

Reciprocity in social network games and generation of social capital

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THE PROBLEM

The research on the effects of video games tends to be divided. On one hand, we see scholars discussing relationships between games and problematic disorders, such as addiction, aggression, loneliness, and obesity. On the other hand, there are scholars who point out that games can produce positive outcomes, such as learning or increased awareness of social phenomena.

What does this tell us about video games? The research implies that games can be both good and bad, and that different elements about the game play lead to these very different outcomes. But what are those elements? Unfortunately, social science has not given much consideration to this seemingly obvious question.

Part of the reason for the lack of literature addressing the antecedents of game play (rather than the outcome) was that it was perceived as being a technologically deterministic approach. Social scientists wish to believe that human behavior is something that can be cognitively. This paradigm has led most of the research on media effects, which examine socio-psychological factors that are unique to the individual¹⁶—such as motivation, cognitive capacity, and personality.

Recently, social scientists have started to look beyond the individual and focus more on the social effects of game play. In the past few years, growing literature has addressed social interactions within games, namely massively multiplayer online games.¹⁸ This area of research took a slightly different approach from previous games research in that scholars tried to become more familiar with the mechanics of the game and found that indeed, the design of the game affects how players socially interact. The research on massively multiplayer online games (MMOs) still remains, however, a very small area in the broad scope of mass media research. One of the reasons may be that although there are quite popular, games such as *World of Warcraft* are not yet a part of mainstream culture, at least in the United States.

In the past two or three years, however, we have seen a striking shift in the video game market, mainly due to the rise of casual games. Casual games are simple games that do not require sophisticated technology or lengthy time requirements. They are also usually free or cost very little

in comparison to traditional console games or MMOs. The player demographics of casual games are broader; women represent 60% of all casual game players, and older adults enjoy playing casual games. Moreover, casual games have started to take on network components, mainly through social network sites such as Facebook.^{19,20}

Social network games

Social network games (SNGs) are a unique subset of video games; they are game applications that incorporate network data from social network sites such as Facebook.^{19,20} Defining this type of game is important, as the industry was calling these games “social games.” The term “social game” can be misleading because any game that involves more than one person can technically be “social.”

On any given day, millions of people are playing SNGs. In February, 2011, Inside Network⁹ reported that more than 90 million people were playing *Cityville*, the number one game application on Facebook. SNGs are a collection of different game genres, all of which have different play mechanics. Some games, such as *Farmville* or *Café World*, are simulation games about resource allocation and customization, while games like *Mafia Wars* or *Castle Age* are similar to traditional strategy games. Other SNGs are adaptations of previous popular casual games and include board, word, card, and arcade games.

Despite these genre differences, SNGs share many functional commonalities. Because they are connected with social networking sites, this allows for many types of social interactions—some take place within the game, but others extend outside of the game as well.

UNIQUE APPROACH

I did not want to “take sides” and present research that supported utopian or dystopian viewpoints. Rather, I was interested in how different outcomes occurred and the role of specific game mechanics in SNGs that would produce different outcomes. However, instead of focusing on the technology per se, I approached this question from a theoretical standpoint and used multiple methods of social science inquiry to unravel the process of game play, examining how motivations affect how people play, and how people play affects different outcomes.

Study 1: Why do people play and how?

The first step of the research was a survey of Facebook game players ranging from 19 to 70 years of age, and was presented at the SRC at CHI2010 with three other co-authors.¹⁹ We found that players of SNGs wanted to build common ground, reciprocate, pass time, and cope. We also identified seven types of play: customizing one's avatar, customizing one's in-game space, publishing game achievements, advancing one's level, caring about mechanics, exchanging gifts, and spending real money.

More important than identifying these factors was the relationships between the factors. Using correlations, the data suggested that most players of SNGs were not playing to be social. However, the people who *were* playing to seek social outcomes were engaging in more diverse forms of use: common ground seekers devoted more energy to customizing their avatar, customizing their in-game space, publishing their game status on their Facebook wall, and were more inclined to spend real money.

The most interesting result was that gift exchange was an important mechanism of SNGs that facilitated reciprocity, but reciprocity was not showing any connection to variables that are traditionally considered as being "social." This suggested that reciprocity in SNGs was strongly prompted by the design and warranted further study.

Study2: The meaning of gifts

The second study was a qualitative study based on semi-structured in-depth interviews with 18 adult Facebook users.¹⁹ Interviewees talked in length about why they play games, the relationships with their game "neighbors" and how the games affected those relationships.

Consistent with the survey data from Study 1, most interviewees tried to become in-game friends with other people in order to make their game play easier. These "selfish" motivations were making up most of the reasons why people started the game: they were inviting their friends or invited by their friends. However, taking a step further, they were also saying that despite the selfish intentions, playing the game together helped maintain, or in cases, enhance their relationship with the other player.

In particular, interviewees talked about how they perceived certain elements of game play as communicative cues. For example, some interviewees said that in a farm simulation game, they perceive in-game "helping" activities such as fertilizing a neighbor's crops, as a proxy for more general kindness. Players were adding sentimental value to these in-game activities; these interviews suggested that reciprocity, fostered through the exchange of game mechanics such as gift exchange or helping behavior, was playing a large role in increasing positive affect towards other players and even providing players with a sense of belonging to a larger group.

Social capital is the potential resource that an individual has due to relationships with other people in her or her personal network. The concept of social capital was introduced by Bourdieu³ and Coleman⁵ as a form of capital

that can include human capital and physical capital. Putnam¹⁵ introduced the concept of "bridging" and "bonding" social capital to describe the different types of resources associated with the quality of relationships within an individual's network. Putnam¹⁵ suggested that weak ties provide bridging social capital, which refers to resources such as novel information and diverse perspectives, and that strong ties (close friends and family) provide social and tangible support.

Although interviewees were not using the term *per se*, their testimonies suggested that their game play was generating bonding social capital. Their sentiments echoed similar findings in MMOs, where ethnography and interviews also detected creation of social capital among players.¹⁸ However, these studies are limited in that they cannot determine precisely what factors lead to social capital, which led me to Study 3.

Study3: Reciprocity and social capital

Study 3 was an attempt to isolate the mechanism of reciprocity and see how much of social capital generation it explains. I used the framework of social exchange theory, primarily based on the work of Homans⁸, John Thibaut and Harold Kelley¹⁷, and Peter Blau¹. These theorists were mainly interested in the micro-sociological analysis of the process underlying social relations.

Social exchange describes exchange of resources that occurs between actors within a certain structure. Actors, whether they are individuals or groups, are driven by self-interest and are motivated by the desire to obtain valued benefits.^{1,12} Reciprocity is a contingency intrinsic to all social exchange; a mechanism that "reinforces and stabilizes tendencies inherent in the character of social exchange itself".¹ It is a factor that differentiates social exchange from economic exchange and altruism: economic exchange is a negotiated exchange while altruism is the act of giving something with no expectation of any future returns.²

The reciprocity in social network games, however, is different from the traditional concept of norm of reciprocity described in social exchange paradigms. Social network games facilitate two different types of exchange. When one player gives a resource to another player, the game system provides an immediate reward. This is a typical example of economic exchange between the player and the system.

At the same time, the giver can still anticipate an unspecified return from the receiver, a classic example of social exchange. Study 2 showed that players were experienced enhanced social bonds through the process of exchange. In this dual-exchange environment where reciprocity is triggered by two different stimuli, does reciprocity still lead to social capital?

Hypotheses

To directly test the effect of reciprocity on generating social capital, an experimental design was employed. Experiments do not always resemble what goes on in the

“real world,” they allow us to directly attribute casual links. Although social network games facilitate various interactions that can be reciprocal, including verbal behavior—such as textual chat and voice chat—as well as non-verbal behavior, this study isolated one type of interaction: helping behavior.

H1. Participants in the reciprocity condition will have higher perceived social capital than participants in the non-reciprocity condition.

Previous research in numerous contexts have shown that females are more likely to reciprocate than males in experimental “game” scenarios^{6,13}. Thus, we would expect gender to have an interaction effect with reciprocity:

H2. Gender will have a moderating effect between reciprocity and social capital.

Accessibility is also an important indicator of social capital¹¹. There have been many approaches on how to measure this. One technique has been to ask a person about their contacts and measure “closeness” through constructs such as intimacy, confidence, and physical distance¹¹. I thus hypothesized that closeness would positively affect social capital. Since physical distance has little meaning in the virtual world, this sense of distance was measured through copresence, the degree to which people in a virtual environment feel like they are sharing the space with people who are physically remote.²¹

H4. Intimacy will positively affect social capital

H5. Confidence (trust) will positively affect social capital⁴

H6. Copresence will positively predict perceived social capital

Method

Undergraduate students taking telecommunication courses in a large mid-Western university were invited to participate in a week-long study in which they would have to become friends with an anonymous student on Facebook play a Facebook game with that student. Participants were offered a \$10 incentive if they completed the study and were also entered in a raffle to win 20 \$10 gift cards. Volunteers were first directed to an online survey, to select those who did not have prior experience with the game used in the experiment.

Participants who filled out the screener survey were randomly assigned to two conditions: a help condition and non-help condition. In the help condition, the experimenter helped participants and responded to their help requests. In the non-help condition, the experimenter did not offer assistance nor respond to any help requests made by the participant.

Ninety participants completed the experiment. One participant in the “no reciprocity” condition was taken out of the analysis because he did not play the game, resulting in 89 participants. There were 45 participants in the “reciprocity” condition; 28 were male and 17 were female. There were 44 participants in the “no reciprocity”

condition; 27 were male and 17 were female. The majority of participants were Caucasian (n=67, 75.3%); there were 10 Asians (11.2%), six African Americans (6.7%), one American Indian (1.1%), three multiracial (3.4%), and two participants who selected “other” (2.2%).

Design and procedure

The experiment employed a 2 x 2 independent groups design looking at the effect of reciprocity (reciprocity, no reciprocity) and gender (male, female) with presence and trust as covariates. Gender was a measured variable, so the only active variable was reciprocity. Reciprocity, however, cannot be manipulated, as it warrants behavior from the participant, so the stimulus was helping and non-helping.

Cityville, a city simulation game on Facebook, was chosen for the experiment. Two Facebook accounts with depersonalized names (“X Person”) were created for the purpose of the experiment. A gender-neutral silhouette was selected for the profile pictures of these two accounts, which were identical. No information about the account holder was provided in the profile.

Participants were instructed to play the game for at least five minutes every day for seven days and become in-game “neighbors” with one of the accounts created by the experimenter. Participants were told that this account was being played by an undergraduate student of the same institution but were not given any guidelines on how to play or whether or not they had to interact with this player. An undergraduate assistant was hired to play the part of the experimenter but was not informed of the hypotheses.

In the game, one can help the participant by visiting the participant’s city and clicking on buildings and other elements of the participant’s property, which generates virtual money for the participant. Although the game is asynchronous, the participant can view the helping behavior of the experimenter when he or she logs into the game: similar to a play-back video, a small icon of the experimenter’s profile picture moves across the screen, showing the participant how he or she was helped.

In the help condition, the experimenter provided help to the participants every day between 9pm and 11pm. In the non-help condition, the experimenter did not help the participants. No other communication took place between the experimenter and the participants other than the in-game behaviors.

After midnight of the 6th day, participants in the helping condition were sent a request for help. On the 7th day, which was the final day of the experiment, all participants in the helping condition responded to the request. Thus, the “helping” and “no helping” conditions translated into “reciprocity” and “non-reciprocity.”

As there was no server-level access to the game, a research assistant manually kept a record of every interaction that took place with the participant and entered the information every day into a spreadsheet; this was double-checked each day by the author for accuracy. The participant’s level in

the game was also recorded daily and screenshots of their virtual city were taken to track their progress.

On the 8th day, participants were sent a message with a link inviting them to the post-experiment survey. This survey asked them about their game play experience (how much time they spent playing the game, how much they enjoyed the game) and their perception about the experimenter.

Measures

Perception about the experimenter was assessed by asking the participant to “think about X, the person you played Cityville with during the past week.” Social capital was a four-item scale (Cronbach’s alpha= .810) adapted from the social capital assessment tool used by Krishna and Shrader for the World Bank¹⁰, which looks at social capital accrued from farming societies and was highly applicable to the context of social network games: “If I needed help, I think I could turn to X,” “If I needed to go away for a few days, I could count on X to help me out,” “Even if the task does not directly benefit X, he/she would contribute time to the task,” and “I can rely on X to be there in times of need.” These statements were rated on a five-point Likert-type scale from “strongly disagree” to “strongly agree.”

The study had three measures of accessibility: intimacy, trust, and copresence. Intimacy (alpha= .770) was a three-item scale based on an “attachment” scale⁷. Trust was a two-item scale: “X is trustworthy” and “I can trust X.” Copresence was a four-item measure based on copresence scales¹⁴ which were adapted to the context of social network games: “I felt like X was playing with me,” “I felt like X was visiting me,” “I could feel the presence of X,” “I had a sense that X was there with me.” Enjoyment was a three-item scale (alpha=.97): “The game was enjoyable,” “I liked the game,” and “I thought the game was fun.” All scales were based on a five-point Likert-type scale ranging from “strongly disagree” to “strongly agree.”

RESULTS & CONTRIBUTION

A T-test of mean comparisons between the two groups indicated no significant difference in time spent playing the game. In general, most participants played the required minimum of five minutes per day. More than half of participants (61.1%) reported playing for more than five minutes but less than 20 minutes every day. Participants in the reciprocity condition ($M=3.82$, $SD=.958$) had slightly higher enjoyment than those in the non-reciprocity condition ($M=3.52$, $SD=.986$) but a T-test showed that the differences were non-significant ($p=.584$).

An analysis of covariance (ANCOVA) was calculated using the General Linear Model in the software package SPSS 18.0 to examine the effect of reciprocity on perceived general support, covarying the effect of intimacy, trust, and copresence. The model explained 61.2% of total variance (adjusted $R^2= .583$). Reciprocity had a significant main effect on social capital ($F(1, 82)=6.01$, $p<.05$, $\eta^2=.04$). The interaction between reciprocity and gender was also significant ($F(2,82)=4.16$, $p<.05$, $\eta^2= .05$).

Table 1. Reciprocity effect on perceived social capital

Gender	Reciprocity	No Reciprocity
Male	$M=2.98$	$M=3.00$
	$SD=.098$	$SD=.099$
	$N=27$	$N=27$
Female	$M=3.31$	$M=2.69$
	$SD=.125$	$SD=.129$
	$N=17$	$N=17$
Mean	$M=3.15$	$M=2.84$
	$SD=.082$	$SD=.083$

Covariates: Copresence, Trust, Intimacy

Perceived accessibility was very low: on a 5-point scale, all were below three, suggesting that participants did not experience high presence ($M=2.72$, $SD=.903$), trust ($M=2.94$, $SD=.903$), or intimacy ($M=1.78$, $SD=.695$). However, the variance in responses still reflected a large, significant effect of presence ($F(1, 82)=38.19$, $p<.001$, $\eta^2=.26$) and trust ($F(1, 82)=14.57$, $p<.001$, $\eta^2=.10$). Intimacy, however, did not have a significant effect on social capital ($F(1, 82)= 0.57$, $p=.453$).

What does this mean?

Consistent with literature on social exchange, reciprocity had a main effect on social capital, such that participants in the reciprocity condition perceived higher social capital than those in the non-reciprocity condition. Although the differences were significant, the effect size was very small. There could be several reasons for this small main effect, the first and foremost being that only one measure of reciprocity—helping behavior—was used for the study. This was to avoid confounding effects among different types of reciprocity, but in a real game situation, multiple types of reciprocity could occur at the same time, such as exchanging virtual gifts or exchanging text messages, which, when combined, could increase the effect size of reciprocity. Another explanation could be that the effect of reciprocity is small but is essential in order to build other the affective measures accessibility. This would be consistent with theories of social exchange, in which reciprocity is described as a requisite.¹

A significant interaction effect was found between gender and reciprocity: male participants’ perceived social capital in the non-reciprocity condition was higher than that of females’ but in the reciprocity condition, females showed higher perceived social capital. Why females are more affected by reciprocity is a result that has been consistently found but still unexplained.

Consistent with theory, copresence and trust were large, significant predictors of perceived social capital. Intimacy, however, did not have any significant effect. The timeframe of one week or the frequency of the interaction may not have been sufficiently long to induce intimacy. However, if we assume that the timeframe and frequency were not an issue, an alternative explanation could be that the type of

exchange that is facilitated by social network games does not induce intimacy. It could be that these games explain cases by which social capital is generated among strangers without any emotional attachment. The fact that social capital was generated even without any emotional closeness creates new research questions on conceptual definitions of social capital. Past definitions of social capital imply that emotional closeness creates bonding social capital but not bridging social capital. However, the measures of social capital used for this study were about helping behavior, which would be bonding capital. This suggests that bridging and bonding social capital are not mutually exclusive, or that there are more dimensions of social capital than these two constructs.

The large effect for copresence suggests that physical distance—even in the virtual world—has a strong psychological effect. This has great implications for system designers. SNGs allow participants to view the behavior of their in-game neighbors within the game; even if two people are playing asynchronously, the design of the game gives them the illusion that the other player is playing the game synchronously. This may give players the immediate sense of “here and now” that induces a feeling of homophily based on proximity. However, whether or not this feeling was induced by the “here” element of space or the “now” element of time is unclear.

Different levels of copresence may be induced by varying the form of visual representation; for instance, having an avatar instead of a profile photo. It is worthy to note, however, that the profile photos that participants saw were not in the physical form of a body, but still induced a similar effect. This may explain why massively multiplayer online games such as World of Warcraft create social capital among players, since the games involve avatars that are moving around in the same virtual space. Since this study only measured copresence instead of manipulating it, future research should try to separate reciprocity and copresence in an experimental setting to examine independent and interactive effects among these constructs.

Summary & Conclusion

These three studies, all employing different methodologies, provide better understanding of how reciprocity creates social capital in the context of social network games. Study 1 found that most players’ motivations for reciprocity were not social, but that players who did want to be social had different patterns of play.²⁰ Study 2 documented the formation of social capital between acquaintances; over time, players reported to have stronger attachment to those people they were playing with, and made positive attributions to in-game reciprocity.¹⁹ Study 3 experimentally manipulated reciprocity and found that players who engaged in reciprocity had higher perceived social capital than those who did not. Reciprocity, however, explained only a small amount of social capital; trust and copresence were stronger predictors of social capital.

These studies were an attempt to fill in the gap in the literature between motivation and outcome, by using theory to guide the assumptions. The results support theory and provide explanation that fills in the gap of research that did not address *how* social capital outcomes are derived from game play. However, the generation of bonding social capital without emotional closeness generates new research questions on conceptual definitions of social capital, providing groundwork for more theory building. In addition, the large effect of copresence creates interesting implications for system designers. Although much research on copresence has focused on immersion, enjoyment, very little research has examined the effect of copresence on social capital. Given that scholars are divided on the beneficial or detrimental effects of computer-mediated relationships, it could be that copresence is the moderating variable that lead to differing outcomes.

ACKNOWLEDGMENTS

Thanks to Tor Bjornrud, Yu-hao Lee, and Jieun Sung, my co-authors of the 2010 SRC at CHI; Cliff Lampe, Rick Wash, Nicole Ellison, and Jessica Vitak, co-authors of the HICSS 2011 paper; and advisor Robert LaRose for guidance and support. Study 2 was supported in part by the National Science Foundation (HCC 0916019). Study 3 was supported by the College of Communication Arts and Sciences Summer Fellowship at Michigan State University.

REFERENCES

1. Blau, P. (1964). *Exchange and power*. New York: John Wiley & Sons.
2. Bolton, G., & Ockenfels, A. (2000). ERC—A theory of equity, reciprocity and competition. *American Economic Review*, 90, 166-193.
3. Bourdieu, P. (2008). *The forms of capital*. In Readings in economic sociology, N. W. Biggart (Ed.). Oxford, UK: Blackwell. doi: 10.1002/9780470755679.ch15
4. Cheshire, C. & Cook, K. S. (2004). The emergence of trust networks: Implications for online interaction. *Analyse and Kritik*, 26, 220-40.
5. Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94, S95-129.
6. Croson, R., & Buchan, N. (1999). Gender and Culture: International Experimental Evidence from Trust Games, *American Economic Review Papers and Proceedings*, 89(2), 386-91.
7. Cutrona, C. E. & Russell, D. (1987). The provisions of social relationships and adaptation to stress. In W. H. Jones and D. Perlman (Eds.) *Advances in personal relationships*, 1, pp. 37-67. Greenwich, CT: JAI Press.
8. Homans, G. C. (1958). Social behavior as exchange. *American Journal of Sociology*, 63, 596-606.
9. Inside Network (2011). *App Data: Independent, accurate application metrics*. Retrieved from www.appdata.com/leaderboard on March 22, 2011.

10. Krishna, A., & Shrader, E. (1999). Social capital assessment tool. *Social Capital Initiative Working Paper*, 22.
11. Lin, N. (1999). Building a network theory of social capital. *Connections*, 22(1), 28-51.
12. Macy, M. W. (1990), Learning theory and the logic of critical mass. *American Sociological Review*, 55, 809-26.
13. Norwell, C., & Tinckler, S. (1994). The influence of gender on the provision of a public good. *Journal of Economic Behavior and Organization*, 25, 25-36.
14. Nowak, K. L., & Biocca, F. (2003). The effect of the agency and anthropomorphism on users' sense of telepresence, copresence, and social presence in virtual environments. *Presence*, 12(5), 481-94.
15. Putnam, R. D. (1995). Bowling alone: America's declining social capital. *Journal of Democracy*, 6, 65-78
16. Rosengren, K. E. (1974) 'Uses and Gratifications: A Paradigm Outlined', in J. G. Blumler and E. Katz (eds.) *The Uses of Mass Communications: Current Perspectives of Gratifications Research*, pp. 269-86. Beverly Hills, CA: Sage.
17. Thibaut, J. W., & Kelley, H. H. (1959). *The social psychology of groups*. New York: Wiley.
18. Williams, D., N. Ducheneaut, L. Xiong, Y. Zhang, N. Yee and E. Nickell, "From tree house to barracks: The social life of guilds in World of Warcraft", *Games & Culture*, 1(4), 2006, pp. 338-361.
19. Wohn, D. Y., Lampe, C., Wash, R., Ellison, N., & Vitak, J. The "S" in social network games: Initiating, maintaining, and enhancing relationships. *Proc. HICSS '11* (Kauai, HI, Jan. 2011), IEEE
20. Wohn, D., Y. Lee, J. Sung, and T. Bjornrud, "Building common ground and reciprocity through social network games," *Ext. Abstract in CHI 2010* (Atlanta, GA), ACM
21. Zhao, S. (2006). Toward a taxonomy of copresence. *Presence*, 12(5), 445-55.