

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](#)

---

### Scholarly Commons Citation

Frederick, C. M., & Zhang, T. (2020). Examining the Qualities of Online and Offline Friendships: A Comparison Between Groups. , (). Retrieved from <https://commons.erau.edu/publication/1413>

This Article is brought to you for free and open access by Scholarly Commons. It has been accepted for inclusion in Publications by an authorized administrator of Scholarly Commons. For more information, please contact [commons@erau.edu](mailto:commons@erau.edu).

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](mailto: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](mailto: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 Happiness. 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 Anxiety and Depression. 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<sub>1</sub>: there is no difference  
240 between online friendship scores and offline friendship scores within the gamer group. H<sub>2</sub>: Offline  
241 friendship scores in the non-gamer group will be higher than online friendship scores in the non-gamer  
242 group. H<sub>3</sub>: there will be differences in online friendship scores and offline friendship scores between 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<sub>4</sub>: 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<sub>1</sub>: There will be no difference between online friendship scores and offline friendship scores  
254 within the gamer group.

255         H<sub>2</sub>: Offline friendship scores in the non-gamer group will be higher than online friendship scores  
256 in the non-gamer group.

257         H<sub>3</sub>: There will be differences in online friendship scores and offline friendship scores between 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 H<sub>4</sub>: 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 H<sub>5</sub>: 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
<b>Demographic information about online friend</b>		
	<b>Gamer</b>	<b>Non-Gamer</b>
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
<b>Demographic information about offline friend</b>		
	<b>Gamer</b>	<b>Non-Gamer</b>
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 ( <i>SD</i> )	Non-Gamer Mean ( <i>SD</i> )
<b>Friendship Subscales: Online Friend</b>		
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)
<b>Friendship Subscales: Offline Friend</b>		
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)
<b>Happiness Scale</b>		
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  $\Lambda = .861$ , 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  $\Lambda = .757$ , 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  
387  
388  
389  
390  
391  
392  
393  
394  
395  
396  
397

## STUDY 2

### Method

#### Participants

Participants were recruited using mTurk and were paid for their participation. The final sample for study 2 was comprised of 521 individuals. The total response set was comprised of 600 individuals, however 80 surveys (13%) were eliminated due to incomplete responses or response patterns showing no variability (e.g. participants responded '1' to all items). Table 4 below provides complete demographic information about participants. For Study 2, individuals were placed in gamer/non-gamer groups using modified criteria. Study 1 allowed self-selection into categories. For study 2, in order to be placed in the gamer group, one had to self-identify as a gamer and play online games 5 hours a week or more.

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)
<b>Demographic information about online friend</b>		
	<b>Gamer</b>	<b>Non-Gamer</b>
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 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	19.08%	3 to 5 times per month
22.73%	2 to 5 times per week	15.27%	2 to 5 times per week
16.41%	More than 1 time per day.	22.14%	More than 1 time per day.

398  
399

#### 400 **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 Differences between gamer and non-gamers. 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	404	6.14	1.51	2.60	p<.01
Non-Gamer	131	6.53	1.40			
	Help					
	Gamer	404	5.99	1.54	2.79	p<.01
Non-Gamer	131	6.42	1.54			
	Intimacy					
	Gamer	404	5.93	1.71	3.12	p<.01
Non-Gamer	131	6.46	1.61			
	Reliable Alliance					
	Gamer	404	6.23	1.64	2.67	p<.01
Non-Gamer	131	6.66	1.60			
	Emotional Security					
	Gamer	404	5.93	1.64	2.93	p<.01
Non-Gamer	131	6.41	1.53			
	Self-Validation					
	Gamer	404	5.89	1.58	2.65	p<.01
Non-Gamer	131	6.29	1.47			
Online Friendships	Companionship					
	Gamer	404	6.00	1.47	.07	ns
Non-Gamer	131	6.01	1.57			
	Help					
	Gamer	404	5.43	1.63	.12	ns
Non-Gamer	131	5.45	1.72			
	Intimacy					
	Gamer	404	5.41	1.83	.13	ns
Non-Gamer	131	5.44	1.92			

	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 Within-group differences: Comparing online and offline friendship qualities for gamers and non-  
458 gamers. 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
<u>Offline Friendships</u>			
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**
<u>Online Friendships</u>			
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&lt;.05, \*\* P&lt;.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.
- 573 Davis, L. C. (2015). The flight from conversation. Retrieved from  
574 [https://www.theatlantic.com/technology/archive/2015/10/reclaiming-conversation-sherry-](https://www.theatlantic.com/technology/archive/2015/10/reclaiming-conversation-sherry-turtle/409273/)  
575 [turtle/409273/](https://www.theatlantic.com/technology/archive/2015/10/reclaiming-conversation-sherry-turtle/409273/)
- 576 on 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-](https://us.ditchthelabel.org/wp-content/uploads/sites/2/2017/05/InGameAbuse.pdf)  
579 [content/uploads/sites/2/2017/05/InGameAbuse.pdf](https://us.ditchthelabel.org/wp-content/uploads/sites/2/2017/05/InGameAbuse.pdf) May 22, 2018.
- 580 Domahidi, 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.
- 582 Domahidi, 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

- 585Griffiths, 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.
- 588Hills, 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
- 590Hussain, 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.
- 593King, 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).
- 596Kowert, 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.
- 598Kowert, 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.
- 601Kowert, 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.
- 603Kowert, 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.
- 605Lessick, 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>
- 608Life 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](http://www.lifecourse.com/assets/files/The%20New%20Face%20of%20Gamers_June_2014.pdf),  
610 May 22, 2018.



- 611Liu, D., Li, X., & Santhanam, R. (2013). Digital games and beyond: what happens when players compete?  
612 *MISQ*, 37(1), 111-124.
- 613Loureiro, 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>
- 616Mendelson, 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>
- 619Nie, N. H. (2001). Sociability, interpersonal relations, and the Internet: Reconciling conflicting findings. *The*  
620 *American Behavioral Scientist*, 45(3). 420-435.
- 621Nowland, 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.
- 623PaaBen, 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.
- 627Pew Research Center (2018a). Social media fact sheet. Retrieved from [http://www.pewinternet.org/fact-](http://www.pewinternet.org/fact-sheet/social-media/)  
628 [sheet/social-media/](http://www.pewinternet.org/fact-sheet/social-media/) on May 22, 2018.
- 629Pew 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.
- 632Pierce, T. (2009). Social anxiety and technology: Face-to-face communication versus technological  
633 communication among teens. *Computers in Human Behavior*, 25, 1367-1372.
- 634Shen, C., & Williams, D. (2010). Unpacking Time Online: Connecting Internet and MMO use with Psycho-  
635 social Well-being. *Communication Research*, 38(1), 123-149.

- 636Trepte, 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.
- 638Turtle, S. (2011). *Alone together*. Basic Books, New York: NY.
- 639Williams, D. (2006). Groups and goblins: the social and civic impact of an online game. *Journal of*  
640 *Broadcasting & Electronic Media*, 50 (4), 651-670.