EMBRY-RIDDLE
Aeronautical University™
SCHOLARLY COMMONS

Publications

2020

Examining the Qualities of Online and Offline Friendships: A Comparison Between Groups

Christina M. Frederick
Embry-Riddle Aeronautical University, frederic@erau.edu

Tianxin Zhang
Embry-Riddle Aeronautical University, zhangt2@my.erau.edu

Follow this and additional works at: https://commons.erau.edu/publication

Part of the Social Media Commons, and the Social Psychology Commons

Examining the Qualities of Online and Offline Friendships: A Comparison Between Groups

Christina M. Frederick, PhD (Corresponding Author)
Professor
Department of Human Factors
Embry-Riddle Aeronautical University
600 S. Clyde Morris Blvd.
Daytona Beach, Florida USA 32168
frederic@erau.edu
+1 386-226-7037

Dr. Frederick is a Full Professor in Human Factors and a founder of the Game-Based Education
and Advanced Research Lab at Embry-Riddle Aeronautical University. Her research over the past
20 years has focused on motivation in applied areas such as sport, aviation and gaming.

Tianxin Zhang, MS
PhD Candidate
Department of Human Factors
Embry-Riddle Aeronautical University
600 S. Clyde Morris Blvd.
Daytona Beach, Florida USA 32168
Zhangt2@my.erau.edu

Mr. Zhang is a doctoral candidate in the Department of Human Factors at Embry-Riddle
Aeronautical University. He received his Master's Degree in Aeronautical Science in 2017, and
is active in research related to digital gaming and education.

Abstract

Online social technologies are now used by a majority of individuals in the U.S. (Pew, 2018a). Sending emails, texting, posting on social media sites, and connecting with others through online gaming open up our social networks to a wider range of individuals. As a result, it is not uncommon to develop friendships with others that are conducted primarily in an online environment. However, we know little about the qualities of online friendships and how they may, or may not, differ from traditional face to face friendships. The present study focused on exploring friendship quality in online and offline domains using two different groups: a gamer group and a non-gamer group that used non-gaming applications to connect with others online. All participants completed a demographic questionnaire to gather information about their online and face to face friendships, the McGill Friendship Questionnaire (Mendelsohn and Aboud, 2014) for their closest online and offline friends and measures of happiness, anxiety, and depression. In Study 1, within group comparison found that gamers' online friendships were of significantly higher quality than their offline friendships. For non-gamers, the opposite results were found. A second study was done using a larger, non-college-based sample. Results of Study 2 found that for gamers and non-gamers offline friendships were of higher quality than online friendships, although both types of friendships existed in both groups. There were no differences between groups in general life happiness, anxiety or depression. Suggestions for follow-up research are presented.

Keywords: gaming, friendship, social networks, happiness

1   **Examining the Qualities of On-line and Face to Face Friendships: A Comparison between Groups**

2   Across the world, it is now the norm to use social media platforms like Facebook, Instagram, and

3   Snapchat to connect with friends and family. In the U.S., nearly 75% of adults report using Facebook to

4   connect with others (Pew, 2018a). Although individuals generally have positive feelings and attitudes

5   about our immersion in the digital world, awareness is growing of the risks of such immersion (Pew

6   Research Center, 2018b). A commonly articulated risk of social media use is that meaningful connections

7   between individuals will be changed or negatively impacted. (Bradshaw and Saba, 2010; Turkle, 2011)

8   Another way people are interacting virtually with each other is by immersion into online communities,

9   such as those offered by online games. There are more than one billion people worldwide who play online

10   games, and almost one-half of the population in the U.S are video gamers (Liu, Li, & Santhanam. 2013).

11   Similarly, when the public is asked how they perceive online gamers, people with no understanding of

12   gaming often picture those gamers as isolated at home, hiding away from social activities, and not

13   building real friendships in the virtual world (Kowert, Festl, & Quandt, 2014; PaaBen, Morgenroth, &

14   Stratemeyer, 2017).

15   To gain a better understanding of social interactions and close relationships in both online and face to

16   face (offline) environments, the present study explored specific qualities of gamer and non-gamer

17   friendships. The study examined online and offline friendships in both gamers and individuals who

18   connected with others online, but were not gamers, and then compared the quality of online and offline

19   friendships within and between groups. For simplicity and clarity, the group comprised of individuals

20   who connected with others online, but did so through applications other than games (e.g. social media,

21   texting) is referred to in this study as the non-gamer group. The purpose of the study was to empirically

22   study how friendships may differ depending on the environment in which they are conducted, and to

23   provide accurate information about the quality of friendships in both groups in order to inform both the

24   scientific and the general community.

25   **Friendship Qualities**

26   The present study's primary focus is a comparison of the qualities of friendships occurring in

27   online vs. offline environments. It is important to briefly define how the term friendship is used in the

28   present study and discuss what qualities comprise a friendship. Based on conceptualizations by

29   researchers such as Buhrmester (1990), Buhrmester & Furman, (1987), Bukowski, Hoza and Boivin

30   (1994) and Aboud & Mendelson (1996), a friendship is an interpersonal relationship between individuals

31   with mutual affection and attachment. It serves several functions, conceptualized by Asher & Parker

32   (1989), Parker & Asher (1989), and Aboud and Mendelson (1996; 1992). The functions served by

33   friendships refer to those qualities or resources that individuals in friendships seek to have provided to

34   them by their friends, and which they may reciprocate in providing.

35   Aboud and Mendelson (1992) studied friendship functions and concluded that there were six

36   distinct functions that friendships provide. These are:

37   1. Stimulating Companionship: sharing activities that arouse or stimulate

38   2. Help: Providing assistance or aid to meet goals

39   3. Intimacy: Sharing and disclosing personal thoughts and aspects of self

40   4. Reliable Alliance: Availability and loyalty

41   5. Self-Validation: Positive self-image maintenance through a friend's reassurance

42   6. Emotional Security: emotional support provided when needed

43   These functions were then translated into scale items and validated by Mendelson and Aboud

44   (2014). The present study uses this conceptualization of friendship and the scale resulting from it. It is

45   interesting to note that much of the theoretical and foundational work defining friendships occurred prior

46   to the creation of virtual environments. When formulated, the model for friendships was face to face

47   interaction and the Mendenson and Aboud (2014) scale, although developed fairly recently, still reflects

48   work based on a norm of face to face social interaction.

49

50   **Social Interaction and Friendship in Online Communities**

51   What does social interaction and friendship look like in virtual communities? The answer to this

52   question may be as complex and diverse as virtual environments themselves. Virtual communities can

53   include everything from one's Facebook contacts to a Second Life community to MMORPG teams.

54   Although some research has applied to virtual or online communities in general, the study of social

55   interactions and friendships in online form has often been examined within specific virtual communities,

56   rather than across them.

57   In an early study, Pankoke-Babatz and Jeffrey (2002) examined the 'netiquette' of users of email,

58   chat rooms and multi-user domains. A majority of their participants reported that their behaviors online

59   reflected an awareness of the audience and adhered to norms of politeness and privacy. The systems

60   studied also seemed to have well-articulated rules of conduct for misbehaviors (e.g. spamming or flames),

61   which were enforced by a recognized authority figure (e.g. system administrator). Later studies also found

62   online norms were reflective of those in real life. Sivunen and Hakonen (2011) found that personal space

63   norms in virtual environments mimicked those in the real world. Similarly, Yee, Barlenson, Urbanek,

64   Chang and Merget (2017) showed that in a Second Life environment real-life gaze and personal distance

65   norms were utilized. Rena & Blackburn (2016) used an experimental design to show that setting

66   influenced behavior, much as it does in everyday life. They observed more casual interaction between

67   participants when the online setting was a café than a virtual library.

68   While the studies discussed above allude to similarities between virtual and real-life social

69   interactions, other studies have articulated some differences. Moncur, Orzeck and Neville (2016) studied

70   'fraping', a behavior unique to online environments. Fraping is when someone other than the owner/user

71   of an online account modifies the user's personal information. When fraping occurs in an adolescent or

72   young adult group, it is typically viewed as mischievous and subversive, but also somewhat humorous if

73   it was done by friends. Older individuals viewed fraping as more negative in general. Both groups found

74   fraping unacceptable if it was done by a stranger rather than a friend. Hu, Kumar, Huang and Ratnavelu

75   (2017) also examined a behavior that manifests differently online and offline. They found that while

76   individuals typically try to hide negative aspects of self in face to face interactions in order to avoid

77   disapproval or rejection, in online environments people often express themselves more freely and

78   genuinely, while also taking less responsibility for the potentially negative results of the interaction. Hu

79   et al. explain that the lack of visual contact during communication and the possibility for anonymity in

80   online environments lend itself to this type of self-presentation behavior.

81   Friendships have also been studied in online environments outside of gaming. Levine and Stekel

82   (2016) studied friendships in adolescent girls who used technology to communicate with others more than

83   1 hour per day and found that friendships existed for the participants both online and offline. While the

84   friendships had some variations in behavior, attachment occurred in both settings and the relationships

85   were more similar than dissimilar across settings. In a study of Facebook use, Marino, Vieno, Pastore,

86   Albery, Frings and Spada (2016) found that introverts had a greater tendency than extroverts to initiate

87   and nurture friends through Facebook, thus making up for a lack of friendships in real life. Marino et al.

88   also concluded that for more extroverted Facebook users, norms for interaction in the offline environment

89   help to define the norms for interaction in Facebook. Sherblom, Withers, Leonard and Smith (2018)

90   studied teams in Second Life, finding that much the same as it would be in real life, better communication

91   among team members and team satisfaction was paired with behaviors such as trust, and being present.

92   In general, it seems that social interaction norms do exist in online environments and, at times,

93   reflect the same norms and behaviors that are present in real life. Even so, new behaviors have arisen in

94   online environments (e.g. spamming, fraping) that also infuse social interactions with different

95   dimensions. One thing that does seem clear is that social interaction and friendship or friendship-like

96   behaviors occur in online environments, just as they do in real life interactions.

97

98   **Online Gaming, Social Interaction and Friendship**

99   A specific virtual community of interest in the present study is the online gaming community.

100   For a number of years, social interaction occurring as a result of online gaming has been of interest and

101   concern (American Psychological Association, 2015). Even so, a modest amount of research in this area

102   has been conducted. Several studies explored social interaction in massively multi-player online role-

103   playing games (MMORPGs). Research with MMORPG players found that game play helped created

104   strong online friendships, that social motives were key for player participation, and that male players,

105   more so than female players, felt more comfortable conversing online than offline (Griffiths et al., 2011).

106   A study with 2,213 gamers and 287 non-gamers in Germany showed that gamers use online gaming to

107   interact with friends as well as create new friendships through game playing, and there was no significant

108   difference between gamers and non-gamers in terms of how to socialize with other people online

109   (Domahidi, Festl & Quandt, 2014). However, Hussain and Griffiths (2014) also reported that some

110   MMORPG gamers reported experiencing social conflict related to their online behavior, played longer

111   than they intended, and used gaming to escape from real life. In this set of studies, both positive and

112   negative effects on friendship through engagement in MMORPG activity were reported.

113   In a study of players of the MMOG (massive, multiplayer online game), EVE, a space-focused

114   game, Ramirez (2018) found that friendships between players evolved over time. Players used

115   communication during gameplay, as well as outside of game play, to facilitate and negotiate friendships

116   developed through EVE. In another study of MMOG players, Bonenfant, LaFrance-Martin, Pregent and

117   Crenier (2018) compared friendships in League of Legends players versus Guild War Players. In this

118   comparison, dynamics of the game tended to create different types of friendships. League of Legends is a

119   very individualistic game where personal skill and knowledge of the game are key to player status and

120   acceptance. Thus, friendships are based more on superficial alliances and not on characteristics of

121   warmth or caring. Bonenfant et al. referred to these friendships as having 'toxic allies'. On the other

122   hand, Guild Wars is an environment that provides assistance for new users and shares resources across

123   players, leading to friendships characterized by kindness and caring.

124   Other studies compared friendships and social competencies in more general groups of gamers.

125   As was found in the MMORPG-focused research, general studies with gamers have found that online

126   gaming impacts social interactions in both positive and negative ways. In a study of college-age, male

127   and female gamers, Kowert and Oldmeadow (2013) found that more involved video gamers were able to

128   positively express themselves and regulate emotion, but might be less able to initiate new social

129   interaction offline. In 2014, Life Course Associates surveyed over 1,000 adults in the U.S ranging in age

130   from 13-64 years old, and reported that gamers (defined as anyone who played an online game in the past

131 60 days) were more likely to live with other people than non-gamers. Gamers also reported having strong

132 friendships that were important to them and that they were close to family members. Kowert &

133 Oldmeadow (2015) found that for individuals experiencing an avoidant form of attachment, games

134 provided players an opportunity for connection and closeness they were not able to establish in offline

135 interactions. Domahidi, Breuer, Kowert, Festl, and Quandt (2016) in a longitudinal study of online and

136 offline gaming friendships found no negative effects of gaming on players' offline friendships or social

137 support. However, in a focused study of the participation networks of e-sport gamers, Trepte, Reinecke

138 and Juechems (2012) found that online gaming led to positive social networks across players. However,

139 this was only so if the players extended their social interactions beyond the boundaries of the online game

140 and brought other players into their offline world. These studies in their totality point to more positive

141 social effects of gaming and help to dispel myths about the negative effect of gaming on friendships and

142 social competencies.

143   While some studies have found little negative impact of online gaming, there is also newer

144 evidence that social interactions within the online gaming environment frequently include behaviors that

145 are unfriendly, hostile and undermine positive social connection (Ditchthelabel.org, 2017). In this survey

146 of over 2,000 online teenage and adult gamers using Habbo, over half reported that they were bullied,

147 trolled, and experienced unwanted hate speech while gaming. Forty-seven percent said they were

148 threatened during play and nearly a third of players had their personal information shared without their

149 consent. Results of a negative gaming experience included participants having to leave a game or

150 experiencing negative psychological states, such as depression, after they were bullied.

151

152 **Potential Impact of Online Interactions**

153   In 2001, Nie expressed concern that online activity, including gaming may impede face to face

154 social interaction between individuals. Since Nie's work, there has been a fear perpetuated in society that

155 focused on gamers as solitary individuals whose online activities reflect a dysfunctional lack of

156 meaningful, positive social interaction (Shen & Williams, 2010; Williams, 2006).

157   A newer perspective about the potential negative impact of online interaction, not specific to

158   gamers comes from Turkle (2011). Davis (2015) interviewed digital researcher Sherri Turkle who

159   proposed during that interview that lack of in-person, face to face interaction, involving eye contact may

160   impede the development of empathy in teens, a quality that has great importance in the development of

161   friendships between people. Turkle (2011) in her influential book, *Alone Together*, presents a world in

162   which we are more comfortable than ever interacting online with others, whether it be through social

163   media or games, and yet at the same time, teenagers and adults report feeling lonelier than ever. Turkle

164   further expressed concern that as online contact continues to supplant face to face contact, especially in

165   teenagers, that the vitally important qualities that connect us with other people (e.g. empathy, friendship),

166   and which we develop through our face to face interactions, will be negatively impacted with both

167   individuals and societies suffering as a result. This premise may not be unfounded, as Pierce (2009) found

168   that female high school students were more comfortable communicating online with others and

169   experienced higher social anxiety in face to face conversations than when conversing online. However, a

170   more recent empirical study of Dutch teenagers found that social media use and empathy were positively

171   linked (Vossen & Valkenburg, 2016). This study found that greater social media use led to greater

172   cognitive and emotional empathy in teens across a one year time period.

173   The concerns about how online vs. offline interactions influence friendships and other personal

174   qualities require more empirical study. Important social theorists like Turkle have expressed concern, and

175   one general survey, done outside the traditional research environment, has also shown significant negative

176   social dynamics occurring in the virtual environment. However, actual empirical studies of online social

177   phenomenon are lacking, especially studies comparing online gamers with others who use online

178   environments, but who are non-gamers.

179

180   **The Personal Effects of Friendship**

181   Having healthy friendships has been positively associated with psychological variables such as

182   happiness (Demir and Lesley, 2005)). Likewise, lack of friendships and negative social connections have

183   been associated with higher levels of anxiety and depression (LaGreca and Harrison, 2005). These

184   findings are not new, however examining how online friendship qualities relate to psychological health or

185   ill-health is a question that needs to be examined. The present study focused on three psychological

186   variables (happiness, anxiety, depression) in order to examine how online versus face to face friendship

187   qualities correlated with each variable, as well as whether gamers vs. non-gamers had any differences for

188   any of these personality variables.

189   <u>Happiness.</u> Happiness is the cognitive and affective evaluation of an individual's life; it consists

190   of the presence of positive affect, the absence of negative affect, and global life satisfaction (Diener,

191   1984, 1994). Demir and Lesley (2005) investigated the relationship between personality, number of

192   friends, best friendship quality and happiness. The study found that friendship quality (FQ) predicted

193   happiness and had more significant influence on level of happiness than personality and number of

194   friends. Lyubomirsky, Thach, & DeMatteo (2006) also reported when individuals reported greater

195   satisfaction with their friendships they were also happier.

196   The relationship between friendship quality and happiness may even be globally consistent.

197   Demir, Ozen, and Dogan (2012) conducted a cross-cultural study to investigate the association of same-

198   sex best friendship quality with happiness among college students in Turkey and the United States. In

199   both the Turkish and American sample, friendship quality was positively and significantly correlated with

200   happiness.

201   <u>Anxiety and Depression.</u> Studies have examined how friendship relates to anxiety and depression in

202   individuals. LaGreca and Harrison (2005) studied 14-19 year olds and concluded that when adolescents

203   had positive friendships, were in dating relationships and affiliated with high status peers this buffered

204   them from experiencing anxiety and depression. Rodebaugh, Lim, Shumaker, Levinson and Thompson

205   (2015) focusing on quality of friendships found that friendship quality predicted social anxiety, with

206   better quality friendships lowering social anxiety. However, interestingly social anxiety was not a

207   predictor of friendship quality. Likewise, Page-Gould, Mendoza-Denton and Tropp's (2008) work also

208   reinforced the idea that it is the friendship experience that determines anxiety, rather than friendship being

209   used as a way to lessen anxiety. In the Page-Gould study, those who had experienced friendships with

210   others who had diverse backgrounds experienced lower levels of anxiety in new environments.

211   Another line of research examined how Internet and social media use might impact anxiety and

212   depression. Selfout, Branje, Delsing, ter Bogt and Meeus (2009) specifically studied depression and

213   anxiety in adolescents who used the Internet and social media. Selfout et al. concluded that social media

214   use is tied to depression and anxiety only when the use is not related to communication with peers. Using

215   the Internet to connect with peers using communication technologies, such as instant messaging, actually

216   seemed to lower levels of depression. Vannuci, Flannery and McCauley-Ohannessian (2017) examined

217   length of time spent using social media and found that greater usage time correlated positively with trait-

218   based anxiety. Rather than examining time spent online or using social media, Primack, Sensa, Escobar-

219   Viera, Barrett, Sidani, Colditz and James (2017) focused their work on the number of social media

220   platforms participants used and found that depression and anxiety were positively correlated with the

221   number of platforms used, even when controlling for time online.

222   Several takeaways can be gleaned from these studies. First, it seems that the experience of

223   friendship and the quality of friendship may play a role in alleviating anxiety and depression. Second,

224   research has also shown a relationship between Internet and social media use and the experience of

225   anxiety and depression.

226

227   **The Present Study**

228   The current research builds on earlier work and extends knowledge about friendship in several

229   ways. A preliminary study (Study 1) examined and compared qualities of online and offline friendships

230   within a general, non-gamer group of individuals and self-identified online gamers. Specifically, we

231   wished to know if online gamers perceive functions of their close friendships differently based on

232   whether that friendship is online or offline. Second, we compared the quality of online and offline

233   friendships, across gamer versus non-gamer groups. Both gamers and non-gamers were asked to complete

234   the McGill Friendship Questionnaire (Mendelson & Aboud, 2014) for their closest online friend and their

235   closest offline friend. Participants also completed a general measure of their personal happiness using the

236   Oxford Happiness Questionnaire (Hills and Argyle, 2002) in order to determine if happiness levels

237   between groups were different. If friendship qualities in both groups were shown to be strong and

238   positive, then it is likely that happiness levels in the groups would not be significantly different. Two

239   within subjects and one between subjects hypotheses were tested in Study 1: H_1: there is no difference

240   between online friendship scores and offline friendship scores <u>within</u> the gamer group. H_2: Offline

241   friendship scores in the non-gamer group will be higher than online friendship scores in the non-gamer

242   group. H_3: there will be differences in online friendship scores and offline friendship scores <u>between</u> the

243   gamer group and the non-gamer group. It is predicted that online friendship qualities will be higher in the

244   gamer than non-gamer group. Furthermore, offline friendship qualities will be higher in the non-gamer

245   than gamer group. H_4: there is no difference in happiness scores between the gamer group and the non-

246   gamer group Do we want to relate this to friendship qualities rather than groups?.

247   Based on the results of Study 1, a second study (Study 2) was conducted. The purpose of the

248   second study was to increase the sample size and collect data from a general young adult population,

249   rather than a specific college sample. The second study also addressed some of the weaknesses of the

250   first study, including a refinement of how the gamer versus non-gamer groups were categorized and the

251   addition of several measures of personality that have been used in studying the psychological correlates of

252   friendship. The following hypotheses were tested in Study 2:

253   H_1: There will be no difference between online friendship scores and offline friendship scores

254   <u>within</u> the gamer group.

255   H_2: Offline friendship scores in the non-gamer group will be higher than online friendship scores

256   in the non-gamer group.

257   H_3: There will be differences in online friendship scores and offline friendship scores <u>between</u> the

258   gamer group and the non-gamer group. It is predicted that online friendship qualities will be higher in the

259   gamer than non-gamer group. Furthermore, offline friendship qualities will be higher in the non-gamer

260   than gamer group.

261     $\underline{H}_4$: Higher overall friendship scores for both offline and online friendships will be positively

262   correlated with individual happiness and negatively correlated with anxiety and depression.

263     $\underline{H}_5$: There will be no difference in happiness, depression, or anxiety levels between the gamer

264   group and the non-gamer group.

265

266   **STUDY 1**

267   **Method**

268

269   **Participants**

270   Participants were undergraduate students at a small private university in the southern United

271   States. They were recruited through the University's Sona System and received class credit or extra credit

272   for participation. Gamer and non-gamer determination was made on a self-report basis. Before

273   completing the study, participants were asked if they currently played games online with others. If they

274   responded affirmatively, they were placed in the gamer group. In the present study, gamers were thus

275   self-identified. This self-labeling as a means of identifying gamers is consistent with past research

276   comparing gamers and non-gamers (King, Delfabbro, and Griffiths, 2013; Carras et al., 2017).

277   Conversely, non-gamers were those who reported that they did not play games online with other people.

278   There were 92 participants (73 males and 19 females) in the gamer group with a mean age of 21.43 years,

279   and there were 59 participants (23 males and 36 females) in the non-gamer group with a mean age of

280   21.25 years.

281   **Measures**

282   **Demographic Survey.** Participants completed a demographic survey developed for the present

283   study. Demographic items included: age, gender, length of friendship with closest online and offline

284   friend, amount of time spent interacting with closest online and offline friend in online mode, amount of

285   time spent interacting with closest online and offline friend in person, age of closest online and offline

286 friend, and gender of closest online and offline friend. Responses to these items for both gamer and non-

287 gamer groups are presented in Table 1.

288
289 Table 1
290 *Demographic information for Gamer and Non-Gamer Groups*
291

Demographic Item	Gamer Response Mean (St.Dev)	Non-Gamer Response Mean (St.Dev)
Age of participant in years	21.43 (4.11)	21.25 (5.86)
Participant Gender	19 females 73 males	36 females 23 males
For Gamers only, number of hours spent playing against the computer per week	4.22 (4.72)	n/a
For Gamers only, number of hours per week spent online gaming with other people	7.53 (7.83)	n/a
Demographic information about online friend		
	Gamer	**Non-Gamer**
Length of time participant has known online friend in years	5.46 (4.52)	5.17 (5.28)
Age of Online Friend	20.43 (6.37)	22.63 (7.35)
Gender of Online Friend	7 females 83 males	29 females 30 males
Frequency that participant interacts with closest online friend in online mode	3.26% Never 19.57% 3-4 times/yr 34.78% 1-2times/month 19.57% 0-1 hr/day 17.39% 2-4 hrs/day 3.26% 4-6 hrs/day 2.17% 6+ hrs/day	10.17% Never 16.95% 3-4 times/yr 33.90% 1-2times/month 28.81% 0-1 hr/day 6.78% 2-4 hrs/day 3.39% 4-6 hrs/day 0% 6+ hrs/day
Frequency that participants interacts with closest online friend in person	32.61% Never 25.00% 3-4 times/year 22.83% 1-2times/month 11.96% 0-1 hr/day 1.09% 2-4 hrs/day 1.09% 4-6 hrs/day 5.43% 6+ hrs/day	44.07% Never 22.03% 3-4 times/yr 18.64% 1-2times/month 8.47% 0-1 hr/day 3.39% 2-4 hrs/day 0% 4-6 hrs/day 1.96% 6+ hrs/day
Demographic information about offline friend		
	Gamer	**Non-Gamer**
Length of time participant has known offline friend in years	8.51 (5.65)	6.78 (5.03)
Age of offline friend	21.39 (3.67)	21.29 (5.69)
Gender of offline friend	21 females 70 males	34 females 24 males
Frequency that participant interacts with closest offline	1.09% Never	5.08% Never

friend in person	32.61% 3-4 times/yr	1.69% 3-4 times/yr
	31.52% 1-2times/month	23.73% 1-2times/month
	6.52% 0-1 hr/day	40.68% 0-1 hr/day
	10.87% 2-4 hrs/day	15.25% 2-4 hrs/day
	8.70% 4-6 hrs/day	5.08% 4-6 hrs/day
	8.70% 6+ hrs/day	8.47% 6+ hrs/day
Frequency that participant interacts with closest offline friend online	2.17% Never	1.96% Never
	6.52% 3-4 times/yr	32.20% 3-4 times/yr
	22.83% 1-2times/month	25.42% 1-2times/month
	35.86% 0-1 hr/day	10.17% 0-1 hr/day
	11.96% 2-4 hrs/day	10.17% 2-4 hrs/day
	7.61% 4-6 hrs/day	10.17% 4-6 hrs/day
	13.04% 6+ hrs/day	10.17% 6+ hrs/day

292

293

294

295 **McGill Friendship Questionnaire (Mendelson and Aboud, 2014).** The McGill Friendship

296 Questionnaire was used to assess the qualities of friendship for this study. The questionnaire contains 30

297 items measuring perceptions about a friend or friendship in late adolescence and adulthood (Mendelson

298 and Aboud, 2014). It includes 6 subscales based on functions of friendship: stimulating companionship,

299 help, intimacy, reliable alliance, self-validation and emotional security. Each item is a statement of a

300 specific friendship function, and items are responded to on a 9-point Likert scale from 0 (never) to 8

301 (always). The Cronbach alphas of all subscales range from .84 to .90.

302 **The Oxford Happiness Questionnaire (Hills and Argyle, 2002).** This questionnaire is

303 comprised of 29 items. Each item is a statement about happiness, and items are responded to on a 6- point

304 Likert scale from 1 (strongly disagree) to 6 (strongly agree). The Cronbach alpha of this questionnaire

305 was .91.

306 **Procedure**

307 After completing the demographic survey and the Oxford Happiness Questionnaire, participants

308 in both gamer and non-gamer groups were asked to complete the McGill Friendship Questionnaire twice;

309 once for their closest online friend and one for their closest offline friend. For gamers, the closest online

310 friend was defined as the person they felt closest to through online gaming and interacted with most often

311   using online games. For non-gamers, the closest online friend was defined as the person with whom they

312   interacted most often online using social media or other online applications.

313   **Results**

314   There were 92 participants (73 males and 19 females) in the gamer group with a mean age of

315   21.43 years, and there were 59 participants (23 males and 36 females) in the non-gamer group with a

316   mean age of 21.25 years. Participants' McGill Friendship Questionnaire subscale scores and Oxford

317   Happiness scores are shown in Table 2.

318

319   Table 2

320   *Mean Scores for Gamers (N=92) and Non-Gamers (N=59) for Friendship Subscales and Happiness*

321   *Measure*

Variable	Gamer Mean (*SD*)	Non-Gamer Mean (*SD*)
Friendship Subscales: Online Friend		
Companionship	7.02 (1.13)	5.62 (1.92)
Help	6.75 (1.37)	4.16 (2.12)
Intimacy	6.85 (1.28)	4.57 (2.44)
Reliable Alliance	7.30 (1.09)	5.66 (2.20)
Emotional Security	6.69 (1.41)	4.87 (2.14)
Self-Validation	6.57 (1.40)	5.17 (1.99)
Friendship Subscales: Offline Friend		
Companionship	6.23 (1.37)	7.05 (1.04)
Help	5.72 (1.57)	6.48 (1.16)
Intimacy	5.40 (1.87)	6.82 (1.21)
Reliable Alliance	6.51 (1.53)	7.33 (.87)
Emotional Security	5.53 (1.73)	6.73 (1.14)
Self-Validation	5.60 (1.49)	6.41 (1.43)
Happiness Scale		
Mean Happiness Score	4.31 (.69)	4.42 (.72)

322
323
324
325   **Comparing Friendships**

326   A fully factorial MANOVA was conducted to examine overall between group and within group

327   differences on the 6 friendship subscales for both online and offline friendships. Box's test for

328   homogeneity of variance was significant ($p < 0.05$). Due to inequality of variances, the alpha level was set

329   at p<.01. Results of the MANOVA found significant differences in friendship scale scores between

330   gamers and non-gamers, F (6,295) = 7.937, $p<.001$, Wilk's Λ = .861, partial eta-squared = .139, observed

331   power = .99. Within groups differences were also found to be significant, F (6,295) = 15.774, $p<.001$,

332   Wilk's Λ = .757, partial eta-squared = .243, observed power = .99.

333   Post-hoc tests were then conducted to examine specific between and within group differences

334   on each of the 6 friendship subscales for both online and offline friendships. For the between group

335   comparisons, Levene's Tests of Equality of Error Variances was conducted. Levene's test indicated that

336   for all variables with the exception of Self-Validation for the offline friend, variances across groups were

337   unequal. As a result, the alpha value for significance was set at p<.01. Univariate tests showed significant

338   within and between group differences on all six friendship variables. Results of this analysis are presented

339   in Table 3.

340

341   Table 3

Post Hoc Test Results

Subscale	Group		Mean Difference	Std. Error	Sig.
help	1	2	-1.082	.208	*p*<.001
		3	1.913	.346	*p*<.001
		4	-.608	.230	.045
	2	3	2.996	.331	*p*<.001
		4	.474	.207	.106
	3	4	-2.522	.345	*p*<.001
Companionship	1	2	-.847	.174	*p*<.001
		3	.998	.329	.016
		4	-.831	.194	*p*<.001
	2	3	1.846	.312	*p*<.001
		4	.0160	.164	.999
	3	4	-1.830	.324	*p*<.001
Intimacy	1	2	-1.515	.228	*p*<.001
		3	1.219	.398	.015
		4	-1.452	.248	*p*<.001
	2	3	2.734	.366	*p*<.001
		4	.063	.193	*p*<.001
	3	4	-2.671	.379	*p*<.001
Reliable Alliance	1	2	-.843	.184	*p*<.001
		3	1.255	.368	.005

		4	-.829	.195	*p*<.001
	2	3	2.098	.344	*p*<.001
		4	.014	.143	.999
	3	4	-2.084	.350	*p*<.001
Emotional Security	1	2	-1.230	.224	*p*<.001
		3	1.071	.367	.023
		4	-1.263	.23	*p*<.001
	2	3	2.302	.347	*p*<.001
		4	-.033	.197	.998
	3	4	-2.335	.352	*p*<.001
Self Validation	1	2	-1.026	.204	*p*<.001
		3	.853	.344	.070
		4	-.869	.240	.002
	2	3	1.879	.335	*p*<.001
		4	.157	.226	.899
	3	4	-1.722	.357	*p*<.001

Note: 1= Gamer Offline, 2= Gamer Online, 3 = Non-gamer Online, 4 =Non-gamer Offline

342

343   Results for the within group analysis showed that the means of each friendship subscale score for

344 gamer online friendships were significantly higher than the means for gamer offline friendships (compare

345 Group 1 and 2). The means of each friendship subscale score for non-gamer online friendships were

346 significantly lower than the means for non-gamer offline friendships (compare Group 3 and 4).

347   Examination of the between group post hoc comparisons, showed that the gamer group's mean

348 scores on each friendship subscale for their online friendships were significantly higher than the non-

349 gamer group's online friendship scores (compare Group 2 and 3), and the gamer group's means on each

350 friendship subscale for their offline friendship were significantly lower than the non-gamer group's mean

351 offline friendship scores (compare Group 1 and 4).. An interesting finding, however, is that gamers'

352 online friendship scores were not significantly different from the non-gamers' offline friendship scores.

353 This pattern of results does not support Hypothesis 1, however it is supportive of Hypotheses 2 and 3.

354 **Differences in Happiness**

355   The mean happiness score in gamers ($M = 4.315$, $SD = .690$) was not significantly different than

356 the mean happiness score in non-gamers. ($M = 4.417$, $SD = .713$). An independent samples t-test was not

357 significant at the alpha level of .05, $t(120.586) = -.869$, $p = .386$. Therefore, the analysis supports

358 Hypothesis 4.

359   **Study 1** provided further insight into the nature of gamer and non-gamer friendships. The results

360   of the analyses conducted found that self-reported gamers perceived the quality of their closest online

361   friendship as higher than their closest offline friendship. In the non-gamer group, the opposite pattern held

362   true; the quality of the closest offline friendship was higher than the online friendship. Analysis further

363   showed that between group differences were present and that non-gamer's offline friendship scores were

364   higher than the same scores for gamers. Likewise, gamer's online friendship scores were higher than

365   online friendship scores for the non-gamers.

366   Perhaps the most interesting finding, however, was that gamer online friendship scores were the

367   same as non-gamer offline friendship scores. In essence, the closest, face to face friendship non-gamers

368   have looks the same as the closest online friendship reported by gamers. High mean scores for the

369   friendship variables for each of these types of friendships support the conclusion that gamers do have

370   close and important friendships with other people, and that these occur online rather than face to face. For

371   gamers, their comfort in the online environment allows them to meet and grow close to others within this

372   milieu, even though they may never meet their closest friend face to face.

373   Study 1 also found that general life happiness levels did not vary between gamers and non-

374   gamers. One contributing factor could be that gamers were able to establish and value close friendships

375   (albeit in the online environment). The domain in which social connection occurs may be different, but

376   the quality and function of the connections appear the same.

377   Although the results of Study 1 are interesting, they are preliminary. The sample size for the

378   study was small and the sample consisted only of college students. In addition, participants were allowed

379   to self-select as a gamer or non-gamer, which could have blurred the distinction between the groups.

380   Last, Study 1 only examined the relationship between gamer/non-gamer status and happiness score,

381   neglecting to include other important personality variables that have been linked to friendship qualities,

382   such as anxiety and depression. In order to address these concerns, a second sample was collected, which

383   is presented as Study 2.

384

385

386   **STUDY 2**

387   **Method**

388 **Participants**

389   Participants were recruited using mTurk and were paid for their participation. The final sample for

390 study 2 was comprised of 521 individuals. The total response set was comprised of 600 individuals,

391 however 80 surveys (13%) were eliminated due to incomplete responses or response patterns showing no

392 variability (e.g. participants responded '1' to all items). Table 4 below provides complete demographic

393 information about participants. For Study 2, individuals were placed in gamer/non-gamer groups using

394 modified criteria. Study 1 allowed self-selection into categories. For study 2, in order to be placed in the

395 gamer group, one had to self-identify as a gamer <u>and</u> play online games 5 hours a week or more.

396

397

Demographic Item	Gamer Response Mean (St.Dev)	Non-Gamer Response Mean (St.Dev)
Age of participant in years	25.17 (6.48)	27.27 (6.15)
Participant Gender	113 females 280 males	72 females 56 males
Online Game Hours per week	14.96 (13.20)	6.89 (9.54)
Demographic information about online friend		
	Gamer	**Non-Gamer**
Length of time participant has known closest online friend in years	6.28 (6.03)	5.67 (5.43)
Age of Online Friend	25.74 (5.52)	27.67 (8.15)
Gender of Online Friend	109 females 276 males	51 females 77 males
Frequency that participant interacts with closest online friend in online mode	3.54% 0 to 1 time per year. 10.35% 2 to 5 times per year. 9.09% 1 to 2 times per month 17.42% 3 to 5 times per month 37.38% 2 to 5 times per week 22.22% More than 1	4.58% 0 to 1 time per year. 9.92% 2 to 5 times per year. 15.27% 1 to 2 times per month 20.61% 3 to 5 times per month 31.30% 2 to 5 times per week 22.22% More than 1

	time per day.	time per day.
Frequency that participants interacts with closest online friend in person	29.04% 0 to 1 time per year. 17.42% 2 to 5 times per year. 12.63% 1 to 2 times per month 14.65% 3 to 5 times per month 17.17% 2 to 5 times per week 9.09% More than 1 time per day.	35.88% 0 to 1 time per year. 16.79% 2 to 5 times per year. 10.69% 1 to 2 times per month 13.74% 3 to 5 times per month 10.69% 2 to 5 times per week 11.45% More than 1 time per day.
Most frequent online interaction with their closest online friend (percentage of participant reported)	73.99% Online Games 61.87% Texting Online 42.93% Social Media 40.40% Voice Chat 17.68% Video Chat 3.78% Emails	84.73% Texting Online 64.12% Social Media 49.62% Online Games 27.48% Voice Chat 20.61% Video Chat 13.74% Emails

Demographic information about offline friend		
	Gamer	**Non-Gamer**
Length of time participant has known closest offline friend in years	9.13 (7.09)	9.63 (6.38)
Age of offline friend	24.31 (7.59)	26.37 (7.57)
Gender of offline friend	160 females 226 males	62 females 63 males
Frequency that participant interacts with closest offline friend in online mode	4.29% 0 to 1 time per year. 13.13% 2 to 5 times per year. 13.89% 1 to 2 times per month 17.93% 3 to 5 times per month 28.79% 2 to 5 times per week 21.97% More than 1 time per day.	7.63% 0 to 1 time per year. 12.98% 2 to 5 times per year. 14.50% 1 to 2 times per month 18.32% 3 to 5 times per month 21.37% 2 to 5 times per week 25.19% More than 1 time per day.
Frequency that participant interacts with closest offline friend in person	4.80% 0 to 1 time per year. 15.91% 2 to 5 times per year. 18.94% 1 to 2 times per month	12.21% 0 to 1 time per year. 14.50% 2 to 5 times per year. 15.27% 1 to 2 times per month

	21.21% 3 to 5 times per month 22.73% 2 to 5 times per week 16.41% More than 1 time per day.	19.08% 3 to 5 times per month 15.27% 2 to 5 times per week 22.14% More than 1 time per day.

398

399

Measures

401   Participants in Study 2 completed the McGill Friendship Questionnaire (Mendelson and Aboud,

402   2014) and the Oxford Happiness Questionnaires (Hills and Argyle, 2002). The information about these

403   scales was reported in Study 1 above. Additionally, participants in Study 2 completed a measure of

404   anxiety and depression.

405   DASS-21 (Lovibond and Lovibond, 1995): The DASS-21 is a 21 item measure of depression, anxiety

406   and stress, although the present study only used the depression and anxiety scores from this scale in Study

407   2. The anxiety and depression subscales of the DASS-21 are 7 items each and participants respond to

408   statements based on a 4 point Likert scale ranging from 0 - did not apply to me at all to 3 – applied to me

409   very much for most of the time. Responses to the items on each subscale are summed and then multiplied

410   by 2, with possible scores ranging from 0-42. A normal depression score on the DASS-21 is 0 to 9,

411   indicating little or no depression, with a score of 28 or higher being extremely severe depression. A

412   normal anxiety score (little to no anxiety) is 0 to 7, with a score of 20 or above an indicator of extremely

413   severe anxiety. The mean depression score for the present sample was 9.265 with scores ranging from 0

414   to 21. The mean anxiety score for the present sample was 8.800 with scores ranging from 0 to 21.

415   Reliability and validity information for the DASS-21 when used with young adults can be found at

416   Osamn, Wong, Bagge, Freedenthal, Gutierrez and Lozano (2012).

417   For Study 2 sample, the DASS-21 Depression subscale had a Cronbach alpha score of .89, and

418   the Anxiety subscale had a Cronbach alpha of .87. The happiness measure had a Cronbach alpha score of

419   .82. The Cronbach alphas for the McGill Friendship Questionnaire subscales were .88for

420   Companionship, .88 for Help, .91 for Intimacy, .91 for Reliable Alliance, .89 for Emotional Security,

421 and .89 for Self-Validation. Thus, all measures used in the present study showed adequate internal

422 reliability.

423

424 **Procedure**

425   The survey for the present study was posted on mTurk in spring 2019 for a total of 35 days.

426 Recruitment described the study as a survey focused on friendship in online environments, specifying that

427 respondents be between 18 to 30 years of age. After reading and completing the consent form,

428 participants responded to the demographic survey, followed by the McGill Friendship Questionnaire

429 (Mendelsohn and Aboud, 2014), the Oxford Happiness Questionnaire (Hills and Argyle, 2002) and the

430 DASS-21 (Lovibond and Lovibond, 1995). All participants were asked to complete the McGill Friendship

431 Questionnaire twice; once for their closest online friend and one for their closest offline friend. For

432 gamers, the closest online friend was defined as the person they felt closest to through online gaming and

433 interacted with most often using online games. For the non-gamer group, the closest online friend was

434 defined as the person with whom they interacted most often online using social media or other online

435 applications and whom they felt closest to in the online domain. For both groups, the closest offline

436 friend was the person they felt closest to and interacted with primarily in a face to face manner.

437   **Results**

438   Hypotheses 1-3 in Study 2 examined within and between group differences on all friendship

439 subscales for the gamer and non-gamer groups. A fully factorial MANOVA was initially chosen to test

440 these differences, however results of the MANOVA found violations of sphericity. That being the case,

441 the data analyses reverted to using univariate tests to examine within and between group differences. To

442 measure between group differences, one-way ANOVA was conducted using the group variables (gamer

443 vs. non-gamer) as the independent variable and entering all friendships subscales separately as dependent

444 variables. To examine within group differences, paired t-tests were conducted on the online friendship

445 subscales paired against the offline friendship subscales. The paired t-tests were conducted separately for

446 each group.

447   <u>Differences between gamer and non-gamers.</u> Results of one-way ANOVA analyses on the six

448   friendship subscales showed significant differences between groups for ratings of offline (face to face)

449   friendships. In each case, the non-gamer group rated the qualities of their offline friendships higher than

450   the gamer groups. The results of this analysis is presented in Table 5 below.

451   In contrast, there were no significant between group differences for ratings of online friendships

452   between gamers and non-gamers. These results are also presented in Table 5. For each friendship quality,

453   the range of possible mean scores is 1 (lowest) to 7 (highest).

454

455   *Table 5: Between Group Differences on Friendship Qualities*

	Friendship Quality	N	Mean	StDev	F	p-value
Offline Friendships	Companionship Gamer Non-Gamer	404 131	6.14 6.53	1.51 1.40	2.60	p<.01
	Help Gamer Non-Gamer	404 131	5.99 6.42	1.54 1.54	2.79	p<.01
	Intimacy Gamer Non-Gamer	404 131	5.93 6,46	1.71 1.61	3.12	p<.01
	Reliable Alliance Gamer Non-Gamer	404 131	6.23 6.66	1.64 1.60	2.67	p<.01
	Emotional Security Gamer Non-Gamer	404 131	5.93 6.41	1.64 1.53	2.93	p<.01
	Self-Validation Gamer Non-Gamer	404 131	5.89 6.29	1.58 1.47	2.65	p<.01
Online Friendships	Companionship Gamer Non-Gamer	404 131	6.00 6.01	1.47 1.57	.07	ns
	Help Gamer Non-Gamer	404 131	5.43 5.45	1.63 1.72	.12	ns
	Intimacy Gamer Non-Gamer	404 131	5.41 5.44	1.83 1.92	.13	ns

Reliable Alliance					
Gamer	404	5.93	1.67	.16	ns
Non-Gamer	131	5.91	1.65		
Emotional Security					
Gamer	404	5.55	1.63	.10	ns
Non-Gamer	131	5.53	1.72		
Self-Validation					
Gamer	404	5.60	1.58	.59	ns
Non-Gamer	131	5.69	1.61		

456

457   <u>Within-group differences: Comparing online and offline friendship qualities for gamers and non-</u>

458   <u>gamers.</u> Paired t-tests were used to examine within group differences in online and offline friendship

459   qualities. For the gamer group, offline friendships were rated significantly higher than online friendships

460   on all six friendship variables. Differences on all variables were significant at p<.01 with the exception of

461   companionship, which was significant at p<.05. For the non-gamer group, offline friendships were also

462   rated significantly higher than online friendships on all six friendship variables. Differences on all

463   variables were significant at p<.01.

464

465   **Relationships among Friendship Qualities and Personality Variables**

466   It was hypothesized that higher overall friendship scores for both offline and online friendships

467   would be positively correlated with individual happiness and negatively correlated with anxiety and

468   depression. Pearson correlations were used to examine this hypothesis. Results found that happiness was

469   positively and significantly correlated with all six offline friendship variables, while anxiety and

470   depression were negatively and significantly correlated with all six offline friendship variables. For

471   online friendships, happiness was positive and significantly correlated with companionship, help, reliable

472   alliance and self-validation, but was uncorrelated with intimacy and emotional security. The online

473   friendship qualities of companionship, reliable alliance, and self-validation were significantly and

474   negatively correlated with depression and anxiety. All correlations are presented in Table 6.

475

476   *Table 6: Correlations among Friendship Qualities and Personality Variables*

	Happiness	Depression	Anxiety
Offline Friendships			
Companionship	.17**	-.23**	-.27**
Help	.16**	-.18**	-.19**
Intimacy	.14**	-.21**	-.26**
Reliable Alliance	.12**	-.21**	-.31**
Emotional Security	.17**	-.21**	-.24**
Self-Validation	.16**	-.22**	-.19**
Online Friendships			
Companionship	.11**	-.13**	-.15**
Help	.10*	-.07	-.02
Intimacy	-.003	-.04	-.02
Reliable Alliance	.08*	-.15**	-.18**
Emotional Security	.04	-.05	-.04
Self-Validation	.08*	-.08*	-.09*

477   N=535, * P<.05, ** P<.01

478

479   Group differences in personality variables. Hypothesis 5 stated that there would be no difference

480   in happiness, depression or anxiety levels between the gamer group and the non-gamer group. Between

481   group *t*-tests were used to examine this hypothesis, and the results showed no significant group

482   differences on any of the three personality variables.

483   Discussion

484   The present study provided a comprehensive examination of the characteristics and correlates of

485   online and offline friendships in two groups: a group of gamers and a group who used online resources to

486   interact with others, but who were not identified as gamers. Individuals in each group were asked to

487   complete a friendship questionnaire measuring six friendship qualities for their closest online and closest

488   offline friend. As well, the current study collected self-reported measures of happiness, depression and

489   anxiety for participants and examined how those important personality variables related to online and

490   offline friendship qualities.

491   The results of the study provide greater understanding of what online and offline friendships

492   look like for gamers and non-gamers. Demographic information showed great similarity in the

493   characteristics of online and offline friendships. Online and offline friendships tended to be long term (> 5

494   years) in duration, with individuals of the same age and gender as the participants. Online friendships had

495   frequent online contacts, typically 3-5 times a month or more with the majority of participants connecting

496   with their friend 2-5 times a week or more. Offline friendships had similar norms for connecting with the

497   closest friend in both gamer and non-gamer groups, although the length of acquaintance with the closest

498   offline friend was longer in duration than the online friend for both gamers and non-gamers. It can be

499   concluded from this information that online and offline friendships are present in both gamers and non-

500   gamers and that they are robust in terms of their duration and the amount of contact the participants had

501   with their friends.

502   The study also examined if there were differences in the qualities of online and offline friendships

503   within and between gamer and non-gamer groups. Study 1 explored this question for a group of college

504   students. In study 1, it appeared that online friendships in gamers were strong and positive in quality and

505   corresponded most closely with offline friendships in non-gamers. However, the sample for study 1 was

506   small and reflected only a college-age group. In study 2, a larger and broader sample of young adults was

507   collected, and the friendship qualities compared again. In the second study, results were somewhat

508   different. In both groups, gamer and non-gamer, offline friendships were rated higher than online

509   friendships, although it should be noted that the means of all friendship qualities for both types of

510   friendship were quite high, showing mean scores greater than 5.0 with the highest possible mean rating

511   being a 7.0. Within groups, it was also found to be the case that friendship qualities for offline

512   friendships were rated significantly higher than those for online friendships.

513   These results point to the important place offline or face to face friendships still hold in the lives of

514   young adults. Although the results attest to the presence and positive quality of online friendships, offline

515   friendships still tend to be of higher quality, as well as longer duration. It does not appear that gamers or

516   non-gamers are abandoning face to face interactions with those closest to them. Instead they have kept

517   their offline friendships and added online friendships. In both types of friendships, online and face to face

518   contacts are used to maintain the connection between parties.

519   The current study also examined how online and offline friendships related to personality variables,

520   as well as if gamers and non-gamer differed in happiness, anxiety and depression. The strongest

521   correlations between personality and friendship qualities were found for offline friendships, and it appears

522   that higher positive friendship qualities are related positively to happiness, but negatively to depression

523   and anxiety. This finding speaks to perhaps the strength of positive friendships in the life of young adults,

524   as one possible buffer against the common but negative conditions of anxiety and depression. Online

525   friendship qualities were, in general, positively related to happiness and negatively to anxiety and

526   depression, but the correlations were weaker and for some important qualities, like intimacy and

527   emotional security were not present at all. It may be that online friendships provide some personality

528   benefits, but not in as comprehensive a manner as offline friendships.

529   Study 1 and Study 2 also showed that general life happiness did not vary between gamers and

530   non-gamers. In addition, Study 2 found depression or anxiety levels were not significantly different

531   between gamers and non-gamers. It would seem, when coupled with the finding that both groups could

532   establish and value close friendships online and offline, that worry over gamers being socially isolated,

533   unable to form social connections, and suffering psychologically is not supported.

534   There is no doubt that online environments are popular and include opportunities for social

535   interaction that can be both positive and negative. It is also clear that more research needs to be done to

536   understand the qualities of social relationships that develop in online environments and how those

537   compare to traditional face to face relationships.

538   Follow-up research related to gamer and non-gamer friendships and social connections could take

539   many forms to enhance our understanding of this phenomenon. A recently published article by Nowland,

540   Necka and Cacioppo (2018) focused on loneliness in the online world. The present study only examined

541   perceived happiness, anxiety and depression in gamer and non-gamer groups, however exploring how

542   loneliness relates to online and offline friendships in gamers and non-gamers would be a valuable avenue

543   to pursue. Additionally, it would also be valuable to see how this finding varies by personal qualities of

544   gamers and non-gamers, such as gender, age, or the amount of time spent immersed in online

545   environments. A final avenue of research that could be explored is examining how online friendships

546   function in virtual reality vs. non-VR online environments. vs. face to face environments. We know very

547   little about social functioning in virtual reality, even though this form of online entertainment is quickly

548   growing in popularity (Lessick and Kraft, 2017; Loureiro, Guerreiro, Eloy, Langaro, & Panchapakesan,

549   2018). While the present study provides some intriguing information about friendship quality in young

550   adults, and the results are optimistic about online social interactions, follow-up research will be important

551   to fully understand both online and offline friendship dynamics.

552

553

554   **References**

555   Aboud, F. E., & Mendelson, M. J. (1996). Determinants of friendship selection and quality: Developmental

556   perspectives .In A.F. Newcomb, W. M. Bukowski, & W. W. Hartup (Eds.), *Friendship in children*

557   *and adolescents.* Cambridge: Cambridge University Press.

558   Aboud, F. E., & Mendelson, M. J. (November, 1992). *Measurement and determinants of friendship quality.*

559   Invited address to Conference on Friendship in Childhood and Adolescence, Montreal, Quebec.

560 Asher S.R., Parker J.G. (1989). Significance of peer relationship problems in childhood. In: Schneider B.H.,

561   Attili G., Nadel J., Weissberg R.P. (eds) *Social Competence in Developmental Perspective. NATO*

562   *ASI Series (Series D: Behavioural and Social Sciences), vol 51.* Springer, Dordrecht.

563 Buhrmester, D. (1990). Intimacy of friendship, interpersonal competence, and adjustment during

564   preadolescence and adolescence. *Child Development, 61*,1101-1111.

565 Buhrmester, D., & Furman, W. (1987). The development of companionship and intimacy. Child

566   Development, 58,1101-1113.

567 Bukowski, W. M., Hoza, B., & Boivin, M. (1994). Measuring friendship quality during pre- and early

568   adolescence: The development and psychometric properties of the Friendship Qualities Scale.

569   *Journal of Social and Personal Relationships,11*,471-484.

570 Carras, M. C., Porter, A. M., Van Rooij, A.J., King, D., Lange, A., Carras, M., & Labrique, A. (2017).

571   Gamers' insights into the phenomenology of normal gaming and game "addiction": A mixed

572   methods study. *Computers in Human Behavior, 79,* 238 – 246.

573Davis, L. C. (2015). The flight from conversation. Retrieved from

574   https://www.theatlantic.com/technology/archive/2015/10/reclaiming-conversation-sherry-

575   turkle/409273/

576on February 5, 2018.

577 Ditchthelabel.org (2017). In:Game abuse: The extent and nature of online bullying within digital gaming

578   environments. Retrieved from https://us.ditchthelabel.org/wp-

579   content/uploads/sites/2/2017/05/InGameAbuse.pdf May 22, 2018.

580Domahidi, E., Festl, R., & Quandt, T. (2014). To dwell among gamers: Investigating the relationship between

581   social online game use and gaming-related friendships. *Computers in Human Behavior, 35*, 107-115.

582Domahidi, E. Breuer, J., Kowert, R., Festl, R., & Quandt, T. (2016). A longitudinal analysis of gaming - and

583   non-gaming- related friendships and social support among social online game players. *Media*

584   *Psychology*, DOI: 10.1080/15213269.2016.1257393

585 Griffiths, D. M., Hussain, Z., Grusser, M. S., Thalemann, R., Cole H., Davies, N.O. M., & Chappell, D.

586   (2011). Social interactions in online gaming. *International Journal OF Game-Based Learning, 1*(4),

587   20-36.

588 Hills, P., & Argyle, M. (2002). The Oxford Happiness Questionnaire: a compact scale for the measurement of

589   psychological well-being. *Personality and Individual Differences, 33*, 1073-1082

590 Hussain, Z., & Griffiths, M. D. (2014). A qualitative analysis of online gaming: social interaction,

591   community, and game design. *International Journal of Cyber Behavior, Psychology, and Learning,*

592   *4*(2), 41-57.

593 King, D. L., Delfabbro, P. H., & Griffiths. M. D. (2013). Trajectories of problem video gaming among adult

594   regular gamers: an 18-month longitudinal study. *CyberPsychology, Behavior & Social Networking,*

595   *16* (1).

596 Kowert, R., Domahidi, E., Festl, R., & Quandt, T. (2014). Social gaming, lonely life? The impact of digital

597   game play on adolescents' social circles. *Computers in Human Behavior, 36*, 385-390.

598 Kowert, R., Domahidi, E., & Quandt, T. (2014). The Relationship between online video game involvement

599   and gaming-related friendships among emotionally sensitive individuals. *Cyberpsychology, Behavior,*

600   *and Social Networking, 17*(7), 447-453.

601 Kowert, R., & Oldmeadow, J. A. (2013). A social reputation: Exploring the relationship between online video

602   game involvement and social competence. *Computer in Human Behavior, 29*, 1872-1878.

603 Kowert, R., & Oldmeadow, J. A. (2015). Playing for social comfort: online video game play as a social

604   accommodator for the insecurely attached. *Computer in Human Behavior, 53*, 556-566.

605 Lessick, S., & Kraft, M. (2017). Facing reality: the growth of virtual reality and health sciences libraries.

606   *Journal of the Medical Library Association. 105* (4), 407-417.

607   doi:http://dx.doi.org.ezproxy.libproxy.db.erau.edu/10.5195/jmla.2017.329

608 Life Course Associates (2014). The new face of gamers. Retrieved from

609   http://www.lifecourse.com/assets/files/The%20New%20Face%20of%20Gamers_June_2014.pdf,

610   May 22, 2018.

611 Liu, D., Li, X., & Santhanam, R. (2013). Digital games and beyond: what happens when players compete?

612   *MISQ, 37*(1), 111-124.

613 Loureiro, S.M.C., Guerreiro, J., Eloy, S., Langaro, D., & Panchapakesan, P. (2018). Understanding the use of

614   Virtual Reality in Marketing: A text mining-based review. *Journal of Business Research*. Doi :

615   https://doi.org/10.1016/j.jbusres.2018.10.055

616 Mendelson, M. J. & Aboud, F. (2014). McGill Friendship Questionnaire- Friendship Functions. Available

617   from Measurement Instrument Database for the Social Science. Retrieved from

618   http://www.midss.org/mcgill-friendship-questionnaire-friendship-functions

619 Nie, N. H. (2001). Sociability, interpersonal relations, and the Internet: Reconciling conflicting findings. *The*

620   *American Behavioral Scientist, 45*(3). 420-435.

621 Nowland, R., Necka, E. A., & Cacioppo, J. T. (2018). Loneliness and social internet use: pathways to

622   reconnection in a digital world. *Perspectives on Psychological Science, 13*(1), 70-87.

623 PaaBen, B., Morgenroth, T., & Stratemeyer, M. (2017). What is a true gamer? The male Gamer stereotype

624   and the marginalization of women in video game culture. *Sex Roles, 76*, 421-435.

625 Parker, J. G., & Asher, S. R. (1989). Friendship Quality Questionnaire-Revised: instrument and

626   administration manual. University of Michigan.

627 Pew Research Center (2018a). Social media fact sheet. Retrieved from http://www.pewinternet.org/fact-

628   sheet/social-media/ on May 22, 2018.

629 Pew Research Center (2018b). The future of well-being in a tech-saturated world. Retrieved from

630   http://www.pewinternet.org/2018/04/17/the-future-of-well-being-in-a-tech-saturated-world/ on May

631   22, 2018.

632 Pierce, T. (2009). Social anxiety and technology: Face-to-face communication versus technological

633   communication among teens. *Computers in Human Behavior, 25*, 1367-1372.

634 Shen, C., & Williams, D. (2010). Unpacking Time Online: Connecting Internet and MMO use with Psycho-

635   social Well-being. *Communication Research, 38*(1), 123-149.

636 Trepte, S., Reinecke, L. and Juechems, K. (2012). The social side of gaming: How playing online computer

637   games creates online and offline social support. *Computers in Human Behavior, 28*(3), 832-839.

638 Turkle, S. (2011). *Alone together*. Basic Books, New York: NY.

639 Williams, D. (2006). Groups and goblins: the social and civic impact of an online game. *Journal of*

640   *Broadcasting & Electronic Media, 50* (4), 651-670.