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## Prosocial Behavior and Teamwork in Online Computer Games

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LOYOLA UNIVERSITY CHICAGO

PROSOCIAL BEHAVIOR AND TEAMWORK  
IN ONLINE COMPUTER GAMES

A THESIS SUBMITTED TO  
THE FACULTY OF THE GRADUATE SCHOOL  
IN CANDIDACY FOR THE DEGREE OF  
MASTER OF ARTS

PROGRAM IN APPLIED SOCIAL PSYCHOLOGY

BY

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To Kyle

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## ABSTRACT

The use of technology for training purposes is a growing field. Many of the traits for successful team building are shared by a variety of video games, overcoming the limitations of traditional team-building exercises. The goal of this research project was to study social and teamwork oriented behaviors within the settings of online computer games. One hundred and eighty-one individuals completed an online survey in which they were asked questions regarding team-work behaviors. These individuals also participated in a game scenario which measured their social orientation. The hypotheses for this research were that individuals who play online computer games will score higher on both teamwork behaviors and social orientation scale. It was also hypothesized that individuals who play cooperative games would score higher in both teamwork behaviors and prosocial orientation compared to competitive gamers. None of the analyses yielded significant results. Reasons as to possibilities for these results are discussed along with ideas for future studies.

## CHAPTER ONE

### INTRODUCTION

The use of technology for training employees is a growing field. According to the Entertainment Software Association (ESA, 2009), 70 percent of major companies utilize interactive software to train their employees. The demand for software of large private organizations has led to the creation of companies who cater solely to these needs. The public sector has also begun to utilize this new medium. The U.S. Army has a video game unit and will be investing 50 million dollars in designing a system to prepare soldiers for combat (ESA, 2009).

Employee training is a key activity in organizations for which a large amount of time and money is spent (Muchinsky, 1993). Training programs can range from teaching new skills, refreshers for already acquired skills, interpersonal skills, and sensitivity training. A few decades ago research began to focus on a new area of organizational development (OD): team-building training. Team building is one of the most respected and frequently used OD strategies (DeMeuse & Liebowitz, 1981). Previous studies lacked clarity into what team building is but it can be summarized as an intervention that is used to build competent, collaborative, and creative work teams (Boss & McConkie, 1981).

It is important to note that in the field of group dynamics and research, some scholars view a distinction between groups and teams. This paper follows a second viewpoint that

teams are a subset of groups. We will define teams as groups of individuals who come together at regular intervals to work towards a common goal and have a shared social identity.

This research seeks to combine both these fields; the use of technology, specifically online gaming, in order to streamline and enhance team building. In this study, the argument for the influence of videogames on team building effectiveness is examined via surveys of individuals who actively engage in gaming. I postulate that individuals who play cooperative online games will acquire higher team-work skills and increase their prosocial attitudes as compared to those who play competitive games or those who do not play any games at all.

### **Team Building**

Team building research has occupied the field of academia for a number of decades (Beer, 1976, Hughes, Rosenbach, & Clover, 1988, Boss & McConkie, 1981). Past studies have focused on both its effectiveness and the theories behind it. One of the theories behind team building is that enlisting the participation of the group in planning and implementing change will be more effective than issuing a mandate. This requires that each member develop a set of skills that will be beneficial to the group (Salas, Rozell, Mullen, Driskell, 1999). Team building “promote[s] an increased sense of unity and cohesiveness and enable[s] the team to function together more smoothly and effectively” (Senécal, Loughhead, & Bloom, 2008). Team building interventions are designed to increase group effectiveness by enhancing cohesiveness.

Team building interventions are used to build competent, collaborative, and creative work teams. This can be done by removing barriers that impede effective functioning and by helping the members understand and utilize the resources within a group. Team building has been reported successful in both the private and the public sector across a variety of organizations ranging from correctional institutions to the banking system (Boss & McConkie, 1981).

Some of the dependent variables used to assess the impact of team building in previous studies are initial reaction, attitudinal/perceptual changes, behavioral changes, and organizational changes (DeMeuse & Liebowitz, 1981). In a meta-analysis performed by Salas et al. (1999), they concluded that the significance of team building on organizational performance varies depending on the focus of the training.

There are four current models of team building: goal setting, interpersonal relations, problem solving, and role clarification (Beer, 1976). Goal setting involves the setting of objectives and the development of individual and team goals. Interpersonal relations increases team work skills, mutual supportiveness, communication, and development of trust. Problem solving emphasizes the identification of major problems in the team. Role clarification increases communication among team members regarding their respective roles within a team. In the Salas et al. (1999) research, the domain of role clarification stood out as the component that made a genuine contribution to the effect of team building on performance.

In a research on team building done by Hughe et al. (1988) military squadrons were given questionnaires that measured nine dimensions: interpersonal trust, relationship between

classes, squadron cohesiveness, job clarity, confidence in cadet leadership, commitment to squadron goals, rewards, satisfaction with squadrons, and satisfaction with academy. The two squadrons most similar to each other were chosen and each put into a different condition. The experimental group was taken to a retreat for three consecutive days during which workshops took place. The workshop included lecturettes on effective feedback techniques, stereotyping, conflict resolution, and goal setting. These lecturettes were complemented with other activities such as group exercises in which towers were built using Tinker Toys, commander-organization dialogue, goal setting, and positive reinforcement. Squadron climate in the experimental group was significantly higher than the control group in five of the nine areas, with the data indicating long term effects on performance and climate variables.

Another study done by Senécal et al. (2008) on the effectiveness of team-building was executed with athletic teams where group work is imperative to successful performance. This study selected two teams that were similar in all dimensions of cohesion prior to the experiment. Upon completion of the intervention, athletes from the experimental condition perceived levels of cohesion higher than those in the control group.

One of the limitations of studies on team-building is that the evaluation of such interventions is much too short. Team-building is an on-going process and some researchers suggest that a minimum of twelve months should be spent implementing and evaluating the procedure. Past researcher has spent an average of six months (DeMeuse & Liebowitz, 1981). Team development is likely to be successful only if its outcomes

are continuously reinforced by management after the intervention. They must be repeated in order to maintain the benefits of the intervention.

### **Video and Computer Game Theory and Usage**

The traits that have led to the success of team-building are shared within a variety of video and computer games. Because of the entertainment and engaging nature of these games, this medium also overcomes the limitations of traditional team-building exercises and implementations. Research on multimedia entertainment (video games, computer games, online games and forums) has made an appearance in the fields of education and communication (Peppler & Kafai, 2007, Duque, Fung, Mallet, Posel, & Fleiszer, 2008, Greenfield, 2009, Dickey, 2005). The focus of this past research has been on edutainment (educational entertainment) (Peppler & Kafai, 2007) or the social byproducts of games (hostility, aggression, etc) (Eastin, 2007).

Duque et al. (2008) studied a new method for medical students to learn how to perform an effective home visit. This method was developed by using an instructional video game. The video game simulated a home visit in which the student had to click on risk factors for falls or harm to the patient while playing against time constraints and distractions. This method showed a high level of engagement associated with improvement in knowledge. Based on user's feedback, it proved to be a tool that not only aided in learning, but provided a structured and fun experience in an innovative manner.

Peppler and Kafai's 2007 study looked into the use of technology at a youth center. They observed the different projects that youths created using a software

application, ranging from video games to music videos. Their research revealed that the use of technology aided youths in understanding game design such as what key strokes are most comfortable, attention to detail in avatar creation, and active participation in the gaming community.

The use of technology for training purposes has existed for a few decades. Computer-assisted instructions (CAI) were programs originally utilized mainly by computer companies (due to their expense). Similarly, the use of games for simulation purposes has also been a popular training technique. Games were developed to simulate interpersonal relations problems, financial and budgeting issues, and resource allocation decisions (Muchinsky, 1993).

Unlike other mass-media experiments in education (e.g., TV, Webinars), games are a highly interactive medium which share many key attributes with pedagogical approaches (Mayo, 2009). Media technologies permeate informal education (what goes on outside the classroom). Video and computer games have taken a major role in developing visual intelligence on a mass scale. Depending on the genre of the game, players are asked to analyze, synthesize, and use critical thinking skills in order to play the game.

Video games promote skills in multitasking and skills involving divided attention. An article by Greenfield (2009) showed that playing two hours of Counter-Strike improved multi-tasking scores over those of a no play control group. Games support intrinsic motivation as well as opportunities for imitation and learning via feedback, fantasy, and challenges. Electronic games require active engagement in environments

which supports discovery, observation, trial and error, and problem solving. Game design itself focuses on a clear task or goal, progressive balance or hierarchy of skills, and immediate feedback. These are also aspects of engaged learning, which has the following elements: focused goals, challenging tasks, clear and compelling standards, protection from adverse consequences for initial failures, affirmation of performance, affiliation with others, novelty and variety, choice, and authenticity (Dickey, 2005).

Media and research often collapse all video gamers into a simplistic archetype resulting in gross generalizations of deviant behaviors (Yee, 2006). The multiple reasons for which people play games are overlooked, thus ignoring in-game behaviors and usage patterns. In Yee's (2006) research, he found three main non exclusive components, each with subcomponents, for motivation to play games: achievement (advancement, mechanics, and competition), social (socializing, relationship, teamwork), and immersion (discovery, role-playing, customization, and escapism). Thus, an individual might be driven to play a game in order to advance (gain power, progress, accumulate in game wealth) as well as socialize and work as a team.

Not all games foster the same goal structure and motivation. Competitive gaming increases aggression compared to cooperative games (Eastin, 2007). Competition and cooperation are different goal structures. Competitive goal structure occurs when "attainment of interlinked goals is negatively related among different people" (Eastin, 2007). In cooperative gaming, individuals achieve their goals when others do as well.

Computer and video games are successful because they engage players in different manners (story, positioning, and choices). Game play is a goal orientated

environment where rules set up what the player-character can and can't do and define victory and loss conditions (Dickey, 2005). Choice is central to gameplay in that it provides both a hook (decisions that the gameplayer makes that relates to the game and thus keeps them playing) and instructional design. Choices can provide explorations into cause and effect relationships and more complex simulations in which learners observe and explore interacting processes.

The use of narrative and role playing are ways in which game design aids players in maintaining focus on goals. Additionally the integration of non-player characters (NPCs) along with user first-person perspectives helps reinforce or maintain both the narrative and role playing. Challenging tasks are reinforced by providing dimensions of the setting (physical, temporal, emotional, etc) and through the use of choices. These choices require players to strategize balancing both resources and time with actions that the player believes will help accomplish the goal (Dickey, 2005).

Content is further reinforced through continuous, immediate feedback: Almost every keystroke yields a response from the game. In contrast, students in a typical classroom get to ask 0.11 questions per hour (Mayo, 2009). In addition, a steady stream of positive rewards accompanies the rapid feedback. Players accumulate points, levels, titles, or magic items for even the smallest successes. These rewards contribute to greater self-confidence and self-efficacy. Greater self-efficacy, in turn, translates to greater persistence and thus a higher level of accomplishment. The combination of these engaging factors helps explain the amount of time individuals spend playing computer games on a weekly basis, with the average being 21 hours per week, over half of typical

work hours (The Daedalus Project, 2005). Most gamers have also been playing for an average of 12 years (ESA, 2009). The continuous amount of play aids in reinforcing the skills acquired.

Most research has not moved beyond the two-player situation, yet games are increasingly multiplayer in design (Mayo, 2009). The growth of massively online multiplayer online games (MMOs) is staggering. As of 2009 one of the most popular multiuser online games, *World of Warcraft*, has over 11 million subscribers worldwide (Blizzard, 2008). Within these games, problems are set up to be solved in teams. Anywhere from a handful up to 40 players interact at a time via text and/or voice, sharing strategies, pursuing the same goals and learning from each other as they engage in the activity. Within many online multiplayer games, individual players form “clans,” “guilds,” or “alliances.” These groups often have a hierarchy that can be based on power level, role within the group, or seniority.

Group gaming produces positive results. Cooperative groups display lower levels of hostility, and over time players in this cooperative setting develop social ties with team members and increasing social perception of others (Eastin, 2007). Bruckman’s (1993, 1997) and Turkle’s (1995) research into multiuser games revealed that virtual environments allow players to experiment in a safe, nonthreatening environment with the ability to explore and reflect different aspects of themselves.

### **Gamer Attitudes and Social Aspects of Gaming**

Much of the research on video and computer games has ignored the older population that participates in this activity. Because our research aims to study prosocial

attitudes and groupwork, it is important to understand the attitudes and characteristics of older gamers as well. Discarding the older population would also negate over 25% of the American population that plays video and computer games (ESA, 2009).

Pearce's study on Baby Boomer Gamers showed that Boomers tend to be attracted to problem solving, exploration, and communication oriented games (Pearce, 2008). It also appears that some genres of games are incompatible with one another. For example, many older computer gamers play first person shooters or role playing games, but it is rare to find a gamer who likes both genres. There is also a distinction between older and younger players, with the younger gamers primarily interested in performance and competition. Younger gamers also display inappropriate emotions and language, carelessness, and lack of efficiency in completing game objectives.

The study done by Pierce (2008) also revealed that gaming is no longer a solitary activity; instead it is becoming increasingly social with 80% reporting being part of a guild or gaming community. A total of 52% reported playing multiplayer games with friends, and 65% reported having made a friend through online gaming. Of those who reported, 33% played online games with friends and family; 14% play online games over the Internet with a partner in the same room and 11% do the same with family members. Research also showed that socialization extended beyond the game itself with 22% of respondents saying they helped to administer game sites, forums, or servers, 20% of survey had attended a game fan convention, and 17% had participated in creative activity, such as fan-art, or in-game fashion design, related to their gaming activities. Online games serve as a communication tool because the social relationships in the game world

function as an extension and supplement to preexisting offline interactions (Zhong, 2009).

Other research has pointed out similar findings in regards to the social aspect of gaming. Krotoski (2004) states that MMORPGs encourage group interaction and involvement, flexibility, and mastery that result in significant friendships and personal empowerment. According to Cole and Griffiths (2007), positive social interactions are fundamental in MMORPGs because they require a large number of players to cooperate and work as a team. These games also contain systems of crafting or skills that are spread among different characters. In order to accomplish certain tasks, gamers must depend on one another reinforcing their relationships and the foundations of teamwork. Online relationships provide an outlet to safely discuss serious matters that may be difficult to talk about with real life family and friends (Cole and Griffiths, 2007). Yee (2006) also found that gamers derive deep emotional experiences from their activities in the games.

It is possible to assume that the socialization and cooperative aspects of online games will attract people who are already inclined towards that attitude. While this is a likely occurrence, research done by Gentile, Anderson, Yukawa, Ithori, Saleem, Ming, Shibuya, Liau, Khoo, Bushman, Rowell, and Sakamoto (2009) reported that three studies conducted in three separate countries revealed that students who played more prosocial games behaved more prosocially and prosocial game play predicted later increases in prosocial behavior. The concept behind this study was the idea of games serving as

models that give directions and require practice and provide immediate reinforcement or feedback.

Greitemeyer and Osswald (2009) argued that since playing antisocial video games increases antisocial tendencies and decreases prosocial tendencies, playing prosocial video games will decrease antisocial tendencies and increase prosocial tendencies. While research supporting the benefits of prosocial games is sparse in comparison to the study of the effects of antisocial games, the results in the study done by Greitemeyer and Osswald showed that participants who played a prosocial game had lower antisocial word completion scores than those who had played a neutral game.

## CHAPTER TWO

### METHODS

#### **Overview**

The purpose of this study is to assess whether individuals who play cooperative online computer games show more prosocial attitudes and gain skills associated with cooperative or team task performance. Game players will be compared to non-game players in terms of prosocial attitudes and behaviors and team-oriented behaviors.

#### **Participants**

A total of 181 individuals from varying geographical areas in the U.S. participated in this research, 121 females and 57 males (3 chose to decline gender) with an age range of 18 to 78 ( $M = 32.5$ ) years of age. Of these individuals, 80 considered themselves gamers while 101 did not. Within the gaming group, 35 individuals played competitive games and 45 played cooperative games. Sample sizes for the independent group differed slightly across the analyses due to incomplete data for some respondents. For more demographic data, please see Tables 1 and 2. A snowball sample was used for this study. A survey was posted on social networking sites such as Facebook, Twitter, and Livejournal, forums, and sent via email. Each participant was entered in a raffle to win a \$25 gift card. .

#### **Design**

Each participant was given a survey containing twenty-one statements regarding teamwork behaviors. These statements were constructed from six core areas belonging to teamwork (Communication, Flexibility, Respect, Work, Roles, and Goals) based on a pilot test conducted prior to this study. The participant rated these statements on a 5-point rating scale ranging from disagree to agree (Cronbach's alpha = .93).

The survey also contained Van Lange's social orientation scale. This scale contains nine trials in which individuals are asked to imagine that they are playing against an "other" for points. Each trial has three different options showing how many points they survey taker would get and how many the "other" would get. The survey is coded so that individuals who choose at least five of a certain type of response will be categorized as prosocial, individualist, or competitive.

Demographics were also included in this survey along with questions regarding the participant's online computer game experience (if they play online computer games, the types of online computer games, and the amount of time played).

Each of the game type responses (top 5 games played) was analyzed for competitive versus cooperative content. Competitive elements included player versus player where the positive outcome of one individual comes at the expense of the negative outcome of the other(s). Cooperative gaming elements included player versus environment where individuals had to work together to gain a positive outcome for all players involved.

## CHAPTER THREE

### RESULTS

We predicted that individuals who play online computer games (both competitive and cooperative) would score significantly higher (agreed with more teamwork behavior statements) on the questionnaire compared to individuals who do not play online computer games. We also predicted that individuals who play cooperative games would score significantly higher than those who play competitive games.

A one-way ANOVA was used to analyze the data obtained from the teamwork behavior questionnaire. Results showed no significant differences between the teamwork behavior scores of individuals who play games in general ( $M = 4.10$ ,  $SD = .414$ ,  $n = 80$ ) and those who do not ( $M = 4.16$ ,  $SD = .506$ ,  $n = 101$ ) [ $F(1, 174) = .668$ ,  $p = .415$ ,  $\eta^2 = 0.004$ ]. There were no significant differences between individuals who play online computer games ( $M = 4.10$ ,  $SD = .490$ ,  $n = 41$ ) and those who play other games ( $M = 4.15$ ,  $SD = .461$ ,  $n = 135$ ) [ $F(1, 174) = .242$ ,  $p = .624$ ,  $\eta^2 = 0.001$ ].

A one-way ANOVA revealed no significant difference in teamwork behavior scores between individuals who play competitive games ( $M = 4.05$ ,  $SD = .534$ ,  $n = 33$ ), individuals who play cooperative games ( $M = 4.14$ ,  $SD = .294$ ,  $n = 44$ ), and individuals who play no games ( $M = 4.16$ ,  $SD = .506$ ,  $n = 99$ ) [ $F(2, 173) = .698$ ,  $p = .499$ ,  $\eta^2 = 0.008$ ].

We also predicted that individuals who play cooperative online computer games will score significantly more prosocial orientation than the competitive and no game groups. Individuals who play competitive online computer games will show greater levels of competitive social orientation. A one-way ANOVA yielded no significant difference in social orientation between individuals who played cooperative games ( $M = 1.82$ ,  $SD = .860$ ,  $n = 45$ ), those who play competitive games ( $M = 1.91$ ,  $SD = .900$ ,  $n = 34$ ), and those who play no games ( $M = 1.90$ ,  $SD = .827$ ,  $n = 99$ ) [ $F(2,175) = .152$ ,  $p = .859$ ,  $\eta^2 = 0.002$ ].

## CHAPTER FOUR

### DISCUSSION

None of the hypothesis proposed yielded significant results. Participants who regularly played computer games did not score higher on measures of good team behaviors than participants that did not play games. In addition, cooperative game players did not show higher pro-social motivation than either non-game players or competitive game players. Both sets of results are surprising given that both self-selection and game playing experiences should have produced the expected differences. Unfortunately, these results are difficult to interpret given that the sample was not selected randomly and the measure of cooperative vs. competitive game playing was potentially flawed. Many participants played more than one type of game so the categorization of cooperative vs. competitive game playing was difficult.

Although one would think that playing cooperative games would lead to better team behaviors, there is some evidence that simply working in groups does not lead to optimal group performance (Davis, 1969). Hackman and Morris (1978) have argued that people often think they know how to work cooperatively with others and thus simply do what comes naturally to them. However, what comes naturally to group members may not represent optimal performance behaviors in groups.

The sample sizes used for the cooperative group, the competitive group, and the non game playing group provided very low statistical power given the small effect sizes

found. A post hoc power analysis revealed that the sample sizes provide an effective power ranging from 7-17% for the one-way ANOVAs to detect the small effect sizes found. Nonetheless, the sample sizes provided sufficient (80%) power to detect effects as small as Cohen's  $d = 0.21$  to  $0.24$ , which are considered "small" in the social sciences (Cohen, 1988). In sum, the ANOVAs had adequate statistical power to identify small effects. These results help to discount low statistical power as an explanation for the lack of significant findings

A factor that would have increased statistical power is the use of continuous measures in a multiple regression analysis. Individuals in this study were categorized based on the type of games they played. An alternative method for future studies should be to rate how often individuals play each type of game.

The criteria used measuring the type of games respondents played (cooperative and competitive) might also help explain the lack of significant effects. The measure was created post collection of data, researching all game responses and classifying them based on a simple grid of "competitive attributes" (i.e.: winning comes at the expense of someone losing) and "cooperative attributes" (success is achieved through group work). Single player games were the most difficult to classify since they can be viewed as either neutral (no other person is losing) or competitive (the game loses if the player wins). A more reliable measure of game type would have been, for example, a pilot test run prior to the experiment in which individuals would list the different attributes that cooperative and competitive games have.

Another issue with the study was that members self-selected into the various conditions. An ideal version of this study would have had to randomly assign participants to one of three separate groups, with a treatment given to each one: one group would be asked to play online computer games, a second group would be asked to play other games, and a third group to not play any games. Prior to a three month treatment, the teamwork questionnaire and the Van Lange scale would be administered. After the three month period, these same tests would be given. Results from both pre and after treatment would be compared between and within groups. Another addition that might be worthwhile is to provide team building exercises to participants prior to playing different types of games to see whether game performance would improve with teach training.

A second limitation of this study is the changing definition of online gaming (For a list of the top 5 game responses, see Table 3). Due to the numerous game websites, traditional card games such as Bridge are now considered online games. The use of cell phones for game purposes, in which individuals can play independently (“Angry Birds”) or with others (“Words With Friends”), is also a growing market. The growth of games such as “Farmville” within social networks is also considered by many to be online games. A future study should be precise in its definition of online games.

One area that this study did not explore in depth was the perceived archetype of gamers and differences in age and gender in the use of technology. Future studies should examine stereotypical group behaviors (the myth of the solitary gamer) versus actual behaviors. A similar observation should focus on age and gender differences in both gaming styles and social orientation.

Finally, the importance of studies such as these should not be dismissed. In a time where companies are becoming more global, they are turning towards online interactions in order to reduce costs of travel and to increase efficiency. In a scenario where face to face communication is missing, it is important to develop appropriate and fruitful teamwork behaviors. In business and other areas, taking on the role of the other is often a crucial part of decision making. Increasing prosocial behaviors can help develop this attitude and therefore augment successful transactions and interactions.

APPENDIX A:  
DEMOGRAPHIC  
INFORMATION TABLES

Table 1. Years Played

Years Played	Number of Individual	Percentage
Less than a year	9	11.3
1-2 years	11	13.8
3-4 years	17	21.3
5 or more years	43	53.8

Table 2. Weekly Hours Played

Weekly Hours Played	Number of Individual	Percentage
Less than an hour	14	17.3
1-5 hours	27	33.3
6-10 hours	23	28.4
11-15 hours	7	8.6
16-20 hours	5	6.2
21-25 hours	2	2.5
26 hours or more	3	3.7

Table 3. Top 5 Games Played

Game	Number of responses
World of Warcraft	28
Starcraft II	8
Call of Duty	5
Farmville	5
Scrabble	4

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## VITA

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