Games for Peace: Empirical Investigations with PeaceMaker

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ABSTRACT

This chapter presents an investigation on decision making in a dynamic and complex situation, the solution of international conflict and the achievement of peace. We use an award winning video game to collect behavioral data, in addition to questionnaire surveys given to players. The Israeli-Palestinian conflict is one of the most difficult political problems of our times, and PeaceMaker represents the historical conditions of the conflict and provides players with an opportunity to resolve the conflict. Students in an Arab-Israeli history course played PeaceMaker from the perspectives of the Israeli and Palestinian leaders at the beginning and end of the semester. We recorded and analyzed their actions in the game and information on their personality, religious, political affiliation, trust attitude, and number of gaming hours per week. Results indicate the number of actions taken in the game alone cannot distinguish between good and bad performers. Rather, individual identity variables such as religious and political affiliation, personal affiliation to the conflict, and general trust disposition relate to the scores obtained in the game. We discuss the implications for policy and general conflict resolution and present our ideas for future research.

INTRODUCTION

Dynamic decision making (DDM) is a field of research dedicated to the study of how individuals make decisions in dynamic, complex environments involving multiple components: alternatives, events, and outcomes; high uncertainty; and many constraints, including time, workload, and resources (Brehmer, 1992). In the Dynamic Decision Making Laboratory (http://www.cmu.edu/ddmlab/), we have studied human decision making in dynamic tasks across a variety of contexts including military command and control, medical decision-making, and supply chain management, among others.

Conflict resolution can be conceptualized as a dynamic decision making process, in which the resolution of the problem is obtained by making a series of interdependent decisions in the face of changing realities, interests, and relationships between the conflicting parties (Kelman, 2008). One of the psychological concepts useful in understanding conflict resolution is experience: decision makers often tend to adhere to past decisions and rely on established procedures and technologies as the safest course of action (Kelman, 2008). In fact, in DDM research, it is known that decision makers often make decisions from experience, based on what is learned from past decisions and their consequences (Edwards, 1962; Gonzalez, Lerch, & Lebiere, 2003).

Unfortunately, little is known about the socio-psychological aspects that influence DDM and the use of experience in addressing a conflict. For example, a concept useful in the understanding and amelioration of the violent manifestation of international conflict is identity, or the need for belonging to an ethnic or national group (Shamir & Sagiv-Schifter, 2006). It is well known in several socio-psychological theories that conflict increases people's attachments to their "own" group and generates hate for the "other" group, because people tend to think in terms of social categories or groups. Thus, group membership provides security at many levels, but it is also the source of many conflicts (Gartzke & Glenditsch, 2006). For example, other versus self accountability is an antecedent to anger, and often this emotional reaction is foreseeable when the self moral values and beliefs are jeopardized by the "other" (Cheung-Blunden & Blunden, 2008).

In this research, we investigate the effects of identity variables on the aspects of conflict resolution as they relate to experience. We are interested in determining the effects of these identity variables as an individual becomes more familiar with a conflict. Our research follows an innovative approach to the study of conflict, by executing controlled laboratory experiments using a video game. The video game used in this research is *PeaceMaker*, developed by ImpactGames (Impact Games, 2008). PeaceMaker simulates realistic Israeli-Palestinian interactions, with the player assuming the role of either the Israeli Prime Minister or the President of the Palestinian Authority. In each case, the leaders attempt to make effective policy choices leading to peace, while having to respond to external events like suicide bombings, army raids, and the demands of public opinion. The goal of the game in either roles is to establish a stable two-states solution to the conflict.

The research reported here will present the use of PeaceMaker in an example of conducting empirical investigations with video games to build theoretical models of socio-psychological variables that influence DDM. In what follows, we describe PeaceMaker and a laboratory study conducted to analyze participants' decision making strategies and socio-psychological factors that relate to the solution of the conflict in the game. We will present some of the results from this study and discuss their implications for future directions in using video games for behavioral research.

BACKGROUND

The popularity of video games worldwide is undeniable. Specifically, the use of interactive videogames for conducting research and improving learning in the classroom is becoming very common. Psychology has adopted video games as research tools for quite some time (Donchin, 1995), but more recently, other disciplines are adopting simulations and games for teaching and research, including Engineering (Foss & Eikaas, 2006), Business and Management (Zantow, Knowlton, & Sharp, 2005), Medicine (Bradley, 2006; Griffiths, 2002), and Political Science (Kelle, 2008; Malaby, 2007; Mintz, Geva, Redd, & Carnes, 1997).

A key characteristic of DDM research is the use of *interactive* problem solving tools (i.e., Microworlds, or Decision Making Games, DMGames) in laboratory experiments (Gonzalez, Vanyukov, & Martin, 2005). Researchers have used DMGames in the study of decision processes for many years, but they refer to those tools by various names, including "microworlds," "synthetic task environments," "high fidelity simulations," "interactive learning environments," "virtual environments," and "scaled worlds," just to name a few (Brehmer & Dorner, 1993; DiFonzo, Hantula, & Bordia, 1998; Gonzalez et al., 2005; Omodei & Wearing, 1995).

DMGames are valuable for decision-making research because they represent a compromise between experimental control and realism. Traditional behavioral decision-making research typically boasts a higher level of experimental control, but involves tasks with a high degree of artificiality. The most common method is to present a hypothetical scenario, on the basis of which participants must imagine the possible consequences of presented alternatives, and to then have participants self-report their preference for which alternative to choose. With DMGames, decisions are actually made and feedback resulting from the decisions is received from the environment, which is used to make future decisions from experience. Thus, DMGames enable researchers to conduct laboratory experiments with dynamic and more realistic environments in which they can also obtain experimental control.

The use of games to teach international conflict in the classroom dates back to 1966. John Gearon created a simple game to be used in the classroom to introduce ninth graders to anarchy and the concept of *balance of power* that emerges in most situations of conflict (Bueno de Mesquita, 2006). Years later, Mintz et al. (1997) used a "decision board" to collect data in the classroom on what information is acquired during the decision-making process in political scenarios. The tool helped determine how much information was needed during the decision making process. More recently, Kelle (2008) used an arms control simulation in an international relations course. Kelle's (2008) analysis of students' reflections concluded that the simulation helped facilitate knowledge of the complexity of international negotiations.

Another example of the use of games in the area of international conflict is that presented by Krolikowska and colleagues (2007). This study presents an example of an environmental conflict emerging from the tensions between nature protection and economic development. A role-playing simulation game was designed and used in a course to give the students direct experience with the challenges involved in solving difficult social-ecological tensions. Data from this study suggested that the biggest barrier to successful problem solving was personal beliefs and viewpoints. This study concluded that conflict resolution is highly dependent on the personal interactions and that adopting others' perspectives is key to finding a lasting solution.

PeaceMaker represents the historical events and the different aspects of a vexing international problem: the Israeli-Palestinian conflict. PeaceMaker was originally developed as a student project at Carnegie Mellon University's Entertainment Technology Center, but it has inspired many to think of the conflict in a different way (ImpactGames, 2008). PeaceMaker has gained popularity and won multiple awards including the University of Southern California's Center on Public Policy on Reinventing Public Diplomacy through Games contest (May 8, 2006) and the Games for Change annual contest (June 27, 2007). Gonzalez, Czlonka, & Eisenberg (submitted) utilized PeaceMaker in a classroom setting to impact students' learning of the historical background of the Israeli-Palestinian conflict and to measure the decision-making strategies that occur with learning. Students in an Arab-Israeli history course played PeaceMaker from the perspectives of the Israeli and Palestinian leaders at the beginning and again at the end of the semester. We recorded and analyzed the students' actions in the game, as well as information on their personality, religious affiliation, political affiliation, and general trust attitude. Results revealed that political and religious background correlate to game performance at the beginning of the semester, but that the correlation disappears by the end of the semester. This study suggests that learning to stand in the others' shoes may reduce the effect that religious and political preconceptions may have on our actions.

The results we present in this book chapter are a follow up analysis to those results reported in Gonzalez et al. (submitted). Here we discuss some new patterns and relationships discovered, which present a new perspective of how performance in PeaceMaker is impacted by aspects of individuals' background and identity.

PeaceMaker

The PeaceMaker (see Figure 1) video game was inspired by real events in the Israeli-Palestinian conflict. ImpactGames (2008) developed PeaceMaker with the assistance of US, Israeli, and Palestinian Authority advisors to ensure that the game did not just reflect personal world views. Many prominent reviewers (Associated Press, 2006; Musgrove, 2005; Thompson, 2006) consider the PeaceMaker's representation of the Israel-Palestinian conflict to be a fair and accurate reflection of the historical and current events and relations. Peacemaker is now a

commercial video game, and it has become popular worldwide and has received a series of accolades and awards in competitions (ImpactGames, 2008).

INSERT FIGURE 1

In PeaceMaker, players can play one of two roles: the Israeli Prime Minister or the Palestinian President. The game can be played on a Macintosh or PC, and it comes in three languages: English, Arabic, and Hebrew. Some generic assumptions of the game are that the player will win the game only if a two-state solution is reached. A two-state solution to the conflict is obtained when Israel and Palestine are able to coexist side by side as independent nations.

Players choose actions to take in the game and accumulate points according to the effects those actions have on the approval ratings of various interest groups. The scores are calculated by a function within the game, and reflect the satisfaction or unhappiness of different nations and political groups, both within the region and around the world (e.g., Israel, Hamas, United Nations, etc.). If the player manages to reach a balanced and highly positive score for both the Israeli and the Palestinian groups, the player wins and the game is over. If a player cannot sufficiently please his/her own people (called ScoreOwn) or the other side's constituents (called ScoreOther), the player loses and the game is over. To win the game, both ScoreOwn and ScoreOther need to be at 100 points each. If either score falls below -50, however, the player loses the game.

There are three difficulty levels in the game: calm, tense, and violent. The levels differ in the frequency and consequences of turbulent events that are beyond the player's control (AI actions); with the frequency highest for the violent level and lowest for the calm level. Using the information from these events and information available by clicking on maps, cities, and polls (other viewed), the user can formulate a strategy and take actions from three main categories: security, political, and construction. Within the three main categories are a variety of subcategories (i.e., security: send police; political: request meeting with foreign leaders; construction: build new housing settlement). Most actions within each main category can be either pro-social (i.e., increase police funding) or antisocial (i.e. decrease police funding). PeaceMaker provides a dynamic environment in which the effects of the actions on the polls (thus, the score) is dependent upon the role the user is playing, the level of violence, the history of the user's past actions, and the current levels of satisfaction at a given time. In addition, every new game will present players with a unique combination of AI actions. Thus, a player cannot win the game using the same strategy for each role or for each difficulty level.

In partnership with Impact Games, the game was modified to collect information about each action taken by a player and the state of the environment at the moment the action was taken. A log file is created for each play of the game. This log file contains information about the role being played; the difficulty level selected; the time it takes for the user to make each decision; the number and type of actions taken in the game (such as AI actions, security, political, or construction); and the resulting score (further broken down by change in points for all satisfaction polls). The output from these log files is our main data source for analysis of performance in-game. That data can also be correlated with data collected by other means such as questionnaires on religion, cultural and political identity, and beliefs.

PEACEMAKER IN LABORATORY RESEARCH

The laboratory study reported in this book chapter is an extension of the work reported by Gonzalez et al. (submitted). This study was conducted with undergraduate students enrolled in a course on the history of the Arab-Israeli conflict. Students played the role of the Israeli Prime Minister and the Palestinian President at the beginning and end of the semester, either in the calm or violent difficulty levels. The goal was to understand what aspects of an individuals' background impact performance in the role-playing game. In the next section, we discuss the methods and instruments used to collect information about the identity variables that characterize the participants. Then, we will present new results on the performance in PeaceMaker as it relates to the categories of the participants' background variables.

Methods

Students were asked to complete a survey to gather general information on their backgrounds and identities. Variables measured in the background questionnaire included the Myers-Briggs Type Indicator (MBTI) measure of personality, a self-rated measure of personal involvement with the conflict, religious affiliation, US political affiliation, typical hours spent gaming, and their trusting personality, measured in a scale originally developed by Yukawa (1985).

In past research using the MBTI has four dimensions of personality: (extraverts (E) vs. introverts (I); sensors (S) vs. intuitors (N); thinkers (T) vs. feelers (F); and judgers (J) vs. perceivers (P)), often thinkers, feelers, judgers, and perceivers are used to identify differences in problem solving and decision-making (Chwif & Barretto, 2003). To report their MBTI score, students were asked to visit the Team Technology website (2008) and make selections on the strength of their agreement between pairs of statements. A report was generated that indicated the personality type with which their responses had the highest percentage of agreement. In our sample, 30% were extraverts, 30% were sensors, 17% were thinkers, and 23% were judgers.

We expected that personal involvement with the conflict, religious affiliation, and US political affiliation would be correlated with the participant's performance in the game, given the nature of the conflict. That is, the conflict has its roots in religious beliefs and the long-standing nature of the conflict extends beyond the region to involve many countries and political groups. We asked students to report their personal affiliation to the conflict (either with Israel, Palestine, other Middle East, or none), evaluated as having grown up in the area, having a significant portion of family from the area, etc. Due to the small number of participants that rated personal affiliation with Palestine, the Palestinian and other Middle Eastern affiliation were coded the same; Other Middle East.

We also expected to find that the hours that participants generally spent playing video games would influence the performance in the game. For instance, Lintern and Kennedy (1984) found that playing Atari's *Air Combat Maneuvering* accounted for 48-86% of the variance of performance on a carrier-landing flight simulator. Further, Donchin (1995) has noted that participants with more gaming experience in general had better performance during an experiment involving a video game task.

Also, researchers pointed out that the video games serve as a natural environment for the development of trust (Malaby, 2007). Trust of the "other side" should influence the actions taken in the game and therefore, game performance. We were interested in finding out whether and how much a person's general trusting nature would impact his or her performance in PeaceMaker. Yukawa's (1985) trust scale originally included 60 items related to trust, while

Yamagishi (1986) and Yamagishi and Sato (1986) developed and utilized a brief version called the Social Values Orientation (SVO) scale. This version, published by Chaudhuri, Khan, Lakshmiratan, Py, and Shah (2003), was used to study the correlation between trust attitude and likelihood of exhibiting behavior that contributes to the public good. It has also been used in a prisoner's dilemma simulation to correlate trust to cooperation (Parks, Henager, & Scamahorn, 1996; Parks & Hulbert, 1995).

A total of 22 participants played at the calm level (50% female, M=19.9 years, Std. Dev.=0.80) and 20 participants played at the violent level (25% female, M= 20.3 years, Std. Dev.=0.86). Students played the game at the beginning and at the end of the semester and in each session they were asked to play the game twice: in the Israeli and in the Palestinian roles. In both sessions, students were counterbalanced in the order which they played the role of the Israeli Prime minister or the Palestinian president. In the first session, all participants completed the same game tutorial, after which they played the game twice. It took participants approximately two hours to complete the first session at the beginning of the semester. The second session took place two months later at the end of the semester. In the interim, students had no contact with the game, but learned about the history of the Israeli-Palestinian conflict in class. In the second session, students again played the game twice, once in each role.

We describe below the results of players' performance and how they relate to each of the background measures we collected.

Results

Our results uncovered a mixture of expected and unexpected relationships. First, as one would expect, game outcomes were such that more players lost in the violent level (15 out of 20 participants, 75%) than the calm level (9 out of 22, 41%). The difference between violent and calm is considerable, but it only indicates that the game was well calibrated in terms of its difficulty. Furthermore, across violence levels, 16 out of 42 participants, 38%, lost all four games; 20 out of 42 participants, 48%, won only one of the four games they played; 5 out of 42, 12%, won two of the four games played, and only 1 out of the 42 participants, 2%, won all four games. Also, more participants lost the games in the beginning of the semester (29 out of 42, 69%) versus the end of the semester (21 out of 42, 50%). This gives a rate of learning of 19%, which is surprisingly low. It was interesting to find that more participants lost when playing as the Israeli Prime Minister (32 out of 42, 76%) than when playing as the Palestinian President (19 out of 42, 45%). More on their behavior at the beginning and end of the semester will be presented next.

To better understand this variability in gaming performance, we initially looked at actions that players took in the games. We expected to find that better players (those with a positive score by the game's end) would have taken different strategies compared to less successful players of the game (those with negative score by the game's end). We expected that their different strategies would be reflected in the numbers and types of actions taken during the games. To evaluate this possibility, we calculated the number of actions taken in the games and compared the more successful games to the less successful games. To classify games into those that were and were not successful, we used the outcomes of the game (Score Own and Score Other). The scores were averaged and the resulting average score was taken as successful if it was greater than zero and not successful it if was less than zero. The percentage of each possible type of action taken was then calculated for both successful and non-successful games.

Figure 2 shows the percentages of each type of action taken by the participants in successful and unsuccessful games. In general, it is observed there is little difference in the number of actions taken in successful and unsuccessful games. For example, in successful games political actions comprised 28% of the total number of actions, while in unsuccessful games they were 24% of the total. Similar, non-significant differences were exhibited in other types of actions as well. Thus, these results suggest that what leads to more successful games is not the number of actions and the types of actions taken in the game. Rather, other variables may influence performance in this game.

INSERT FIGURE 2

We expected that the identity variables of the participants would determine their success in this game. We examined the variables measured in the background questionnaires and determined how they were related to scores in the game. Figure 3 shows the mean scores in the game at the beginning and end of the semester sessions for four personality combinations that have been identified as related to decision making performance (Chwif & Barretto, 2003): Feeling and Judging (FJ); Feeling and Perceiving (FP); Thinking and Judging (TJ); and Thinking and Perceiving (TP). The average scores in general were negative at the beginning of the semester, regardless of the personality type of the player, with the lowest scores for the Thinking/Judging personality type. Interestingly, as seen in the figure, by the end of the semester, the Thinking/Judging participants improved their performance in the game considerably, becoming the best players among all personality types.

INSERT FIGURE 3

We also expected that performance would be affected by how closely involved someone was with the conflict. Figure 4 shows the scores at the beginning and end of the semester separated by the participants' reported personal affiliations (i.e., Israel, None, or Other Middle East). Those with Other Middle Eastern affiliation were the ones with the lowest scores among the groups, both at the beginning and at the end of the semester. Those with Israeli and no affiliation had negative scores at the beginning of the semester, but by the end of the semester, they were able to raise their scores to the positives.

INSERT FIGURE 4

As with the personal involvement, we also expected that participants' religious affiliation would influence their performance in-game. Figure 5 presents the scores at the beginning and end of the semester by religious affiliation. At the beginning of the semester, those with religious affiliation to Christianity, Hinduism, and Judaism had the worse scores among all the groups. By the end of the semester, only those reporting Hinduism continued performing poorly,

and a considerable improvement was seen in the Christianity group. We had a separate category for Islam, but no players reported Islam as their religious affiliation.

INSERT FIGURE 5

For the scores broken down by political affiliation, those with Democratic and Republican US political affiliation were poor performers at the beginning of the semester, but they improved by the end of the semester. Figure 6 shows the performance differences at the beginning and end of the semester by US political affiliation. The Libertarians were consistently positive at the beginning and at the end of the semester. Although those with Democratic, Republican, or no affiliation improved performance, they were still negative by the end of the semester. Those with other political affiliation initially had the highest scores and ended up with lower scores by the end of the semester.

INSERT FIGURE 6

We expected that the general trusting tendency of participants would also have an effect on how they would play the game. Figure 7 presents the scores at the beginning and end of the semester, for those participants that were relatively trusting (score on the questionnaire fell below the mean) versus those that were relatively untrusting (score fell above the mean). Figure 7 shows that untrusting participants initially had lower scores than the trusting participants, but at the end of the semester, untrusting individuals scored better than the trusting individuals.

INSERT FIGURE 7

Finally, Figure 8 shows the results broken down by the number of weekly gaming hours participants reported. We separated the scores for those that reported playing video games for less than six hours a week from those that reported playing video games for six or more hours each week. The graph shows that in general, all participants that reported less hours of gaming practice per week tended to improve their performance in the game from the first to the second session, while those with more gaming practice per week tended to have a positive score but don't improve their performance from the first to the second session.

INSERT FIGURE 8

Discussion and Relevance of these Findings

The results above are interesting in several ways. First, we show that it is difficult to determine how a player becomes successful at the game. We found that the actions taken in-game are not

good indicators of performance. The concrete, but insensitive, measure we used to come to this conclusion is the number of actions taken in a game. We believe, however, that more work is needed to determine the strategies used by successful and unsuccessful players. For example, in PeaceMaker, the key to success might be in the *timing* of the decisions and the particular *sequence* of actions taken in the game rather than the number of actions. This idea will need a more detailed type of analysis to examine the actions taken by the players.

Interestingly, performance in the game was clearly influenced by the player's personality, affiliation to the Middle East, religion, political affiliation, and trusting attitudes. For example, participants that were able to improve their performance in the game from the beginning to the end of the semester were those with a Thinking and Judging personality. People with a Thinking personality focus on analytical decision-making, based on a desire for fairness; those with Judging personality prefer control over their lives, seek closure, are organized, and plan accordingly (Filbeck & Smith, 1996). Thus, it is interesting that participants sharing these characteristics were the ones able to improve their performance considerably over the two sessions.

It is also interesting to note that individuals that reported Christianity were able to reverse their performance from negative to positive score from the first to the last session. Those that reported other religion went from a positive to a negative score from the first to the second session. Surprisingly, very little is known about the effect of religion in decision making and conflict resolution, but there are many discussions on the way religion influences judgments in several situations. According to a poll conducted by the Pew Research Center (Lugo, 2007), Americans' religious beliefs influence their views on a range of political issues, including foreign policy. In addition, conventional wisdom suggests that cultural differences matter in the conduct of international affairs, but it is unclear what elements of cultural identity matter most, and it is also unclear what relationships those elements have to political ideologies, to conflict, and to conflict resolution (Gartzke & Gleditsch, 2006). Thus, more research is needed to interpret the patterns of religious and political affiliation influences that were found in this study.

Results showed that those with a general tendency to be untrusting scored better by the end of the semester than did those generally trusting of people. This seems to be a counterintuitive result that indeed is opposite to results in a cooperative game (Parks et al., 1996; Parks & Hulbert, 1995). When an action is taken in the game, such as holding negotiations or giving aid to the poor, some constituents in the game would like it and some others would not. Thus, it is possible that those who do not have as much trust for people are skeptical about their actions being accepted by all. Because they are aware that people are going to be critical even of good gestures, they may be more cognitively prepared for these results and to respond better than someone who is more trusting.

Finally, the results on gaming hours confirm the difficulty of the game. PeaceMaker is not a game of skill acquisition in which more gaming hours necessarily translate into more learning. Those with more gaming hours did, in fact, not improve their performance from the beginning to the end of the semester. Thus, even participants that usually spend more than five hours per week playing video games had difficulty winning the game. PeaceMaker does not seem to be a game that a video game player can pick up and conquer quickly.

FUTURE RESEARCH DIRECTIONS

It is clear that this study needs to be extended and expanded to account for a larger diversity of participants in all senses: religions, affiliations, and gaming hours. We have started to do that,

and have conducted a data collection session similar to the one described in Doha, Qatar. In addition, we are building partnerships with the Peres Center for Peace in Israel. This is a non-profit organization that is currently conducting workshops in Israeli and Palestinian high schools using PeaceMaker. The future analyses of these data collection efforts are expected to confirm the current relationships, provide stronger relationships, and uncover other aspects of the social, religious, and cultural aspects that influence performance in this game.

We have also continued data collection in the US, manipulating other experimental elements under our control. Most recently, we have focused on improving the motivation players are given to win the game. In our first studies in the classroom (Gonzalez et al., submitted), students were told they needed to play the game and write a descriptive paper on their experience. There was no specific motivation to perform well in the game which may account for why 38% of the participants lost all games played. Without specific incentives, the detachment naturally inherent when playing a computer game may not motivate players to achieve success. Some of our most recent experiments tie performance in a repeated games design to the amount of credit received, and thus provide clear benefit for the individual. We also plan to manipulate other experimental variables, such as training time and feedback. For instance, Gonzalez, Martin, and Hansberger (2006) in a different video game study were able to control for textual feedback (advice from experts) and showed an improvement in performance in the game after repeated trials.

Given the above proposals, some would argue that the risk of doing experimental studies with a realistic game, like PeaceMaker, is that the game may not reflect the real situation and may limit the degree to which findings can be extrapolated. While research is replete with the challenging tradeoff between external validity and experimental control (Greitzer, Hershman, & Kelly, 1981), we would argue that it is important to be able to manipulate the world in the game. At this point, PeaceMaker does not allow a player (or an experimenter) to create a new scenario or situation to play with. It would be interesting to be able to collect data, as we do in other experiments in the laboratory, in situations in which we can control and play "what if" scenarios where we can change the world directly. It remains to be seen whether PeaceMaker will develop to the point that this becomes possible, but our research suggests that there are still many aspects of the game that can be examined further.

CONCLUSION

Initial laboratory experiments with PeaceMaker highlighted interesting findings regarding individual factors related to dynamic decision making. These findings are evidence of a large opportunity for future research to learn more about decision making through video games like PeaceMaker, by diversifying the population sample and by manipulating variables such as motivation and feedback. An even greater opportunity lies in the potential for researchers and video game developers to collaborate to develop video games that have the capability to manipulate the internal variables of the game: creating experimental tools for researchers. It is important to the advancement of game studies for these relationships to be forged between the academic and gaming world. The study presented here shows an example of how a video game, educational and fun, can be used as an experimental tool to generate and create new behavioral theories.

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Figure Captions

Figure 1. PeaceMaker Screenshot. © [*2007*] [*Eric Brown*]. Used with permission.
Figure 2. Percentage of actions in the game taken in successful and unsuccessful games.
Figure 3. Mean performance by dimensions of the MBTI personality type.
Figure 4. Mean performance by personal affiliation at the beginning and end of the semester.
Figure 5. Mean performance by religious affiliation at the beginning and end of the semester.
Figure 6. Mean performance by US political affiliation at the beginning and end of the semester.
Figure 7. Mean performance by trust scores at the beginning and end of the semester.
Figure 8. Mean performance by gaming hours at the beginning and end of the semester.

Figure 1.

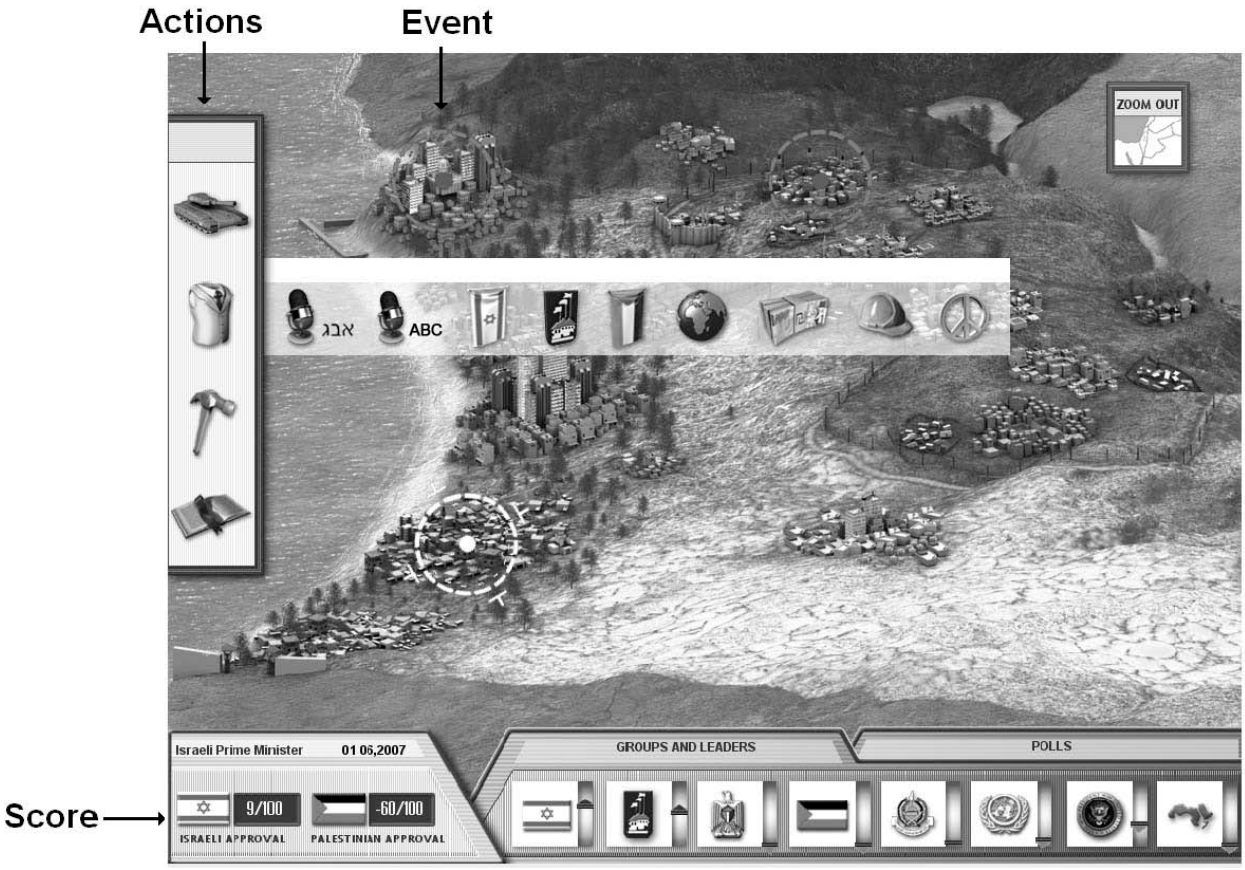
Actions
Event
ZOOM OUT
אבג
ABC
Israeli Prime Minister
01 06,2007
GROUPS AND LEADERS
POLLS
Score
9/100
ISRAELI APPROVAL
-60/100
PALESTINIAN APPROVAL

Figure 2.

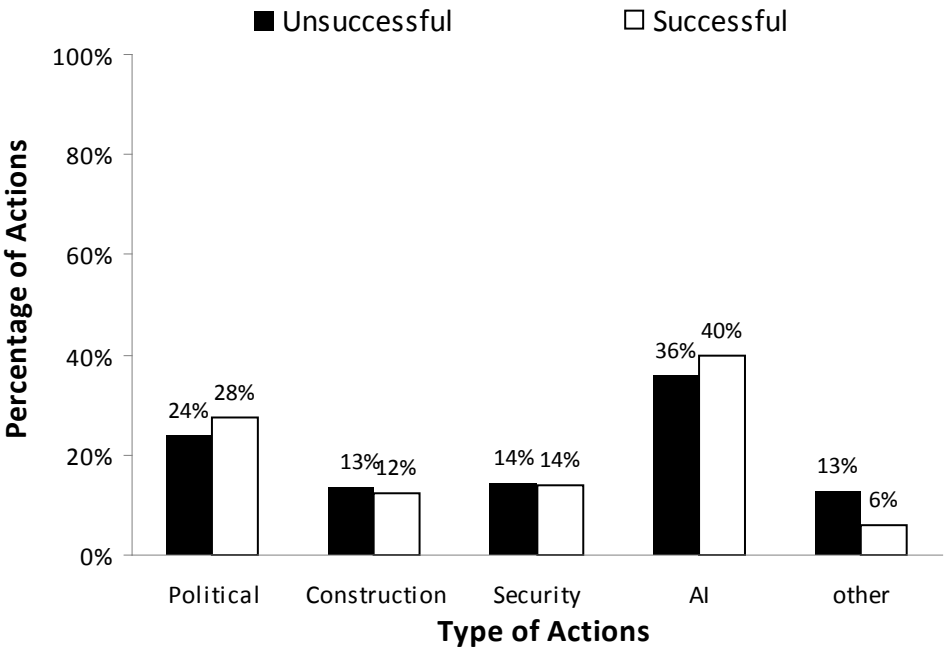
Unsuccessful
Successful
100%
80%
60%
40%
20%
0%
Percentage of Actions
24%
28%
13%
12%
14%
14%
36%
40%
13%
6%
Political
Construction
Security
AI
other
Type of Actions

Figure 3.

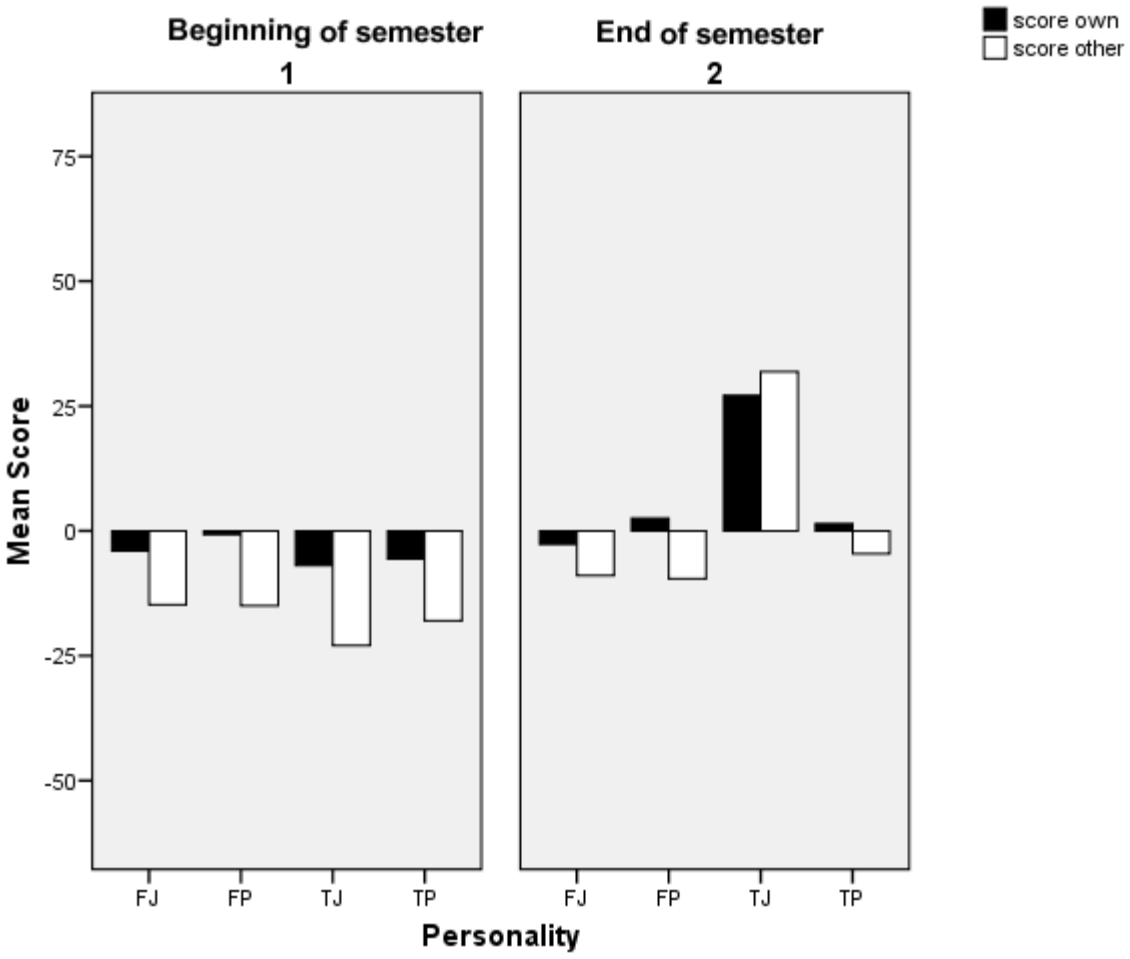
Beginning of semester
1
End of semester
2
score own
score other
75
50
25
0
-25
-50
Mean Score
FJ
FP
TJ
TP
FJ
FP
TJ
TP
Personality

Figure 4.

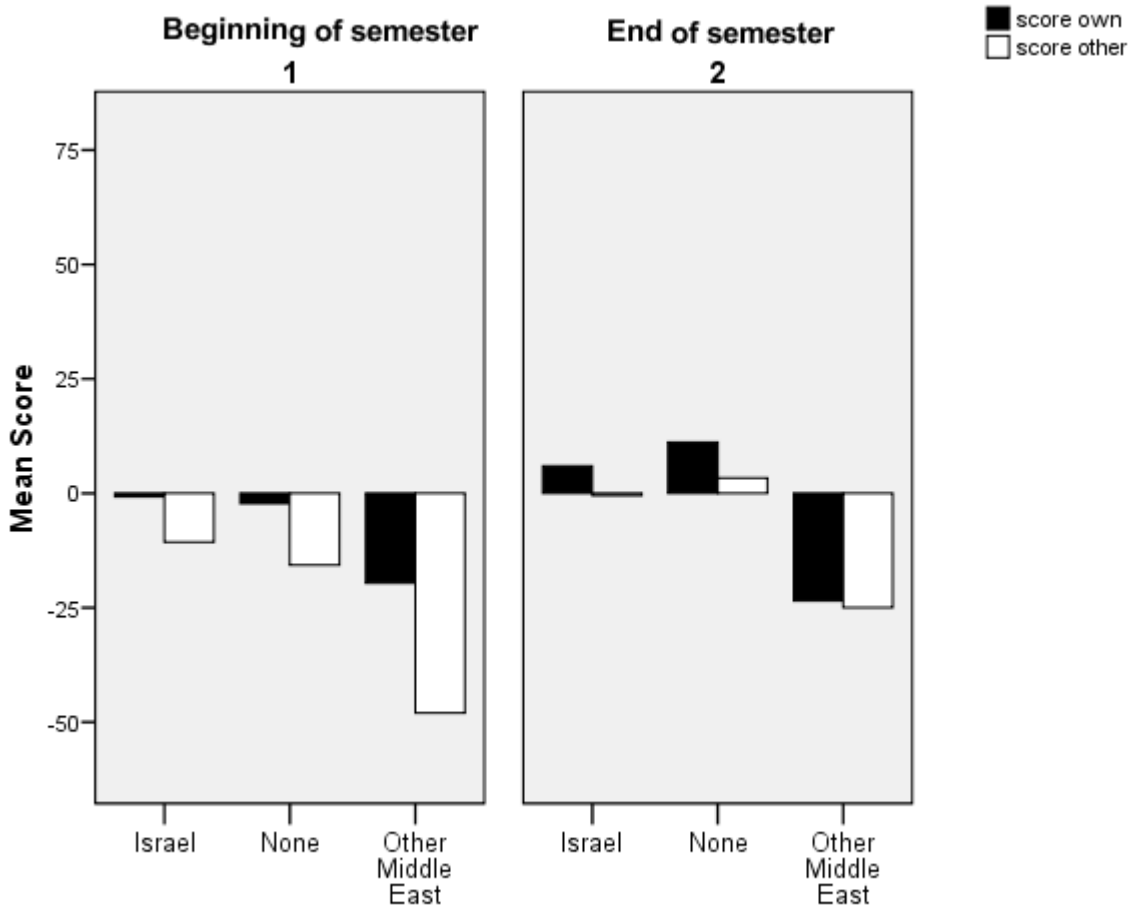
score own
score other
Beginning of semester
1
End of semester
2
Mean Score
75
50
25
0
-25
-50
Israel
None
Other Middle East
Israel
None
Other Middle East

Figure 5.

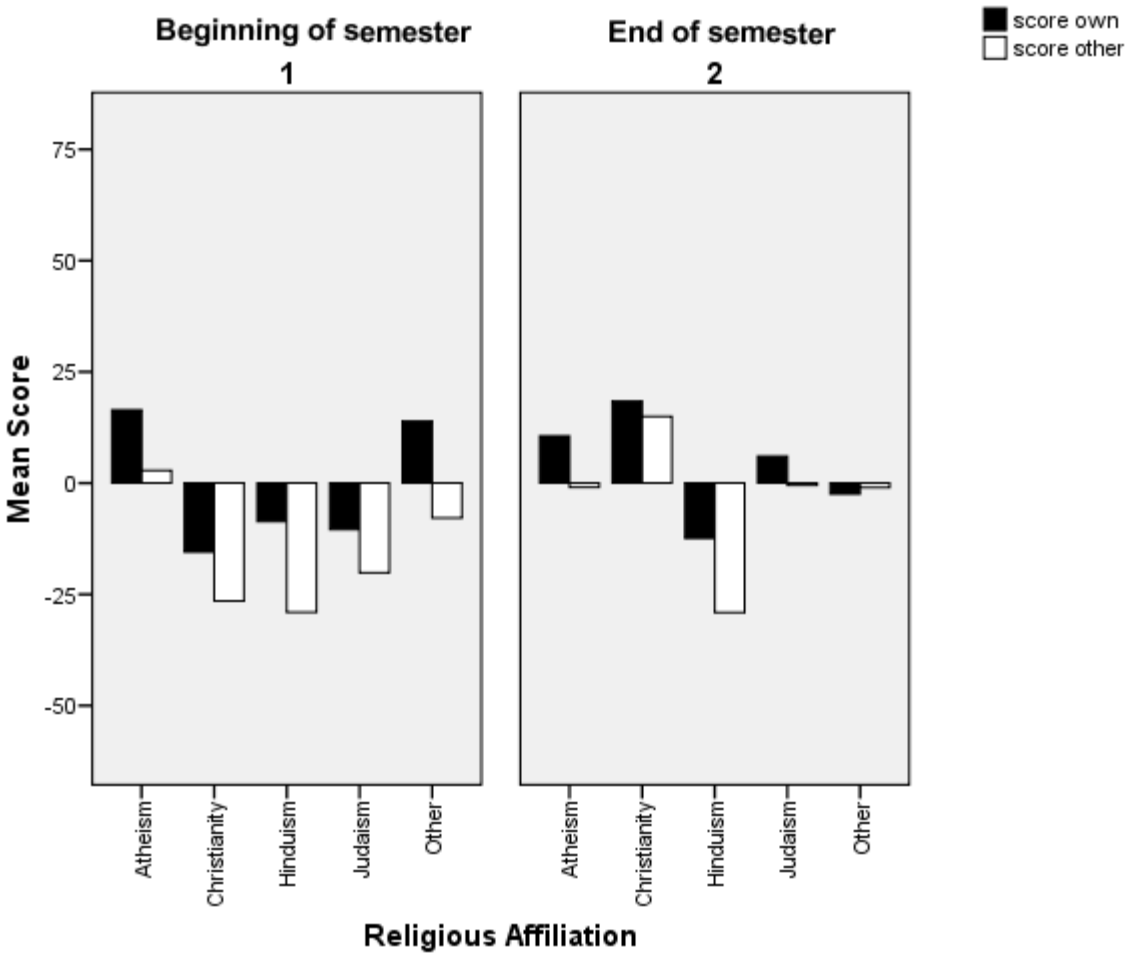
score own
score other
Beginning of semester
1
End of semester
2
Mean Score
75
50
25
0
-25
-50
Atheism
Christianity
Hinduism
Judaism
Other
Religious Affiliation

Figure 6.


score own
score other
Beginning of semester
1
End of semester
2
Mean Score
75
50
25
0
-25
-50
Democratic
Libertarian
None
Other
Republican
Democratic
Libertarian
None
Other
Republican
Political Affiliation

Figure 7.

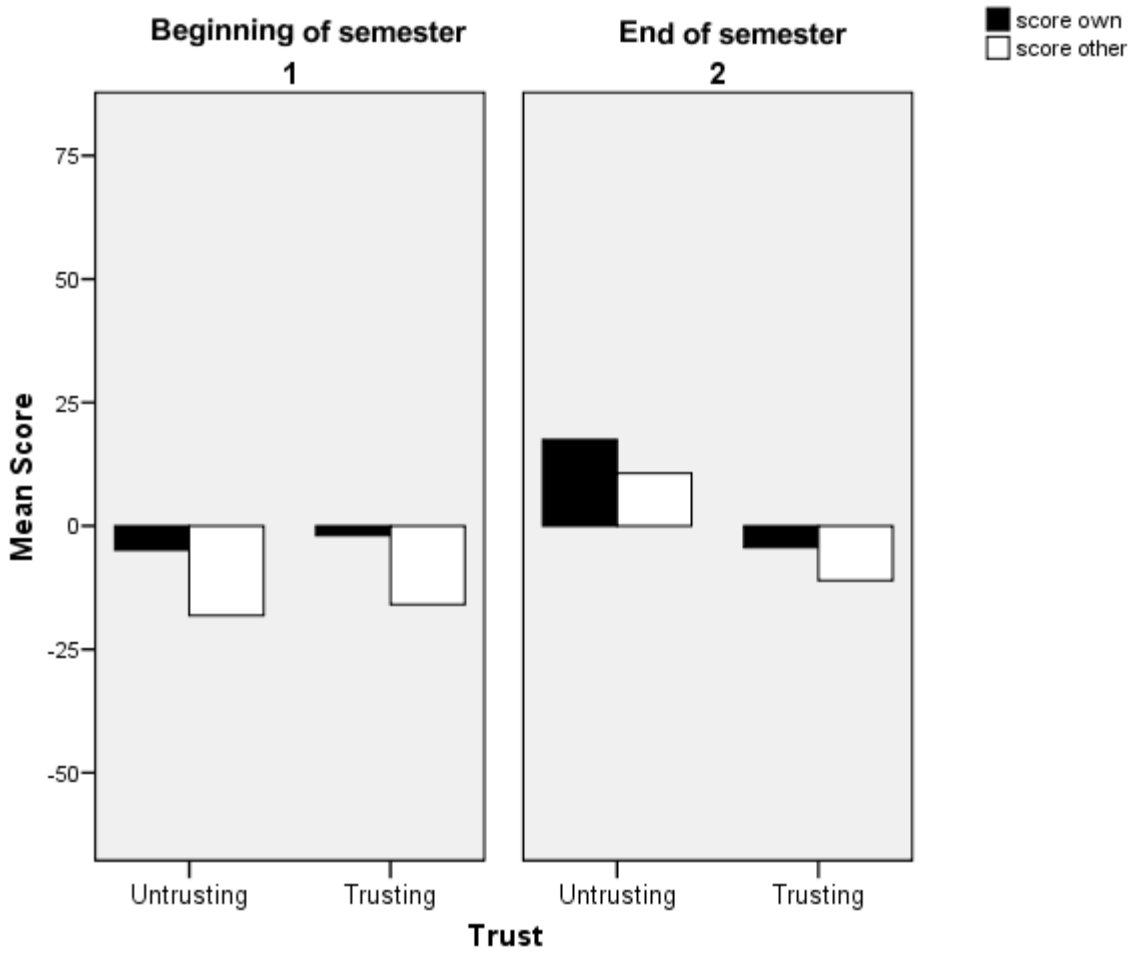
score own
score other
Beginning of semester
1
End of semester
2
75
50
25
0
-25
-50
Mean Score
Untrusting
Trusting
Untrusting
Trusting
Trust

Figure 8.