0.82) resulted in significantly fewer symptoms of social anxiety disorder. The overall findings from this meta-analysis indicated that both ICBT and VRET were effective treatments for SAD, while CBM was seen as less effective. Researchers concluded that significant evidence exists to suggest that these two applications can reduce symptoms and provide potential interventions for SAD. These findings aside, it was noted that additional research would be required to examine the efficacy of these interventions and the effects of online treatments of social anxiety disorder on general functioning such as quality of life, social interaction and relationships.

Additional research by Andersson, Carlbring & Rozental (2019) conducted a meta-analysis into the response and remission rates of internet-based cognitive behaviour therapy which involved a review of 29 Swedish clinical trials (*n = 2,866*). Pre-treatment and post-treatment scores were used to determine the rate of change and recovery, with logic regression used to highlight potential predictors. The results from the meta-analysis stated 1,1162 (65%) of patients receiving treatment were classed as recovering, and 620 (35%) classed as being in remission. Based on these results, this review concluded that the efficacy of ICBT as an intervention was in line with traditional CBT approaches.

Although digital interventions such as ICBT has shown positive outcomes, this approach is limited to promoting behavioural changes through more structured educational and assignment based one-to-one and group therapy. Social gaming has the potential to overcome the limitations of current alternative interventions by embracing the features of social gaming platforms and their promotion of social interaction, cooperation and friendship. The ability for participants to utilise their virtual presence through avatars of a social gaming platform can benefit suffers of social anxiety (Prizant-Passal, Shechner & Aderka, 2016).

As an alternative digital intervention approach to treating the symptoms of social anxiety, social gaming is a potential medium that has shown great potential to provide a safe and inclusive platform (Prizant-Passal, Shechner & Aderka, 2016). Given the popularity of social gaming (Entertainment Software Association., 2019), it important to take advantage of such a growing technological engagement platform in a bid to being a new method of treatment to a mass audience.

In examining the positive effects of active social gaming as a platform, the objective is to establish if active social gaming is a suitable alternative digital intervention for the treatment of SAD by assisting in decreasing the symptoms of social anxiety disorder and increasing the outcomes on the social functioning of tasks in everyday life.

An area that is of further interest due to a gap in research relates to the social anxiety and social functioning effects of adults who engage in active gaming platforms and by association, engage in social media as part of their game-play experiences. The social engagement element adds an extra dimension to game-play and also may contribute to the social functioning differences between game-play, competition and social anxiety. Further understanding of the potential positive effects in this area could allow game developers to incorporate new features into their product offerings, such as time-based notifications or interval gameplay statistics to provide players with information on how much time they have played (excessive play) or features to actively challenge for measurement of social engagement (enjoyment) to better provide feedback for the player. These types of in-game measurements or statistics could be incorporated into associated mobile applications to complement active health monitoring, assessment and treatments integration with features such as Apple Health and Google Fit. Given the prevalence of gaming, an integrated gaming/eHealth product could be a better platform offering to be explored for SAD.

The Current Study

The current study aims to examine the strength of the relationship between active gaming and thoughts, feelings and everyday tasks. Based on existing research, there is evidence that active social gaming has a positive effect on people's social experiences. However, it is unclear if these effects translate to social anxiety and social functioning outcomes in adults who engage in active gaming platforms as part of their game-play experiences.

The research question proposed is "What is the relationship between active gaming and thoughts, feelings, and everyday tasks". The proposed hypothesis for this research study is that active engagement in social gaming by adults has a positive effect on their social anxiety and social functioning, thereby resulting in a strong correlational relationship.

As part of the data analysis methodology to be conducted for this study, statistical analysis will be performed on the data collected. Data collections will be recorded electronically by participant completion of self-report questionnaires comprising of the Competitive and Cooperative Presence in Gaming Questionnaire (CCPIG; Hudson & Cairns, 2014) 39-item five-point (1-5) scale measuring social presence in complex virtual environments, the Liebowitz Social Anxiety Scale (LSAS-SR; Liebowitz, 1987) 24-item four-point (0-3) scale divided into two subscales measuring fear or anxiety, and avoidance, and the Social Functioning Questionnaire (SFQ; Tyrer et al., 2005) eight-item four-point (0-3) scale measuring difficulties completing everyday tasks. Upon completion of the study data collection window, participant data will be loaded and analysed in IBM SPSS Statistics 25.

H1: Social Gaming as measured by the Competitive and Cooperative Presence in Gaming Questionnaire (CCPIG; Hudson & Cairns, 2014) score predicts reductions in the Liebowitz Social Anxiety Scale (LSAS-SR; Liebowitz, 1987) in 88 healthy adults.

H2: Social Gaming as measured by the Competitive and Cooperative Presence in Gaming Questionnaire (CCPIG; Hudson & Cairns, 2014) score predicts promotions in the Social Functioning Questionnaire (SFQ; Tyrer et al., 2005) in 88 healthy adults.

Method

Participants

A total of 124 participant responses were received from online invitations of participation. Data cleaning measures (removal of 0-hour gaming frequency and outliers) reduced the sample size for the current study to 88 participants. The final participant sample consisted of 88 adults (Male: *n* = 56; 63.6%, Female: *n* = 32; 36.4%) adults who actively engaged in social gaming and who volunteered to take part in the study. Participants were categorised by age ranges 18-24 (*n* = 41; 46.6%), 25-35 (*n* = 36; 40.9%), 35-45 (*n* = 8; 9.1%) and over 45 (*n* = 3; 33.4%). No remuneration was offered for participation in this study.

Participants were recruited online through non-probability convenience and snowball sampling invitation posts on gaming forums and social media platforms. The online participant invitation contained a link to the research study electronic questionnaire created in Google Forms, with the questionnaire consisting of the key data collection components (Appendices A-G). An information sheet (Appendix A), inviting participation in the research study, clearly outlining the research purpose and procedure. Agreement to participate in the research study recorded through an informed consent form (Appendix B) and demographic questionnaire to record age, gender, gaming frequency and most played gaming genre (Appendix C). Social Gaming, as measured by Competitive and Cooperative Presence in Gaming Questionnaire (CCPIG; Hudson & Cairns, 2014), Social Anxiety, as measured by the Liebowitz Social Anxiety Scale (LSAS-SR; Liebowitz, 1987), and Social Functioning, as measured by The Social Functioning Questionnaire (SFQ; Tyrer et al., 2005). A debrief sheet (Appendix G) provided support information to the participants upon completion of the questionnaires.

Participants below the age of 18 years and vulnerable groups were excluded from taking part in the study as the selection criteria were based specifically on adult active social gamers. Informed consent was sought, and participants were briefed on their right to withdrawn at any time without penalty. Full approval by the NCI Ethics Committee for this study was received by the researcher in compliance with NCI Ethical Guidelines for Research with Human Participants and PSI Ethical Guidelines for Research in Psychology. Under the freedom of information, legalisation participants were informed of their entitlement to access the information they have provided at any time while it is in storage as part of this study. Additionally, the online aspects of participation were validated against the British Psychological Society Ethics Guidelines for Internet-Mediated Research (BPS, 2017).

Design

The research design approach for this study is based on a quantitative observational between-subjects design, with participants recruited online through non-probability convenience and snowball sampling.

H1: Social Gaming as measured by the Competitive and Cooperative Presence in Gaming Questionnaire (CCPIG; Hudson & Cairns, 2014) score predicts reductions in the Liebowitz Social Anxiety Scale (LSAS-SR; Liebowitz, 1987) in 88 healthy adults.

The tests conducted on the data for this hypothesis were -

1. Pearsons's Correlation was used to measure the strength and direction of the association between social gaming and social anxiety. The independent variable (IV) was social gaming (total scores; CCPIG_Total) and the dependent variable (DV) was social anxiety (total scores; LSAS_Total).
1. Multiple Regression was used to measure the prediction of variation between variables. The predictor variable (PV) was social gaming (total scores; CCPIG_Total) and the criterion variable (CV) was social anxiety (total scores; LSAS_Total).

H2: Social Gaming as measure by the Competitive and Cooperative Presence in Gaming Questionnaire (CCPIG; Hudson & Cairns, 2014) score predicts promotions in the Social Functioning Questionnaire (SFQ; Tyrer et al., 2005) in 88 healthy adults.

The tests conducted on the data for this hypothesis were -

2. Pearsons's Correlation was used to measure the strength and direction of the association between social gaming and social functioning scores. The

independent variable (IV) was social gaming (total scores; CCPIG_Total) and the dependent variable (DV) was social functioning (total scores; SFQ_Total).

3. Multiple Regression was used to measure the prediction of variation between variables. The predictor variable (PV) was social gaming (total scores; CCPIG_Total) and the criterion variable (CV) was social functioning (total scores; SFQ_Total).

Materials

The online participant invitation contained a link to the research study electronic questionnaire created in Google Forms, with the questionnaire consisting of the key data collection components (Appendices A-G).

Research Study Information, Informed Consent and Demographics

An information sheet (Appendix A), invited participation in the research study, clearly outlining the research purpose and procedure. Agreement to participate in the research study was recorded through an informed consent form (Appendix B), and demographic questionnaire recorded age, gender, gaming frequency and most played gaming genre (Appendix C).

Measurement of Social Gaming

Competitive and Cooperative Presence in Gaming Questionnaire (CCPIG; Hudson & Cairns, 2014) 39-item five-point (1-5) scale measuring social presence in complex virtual environments. Scoring is based on a Likert-scale ranging from 1-5 (1 – "Not at all" / 5 – "Very much so") (Appendix D). Higher scores indicate higher social presence levels. Internal consistency and reliability were measured at (Cronbach's alpha = .96) for this study, compared to (Cronbach's alpha = .92) reference study (Maurer, Lankes, Stiglbauer & Tscheligi, 2016).

Measurement of Social Anxiety

The Liebowitz Social Anxiety Scale (LSAS-SR; Liebowitz, 1987), a 24-item four-point (0-3) scale divided into two subscales measuring fear or anxiety, and avoidance. Measurement is based on a Likert-scale ranging from 0-3 (0 – "None" / 1 – "Mild" / 2 - "Moderate" / 3 – "Severe") and Avoidance (0 – "Never" / 1 – "Occasionally" / 2 - "Often" / 3

– "Usually") (Appendix E). Higher scores indicate higher levels of social anxiety. Internal consistency and reliability were measured at (Cronbach's alpha = .97), for this study, compared to (Cronbach's alpha = .88) reference study (Recabarren, Gaillard, Guillod & Martin-Soelch, 2019).

Measurement of Social Functioning

The Social Functioning Questionnaire (SFQ; Tyrer et al., 2005), an eight-item four-point (0-3) scale measuring difficulties completing everyday tasks. Measurement is based on a Likert-scale ranging from 0-3 (0 – "Most of the time" / 3 – "Not at all") (Appendix F). Scores were reverse coded for questions 2,3,4,7 and 7. Higher scores indicate lower levels of social functioning. Internal consistency and reliability were measured at (Cronbach's alpha = .43), for this study, compared to (Cronbach's alpha = .70) reference study (Jenzer, Read, Naragon-Gainey & Prince, 2018).

The Social Functioning Questionnaire (SFQ; Tyrer et al., 2005), was modified for this research study. The original scale follows a non-normalised set of responses to the eight-item questions, therefore during online form design in Google Forms, design considerations were taken to facilitate a less complex form design and a more user-friendly and consistent set of responses. As the changes to the questionnaire were limited only to the normalisation of the response phrases, there was no impact on any scoring outcomes.

Debriefing

A debrief sheet (Appendix G) was provided offering post research-study support advice, and thanks for participation.

Statistical Analysis

Statistical data analysis was completed using IBM SPSS Statistics for Mac Version 25 with a statistical significance level of $p < 0.5$. Descriptive statistics were performed for demographics and social gaming presence. Inferential statistics were performed using Pearson's R Correlation and Multiple Linear Regression for both hypotheses. Cronbach's alpha coefficients were used to measure reliability.

Procedure

Commencement of online research study participation was initiated by clicking on the research study invitation link hosted on Google Forms, where participants were presented with an Information Sheet (Appendix A), inviting them to participate in the study, clearly outlining the research purpose and procedure. Agreement to participate in the research study was recorded by an electronic informed consent form (Appendix B), and demographic questionnaire recorded age, gender, gaming frequency, and most played gaming genre (Appendix C).

In the first self-report questionnaire section, participants were asked to rate their measurement of social gaming by the completion of the Competitive and Cooperative Presence in Gaming Questionnaire (CCPIG; Hudson & Cairns, 2014) 39-item five-point (1-5) scale measuring social presence in complex virtual environments, with measurements rated on a Likert-scale ranging from 1-5 (1 – “Not at all” / 5 – “Very much so”) (Appendix D).

In the next self-report questionnaire section, participants were asked to rate their levels of social anxiety by completion of the Liebowitz Social Anxiety Scale (LSAS-SR; Liebowitz, 1987), a 24-item four-point (0-3) scale divided into two subscales measuring fear or anxiety, and avoidance, with measurements rated on a Likert-scale ranging from 0-3 (0 – “None” / 1 – “Mild” / 2 - “Moderate” / 3 – “Severe”) and Avoidance (0 – “Never” / 1 – “Occasionally” / 2 - “Often” / 3 – “Usually”) (Appendix E).

In the final self-report questionnaire sections, participants were asked to complete the Social Functioning Questionnaire (SFQ; Tyrer et al., 2005) eight-item four-point (0-3) scale measuring difficulties completing everyday tasks, with measurements rated on a Likert-scale ranging from 0-3 (0 – “Most of the time” / 3 – “Not at all”) (Appendix F).

Upon completion of the three self-report questionnaires, a debrief sheet (Appendix G) was provided to the participants for support advice, and then thanked for their participation. As a final step, participants were presented with a submit button to click to end the data collection process to record for analysis.

Ethical Considerations

Full approval by the NCI Ethics Committee for this study was received by the researcher in compliance with NCI Ethical Guidelines for Research with Human Participants and PSI Ethical Guidelines for Research in Psychology.

By following ethical regulations applicable to this qualitative research study, participants were made aware of their rights when agreeing to take part in this study. Participants were explicitly informed that their anonymity and confidentiality could not be maintained. They were also made aware of their right to withdraw consent and withdraw data prior to it being made available for research purposes and were given the opportunity to review materials before publication and to edit or withdraw data.

Pilot Study

A pilot study was performed using two participants to validating the methodology of the design. Feedback was considered through debriefing, which allowed for any modification of the design.

Results

Overview

Participants consisted of 88 adults (Male: *n* = 56; 63.6%, Female: *n* = 32; 36.4%) adults categorised by age ranges 18-24 (*n* = 41; 46.6%), 25-35 (*n* = 36; 40.9%), 35-45 (*n* = 8; 9.1%) and over 45 (*n* = 3; 33.4%).

Descriptive Statistics – Hypothesis 1

As can be seen in Table 1, the population for this study comprises of 88 participants (Male: *n* = 56; 63.6%, Female: *n* = 32; 36.4%).

Table 1

Descriptive Statistics for Social Anxiety and Social Gaming scoring variables

Variable	N	Mean	Std. Deviation
LSAS_Total	88	51.03	27.43
CCPIG_Total	88	137.08	27.20

Inferential Statistics – Hypothesis 1

The relationship between active social gaming and social anxiety was investigated using a Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. There was a weak positive correlation between the two variables (r = .02, n = 88, p = .830). This result indicates that active social gaming was not associated with lower social anxiety scores (*Table 2*).

Table 2

Correlation between Social Anxiety and Social Gaming variables included in the model

	1	**2**
1. LSAS_Total	1	
2. CCPIG_Total	.02	1

Note. Statistical significance: *p < .05; **p < .01; ***p < .001

An initial examination of demographics variables for Gender and Age were performed to measure the strength of their relationships to social gaming scores. An independent samples t-test was performed to compare the relationship between social gaming scores (CCPIG_Total) and Gender. The result showed that there was no statistical significance difference between social gaming scores (CCPIG_Total) and gender (p = .997). A one-way ANONA was performed to measure the relationship between social gaming scores (CCPIG_Total) and age groups. The result showed a statistically significant difference between social gaming scores (CCPIG_Total) and age groups as determined by one-way ANOVA(F(57, 30) = 1.89, p = .030).

Multiple regression was performed to investigate the ability of active social gaming to predict levels of social anxiety. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. Additionally, the correlations between the predictor variables included in the study were examined. All correlations were weak (r = .02, p = .415). This indicates that multicollinearity was unlikely to be a problem (see Tabachnick & Fidell, 2007). All predictor variables were not statistically correlated with social anxiety which indicates that the data was not suitably correlated with the dependent variable for examination through multiple linear regression to be reliably undertaken.

Since no *a priori* hypotheses had been made to determine the order of entry of the predictor variables, a direct method was used for the multiple linear regression analysis. The independent variable explained .001% of variance in social anxiety ($F(1, 86) = .05$, $p = .830$).

This result indicates that increased levels of social gaming do not predict lower levels of social anxiety (*Table 3*).

Table 3

Multiple regression model for Social Gaming variable predicting Social Anxiety (n =88)

	R^2	β	B	SE	CI 95% (B)
Model	.001				
CCPIG_Total		.02	.02	.11	-.19 / .24

Note. R^2 = R-squared; β = standardized beta value; B = unstandardized beta value; SE = Standard errors of B; CI 95% (B) = 95% confidence interval for B; N = 1839; Statistical significance: *p < .05; **p < .01; ***p < .001

Descriptive Statistics – Hypothesis 2

As can be seen in Table 4, the population for this study comprises of 88 participants (Male: *n* = 56; 63.6%, Female: *n* = 32; 36.4%).

Table 4

Descriptive Statistics for Social Functioning and Social Gaming scoring variables

Variable	N	Mean	Std. Deviation
SFQ_Total	88	8.83	3.16
CCPIG_Total	88	137.08	27.20

Inferential Statistics – Hypothesis 2

The relationship between active social gaming and social functioning was investigated using a Pearson product-moment correlation coefficient. There was a weak negative correlation between the two variables, (r = -.07, n = 88, p = .500). This result indicates that active social gaming was not associated with lower social functioning scores (*Table 5*).

Table 5

Correlation between Social Functioning and Social Gaming variables included in the model

	1	**2**
1. SFQ_Total	1	
2. CCPIG_Total	-.07	1

Note. Statistical significance: *p < .05; **p < .01; ***p < .001

Hierarchical multiple regression was performed to investigate the ability of active social gaming ~~to~~ to predict levels of social functioning. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. Additionally, the correlations between the predictor variables included in the study were examined. All correlations were weak (r = -.07, p = .250). This indicates that multicollinearity was unlikely to be a problem (see Tabachnick & Fidell, 2007). All predictor variables were not statistically correlated with social functioning, which indicates that the data was not suitably correlated with the dependent variable for examination through multiple linear regression to be reliably undertaken.

Since no *a priori* hypotheses had been made to determine the order of entry of the predictor variables, a direct method was used for the multiple linear regression analysis. The independent variable explained .005% of variance in social functioning ($F(1, 86) = .46$, $p = .500$).

This result indicates that increased levels of social gaming do not predict higher levels of social functioning (*Table 6*).

Table 6

Multiple regression model for Social Gaming variable predicting Social Functioning (n =88)

	R^2	β	*B*	*SE*	CI 95% (B)
Model	.005				
CCPIG_Total		-.07	-.01	.01	-.03 / .02

Note. R^2 = R-squared; β = standardized beta value; B = unstandardized beta value; SE = Standard errors of B; CI 95% (B) = 95% confidence interval for B; N = 1839; Statistical significance: *p < .05; **p < .01; ***p < .001

Discussion

Overview

The aim of the current study was to examine the relationships between active social gaming and social anxiety, in addition to active social gaming and social functioning.

Social Anxiety

Hypothesis 1 proposed that higher levels of active social gaming predict lower levels of social anxiety. The results indicate that based on the sample of 88 healthy participants, higher levels of social gaming does not predict lower levels of social anxiety. This result suggests that the null hypothesis can be accepted in the case of no statistical relationship being found.

Social Functioning

Hypothesis 2 proposed that higher levels of active social gaming predict higher levels of social functioning. The results indicate that based on the sample of 88 healthy participants, higher levels of social gaming does not predict higher levels of social functioning. This result suggests that the null hypothesis can be accepted in the case of no statistical relationship being found.

Theoretical and Practical Implications

Based on the results of this study, no significant relationships were established for the primary hypothesis between active social gaming and social anxiety and the secondary hypothesis between active social gaming and social functioning. These results are considered interesting, as existing studies have found significant effects on digital interventions (Kampmann, Emmelkamp & Morina, 2016). There is a key difference between existing digital interventions studies, such as ICBT compared to social gaming platforms. Given the

nature of social gaming platforms and their promotion of social interaction, friendship, and multiplayer co-operative and competitive environments, it may not be practical to draw a direct comparison on effect scores to a digital intervention such as ICBT which looks to promote behavioural changes through more structured educational and assignment based one-to-one and group therapy.

There are some proposed explanations as to why this study did not report significant results to support the proposed hypotheses. For the measurement of social gaming, this study design chose the 39-item Competitive and Cooperative Presence in Gaming Questionnaire (CCPIG; Hudson & Cairns, 2014), the suitability may not have been ideal in its scope of designed variables. Additionally, this method of social gaming measurement has not been utilised extensively in research studies. Another explanation of the non-significant results could be attributed to the design of the current study being correlational, rather than experimental. A future study could utilise an experimental design of participants with high anxiety levels in a multi-week social gaming intervention and measure the rate of social anxiety change based on the participant's social gaming experience. This design approach may provide stronger evidence that there is an actual effect between social gaming and social anxiety.

Strengths and Limitations

Strengths of the current study can be categorised as follows, the study of social gaming, social anxiety and social functioning, as a novel idea, is one of the first studies to be carried out in the area. This study has added to the current understanding of active social gaming and social anxiety and can be used as a basis for further studies to increase the knowledge into technological interventions that can enhance the available treatments of social anxiety in society. This study is not without limitations, primarily the use of online

self-report questionnaires as a medium of data collection can be subject to self-report bias. Also, the area of social gaming as a platform for measurement is complex, as membership and participation of gaming forums as a primary source of data collection is not without its difficulties due to the rules of engagement on online gaming forum communities given their strict moderation.

Additionally, the design and use of online questionnaires, such as in this design using Google Forms, better consideration could be exercised on the implications of using specific question designs and their impact on data collection, data preparation and data analysis. Finally, Age was defined as a categorical variable in order to enhance the usability and user-friendliness of the online questionnaire, thus limiting the level of analysis of participants for further tests, resulting in summary information, rather than individual data. Age would be better measured as a continuous variable rather than a categorical variable to allow for specific age analysis to further indicate critical age-related subject matter, by including it as a covariate in multiple regression testing. Alternatively, it would be possible to perform a study in one age group to eliminate additional age design complexities.

Direction for Future Research

Further research in the area of social gaming and social anxiety could look to examine individuals who have been diagnosed with a social anxiety disorder and predict what effects can be attributed to their outcomes. An experimental design, eliminating self-report bias, and incorporating an intervention would be an alternative approach to gather more specific results in this area of research. Such an intervention could examine correlational factors based on behavioural applications. Also, given the limitation of age analysis in this research study design, future studies could analyse if age has a statistically significant effect on social anxiety.

Conclusion

In conclusion, the findings from the current study do not support the hypothesis that statistically significant outcomes exist for social gaming to predict lower social anxiety and additionally, higher social functioning. Social gaming as a digital experience allows individuals to engage, interact and experience social experiences, therefore future research in this areas should focus on experimental design studies for digital interventions for social anxiety disorders to provide a more enriched set of analysis and results. The current and future studies would be beneficial in the quest to provide opportunities for the development of enhanced digital interventions as alternatives to traditional applications to provide more treatments for the population who suffer from the symptoms of social anxiety.

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Appendices

Appendix A - Information Sheet

Study Title: The relationship between active gaming and thoughts, feelings, and everyday tasks.

Purpose of the Research Study

This study examines the relationship between social gaming and how we think and feel, and carry out everyday tasks.

Invitation

I would like to invite you to take part in a research study. Before you decide you need to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully. Ask questions if anything you read is not clear or if you would like more information. Take time to decide whether or not to take part.

Who I am and what this study is about

My name is Anthony Doyle, a 3rd-year part-time student studying Psychology at the National College of Ireland. As part of the course curriculum, I am performing a research study to achieve compliance with the completion of the BA (Hons) Psychology programme.

Why have you been invited to take part?

You have been selected to participate in this research study as you have volunteered to take part and meet the inclusion criteria that requires active gamers who regularly engage in gaming activities.

Do you have to take part?

Participation in this research study is entirely voluntary, and you have the right to refuse participation, refuse any question and withdraw at any time without any consequence whatsoever.

What are the possible risks and benefits of taking part?

There are no perceived risks anticipated from taking part in this research study, yet if you suffer from adverse effects from active video game play, it would be advisable not to participate further. The benefits of participation in this research study will be the contribution to future research on the positive effects of active gaming and gain insight into how a psychology research study is conducted.

Will taking part be confidential?

All necessary safeguarding controls will be undertaken to ensure the confidentiality, integrity and availability of the data collected, analysed and produced as part of this research study. Industry-leading practice technology security methods, such as access control, encryption, anonymisation, especially within personal and professional computer collaboration environments (cloud) will be applied accordingly, including the logical security of questionnaire responses. Non-anonymised data in the form of digitally signed consent forms are collected and retained as part of the research process.

What will happen to the results of the study?

The results from this study including anonymised group-level data will be disseminated as part of a written submission and presented as part of my final year project to achieve compliance with the completion of the in BA (Hons) Psychology programme at the National College of Ireland. Additionally, there may be a possibility that the submission will be presented at the PSI Student Congress and also may be submitted to an academic journal for formal publication.

Who should you contact for further information?

If you have any concerns about this study, please contact the researcher who will aim to answer any questions you may have. The researcher Anthony Doyle can be contacted at X16100476@student.ncirl.ie, or you may contact my supervisor at David.Mothersill@ncirl.ie

Thank you for your participation.

Anthony Doyle

Appendix B - Informed Consent Form

Consent to take part in research

- I voluntarily agree to participate in this research study.
- I understand that even if I agree to participate now, I can withdraw at any time.
- I understand that I can withdraw permission to use data from my questionnaire within two weeks following my participation in this study, in which case the material will be deleted.
- I have had the purpose and nature of the study explained to me in writing, and I have had the opportunity to ask questions about the study.
- I understand that participation involves completion of self-report questionnaires measuring active gaming and how I think and feel from the experience.
- I understand that I will not benefit directly from participating in this research.
- I understand that all the information I provide for this study will be treated confidentially.
- I understand that in any report on the results of this research, my identity will remain anonymous.
- I understand that if I inform the researcher that myself or someone else is at risk of harm they may have to report this to the relevant authorities - they will discuss this with me first but may be required to report with or without my permission.
- I understand that the signed consent form and completed questionnaires will be retained in NCI in a secure location with access limited to the researcher and supervisor until the exam board confirms the results of the dissertation.

- I understand that under freedom of information legalisation I am entitled to access the information I have provided at any time while it is in storage as specified above.
- I understand that I am free to contact any of the people involved in the research to seek further clarification and information

.

Researcher: Anthony Doyle - X16100476@student.ncirl.ie

Supervisor: Dr. David Mothersill – David.Mothersill@ncirl.ie

Informed Consent

☐ Yes

Appendix C - Demographic Questionnaire

Age:

☐ 18-24

☐ 25-34

☐ 35-45

☐ Over 45

☐ Prefer not to say

Gender:

☐ Male

☐ Female

☐ Prefer not to say

How many hours do you spend gaming per week?

☐ 0

☐ 3-4

☐ 5-7

☐ 8-10

☐ 10+

What genre of games do you play the most?

☐ FPS – First Person Shooter

☐ MMOG – Massively Multiplayer Online Game

☐ RPG – Role Play Games

☐ Action-Adventure

☐ Fighting

☐ Simulation

☐ Sports

☐ Strategy

☐ Racing

☐ None

Appendix D – Competitive and Cooperative Presence in Gaming Questionnaire (CCPIG)

Section 1

1. The presence of my opponents motivated me.

1 2 3 4 5

Not at all Very much so

2. It seemed as though my opponents were acting with awareness of my actions.

1 2 3 4 5

Not at all Very much so

3. My opponents created a sense of urgency.

1 2 3 4 5

Not at all Very much so

4. My opponents were challenging.

1 2 3 4 5

Not at all Very much so

5. I acted with my opponents in mind.

1 2 3 4 5

Not at all Very much so

6. I knew what my opponents were trying to achieve

1 2 3 4 5

Not at all Very much so

7. The game was a battle of wits.

1 2 3 4 5

Not at all Very much so

8. I was aware that my opponents might work out my goals

1 2 3 4 5

Not at all Very much so

9. The actions of my opponents affected the way I played

1 2 3 4 5

Not at all Very much so

10. I felt I affected my opponents' actions.

1 2 3 4 5

Not at all Very much so

11. The game was a battle of skill.

1 2 3 4 5

Not at all Very much so

12. I reacted to my opponents' actions.

1 2 3 4 5

Not at all Very much so

13. I felt tense while playing my opponents.

1 2 3 4 5

Not at all Very much so

14. My opponents played a significant role in my experience of the game.

1 2 3 4 5

Not at all Very much so

Section 2

15. I acted with my team-mates in mind.

1 2 3 4 5

Not at all Very much so

16. I considered my team-mates' possible plans/thoughts.

1 2 3 4 5

Not at all Very much so

17. It was as much about the team as about my own game

1 2 3 4 5

Not at all Very much so

18. I felt my team shared a common overall aim.

1 2 3 4 5

Not at all Very much so

19. I did not want my team to think I had let them down.

1 2 3 4 5

Not at all Very much so

20. I felt my team-mates were looking out for me.

1 2 3 4 5

Not at all Very much so

21. I felt I contributed to the team.

1 2 3 4 5

Not at all Very much so

22. I felt my actions made a difference to my team-mates.

1 2 3 4 5

Not at all Very much so

23. My actions were determined by the objectives of the team.

1 2 3 4 5

Not at all Very much so

24. I felt my team was committed to working together.

1 2 3 4 5

Not at all Very much so

25. The actions of my teammates affected my thoughts and actions.

1 2 3 4 5

Not at all Very much so

26. Being part of a team motivated me.

1 2 3 4 5

Not at all Very much so

27. My team communicated well.

1 2 3 4 5

Not at all Very much so

28. The team had a mutual understanding.

1 2 3 4 5

Not at all Very much so

29. I put the performance of the team over my personal performance

1 2 3 4 5

Not at all Very much so

30. My teammates played a significant role in my experience of the game.

1 2 3 4 5

Not at all Very much so

31. I wanted my team to value me

1 2 3 4 5

Not at all Very much so

32. I felt responsible for achieving the objectives of the team.

1 2 3 4 5

Not at all Very much so

33. I felt a social connection to my teammates (camaraderie).

1 2 3 4 5

Not at all Very much so

34. I made an effort to work with my teammates.

1 2 3 4 5

Not at all Very much so

35. I felt like I was part of a team.

1 2 3 4 5

Not at all Very much so

36. I felt my team shared common short term goals.

1 2 3 4 5

Not at all Very much so

37. I was aware of my team.

1 2 3 4 5

Not at all Very much so

38. My teammates were useful.

1 2 3 4 5

Not at all Very much so

39. I felt the team helped me.

1 2 3 4 5

Not at all Very much so

Appendix E – Liebowitz Social Anxiety Scale (LSAS-SR)

Liebowitz Social Anxiety Scale (LSAS-SR)

Name _____ Date _____

Fill out the following questionnaire with the most suitable answer listed below. Base your answers on your experience in the past week and, if you have completed the scale previously, be as consistent as possible in your perception of the situation described. Be sure to answer all items.

Fear or Anxiety	Avoidance
0 = None	0 = Never (0%)
1 = Mild	1 = Occasionally (1%-33% of the time)
2 = Moderate	2 = Often (33%-67% of the time)
3 = Severe	3 = Usually (67%-100% of the time)

Understanding the situations:	FEAR OR ANXIETY	AVOIDANCE
1. **Telephoning in public** - speaking on the telephone in a public place		
2. **Participating in small groups** - having a discussion with a few others		
3. **Eating in public places** - do you tremble or feel awkward handling food		
4. **Drinking with others in public places** - refers to any beverage including alcohol		
5. **Talking to people in authority** - for example, a boss or teacher		
6. **Acting, performing or giving a talk in front of an audience** - refers to a large audience		
7. **Going to a party** - an average party to which you may be invited; assume you know some but not all people at the party		
8. **Working while being observed** - any type of work you might do including school work or housework		
9. **Writing while being observed** - for example, signing a check in a bank		
10. **Calling someone you don't know very well**		
11. **Talking with people you don't know very well**		
12. **Meeting strangers** - assume others are of average importance to you		
13. **Urinating in a public bathroom** - assume that others are sometimes present, as might normally be expected		
14. **Entering a room when others are already seated** - refers to a small group, and nobody has to move seats for you		
15. **Being the center of attention** - telling a story to a group of people		
16. **Speaking up at a meeting** - speaking from your seat in a small meeting or standing up in place in a large meeting		
17. **Taking a written test**		
18. **Expressing appropriate disagreement or disapproval to people you don't know very well**		
19. **Looking at people you don't know very well in the eyes** - refers to appropriate eye contact		
20. **Giving a report to a group** - refers to an oral report to a small group		
21. **Trying to pick up someone** - refers to a single person attempting to initiate a relationship with a stranger		
22. **Returning goods to a store where returns are normally accepted**		
23. **Giving an average party**		
24. **Resisting a high pressure salesperson** - avoidance refers to listening to the salesperson for too long		

Appendix F - Social Functioning Questionnaire (SFQ)

Please look at the statements below and tick the reply that comes closest to how you have been recently (or in the past two weeks for studies involving repeated measurement).

I complete my tasks at work and home satisfactorily.	Most of the time	□	0
	Quite often	□	1
	Sometimes	□	2
	Not at all	□	3
I find my tasks at work and at home very stressful.	Most of the time	□	3
	Quite often	□	2
	Sometimes	□	1
	Not at all	□	0
I have no money problems.	Most of the time	□	3
	Quite often	□	2
	Sometimes	□	1
	Not at all	□	0

I have difficulties in getting and keeping close relationships.	Most of the time	□	3
	Quite often	□	2
	Sometimes	□	1
	Not at all	□	0
I have problems in my sex life.	Most of the time	□	3
	Quite often	□	2
	Sometimes	□	1
	Not at all	□	0
I get on well with my family and other relatives.	Most of the time	□	0
	Quite often	□	1
	Sometimes	□	2
	Not at all	□	3
I feel lonely and isolated from other people.	Most of the time	□	3
	Quite often	□	2
	Sometimes	□	1
	Not at all	□	0
I enjoy my spare time.	Most of the time	□	0
	Quite often	□	1
	Sometimes	□	2
	Not at all	□	3

Appendix G - Debrief Sheet

Thank you for taking part in this research study.

The study in which you just participated was designed to examine the relationship between social gaming and how we think and feel, and carry out everyday tasks.

If you have any questions regarding the study or you wish to have your data removed from the study within the next two weeks, please contact me at X16100476@student.ncirl.ie, or alternatively, you may contact my supervisor at David.Mothersill@ncirl.ie

The data that you have contributed is treated confidentially and anonymously, and if published, the data will not be in any way be identifiable as yours.

If you have been affected by your participation in this study, the following organisations may be of assistance -

Rutland Centre (Gaming Addiction)

www.rutlandcentre.ie - 01 494 6358

Mental Health Ireland (Mental Health Resources)

www.mentalhealthireland.ie - 01-284 1166

Anthony Doyle