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The social side of gaming: How playing online computer games creates online and offline social support

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ABSTRACT

Online gaming has gained millions of users around the globe, which have been shown to virtually connect, to befriend, and to accumulate online social capital. Today, as online gaming has become a major leisure time activity, it seems worthwhile asking for the underlying factors of online social capital acquisition and whether online social capital increases offline social support. In the present study, we proposed that the online game players' physical and social proximity as well as their mutual familiarity influence bridging and bonding social capital. Physical proximity was predicted to positively influence bonding social capital online. Social proximity and familiarity were hypothesized to foster both online bridging and bonding social capital. Additionally, we hypothesized that both social capital dimensions are positively related to offline social support. The hypotheses were tested with regard to members of e-sports clans. In an online survey, participants ($N = 811$) were recruited via the online portal of the Electronic Sports League (ESL) in several countries. The data confirmed all hypotheses, with the path model exhibiting an excellent fit. The results complement existing research by showing that online gaming may result in strong social ties, if gamers engage in online activities that continue beyond the game and extend these with offline activities.

1. Introduction

Online gaming has been shown to trigger a considerable number of negative outcomes. It has been demonstrated to increase the risk for isolation especially for younger users (Orleans & Laney, 2000), has been linked to excessive playing and the development of game addictions (Gruesser, Thalemann, & Griffiths, 2007), and to the erosion of offline friendships (Kraut, Rice, Cool, & Fish, 1998b; Kraut et al., 1998a). On the other hand, scientific research has also accumulated first evidence for positive outcomes of gaming (Huvila, Holmberg, Ek, & Widén-Wulff, 2010; Reinecke, 2009; Trepte & Reinecke, 2011; Williams et al., 2006). For instance, Williams et al. (2006) have shown that gaming may extend players' preexisting relationships. Gamers report that the social side of gaming is important to them and one of the strongest motivators to engage in gaming (Frostling-Henningsson, 2009; Jansz & Martens, 2005; Jansz & Tanis, 2007).

Previous research on social interaction and friendship formation has differentiated two types of social ties, which may contribute to our understanding of the social implication of games: bridging and bonding social capital (Castiglione, Van Deth, & Guglielmo, 2008; Putnam, 2000). Bridging social capital refers to weak social ties in which people feel informed and inspired by each other. Bonding social capital refers to strong social ties delivering emotional support and understanding (Steinkuehler & Williams, 2006; Williams et al., 2006). Gaming as well as other online activities have been shown to increase bridging social capital (Huvila et al., 2010; Steinkuehler & Williams, 2006; Williams et al., 2006). However, there are mixed results in terms of bonding social capital: Some studies have revealed positive effects of online gaming on bonding social capital online (Huvila et al., 2010), whereas others provide a rather pessimistic view (Steinkuehler & Williams, 2006; Williams et al., 2006). Preceding studies addressing online predictors of offline social support have found no or only weak influences (Huvila et al., 2010; Williams et al., 2006). In that respect, results with regard to online games are similar to those found for other online settings such as social network sites or online communities (Lee & Lee, 2010; Pollet, Roberts, & Dunbar, 2011; Vergeer & Pelzer, 2009).

Today, research on social capital in online games has reached a point where the key variables are thoroughly investigated, yet a deeper analysis of the underlying psychological factors is still missing. To complement existing research, it seems fruitful (1) to ask what factors generate bridging and bonding social capital and (2)

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to establish a model that predicts offline social support by taking into account these factors.

As online gaming accounts for a 10% share of the time US Americans spend online, its influence on social interaction in general, and on friendships in particular is a pressing question (Nielsen, 2010). To expand our knowledge of the factors accounting for bridging and bonding social capital in online gaming, a social psychological approach that addresses in-group behavior seems well suited. In social psychological research on close relationships, it has been demonstrated that *physical* and *social proximity* as well as *familiarity* breed friendship initiation and formation (Furnham, 1989; Regan, 2011). Physical proximity refers to the face-time people share, social proximity describes how close people are in terms of mutual availability and accessibility, and familiarity is based on the frequency of interpersonal exposure. The more physically and socially proximate people are and the more familiar they perceive each other, the more likely they are to get in touch with each other and become friends. Thus, to answer the two research questions stated above, social psychological research on relationship initiation and formation will be taken into account (Sprecher, Wenzel, & Harvey, 2008).

To investigate these questions, e-sports clans seemed particularly well suited. In computer and video gaming, a clan or a guild is a group of players that play online games together (Williams et al., 2006). E-sports clans are teams formed for competitive gaming. The gamers may get in touch with each other personally, but are not obliged to.

In the following Section 1.1, we will address how and why gaming itself and social interaction that extends beyond the game may increase social capital, and whether clan social capital determines offline social support. To do so, we will first address research on social capital and online gaming. After that, we will discuss three mechanisms influencing social capital: physical proximity (cf. Section 1.2.1), social proximity (cf. Section 1.2.2) and familiarity (cf. Section 1.2.3). We will then propose a model that introduces these as independent variables fostering bridging and bonding social capital, and thus promoting offline social support (cf. Section 1.3). The model will be investigated in an e-sports setting (cf. Section 2 for methods) and tested using path analysis (cf. Section 3 for results). In the final section, the theoretical implications of the results will be discussed, and practical applications will be deduced (cf. Section 4).

1.1. Social capital in online gaming

Social capital has become a key concept in analyzing personal interactions and relationships (Castiglione et al., 2008). It subsumes the positive outcomes and resources individuals and societies derive from personal relationships and interpersonal contacts (Putnam, 1995). These outcomes can either be material, or refer to information, or social support (Williams, 2006). The concept can be split into two dimensions: bridging and bonding social capital. The first encompasses loose relationships which broaden one's perspective and are not restricted to one's age group, ethnicity, profession, or other key aspects of one's identity. Bridging social capital does not typically yield emotional support, but can be valuable in uncertain times, e.g., for monetary support or adjusting into a new job (Steinfield, Ellison, & Lampe, 2008). Bonding social capital refers to close relationships, which do yield emotional support. Social capital has seen a rise of interest since Putnam's (2000) systematic approach, and it has been used in scientific research for many years (Adler & Kwon, 2002).

An extensive body of research deals with the acquisition of social capital in various online fields, such as social network sites (Pollet et al., 2011; Steinfield et al., 2008; Valenzuela, Park, & Kee, 2009), online communities (Beaudoin & Tao, 2007; Lee & Lee, 2010), blogging (Ko & Kuo, 2009), communicating or gathering information in online settings (Skoric, Ying, & Ng, 2009), and online gaming (Cole & Griffiths, 2007; Huvila et al., 2010; Steinkuehler & Williams, 2006; Utz, 2000; Williams et al., 2006).

Studies on the impact of gaming on social capital have demonstrated that the acquisition of social capital is usually restricted to bridging social capital and only rarely extends to bonding social capital (Huvila et al., 2010; Steinkuehler & Williams, 2006; Williams et al., 2006). For instance, Steinkuehler and Williams (2006) have shown that gamers in MMOs accumulated weak, but no strong social ties in their guilds. Thus, it seems justified to ask, why bonding social capital seems to be harder to acquire in online realms, and what the underlying factors of the formation of both bridging and bonding social capital might be. Both questions will be addressed in the following section.

1.2. Determinants of social capital

Taking into account the fact that social capital may be considered a result of friendship formation, we now take a closer look at the processes of friendship initiation and formation. Social psychological research on friendship initiation and formation identifies different factors determining whether strangers develop a liking for each other (Sprecher et al., 2008). Among the factors that best predict relationship development are physical proximity, social proximity, and familiarity (Furnham, 1989; Regan, 2011). As bridging and bonding social capital are an output of and an indicator for loose and strong social ties, we can assume that they may be predicted by similar mechanisms. Consequently, these factors and their potential to predict bridging and bonding social capital will be addressed in the following.

1.2.1. Physical proximity

Physical proximity refers to the availability and accessibility of others for interaction (Furnham, 1989). Numerous studies have demonstrated that individuals who are within physical reach are more likely to become friends (Fehr, 2008). Physical proximity has often been described as a 'law' of affiliation, because it permits interaction partners to get in touch with each other (Regan, 2011). Physical proximity does not guarantee attraction. However, affiliation and attraction are more likely to occur for physically proximate than for physically distant interaction partners.

In the realms of online gaming, other players seem to be quite available and accessible in the virtual world and in terms of their virtual identity, but they usually are physically distant. Steinkuehler and Williams (2006) have pointed out that a lack of physical proximity might be the crucial factor constraining deep emotional support in online game communities: "[...] if the benchmark for bonding social capital is the ability to acquire emotional, practical, or substantive support, then MMOs are not well set up for the task: While deep affective relationships among players are possible, they are less likely to generate the same range of bonding benefits as real-world relationships because of players' geographic dispersion [...]" (p. 906). Thus, it can be assumed that getting in touch with each other physically is a crucial precondition for bonding social capital. In contrary, bridging social capital appears less demanding. To acquire loose social ties, it seems to be sufficient or even more efficient to get in touch with each other virtually. Consequently, we assume that a predominance of physical proximity over virtual proximity should generate bonding social capital online, whereas physical proximity and the resulting social interaction makes the formation of bridging social capital in form of only loose or superficial social ties less likely. Accordingly, H1 predicts that:

H1a. Physical proximity will be positively related to clan bonding social capital.
H1b. Physical proximity will be negatively related to clan bridging social capital.

1.2.2. Social proximity

Social proximity refers to the closeness of social networks (Furnham, 1989; Regan, 2011). People are considered to be socially proximate, if they are mutually accessible (Parks, 2007). Individuals who are in central positions within a network are usually more accessible than other, more distant interaction partners (Arriaga, Agnew, Capezza, & Lehmiller, 2008). Social proximity facilitates initial contact, for example through shared social norms (Regan, 2011). Similar to physical proximity, social proximity has been shown to positively influence attraction and affiliation in numerous studies (Regan, 2011).

E-sports players who are involved in the administration and management of their clan should experience an increase in social capital as they get in touch with nearly all clan members (therefore increasing bridging social capital) and, more closely, with those gamers showing the highest clan involvement (therefore increasing bonding social capital). Ducheneaut, Moore, and Nickell (2007) investigated sociability in MMOs and critically noted that "The focus in current online games on progress and 'leveling' is also at odds with the need for places where players can 'wind down', relax, and socialize with each other. In other words, the game's social spaces can be easily invaded by a peculiar form of 'game-work'' '(p. 163), characterized by a constant need for accomplishing missions and improving one's character. Both, research on friendship formation and results on the acquisition of social capital in online gaming (cf. preceding section) suggest that friendships as well as loose social ties seem to be brought into life, if gamers interact beyond the game. Such activities may include involvement in organizational and administrative tasks that are required to keep the clan up and running. Hence, H2 predicts that:

H2a. Social proximity will be positively related to clan bonding social capital.
H2b. Social proximity will be positively related to clan bridging social capital.

1.2.3. Familiarity

Familiarity refers to the social psychological notion that humans have a liking for the familiar (Furnham, 1989; Regan, 2011). The effect of merely being exposed to somebody has been shown to produce a preference for that person (Zajonc, 2001). The more individuals are socializing with each other, the closer they get and feel. Familiarity promotes the acquisition of relationships, because of the interaction partners' increasing similarity (Regan, 2011). Similarity of attitudes, demographic characteristics, traits, interests, and hobbies have been shown to influence attraction and liking in offline (Byrne, 1971, 1997), as well as in online environments (Antheunis, Valkenburg, & Peter, 2010). Thus, familiarity should serve as a predictor for both dimensions of social capital, bridging as well as bonding. Therefore, H3 states:

H3a. Familiarity will be positively related to clan bonding social capital.
H3b. Familiarity will be positively related to clan bridging social capital.

Thus, bridging and bonding social capital are suggested here to be determined by physical and social proximity as well as by familiarity. In Section 1.3, we will elaborate on how online bridging and bonding social capital may determine offline social support.

1.3. Transferring online social capital into offline social support

Previous research has often come to the conclusion that social capital seems to be restricted to the online context in which it is acquired and that it may not be transferred to offline worlds (Lee & Lee, 2010; Miyata & Kobayashi, 2008; Pollet et al., 2011; Vergeer & Pelzer, 2009; Williams, 2007). Only few studies have found a relationship of *online* activities and *offline* social support (Lee & Lee, 2010; Pollet et al., 2011; Stern & Adams, 2010; Vergeer & Pelzer, 2009). Taking a closer look at prior research reveals that the results largely seem to depend on how online activities – as the predictor of offline social support – have been defined and measured within the studies. One set of studies *directly* relates the frequency or duration of online uses to social support and usually comes to the conclusion that online activities have no influence on social support. A second set of studies proclaims *indirect* relationships in terms of statistical mediation. This second set of studies suggests a relationship between online activities and social capital and, in turn, between social capital and offline social support and comes to different conclusions. Both sets of studies will be reflected in the following.

The first set of studies that fail to demonstrate a significant relationship between online activities and offline social support tend to investigate the frequency, duration, or intensity of online exposure as factors determining offline social support (Lee & Lee, 2010; Miyata & Kobayashi, 2008; Pollet et al., 2011; Vergeer & Pelzer, 2009; Williams, 2007). For online games, Williams (2007) reported that the frequency of online gaming had a negative impact on bonding social capital offline, as well as on interpersonal trust and that it was positively associated with feelings of loneliness. He investigated the impact of game play in a field-experiment, where ($N = 347$) participants were provided with a game and completed a survey prior to and 1 month after game play. Thus, in this study game use was operationalized based on exposure to the game. Huvila et al. (2010) demonstrated that Second Life users form social capital in the virtual world, but found no evidence for an influence of the users' online activities on their offline social support. In their study, Huvila et al. (2010) operationalized usage intensity as the amount of content produced by the users in Second Life.

Similar results were found for other forms of online activities. For instance, Pollet et al. (2011) found no significant relationship between the time spent using social network sites or instant messaging and the strength of the users' offline social networks. Similarly, Vergeer and Pelzer (2009) have demonstrated that the time spent on socializing with others online is unrelated to offline social support. Additionally, the number of family members, friends, and acquaintances participants communicated with during the preceding week via e-mail, chat, or instant messaging, was also unrelated to offline social support in their study. Analogously to these recent studies, the 'first generation' of longitudinal studies on the effects of internet use has demonstrated that the duration and frequency of internet use is not or negatively related to offline social support (Kraut et al., 1998a, 1998b). Thus, the majority of previous studies that proposed a *direct* relationship between online activities or mere exposure to online games failed to demonstrate significant results.

In a second set of studies the relationship between online activities and offline social support is assumed to be *mediated* by online social capital. A number of studies investigating the accumulation of online social capital via social network sites (Vergeer & Pelzer, 2009), instant messaging (Valkenburg & Peter, 2007), or e-mail communication (Miyata & Kobayashi, 2008) have revealed that online social capital in fact is related to offline social support (Stern & Adams, 2010). In the context of online gaming, Williams et al. (2006) have demonstrated that approximately 50% of World of

Warcraft users seem to be able to extend their offline friendships to the online game, and that bonding social capital (extending online friendships to offline realms) was established by approximately 5% of the players. The authors argue that the formation of offline social support highly depends on the game's infrastructure and that physical proximity and activities beyond the game could possibly increase the share of users that successfully transfer online social capital into offline social support. Also, Steinkuehler and Williams (2006) argue that "[...] it is difficult to provide one another rides to work or a literal shoulder to cry on when friends live in different states and time zones. As to the latter, the persistent 'playful mood' (Oldenburg, 1999) of the third place of MMOs often stymied players' attempts to engage in emotionally weighty conversation." (p. 906).

Two constitutive arguments support the notion that bridging and bonding social capital in online gaming may foster players' offline social support. First, previous studies found that bridging and bonding social capital formed in online contexts fosters offline social support in settings such as social network sites or instant messaging. Second, the clan's structure may possess the mechanisms necessary for a transition from online to offline friendships, because it can provide physical and social proximity as well as familiarity which are crucial preconditions for the formation of bridging and bonding social capital. Therefore, H4 predicts:

H4a. Clan bonding social capital will be positively related to offline social support.
H4b. Clan bridging social capital will be positively related to offline social support.

1.4. Mediation hypotheses

We have hypothesized that familiarity and social proximity are positively related to bridging and bonding capital, and that physical proximity positively determines bonding social capital. Additionally, we have proposed that bridging and bonding social capital influence the acquisition of social support. It thus seems plausible to argue that bridging and bonding social capital will act as mediators for the effects of familiarity, physical and social proximity on offline social support.

H5a. Physical proximity will have a positive indirect effect on offline social support.
H5b. Social proximity will have a positive indirect effect on offline social support.
H5c. Familiarity will have a positive indirect effect on offline social support.

The predicted path model including all statistical relationships predicted in H1–H5 is depicted in Fig. 1.

2. Methods

2.1. Sample and procedure

Participants (N = 811) were recruited via the online portal of the Electronic Sports League (ESL). An invitation to participate in an online survey on e-sports was posted in the news sections of the websites of the ESL Europe (http://www.esl.eu) and the German subdivision of the ESL (http://www.esl.eu/de/). Respondents received no compensation for their participation in the survey. However, ESL merchandising (two backpacks and two t-shirts) was raffled among all participants. The ESL, which currently has more than 3.2 million international members, provides clans with the possibility to engage in matches against other clans. The majority of participants (n = 524) lived in Germany; the remaining participants lived in 25 other countries, among them Bulgaria (n = 61), Russia (n = 46), Spain (n = 22), and Italy (n = 19). 96.8% were male (n = 785) with ages ranging from 13 to 78 years (M = 19.08 years, SD = 4.28 years). Participants' favorite game genres were first-person shooters (69.1%), action (14.3%), and strategy games (7%).

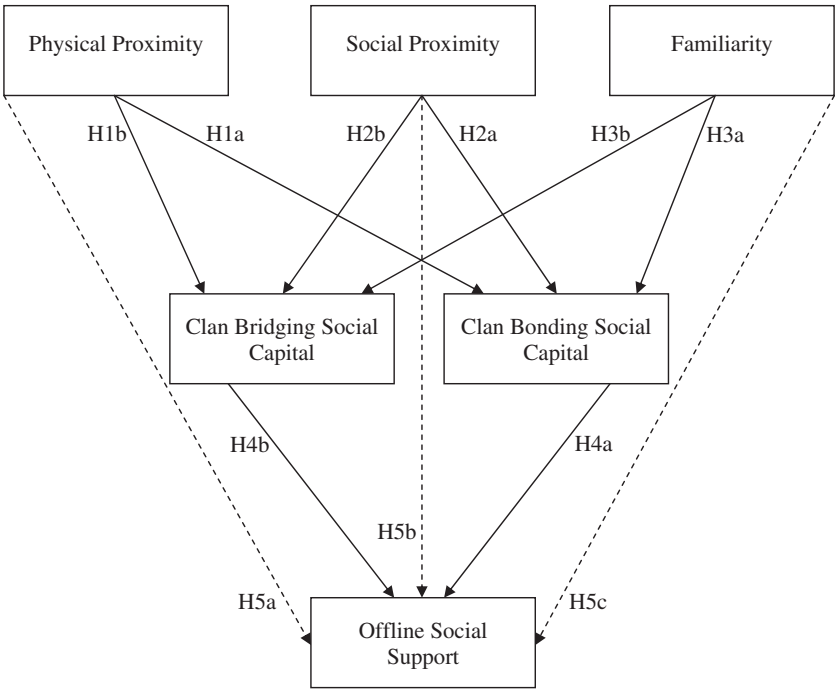

Fig. 1. Hypothesized path model with hypotheses labeled.

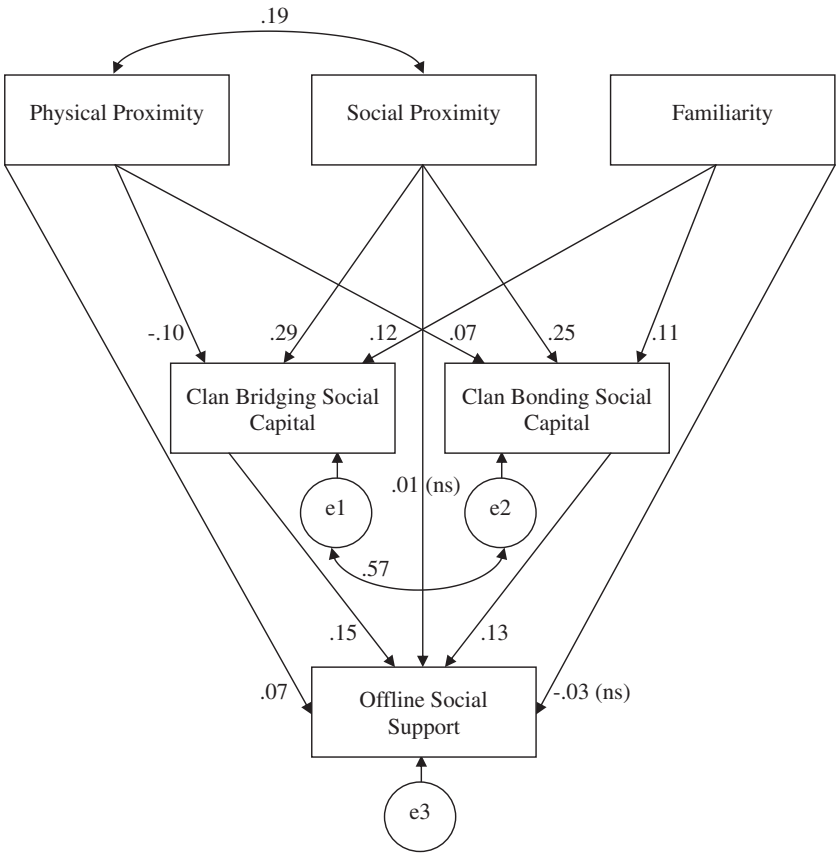

Fig. 2. Path model of the tested hypotheses. Reported beta coefficients are significant at $p < .05$.

Participants were member in at least one clan for a mean duration of 13.9 months (SD = 18.5) at the time of the survey.

2.2. Measures

2.2.1. Clan social capital

Participants responded to 10 items from Williams' (2006) Internet Social Capital Scales on a five-point scale ranging from 1 "does not apply at all" to 5 "does fully apply". Items were edited to fit the clan context (e.g., "There is someone in my clan I can turn to for advice about making very important decisions"). The items formed two subscales – clan bridging and clan bonding social capital – with five items each. For clan bridging social capital (M = 3.65; SD = .86) Cronbach's α was .786 and for clan bonding social capital (M = 3.47; SD = .86) α was .702.

2.2.2. Offline social support

The UCLA Social Support Inventory (UCLA-SSI) was used to assess offline social support (Dunkel-Schetter, Feinstein, & Call, 1986). The UCLA-SSI assesses three types of social support received: (a) Informational support in form of advice, (b) tangible support in form of assistance, and (c) emotional support in form of reassurance and listening. Participants were instructed to indicate how often they had received these forms of support during the preceding 4 weeks by (a) friends, (b) relatives, (c) partners, and (d) groups or organizations on a scale from 1 "never" to 5 " very frequently". Scores were summed up and averaged to form a single indicator (M = 3.18, SD = .74, α = .864).

2.2.3. Physical proximity

We assessed physical proximity with four items (e.g., "We always meet offline to practice") on a 5-point scale from 1 "does not apply at all" to 5 "does fully apply" (M = 2.04, SD = .93), Cronbach's α = .694.

2.2.4. Social proximity

Social proximity refers to the mutual accessibility of clan members. As members who are engaged in clan administration have to get in touch with others, we assessed social proximity based on the involvement in clan administration. The four items ("In my clan, I spend a lot of time on organizing the clan", "In my clan, I'm the team leader", "I'm the manager of my clan", "I'm not involved in the clan organization very much" (reverse coded)) were rated on a 5-point scale from 1 "does not apply at all" to 5 "does fully apply" (M = 3.02, SD = 1.29), Cronbach's α = .819.

2.2.5. Familiarity

In the e-sports setting, mechanisms that increase the players' mutual encounters and contact frequency should be a good indicator of familiarity. We assessed familiarity with the frequency of mutual exposure which is the training frequency. Participants responded to the item "How often do you and your clan practice?" on a 7-point scale from 1 "never" to 7 "daily" (M = 6.01, SD = 1.4).

3. Results

Zero-order correlations among all variables as well as their means and standard deviations are presented in Table 1. All paths predicted in Hypotheses 1–5 were tested using path analysis computed with the AMOS 19 statistical package using the maximum likelihood method. As physical proximity and social proximity showed a significant zero-order correlation (cf. Table 1), both variables were allowed to co-vary in the model. Furthermore, as clan bonding and clan bridging social capital showed a significant

Table 1
Means, standard deviations, and zero-order correlations.

	M	*SD*	1	2	3	4	5	6
1. Familiarity	6.01	1.40	–					
2. Social Proximity	3.02	1.29	−.05	–				
3. Physical proximity	2.04	.93	.01	.19**	–			
4. Clan bonding social capital	3.47	.86	.09**	.26**	.12**	–		
5. Clan bridging social capital	3.65	.86	.10**	.27**	−.04	.69**	–	
6. Offline social support	3.18	.74	.00	.10**	.08*	.23**	.22**	–

** $p < .01$.
* $p < .05$.

zero-order correlation (cf. Table 1) the disturbance terms of both variables were allowed to co-vary within the model. Model fit was estimated based on established fit criteria. Model fit was considered acceptable with a minimum discrepancy statistic (CMIN/*df*) below 2.00 (Byrne, 1989), a root mean square error of approximation (RMSEA) below .06 (Hu & Bentler, 1999), and a comparative fit index (CFI) above .95 (Hu & Bentler, 1999). With CMIN/*df* = 1.26, RMSEA = .02 (90% confidence interval from .00 to .07), and CFI = .99, the model exhibited a good fit. The statistical model is presented in Fig. 2.

As predicted in H1, physical proximity showed a significant positive relation to clan bonding social capital ($\beta = .07$, $p < .05$) and a negative relation to clan bridging social capital ($\beta = -.10$, $p < .01$).

Furthermore, confirming H2, social proximity was positively related to both clan bonding social capital ($\beta = .25$, $p < .001$) and clan bridging social capital ($\beta = .29$, $p < .001$). Familiarity was positively related to both clan bonding social capital ($\beta = .11$, $p < .01$) and clan bridging social capital ($\beta = .12$, $p < .001$), thus confirming hypothesis 3.

Both clan bonding social capital ($\beta = .13$, $p < .01$) and clan bridging social capital ($\beta = .15$, $p < .001$) were significant predictors of offline social support. Hypothesis 4 was therefore confirmed.

Hypotheses 5a–5c predicted a positive indirect effect of physical proximity, social proximity, and familiarity on offline social support, mediated by bonding and bridging clan social capital. When controlling for the influence of bonding and bridging clan social capital, neither social proximity ($\beta = .01$, $p = .88$) nor familiarity ($\beta = -.03$, $p = .42$) had a significant direct effect on offline social support, whereas physical proximity showed a small but significant positive direct effect on offline social support ($\beta = .07$, $p < .05$). Following the procedure recommended by Preacher and Hayes (2008), the indirect effect of physical proximity, social proximity, and familiarity on offline social support was bootstrapped with 5000 bootstrap samples with replacement. Both social proximity ($\beta = .08$, $p < .001$, 90% bias-corrected confidence interval from .06 to .10) as well as familiarity ($\beta = .03$, $p < .01$, 90% bias-corrected confidence interval from .02 to .05) showed a positive indirect effect on offline social support. In contrast to that, physical proximity did not show a significant indirect effect on offline social support ($\beta = -.01$, $p = .61$, 90% bias-corrected confidence interval from −.03 to .01). Consequently, H5b and H5c were confirmed, whereas H5a was not supported by the data.

The final model is presented in Fig. 2. The model explains 9% of the variance in clan bonding social capital ($R^2 = .09$), 10% of the variance in clan bridging social capital ($R^2 = .10$), and 7% of the variance in offline social support ($R^2 = .07$).

4. Discussion

Physical and social proximity as well as familiarity have previously been described as mechanisms of friendship initiation and formation (Fehr, 2008; Regan, 2011). We thus proposed a significant statistical relationship between theses three variables and clan bridging as well as clan bonding social capital. In the present study, we referred to physical proximity as the amount of real life encounters clan members have, operationalized social proximity with regard to the participants' involvement in clan administration, and assessed familiarity based on the clan members' training frequency. All three variables showed significant relations to clan bridging and bonding social capital. Involvement in clan administration which was assessed as an indicator for social proximity, turned out to be the strongest predictor of clan social capital. Furthermore, the study revealed that physical proximity was differentially related to bonding versus bridging social capital and seems to be more beneficial and relevant for the acquisition of bonding social capital. Both bridging and bonding social capital were positively related to offline social support. Furthermore, clan social capital was a significant mediator variable that led to significant positive indirect effects of training frequency and involvement in clan administration on offline social capital. Overall, the data confirmed our assumption that gaming in clans may foster the gamers' offline contacts to other clan members, and may thus provide them with additional social support.

Previous research has often assumed that online interactions are not suited to generate offline social support (Lee & Lee, 2010; Miyata & Kobayashi, 2008; Pollet et al., 2011; Vergeer & Pelzer, 2009; Williams, 2007). While earlier studies that aimed at finding a *direct* connection between the mere exposure to online games or other online contexts and offline social support failed to find positive effects, our study demonstrates that online gaming does in fact show a positive relation to offline social support, if *underlying factors and processes* such as familiarity, physical- and social proximity, as well as online social capital are taken into account. Based on preceding research as well as the results of the present study, two conclusions appear justified:

First, social proximity seems to be the most reliable predictor of social support. Members involved in clan-related tasks have a better chance to get in touch and thus to benefit from other predictors of friendship formation such as familiarity. Consequently, they are more likely to establish supportive relationships. It seems crucial to note that gamers particularly benefit in terms of offline social support, if they engage in clan activities beyond the game. This does not necessarily imply that they engage in other leisure time activities together or meet offline. Mere commitment to the formal management of the clan seems to enhance interaction with other clan members and team-building and is beneficial for the social support gained from clan life. Previous qualitative studies have suggested that gamers may increase their social support, if games would provide them with opportunities to "wind down" (Ducheneaut et al., 2007, p. 163) and socialize rather than merely focusing on their progress within the game. This assumption is supported by our data: As soon as gamers go one step beyond mere competition and ambitions solely related to game-play and engage in any kind of game- or team-management, they seem to gain more social support in both settings, online as well as offline.

Second, the present research contributes to a long research tradition in social psychology that has identified the predictors of

friendship formation in offline settings (Fehr, 2008; Furnham, 1989; Regan, 2011) by demonstrating the applicability and validity of these predictors for friendship formation in online realms. In the present study, three predictors of friendship formation that have been indentified in previous research on offline friendships provided significant direct or indirect links between online activities (gaming in clans) and offline social support. The present study thus reveals that the underlying mechanisms of social support in an online gaming context resemble the psychological principles of offline friendship formation and demonstrates that the use of traditional "offline concepts" developed in social psychology may be equally fruitful to expand our knowledge on the formation of online social capital in future research.

4.1. Limitations

Due to its cross-sectional nature, the results of the present study may underlie certain limitations. No causal attributions can be drawn concerning the direction of the variable's interrelations. Further longitudinal research is needed to indicate long-term effects of e-sports and clan membership on online social capital as well as on offline social support.

A second potential limitation refers to the measures of physical proximity and social proximity as well as familiarity used in the present study. To increase the reliability and validity of the measures, items referring to overt patterns of behavior (e.g., training frequency) or observable forms of social interaction within the clan (e.g., predominance of online vs. offline interactions or involvement in clan administration) rather than subjective feelings of physical proximity, social proximity, and familiarity were applied. We believe that these behavior-based items provide reliable and valid measures of the respective constructs. At the same time, however, the breadth of the used indicators is limited: involvement in clan administration, for example, is by no means the only indicator of social proximity. The same applies to the indicators used to assess physical proximity and familiarity. The findings of the present study should therefore be replicated with additional empirical indicators of these theoretical constructs.

Finally, the present study was located in an e-sports setting. E-sports clans may differ from other settings of game play with regard to the opportunities they provide for players to get in touch personally and to engage in mutual activities (e.g., organizing tournaments) that go beyond the game. Thus, in order to generalize the results, the present study will have to be replicated with regard to other gaming contexts than e-sports. Although the e-sports setting is a specific gaming context and may be especially well suited to foster social interaction as compared to other online games, we believe that our results are not restricted to this setting, but that all games may be suited to generate social capital as soon as players are able to establish physical and social proximity as well as familiarity.

4.2. Conclusions

The results of the present study have revealed three underlying processes – physical proximity, social proximity, and familiarity – that either directly or indirectly determine the formation of offline social support through gaming in e-sports clans. These results have practical implications that could proof beneficial especially with regard to the protection of younger video game players who are particularly at risk of excessive gaming and thus of facing social isolation. Implementing mechanisms that foster physical-and social proximity as well as familiarity in gaming and hence supporting the formation of social capital might help buffering the potential negative effects of online gaming by transforming games into an activity with a positive potential for offline friendships.

Prior research on online gaming (Steinkuehler & Williams, 2006; Williams et al., 2006) as well as the results of the present study suggest that beneficial effects of online gaming on online social capital and offline social support are particularly likely the more users interact both in online and offline settings. Mutual activities that go beyond game play may thus make gaming in general and e-sports in particular a valuable social resource.

Finally, games and their social effects may also be applicable in clinical contexts. The social side of gaming might be particularly beneficial for physically disabled persons who suffer from limited mobility and a lack of social interactions and social capital. An advanced understanding of the factors influencing the formation of bridging and bonding social capital in the context of gaming as well as offline social support thus appears highly promising both in terms of theory building and our scientific view on the effects of video games as well as with regard to the practical use of games as facilitators of social interaction.

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