Media Psychology, 15:356–371, 2012

ISSN: 1521-3269 print/1532-785X online
DOI: 10.1080/15213269.2012.702603

Routledge
Taylor & Francis Group

Electronic Friend or Virtual Foe: Exploring the Role of Competitive and Cooperative Multiplayer Video Game Modes in Fostering Enjoyment

MIKE SCHMIERBACH
College of Communications, Pennsylvania State University, University Park, Pennsylvania, USA

QIAN XU
School of Communications, Elon University, Elon, North Carolina, USA

ANNE OELDORF-HIRSCH
DemandEngine, Savannah, Georgia, USA

FRANK E. DARDIS
College of Communications, Pennsylvania State University, University Park, Pennsylvania, USA

Industry and scholarly sources both argue that multiplayer gaming and competition are important factors in creating enjoyment, but relatively little empirical work demonstrates this claim. This study uses an experimental design (N = 139) to evaluate the effects of different multiplayer modes on enjoyment, allowing participants to interact naturally with a confederate partner and manipulating both game mode and partner behavior in a game of Madden '08. Results show that enjoyment is significantly enhanced by the combination of competitive play and a friendly partner, and demonstrate that the quality of interpersonal interaction only partly accounts for this.

Individuals have access to a growing diversity of video games, from blockbuster console titles like *Madden* and *Modern Warfare* to PC-based massively multiplayer games such as *World of Warcraft* and *Lord of the Rings Online*,

Address correspondence to Mike Schmierbach, College of Communications, 201 Carnegie Building, Pennsylvania State University, University Park, PA 16802, USA. E-mail: mgs15@psu.edu

and even to simple titles such as *Angry Birds* or *Farmville* that can be played in a Web browser, via a social networking site or on a smart phone. Yet, common to all these titles and many more is rigorous attention to multiplayer components. Players compete with human foes or cooperate with friendly teammates in games like *Modern Warfare* and *World of Warcraft*. Even games like *Angry Birds* include mechanisms to share scores or work cooperatively, and social dynamics are a key factor in the success of Facebook games like *Farmville*. In short, understanding the way players respond to games requires understanding the effect of multiplayer features within those games.

A growing body of academic research considers factors contributing to the enjoyment of video games, often as part of a larger investigation into the motivations that underlie game play (e.g., Hartmann & Klimmt, 2006; Wood, Griffiths, Chappell, & Davies, 2004). These studies provide a remarkable diversity of explanations for enjoyment, considering, for example, the personality traits of gamers (Hartmann & Klimmt, 2006), the gratifications sought by gamers (Sherry, Lucas, Greenberg, & Lachlan, 2006), and the appeal of certain features such as competition (Vorderer, Hartmann, & Klimmt, 2003). As video games are primarily an entertainment medium, understanding the factors that make them enjoyable is critical to understanding larger questions about whether, when, and why people play games. However, relatively little of the research in this area has specifically attended to the effects of multiplayer elements, and more work is needed.

In this study, we use a laboratory approach to explore the nature of an enjoyable playing experience, evaluating the role of multiplayer gaming. In particular, we look to extend work suggesting that competition with human opponents may be enjoyable, by considering the alternative of cooperative multiplayer gaming as well as evaluating the effect of partner behavior toward the player.

MULTIPLAYER GAMING AND ENJOYMENT

Social Interaction

Our central focus in this paper is on the effects of multiplayer gaming environments, specifically those that allow for copresent foes or partners. That is, we are interested in games that allow more than one person to simultaneously influence play while each person is present in a shared space. Such environments remain common; the best-selling Wii console, for example, comes packaged with a title (*Wii Sports*) that heavily emphasizes such play elements, and marketing for the console frequently shows images of several individuals sitting or standing in the same room, all holding controllers. Even the name "Wii" is a play on "We," implying that the device makes gaming a group activity. Even in online environments, the prevalence

of friend lists and growth of voice communication suggests that developers are at least partly attempting to simulate these in-person interactions.

We argue that such environments are important for two reasons. First, they provide a means of allowing for in-person social interaction. As Denham (2004) argued, the situation in which an individual consumes media can contribute to enjoyment of that media. Although Denham's article focuses on the more passive experience of viewing sports, there are good reasons to think that more active processes such as playing a game also can be influenced by social context. For example, research on social facilitation (Zajonc, 1965) demonstrates that individuals perform better—at least when already comfortable with the task—in the presence of an audience. Subsequent research has shown this to be a robust finding across a variety of contexts, and even suggests that other outcomes, such as arousal, are also enhanced by the presence of an audience (e.g., Bond & Titus, 1983). Clearly, people can respond favorably to the mere presence of others, although this research also suggests that some individuals experience anxiety or otherwise perform poorly around others. In this study, we deliberately control for performance effects, but social facilitation research demonstrates that having others watch while you complete a task is psychologically significant.

In the specific context of gaming, several studies suggest that players are drawn to social elements when they are available, listing such interaction as a key motivation for play. Self-determination theory suggests that relatedness is a key need that, when fulfilled, provides enjoyment (Przybylski, Rigby, & Ryan, 2010). In an experimental investigation of this theory, Tamborini, Bowman, Eden, Grizzard and Organ (2010) reported that playing a bowling game with a human partner created higher feelings of relatedness, which in turn was correlated with enjoyment. Other research by Yee and colleagues (Yee, 2007; Williams, Yee & Caplan, 2008) has shown that social motivations are a key dimension of reasons for play cited by players of massively multiplayer online games (MMOGs). Similarly, Cole and Griffiths (2007) reported that social interaction is common in MMOGs and contributes to enjoyment, with sizable majorities of participants reporting that the games helped create meaningful relationships. More directly relevant to the current study, Gajadhar, de Kort, and Ijsselsteijn (2008) reported empirical evidence that individuals playing a game with a copresent individual created greater enjoyment than playing the same game and relying on mediated communication with the other player. It is important to note that enjoyment, in this context, must be defined in a manner distinct from the contributing factors noted above. For example, while Tamborini, Grizzard, Bowman, Reinecke, Lewis, and Eden (2011) argue that need satisfaction can explain enjoyment, they consider both the nonhedonic needs identified in self-determination theory as well as more hedonic feelings of pleasure. To define enjoyment as merely experiencing hedonic pleasure or simply as equivalent to need satisfaction would be tautological. We argue that enjoyment should be perceived

as such by players—physiological measures are inadequate if individuals don't recognize their responses as enjoyable. In addition, enjoyment should include a positive self-reflection on the experience and a desire to play more, as the latter is important to why explorations of the concept are important.

Competitive Play and Enjoyment

The second potential factor linking multiplayer gaming to enjoyment is competition. Vorderer et al. (2003) argued that competition is a critical variable in explaining enjoyment of games. They suggested that competition increases the urgency of responding to interactive media and heightens the emotional payoff of a successful response. The authors used survey data to show that a motivation to compete does predict play of specific genres in which competition is a notable feature, although playing a game and enjoying that experience are not necessarily equivalent. Other studies confirmed that competition is an important aspect of games for at least some players. For example, Sherry et al. (2006) identified competition as a key gratification sought by players and offered data suggesting that, among several groups, individuals who reported seeking this gratification tended to be heavier gamers. Klug and Schell (2006) similarly argued in a conceptual essay that the competitor is a distinct type of player, drawn by the opportunity to best others.

Although competition can be operationalized a number of ways, we focus on direct, interpersonal competition—that is, situations in which a player is directly challenged by one or more human foes whose performance in the game affects the performance of the player. Prior research suggests that people adapt their playing styles and perceptions when faced with a human opponent. While much of this research is focused on aggression (e.g., Eastin, 2006, 2007; Eastin & Griffiths, 2006), a small number of experiments have more directly compared the effects of playing with human and computer opponents on enjoyment. Research by Ravaja et al. (2006) confirmed that the opportunity to compete with a human opponent, rather than against a computer, amplified engagement, arousal, and enjoyment. Weibel, Wissmath, Habegger, Steiner, and Groner (2008) found that battling a human-controlled foe increased presence, flow, and enjoyment. Unfortunately, many of these studies demonstrated that people responded to the perception that they were playing against another human rather than examining the actual presence of another participant. In the various Eastin and Weibel et al. studies, the researchers used deception, informing the participants that their computer-controlled opponent was human-controlled. While increasing control, this ignores the more ecologically valid scenario in which players not only compete with another person but can interact socially at the same time. Such a design was part of the Ravaja et al. study, where real human

opponents were used. Competition with a copresent other should exert a unique influence on enjoyment beyond that of either factor on its own.

Cooperative Play and Enjoyment

Whereas competitive multiplayer game modes offer two means to enhance enjoyment, cooperative modes pose a different scenario. In a cooperative multiplayer game, participants collaborate to accomplish the shared task of beating an opponent. In the current study, consistent with our operationalization of competitive multiplayer gaming, we also focus on cooperative gaming when the partner is copresent, allowing for unmediated interpersonal interaction. Thus, to the extent that enjoyment here is due to socializing or facilitation, we would expect enjoyment in the cooperative game to be higher than in a solo game.

However, there are reasons to predict that enjoyment may not be as high in a cooperative setting as a competitive one. First, since the opponent in a cooperative game is the computer artificial intelligence, it will not offer the same type of competitive challenge as a human foe. Evidence regarding cooperative games is limited, but three studies suggest that cooperative play reduces aggressive responses relative to solo or competitive play (Anderson & Morrow, 1995; Lim & Lee, 2009; Schmierbach, 2010). While inconclusive, this could suggest that players in a cooperative playing mode are less intensely involved or aroused, factors that could also diminish enjoyment. Second, as described in research on task performance (McGrath, 1984; Strauss, 1999), collaborative groups require varying degrees of interdependence. When tasks require greater interdependence, such that the overall outcome requires effective coordination, agreement, and collective effort, this can generate conflict and disagreement, both of which would likely inhibit enjoyment. That is, because cooperative gaming involves relying on a partner for success, players may become frustrated and, thus, suffer a lower level of enjoyment relative to game situations in which they are fully autonomous.

In addition, it is important to consider the specific genre of game being played. Many prior studies of multiplayer gaming have focused on first-person shooters, where direct aggression against foes is not only possible but required for success. In games with cooperative modes, the opportunity for discussion of tactics is often quite low. By contrast, in this study we employ a sports game—*Madden*, based on NFL football—where the real-world equivalent is readily understood by participants and features clear examples of teamwork and group tactics. At the same time, the game also provides a very clear competitive structure, with scoring and a strong correspondence between opponent techniques and individual success. Both cooperative and competitive modes may exert unique influences in this context, making it harder to project which will prove more enjoyable based on the prior literature.

In summary, then, we can project that multiplayer gaming in general should prove more enjoyable than playing solo, given the importance of social interaction. In addition, research also underscores the enjoyment that comes from all kinds of competition, including competition with a human foe. Because of these discrete mechanisms, we cannot treat the two forms of multiplayer gaming—cooperative and competitive—as interchangeable. If both mechanisms do not apply to the particular features of a sports game played with a stranger, it is plausible that one type of multiplayer gaming may prove more enjoyable than solo play while another would not. As such, we consider hypotheses regarding both multiplayer modes:

H1a: Participants will report greater enjoyment when playing a competitive multiplayer game than a solo game.
H1b: Participants will report greater enjoyment when playing a cooperative multiplayer game than a solo game.

We offer these separately to reflect the fact that potential explanatory mechanisms do not apply equally to both modes, leaving open the possibility that one kind of play would prove more enjoyable than another. If social interaction is key, we might expect equal or even greater enjoyment in a cooperative game, as there will be no between-player hostility to inhibit social connections. However, if competition is a critical factor, then cooperative play may pale in comparison, with the challenge of beating a computer simply not offering the same appeal as besting a human foe. Moreover, if players are focused on winning, they may become frustrated with a partner who blocks their success. Without knowing which mechanism is more influential, we offer the following research question:

RQ1: Will enjoyment differ between a cooperative and competitive multiplayer game?

Consequences of Partner Behavior

As the previous discussion suggests, the potential social benefits of multiplayer gaming would appear to be contingent on the nature of the interpersonal interaction. Few studies on multiplayer gaming have provided a mechanism to account for this—in fact, many simply relied on deception, informing human players that a computer foe was actually human-controlled, precluding actual social interaction. One notable exception is the research of Ravaja et al. (2006), who compared physiological responses to computer-controlled opponents as well as both friend- and stranger-controlled foes. While most of their results showed general differences between human and computer opponents, they did find greater arousal for those playing friends versus those playing strangers. It is not clear, however, how much social

interaction was possible within the study design or whether the increased arousal corresponded to conscious evaluations of the game experience. Thus, we do not know whether this response was to the manner in which the friend behaved or to the mere presence of a known or unfamiliar other.

In the current study, we probe the potential influence of partner behavior beyond mere presence, by using confederate players instructed to behave in either a friendly, supportive manner or an unfriendly, hostile way. By manipulating confederate behavior, we can determine whether players are attentive to such social cues—if they are, it would underscore the importance of social interaction in explaining enjoyment of multiplayer games. That is, to the extent that one contributing factor linking multiplayer gaming to enjoyment is the possibility of social interaction, individuals should care about how they are treated by others. If the other player is rude or hostile, it would mitigate any benefits of social interaction (while having minimal influence on the sense of competition). Confederate behavior, thus, serves as an additional way to probe the mechanisms driving responses to multiplayer gaming. In general, we expect that players will respond positively to a friendly confederate, leading to the following hypothesis:

H2: Participants will report greater enjoyment when playing with a friendly confederate than with an unfriendly confederate.

Moreover, it is also important to consider any potential moderating role of partner behavior on the effects of game mode. For example, if both interpersonal interaction and competition are important to enjoyment, we might expect that those playing an unfriendly human competitor will still experience heightened enjoyment, while those playing with an unfriendly cooperative partner would not. In the former condition, the need for competition will still be satisfied, while the latter condition would provide neither competition nor social benefits. Thus, we consider the following research question:

RQ2: Will the effects of multiplayer game mode vary based on the level of friendliness of a confederate?

METHOD

Participants

Prior to the laboratory study, a total of 315 undergraduate students from two communication classes in a large northeastern U.S. university were evaluated via a pretest. Among them, 196 who passed a football knowledge test were scheduled for playing tasks in the lab. Fifty-seven out of these 196

individuals failed to complete the laboratory portion of the study. Ultimately, 139 students completed the study. Among them, 51.8% were female.

Procedures

Participants were first asked to complete an online questionnaire assessing their prior game experience and feelings toward games, as well as their knowledge of American football. Those who demonstrated scores of 4 or higher out of 6 for the football knowledge test were scheduled to come to the university's media lab to play the *Madden '08* video game. This pretest increased the odds of selecting participants who were likely to enjoy playing a football-themed video game and reduced the amount of training required, since participants were familiar with the goals and rules of football. Upon arrival, participants were given a 15-minute training session on how to play *Madden '08* with the specified console. They were then assigned randomly to play the game in one of three mode conditions (described below): solo, cooperative, competitive. Participants playing a cooperative or competitive game had a confederate partner who interacted with the participant in either a friendly or unfriendly manner. After playing the game, they filled out a paper-and-pencil questionnaire concerning their game-playing experience.

Design

Participants played *Madden '08*, one of the best-selling titles of 2007 (Thorsen, 2008) and at the time of the study the most recent entry in the popular franchise. The game allows cooperative, competitive, and solo play, which was important to our design. Because play focuses on a sports match and does not involve a drawn-out narrative, participants could experience a complete game, including a final outcome of victory or defeat, in the limited amount of laboratory time. The game requires participants to act as both coach—selecting plays and enacting game strategy such as timeouts—and player, handling the ball carrier on offense and switching at will between defensive players. To ensure a diversity of play experiences, both the Nintendo Wii and PlayStation 2 versions of the game were used. System was randomly assigned. Additional analyses not presented here showed that controlling for system did not meaningfully alter any of the results, and that system did not significantly moderate any of the effects of mode or confederate behavior.

Participants were asked to play the game until halftime, which meant playing two 3-minute quarters. They were told that whoever led at the halftime would be the winner of the game. The actual time spent playing ranged from approximately 12 to 20 minutes, depending on the specific events of the game, and was not significantly different among conditions. Participants played as the Amsterdam Admirals, an NFL Europa team, against

the Frankfurt Galaxy, another team from the same developmental league. These teams were chosen to minimize the influence of any familiarity with particular players or fan loyalties.

The influence of game mode was the focus of the key experimental manipulation—participants were randomly assigned to play the game either solo, cooperatively, or competitively. In the solo condition, participants were in the lab by themselves and played against the computer. In the cooperative condition, participants played on the same team as a human confederate who was introduced as a fellow study participant. In the competitive condition, they played against a confederate, introduced in the same manner, who controlled an opposing team. This confederate was instructed to act in either a friendly or unfriendly manner, determined randomly. Friendly confederates gave positive comments in response to participant play, while unfriendly confederates made negative comments and asserted their superiority as players. In total, there were 35 players in the solo condition; 30 in the friendly, cooperative condition; 25 in the friendly competitive condition; 23 in the unfriendly, cooperative condition; and 26 in the unfriendly, competitive condition.

Measures

Enjoyment

The enjoyment scale was based on McAuley, Duncan, and Tammen's (1989) and Deci, Eghrari, Patrick, and Leone's (1994) studies. It was a subscale of the Intrinsic Motivation Inventory (IMI), a set of multidimensional measurements to assess individuals' subjective experiences. In the current study, enjoyment was measured by seven items relating to playing *Madden '08* on 7-point scales ranging from *strongly disagree* to *strongly agree*: "While I was playing Madden I was thinking about how much I enjoyed it," "I found playing Madden very interesting," "I enjoyed playing Madden very much," "I thought playing Madden was boring" (reversed), "Playing Madden was fun," "I thought playing Madden was interesting," and "I would describe playing Madden as enjoyable" ($M = 4.75$, $SD = 1.22$, Cronbach's $\alpha = .94$).

Partner liking

To ensure the partner behavior manipulation had the intended effect and to consider the influence of feelings toward one's partner on enjoyment, we constructed a measure of partner liking using questions similar to those employed for measuring enjoyment. The wording of questions matched those for enjoyment, with "interacting with my partner" replacing "playing Madden." The variable was the mean of these seven questions ($M = 4.06$, $SD = 1.36$, Cronbach's $\alpha = .94$). These questions were only asked of those in a partner condition.

Final margin of victory

This variable was created by calculating the difference between the final observed scores for both teams. It ranged from −32.00 to 36.00, with negative scores indicating that the participant lost the game ($M = -1.25$, $SD = 13.29$). Preliminary analyses showed that performance, as measured by margin of victory, varied between conditions, and therefore all analyses control for this measure to ensure that any effects of mode on enjoyment are not confounded with this unintended difference in outcomes.

RESULTS

Analyses

The initial analyses focus on the hypotheses and first three research questions. Analyses were conducted as a series of analysis of covariance (ANCOVA) models with enjoyment as the outcome variable. In all analyses, margin of victory was included as a covariate. In Model 1, game mode (cooperative, competitive, or solo) was included as the single fixed factor. In Model 2, confederate behavior (friendly or unfriendly) was included as a single fixed factor and the solo condition participants were omitted. Finally, in Model 3, a combined variable was constructed with five possible values, one for each treatment condition—solo, friendly cooperative, unfriendly cooperative, friendly competitive, and unfriendly competitive—and used as a single fixed factor. This model allows for evaluation of the interaction of mode and confederate behavior, since a traditional two-factor interaction test cannot be conducted while including the solo condition. This last model is the primary means used to test the bulk of the relevant experimental effects; the key statistics for each of the five conditions are reported in Table 1.

Prior to analysis we conducted a manipulation check using an ANCOVA model with solo condition participants omitted and mode and confederate behavior as fixed factors, predicting partner liking. Results showed no effect

TABLE 1 Mean Scores for Enjoyment and Partner Assessment by Game Mode and Partner Behavior

	Solo	Competitive friendly	Competitive unfriendly	Cooperative friendly	Cooperative unfriendly
Partner liking	NA	4.96_{A}	3.28_{B}	4.56_{A}	3.39_{B}
Enjoyment	4.61_{B}	5.43_{A}	4.94_{AB}	4.56_{B}	4.30_{B}

Notes. Values are estimated marginal means from ANCOVA with game performance included as a covariate. Means not sharing a subscript in a row are significantly different based on post-hoc comparisons, $p < .05$.

of mode, $F(1, 98) = .01$, *ns*. As expected, there was a strong effect of behavior, $F(1, 98) = 36.44$, $p < .001$, $\eta_p^2 = .27$, with individuals reporting significantly higher liking when the confederate behaved in a friendly, rather than an unfriendly, manner.

ANCOVA Results

We tested Hypotheses 1a and 1b using Model 1, considering just the main effect of game mode on enjoyment. Mode exerted a significant influence on enjoyment, $F(2, 130) = 4.25$, $p < .05$, $\eta_p^2 = .06$. Specifically, the overall mean for enjoyment in the competitive condition ($M = 5.18$) was significantly higher than that for the cooperative ($M = 4.45$) or solo ($M = 4.61$) conditions. This result supports Hypothesis 1a but not Hypothesis 1b—competitive play was more enjoyable than solo play, but cooperative play was not. This addresses Research Question 1 as well, showing that competitive play was more enjoyable than cooperative play, at least in the context of a sports video game played with a stranger.

We tested Hypothesis 2 using Model 2, considering just the effects of confederate behavior on enjoyment. These results showed no significant effect of partner behavior, $F(2, 130) = .88$, *ns*. The overall means for all three relevant conditions were not significantly different from one another, meaning Hypothesis 2 was not supported because friendly and unfriendly conditions did not meaningfully differ, although the pattern was consistent with expectations such that those in the friendly condition ($M = 4.93$) had slightly higher scores than those in the unfriendly condition ($M = 4.65$).

To address Research Question 2 and further probe the results, we turn to Model 3, which employed a single factor IV that distinguished all five possible experimental conditions. These results confirm there was an overall significant difference among the five conditions, $F(4, 128) = 2.83$, $p < .05$, $\eta_p^2 = .08$. Participants in the friendly and competitive condition reported significantly higher enjoyment than those in the solo condition or either cooperative condition. As these were planned comparisons, post-hoc tests were based on least-significant differences. Scores for those in the unfriendly or competitive mode were not significantly different from any remaining condition, and scores among those in the solo or cooperative conditions were not significantly different from one another.

Mediation Analyses

The literature implied that both competition and social interaction may contribute to responses to multiplayer gaming. To more fully distinguish how each factor contributed to enjoyment in these data, we carried out additional analyses to consider the potential mediating role of partner liking. Our expectation was that partner liking should account for the effects of the partner

behavior manipulation but not the manipulation of mode. To quantify any mediation, we used AMOS to calculate the indirect effect of the manipulations on enjoyment via liking. We created a series of dummy-coded variables representing each of the non-solo conditions, making friendly and competitive the excluded condition. We then evaluated a just-identified model with the dummy coded variables covarying and with paths from each to partner liking and directly to enjoyment, as well as a path from liking to enjoyment. By its nature, this model has perfect fit, since all possible paths are specified. Our focus was not on the individual paths, but on the estimated indirect effect of each dummy-coded variable on the outcome of enjoyment. (Indirect effects and confidence intervals employed bootstrapping with 1,000 iterations and bias correction.) The relevant result is the value of the estimated indirect path for a given dummy-coded variable. A significant result would indicate evidence of mediation, with the effect of the specific dummy-coded condition relative to the friendly and competitive condition being mediated by the specific mediator in that model.

Results showed significant indirect effects of the unfriendly conditions in both competitive ($\beta = -.29$, $p < .05$) and cooperative ($\beta = -23$, $p < .05$) modes. There was no significant indirect effect for the friendly and cooperative dummy-coded variable, meaning that partner evaluation did not mediate any effect of this condition relative to the friendly and competitive mode. However, there was a remaining direct effect of the friendly and cooperative condition ($\beta = -.24$, $p < .05$), showing a remaining effect of the manipulation not mediated by partner liking. In sum, feelings toward partner provide a mechanism to explain how partner behavior affects enjoyment, but cooperative and competitive gaming did not inherently vary in terms of partner liking, implying another mechanism is also involved.

DISCUSSION

Overall, the results provide considerable evidence about how individuals respond to different game modes. Our initial expectation was that enjoyment would be higher when individuals played with or against a partner than when they played alone, and there were reasons to suspect that competitive play might be especially enjoyable. The results support the claim that certain types of competitive play are more enjoyable than other game modes, at least with a friendly opponent, but do not suggest that any multiplayer gaming is automatically more fun than solo play. We posited two reasons why competitive multiplayer gaming would be enjoyable: It provides a particularly effective type of competition, which is often connected with game enjoyment, and it offers a social context. It appears that both social interaction and game mode may play some role, as enjoyment was somewhat diminished with an unfriendly partner and attitudes toward partner were correlated with enjoy-

ment. However, the results definitely lend more support to the conclusion that competitive elements specifically are fun, as cooperative play—which is equally social—was nonetheless significantly less enjoyable.

It could be that cooperative games are problematic because players are interdependent—that is, the success of one depends on the skill of the other. Players may have felt unable to fully control the game when they had to rely on a partner, and this may have led to an increase in conflict between partners. However, the results for partner liking suggest that this did not fully manifest. While competitive, friendly partners were rated most likeable, this score was not significantly different from friendly, cooperative partners, and the means for the two unfriendly modes were roughly equal. Similarly, the mediation analysis showed that partner liking did not fully mediate the effects of the manipulation, with a direct effect of mode remaining present. At the very least, partner liking by itself cannot account for the failure of cooperative gaming to prove enjoyable. Further research could probe this in greater detail by including conditions in which players could not communicate directly but played the same game mode, as well as by introducing a condition where players could engage in social interaction while playing solo, but the inclusion of variations in partner behavior still helps illuminate the processes at work.

Some caveats are important. First, this relationship was suppressed by the tendency of individuals in the competitive game to perform worse. This is an important note for future research; had we not measured and controlled for game outcome, the effect of mode would have been hidden. For that matter, the potential role of performance in shaping enjoyment should be considered further in future research. Our data clearly showed a correlation between performance and enjoyment, but we are not able to explore this fully within this study. It is plausible that performance has a more nuanced relationship with enjoyment and challenge-skill balance; for example, both may be maximized when players win close games, rather than blowouts. One factor sometimes cited in explaining the appeal of multiplayer games is the relative challenge presented by a more flexible human foe. In these data, it appears that the added difficulty of a human opponent was detrimental, not beneficial, but future research should more carefully probe the role played by competition in creating feelings of optimal challenge, which may help foster feelings of flow and enjoyment (Sherry, 2004).

Second, it may be that enjoyment of cooperative game playing relies on interacting with known others, reinforcing existing social relationships. The laboratory environment and use of a confederate could not facilitate such interactions, meaning that this study may underestimate enjoyment of such games. Similarly, it seems likely that enjoyment of competitive games might also be higher when individuals play with their friends, who may be seen as more likable—this would be consistent with the findings from Ravaja et al. (2006) showing distinct responses to playing with friends and strangers. That

is, the competitive-friendly condition is probably more representative of a typical face-to-face gaming session. In some cases where individuals play online strangers, however, their foes may be quite unfriendly, dampening any increased enjoyment created by such a mode.

Although the results suggest that players respond favorably to competitive gaming, it is important to note that this may partly be a function of the particular type of game used. Football is built around competition between teams, with very clear victory conditions. While it also places a clear value on cooperation among teammates, this may not be effectively implemented in *Madden '08*. Cooperative play in *Madden '08* requires one player to be more of a leader, calling plays and serving as quarterback. In our design this was the participant, but some participants may actually have preferred a more passive role in which they could rely more on their partner. Further research using other titles and genres that also include cooperative and competitive multiplayer modes would be helpful.

It is also notable that the findings here account for a relatively small portion of variation in remaining enjoyment even after performance is accounted for. While consistent with other experimental research on media enjoyment, the results underscore how much remains unexplained with regards to what drives game playing. Some of this could be due to the constraints being compelled to play a game with a stranger in a lab places on enjoyment. No doubt some of this variance lies with individual attitudes toward games and the moderating influence of their personal motivations. More nuanced research along these lines could better assess how much these pre-existing orientations would amplify the different responses seen to multiplayer games found in this study.

In summary, the results demonstrate that players respond to the social contexts in which they play games, but in fairly nuanced ways. Playing with another person was not necessarily more fun, but competing with a player who nonetheless acts in a friendly manner did prove enjoyable. Overall, this supports the literature that suggests competition is key to understanding enjoyment of games, but it also suggests that social interaction nonetheless has an important role to play. Clearly, enjoyment of a game is a complex and multifaceted consequence of many different game features.

REFERENCES

Anderson, C. A., & Morrow, M. (1995). Competitive aggression without interaction: Effects of competitive versus cooperative instructions on aggressive behavior in video games. *Personality and Social Psychology Bulletin*, *21*, 1020–1030. doi:10.1177/01461672952110003

Bond, C. F., & Titus, L. J. (1983). Social facilitation: A meta-analysis of 241 studies. *Psychological Bulletin, 94*, 265–292. doi:10.1037/0033-2909.94.2.265

Cole, H., & Griffiths, M. D. (2007). Social interactions in massively multiplayer online role-playing gamers. *CyberPsychology & Behavior, 10*, 575–583. doi:10.1089/cpb.2007.9988

Deci, E. L., Eghrari, H., Patrick, B. C., & Leone, D. (1994). Facilitating internalization: The self-determination theory perspective. *Journal of Personality, 62*, 119–142. doi:10.1111/j.1467-6494.1994.tb00797.x

Denham, B. E. (2004). Toward an explication of media enjoyment: The synergy of social norms, viewing situations, and program content. *Communication Theory, 14*, 370–387. doi:10.1111/j.1468-2885.2004.tb00320.x

Eastin, M. (2006). Video game violence and the female game player: Self- and opponent gender effects on presence and aggressive thoughts. *Human Communication Research*, *32*, 351–372. doi:10.1111/j.1468-2958.2006.00279.x

Eastin, M. (2007). The influence of competitive and cooperative group game play on state hostility. *Human Communication Research*, *33*, 450–466. doi:10.1111/j.1468-2958.2007.00307.x

Eastin, M., & Griffiths, R. (2006). Beyond the shooter game: Examining presence and hostile outcomes among male game players. *Communication Research*, *33*, 448–466. doi:10.1177/0093650206293249

Gajadhar, B. J., de Kort, Y. A. W., & IJsselsteijn, W. A. (2008). Shared fun is doubled fun: Player enjoyment as a function of social setting. *Lecture Notes in Computer Science, 5294*, 106–117. doi:10.1007/978-3-540-88322-7_11

Hartmann, T., & Klimmt, C. (2006). Gender and computer games: Exploring females' dislikes. *Journal of Computer-Mediated Communication*, *11*(4), 910–931. doi:10.1111/j.1083-6101.2006.00301.x

Klug, G. C., & Schell, J. (2006). Why people play games: An industry perspective. In P. Vorderer & J. Bryant (Eds.), *Playing video games: Motives, responses, and consequence* (pp. 91–100). Mahwah, NJ: Erlbaum.

Lim, S., & Lee, J. R. (2009). When playing together feels different: Effects of task types and social contexts on physiological arousal in multiplayer online gaming contexts. *CyberPsychology & Behavior, 12*, 59–61. doi:10.1089/cpb.2008.0054

McAuley, E., Duncan, T., & Tammen, V. (1989). Psychometric properties of the Intrinsic Motivation Inventory in a competitive sport setting: A confirmatory factor analysis. *Research Quarterly for Exercise and Sport, 60*, 49–58.

McGrath, J. E. (1984). *Groups: Interaction and performance*. Englewood Cliffs, NJ: Prentice Hall.

Przybylski, A. K., Rigby, C. S., & Ryan, R. M. (2010). A motivational model of video game engagement. *Review of General Psychology, 14*, 154–166. doi:10.1037/a0019440

Ravaja, N., Saari, T., Turpeinen, M., Laarni, J., Salminen, M., & Kivikangas, M. (2006). Spatial presence and emotions during video game playing: Does it matter with whom you play? *Presence: Teleoperators and Virtual Environments*, *15*, 381–392. 10.1162/pres.15.4.381

Schmierbach, M. (2010). "Killing spree": Exploring the connection between competitive game play and aggressive cognition. *Communication Research, 37*, 256–274. doi:10.1177/0093650209356394

Sherry, J. L. (2004). Flow and media enjoyment. *Communication Theory, 14*, 328–347. doi:10.1111/j.1468-2885.2004.tb00318.x

Sherry, J. L., Lucas, K., Greenberg, B. S., & Lachlan, K. (2006). Video game uses and gratifications as predicators of use and game preference. In P. Vorderer & J. Bryant (Eds.), *Playing video games: Motives, responses, and consequence* (pp. 213–224). Mahwah, NJ: Erlbaum.

Strauss, S. G. (1999). Testing a typology of tasks: An empirical validation of McGrath's (1984) group task circumplex. *Small Group Research, 30*, 166–187. doi:10.1177/104649649903000202

Tamborini, R., Bowman, N. D., Eden, A., Grizzard, M., & Organ, A. (2010). Defining media enjoyment as the satisfaction of intrinsic needs. *Journal of Communication, 60*, 758–777. doi:10.1111/j.1460-2466.2010.01513.x

Tamborini, R., Grizzard, M., Bowman, N. D., Reinecke, L., Lewis, R. J., & Eden, A. (2011). Media enjoyment as need satisfaction: The contribution of hedonic and nonhedonic needs. *Journal of Communication*, *61*, 1025–1042. doi:10.1111/j.1460-2466.2011.01593.x

Thorsen, T. (2008). NPD: 2007 game earnings nearly $18 billion, Halo 3 sells 4.82 million. Retrieved from http://www.gamespot.com/news/6184847.html

Vorderer, P., Hartmann, T., & Klimmt, C. (2003). Explaining the enjoyment of playing video games: The role of competition. In D. Marinelli (Ed.), *Proceedings of the 2nd International Conference on Entertainment Computing* (*ICEC 2003*), *Pittsburgh* (pp. 1–8). New York: ACM.

Weibel, D., Wissmath, B., Habegger, S., Steiner, Y., & Groner, R. (2008). Playing online games against computer- vs. human-controlled opponents: Effects on presence, flow, and enjoyment. *Computers in Human Behavior, 24*, 2274–2291. doi:10.1016/j.chb.2007.11.002

Williams, D., Yee, N., & Caplan, S. E. (2008). Who plays, how much, and why? Debunking the stereotypical gamer profile. *Journal of Computer-Mediated Communication, 13*, 993–1018. doi:10.1111/j.1083-6101.2008.00428.x

Wood, R. T. A., Griffiths, M. D., Chappell, D., & Davies, M. N. O. (2004). The structural characteristics of video games: A psycho-structural analysis. *CyberPsychology and Behavior, 7*, 1–10. doi:10.1089/109493104322820057

Yee, N. (2007). Motivations for play in online games. *CyberPsychology & Behavior, 9*, 772–775. doi:10.1089/cpb.2006.9.772

Zajonc, R. B. (1965). Social facilitation. *Science, 149*, 269–274.