

5-20-2011

Incorporating Influence Tactics into a Decision Aid: Tested via a Dictator Game

Doug C. Derrick

The University of Arizona, dderrick@cmi.arizona.edu

Follow this and additional works at: <http://aisel.aisnet.org/mwais2011>

Recommended Citation

Derrick, Doug C., "Incorporating Influence Tactics into a Decision Aid: Tested via a Dictator Game" (2011). *MWAIS 2011 Proceedings*. 1.

<http://aisel.aisnet.org/mwais2011/1>

This material is brought to you by the Midwest (MWAIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in MWAIS 2011 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Incorporating Influence Tactics into a Decision Aid: Tested Via a Dictator Game

Douglas C. Derrick
The University of Arizona
dderrick@cmi.arizona.edu

ABSTRACT

The purpose of this study was to examine how proactive influence tactics could be incorporated into decision aids in order to change human perceptions and decisions. This study serves as a foundation for future research that could incorporate such tactics into automated agents. It is posited that influence and impression management techniques may have an effect in human-agent interactions and this study examines if framing a decision aid around the tactic of inspirational appeal can change human behavior. The goal was to determine if appealing to “fairness” in simple paper-based decision aids could alter decisions. A game-theoretic dictator game is used to test the effect and the study lends modest support to the fact that altering messages and frames can change behavior. Specifically, when a decision was framed as a matter of “fairness”, participants were more likely to act in their teammate’s interest instead of their own.

Keywords (Required)

Proactive Influence Tactics, Dictator Game, Inspirational Appeal, Decision-Making.

INTRODUCTION

Information has reached a critical mass. The sheer volume of data and data sources make it impossible for a human being to capture and process all available and relevant data, facts, figures, etc. Paradoxically, teams often have limited information and must rely on individual members to take certain actions in the face of incomplete and inaccurate data. This conundrum can be categorized as the mass and economy of information. A “mass” of information is needed to enhance decision making, but information economy is required in order to avoid wasting effort or overwhelming decision makers. This basic reality is the backdrop for the systematic study of human-agent interactions and the requirement to create more robust and intelligent decision aids. Intelligent agents are often used to aid humans in making complex decisions. For over two decades, behavioral scientists have been examining specific behaviors that are used to exert influence over other people. Behavior that is used to intentionally influence the attitude or behavior of another person is usually called an influence tactic (Yukl, 2006). In the current state of research, intelligent agents are devoid of the ability to exhibit these behavioral influence tactics. Before creating an agent that would actively try to change human behavior and perception rather than simply make a decision-support recommendation, this study tested the concept of incorporating these tactics into a paper-based decision aid. The proposition being that increasing the agents’ ability to effectively influence human behavior will lead to enhanced, more intelligent decision aids that users will more readily follow and accept.

THEORETICAL BACKGROUND

Unlike impression management tactics (e.g., ingratiation) or political tactics (used to influence organizational behaviors), proactive influence tactics have an immediate task objective (i.e., getting the target person to carry out a new task, or supporting a proposed change). According to Yukl (2006), if a request is clearly legitimate, relevant for the work, and something the target person knows how to do then it is often possible to get target compliance by using a simple request based on legitimate power. However, if target resistance is likely or legitimate power does not exist then the agent may need to use proactive influence tactics.

Kipnis, Schmidt, and Wilkinson (1980) developed a preliminary taxonomy of proactive tactics by analyzing successful and unsuccessful influence attempts by individuals. Based on this approach, they identified several tactics and created the Profiles of Organizational Influence Strategies (POIS). Schriesheim and Hikin (1990) conducted a factor analysis of these items and found support for six unique influence tactics. In two separate studies, Yukl and Tracey (1992) found support for eleven distinct tactics that were based on prior research of leadership and power. Three tactics could be initially included into an automated agent. These include: rational persuasion, apprising, and inspirational appeal.

Rational Persuasion

Rational persuasion involves the use of explanations, logical arguments, and factual evidence to show that a request or decision is relevant for obtaining task objectives (Yukl, 2006). Most agent-based decision support systems at best perform a weak form of rational persuasion by offering only a recommendation with a short explanation or undocumented assertions.

An agent could attempt to provide a stronger form of rational persuasion with more detailed explanations and concrete evidence to back up the decisions and recommendations. This technique is most effective when team members share the same task objectives, but does not recognize that the decision is the best means to meet the objectives. Along with facts and logic, this technique usually includes formal opinions or inferences that team members must accept. It has been shown that the success of this technique is moderated by the team members' perception of the reliability of the source of the information and decision (Higgins, Judge, & Ferris, 2003).

Apprising

With this tactic, the agent explains why a course of action is likely to benefit the target team member. This tactic also involves using facts and logic, but the benefits of the decision are placed in terms of the individual instead of the team. Unlike exchange tactics, the benefits are a by-product of making the decisions not something that the agent promises to provide (Yukl, 2006).

Inspirational Appeal

In an inspirational appeal, an agent makes a request or proposal that arouses enthusiasm by appealing to a target's values, ideals, and aspirations, or by increasing the target's confidence that he or she can do the requested task (Falbe & Yukl, 1992). Inspirational appeal moves people to a decision and action often through high rhetoric and linking requests to values. This experiment evaluates if incorporating this tactic into a decision aid by appealing to participants' values of fairness and teamwork can affect decision making so that they will act against their own selfish interest.

DICTATOR GAME EXPERIMENT

In order to test the concept of embedding an influence tactic into a decision aid, a simple game-theory-based decision experiment was created. In this dictator game, participants were told that they would partner with a class member to purchase lottery tickets as a team. The basic decision is how many tickets to purchase.

Sample

The sample consisted of forty-four senior Economics majors from a large state university in the Southwest. Each participant had been trained in game theory, expected value, and decision-making. Twenty-nine of them were male and fifteen were female.

Procedures

Participants were involved in a series of experiments and they were instructed that the number of "dollars" that they received in this experiment would be used to increase their odds of winning an actual cash prize. Therefore, the higher the participants' expected value, the greater their odds of winning \$50 at the end of all of the experiments. The incentive was clearly to maximize their individual expected value. The experiment consisted of two conditions: maximization and fairness. All participants were given a brief verbal explanation about the game and then handed a sheet with the following written instructions:

"You and your partner will jointly buy raffle tickets in order to win a \$100 prize that you will split evenly (\$50 to each of you). Your partner will not know how many tickets you buy, but both of you will be notified if your team has a winning ticket.

The tickets cost \$2 each, and there are 50 tickets in the raffle.

Each of you has been given \$50 to use to buy tickets, which means that you can buy 0-25 of them. Any money that you do not spend on tickets is yours to keep.

Your partner is being forced to buy exactly 15 tickets."

The game was designed in this way instead of a straight dictator game in order to foster a sense of "team" and to create the sense that the other person actually is losing something to the benefit of the second player. As shown in its extensive form (figure 1) this is a dictator game, where the second player decides what to do and that determines the expected payoffs for both players. The economic decision theoretic solution is for the second player to choose 0 tickets. In fact, purchasing zero tickets strictly dominates all other choices for player 2.

As mentioned earlier, influencing other's behavior can be achieved by appealing to their values, ideals, and aspirations. The goal was to learn whether or not framing the decision aid with an inspirational appeal to fairness impacted a player's decision. The proposition was that an appeal to the participants' value of fairness would cause them to move off of their decision theoretic solution (0 tickets) and purchase more tickets (closer to 15).

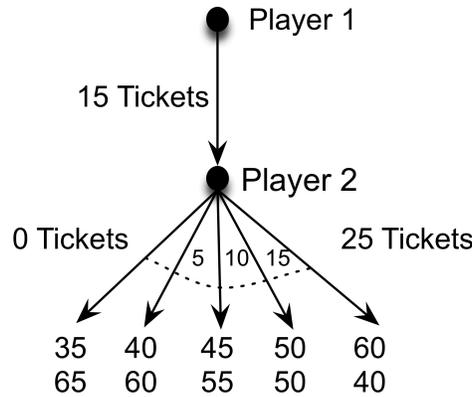


Figure 1. Extensive Form of Lottery Dictator Game

In the maximization condition, the second player was given the following as a decision aid:

“If you want to maximize your expected value, then you should consider buying as few tickets as possible”.

In the fairness condition, the second player’s decision aid read as follows:

“If you value fairness, teamwork and want to enable your teammate to have equal footing, then you should consider buying at least 15 tickets”.

Each player was led to believe that they were being paired with another member in the classroom and different colored sheets of paper were used to highlight this effect. In effect, the participants acted as if they partnered with a person that was being forced to purchase 15 tickets, and this was confirmed via a post survey. In order to make sure that there was no confusion, the players were also given sample expected value charts for the number of tickets they would purchase. These decision aids are shown in tables 1 and 2.

# Tickets You Buy	# Tickets Partner Buys	Your EV
0	15	\$65
5	15	\$60
10	15	\$55
15	15	\$50
20	15	\$45
25	15	\$40

Table 1. Maximization Decision Aid

# Tickets You Buy	# Tickets Partner Buys	Your EV	Partner’s EV
0	15	65	35
5	15	60	40
10	15	55	45
15	15	50	50
20	15	45	55
25	15	40	60

Table 2. Fairness Decision Aid

After reviewing all of the materials, the participants made their decision by writing the number of tickets they would purchase and returning the paper to experimental staff. The primary hypothesis was that participants in the fairness condition would more often make a “fair” choice of at least 15 tickets than those in the maximization condition.

RESULTS

Figure 2 shows the basic distribution of the two groups. The maximization group is shown in green and the fairness group is shown in blue. The x-axis is the number of tickets and the y-axis represents the count of participants that fell into that category.

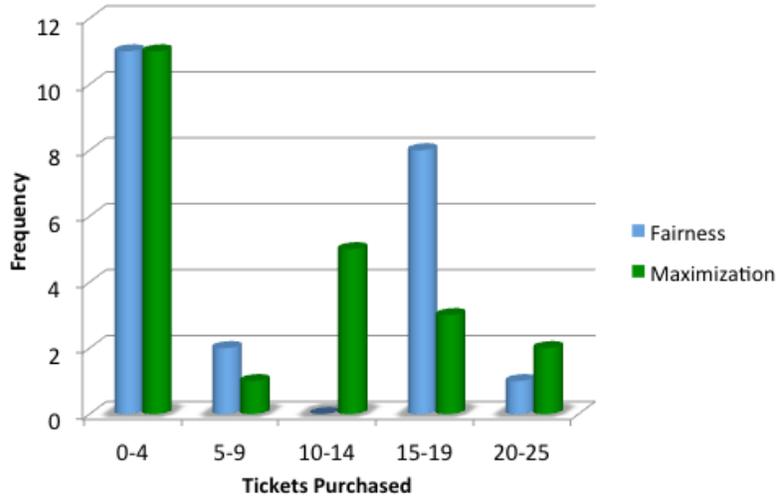


Figure 2. Experimental Group Distributions

As expected, many of the participants chose 0-4 tickets, which is in agreement with the economic decision theoretic solution. Similarly, it is in-line with expectations that there is a spike at 15 tickets for the fairness condition. It was unexpected that participants in the maximization group would also choose some degree of “fairness”. Three individuals were excluded in the analysis for not following instructions. Since this is not a normal distribution, a Wilcoxon rank sum test was used in order to determine if the two samples are statistically dissimilar. The Wilcoxon rank sum test gives $Z = -0.766$ ($p < .25$, one-tailed). There was not a statistically significant difference. However, when the number of tickets purchased was dichotomized into two distinct choices, fairness for those individuals that purchased 15 or more and maximization for those who selected less than 15, the results became more interesting. Fifteen tickets was the natural cut point because any decision less than 15 still provided some degree of maximization for the second player (their expected value was greater than their partners’ expected value) and a choice of 15 or more provided a fair (at least equal) expected value for both players. The new distribution is shown in figure 3 below.

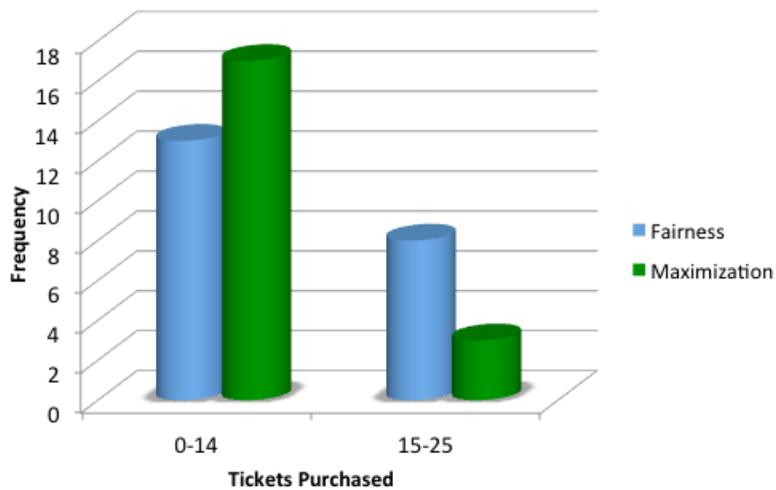


Figure 3. Distribution of Fair vs. Selfish Choices

In this new distribution, only 3 of 20 participants in the maximization condition chose a “fair” outcome. On the contrary, almost three times as many (8 out of 21) participants in the fairness condition chose to be “fair”. This new variable was

coded as 0 for those who chose to fairness and 1 for those participants that chose maximization. The correlation between condition (coded as 0 for fairness, 1 for maximize) and the choice dichotomous variable was significant at $p < .05$, Pearson correlation = -0.261. In order to test if the two conditions were statistically dissimilar, the Wilcoxon rank sum test was used and found that $Z = -1.648$ and this was significant at $p < .05$ (one-tailed). Finally, there was a significant association between condition and fairness $\chi^2(1) = 2.783$ ($p < .05$, one-sided). Therefore, the hypothesis that participants in the fairness condition would more often make a “fair” choice (at least 15 tickets) than those in the maximization condition was supported.

DISCUSSION OF RESULTS

The pilot study yielded several items of interest. First, many of the participants in the fairness condition made a decision in accordance with their economic self-interest and were not influenced by the inspiration appeal to fairness in their decision aid. There are several possible explanations for this. No attempt was made to measure how much a participant valued fairness before appealing to it. It is quite likely that the appeal was ineffective because the participant did not value fairness more than his or her own self-interest enough to change his or her behavior. Also, measurements of how participants’ attitudes or feelings of guilt were affected by the two conditions were not taken. It is also conceivable that an individual participant held another value that may have been more effective to use in the decision aid. An adaptive agent could measure a person’s values via survey or observation and then adapt the inspirational appeal in the decision aid to the individual’s values to greater effect.

The appeal itself was a fairly weak frame. Usually an inspirational appeal use high rhetoric and is more persuasive than this simple frame. It is remarkable that even this basic statement yielded an effect and lends credence to the idea that an automated agent could use these tactics to influence decisions. It is important to note that this game has an element of risk seeking or risk aversion because it is based on a “lottery”. This attribute was also not measured during the experiment and may explain some of the behavior of individuals in the maximization condition that chose to purchase tickets against their expected value. A final interesting observation is that a number of the participants in the maximization condition chose fairness over self-interest without any prompt and in spite of a decision aid that encouraged selfishness. This highlights that decisions are most often made based on a milieu of varied values, attitudes and attributes. Other factors overrode the strictly dominant choice of maximizing expected value. Agents that are able to identify distinctive user characteristics and uniquely adapt to individuals may be more effective at shaping individuals’ decisions.

CONCLUSION

This was an exploratory study that used a paper-based decision experiment to show that framing decision aids as appeals to individuals’ values possibly change individuals’ decisions. The goal was to identify potential messages and tactics that could be used by automated agents when interacting with humans. Specifically, results of this study will be used in the development of an Embodied Conversational Agent (ECA) that employs several influencing behaviors. Multiple studies have shown that ECA behavior and the messages that it sends have an effect on users’ perceptions and behavior. For example, Prendinger, Mori, and Ishizuka (2005) found that empathetic responses from an ECA could decrease user stress. Similarly, they showed that affective behavior from the ECA might have a positive effect on users’ perception of the difficulty of a task. Other researchers showed that an empathetic ECA is perceived favorably and can have an effect on users’ feelings (Bente et al., 2008). Wang and colleagues (2008) focused on how a pedagogical agent communicates to students. Specifically, they examined the effect of a “polite” (indirect suggestions) versus a “direct” (more challenging) agent. They found that across all students, a polite agent, compared to a direct agent, had a positive impact on students’ learning outcomes. They conclude by stating that their results confirm the hypothesis that learners tend to respond to pedagogical agents as social actors and suggest that research should focus less on the media in which agents are realized and place more emphasis on the agent’s social intelligence. Mayer, Johnson, Shaw, and Sandhu (2006) sought to create understanding of the effect of a socially sensitive agent and demonstrated that the social cues from the agent were indeed perceptible to the human counterparts.

This study provides support that ECAs may be able use human-like influence tactics to change behavior and decisions. The idea being that that if human behavior and decisions can be changed with a “media-poor” interaction like this paper-based experiment than a “media-rich” and adaptive ECA should be able to employ similar tactics to greater effect. An adaptive agent that tailors its messages and decision support recommendations based on an individual user may have greater effect at changing human decisions and influencing human behavior.

REFERENCES

1. Bente, G., Rüggenberg, S., Krämer, N. C., & Eschenburg, F. (2008). Avatar-Mediated Networking: Increasing Social Presence and Interpersonal Trust in Net-Based Collaborations. *Human Communication Research*, 34(2), 287-318.
2. Falbe, C. M., & Yukl, G. (1992). Consequences for Managers of Using Single Influence Tactics and Combinations of Tactics. *The Academy of Management Journal*, 35(3), 638-652.
3. Higgins, C. A., Judge, T. A., & Ferris, G. R. (2003). Influence tactics and work outcomes: a meta-analysis. *Journal of Organizational Behavior*, 24(1), 89-106.
4. Kipnis, D., Schmidt, S. M., & Wilkinson, I. (1980). Intraorganizational influence tactics: Explorations in getting one's way. *Journal of Applied Psychology*, 65(4), 440-452.
5. Mayer, R. E., Johnson, W. L., Shaw, E., & Sandhu, S. (2006). Constructing computer-based tutors that are socially sensitive: Politeness in educational software. *International Journal of Human-Computer Studies*, 64(1), 36-42.
6. Prendinger, H., Mori, J., & Ishizuka, M. (2005). Using human physiology to evaluate subtle expressivity of a virtual quizmaster in a mathematical game. *International Journal of Human-Computer Studies*, 62(2), 231-245.
7. Schriesheim, C. A., & Hinkin, T. R. (1990). Influence tactics used by subordinates: A theoretical and empirical analysis and refinement of the Kipnis, Schmidt, and Wilkinson subscales. *Journal of Applied Psychology*, 75(3), 246-257.
8. Wang, N., Johnson, W. L., Mayer, R. E., Rizzo, P., Shaw, E., & Collins, H. (2008). The politeness effect: Pedagogical agents and learning outcomes. *International Journal of Human-Computer Studies*, 66(2), 98-112.
9. Yukl, G. (2006). *Leadership in Organizations* (6th ed.). Upper Saddle River, NJ: Pearson Prentice Hall.
10. Yukl, G., & Tracey, J. B. (1992). Consequences of influence tactics used with subordinates, peers, and the boss. *Journal of Applied Psychology*, 77(4), 525-535.