
Introducing a Game to Generate a Sense of Enjoyment and Acceptance in the Process of Decision-Making

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ABSTRACT

We examined casual decision-making among a group of participants, which frequently occurs in daily life. In such a situation, participants do not have strong preferences for the decision. In addition, because the process of decision-making among people is part of the time they spend together, it is important to feel enjoyment in the process and satisfaction with the final decision. In this paper, we propose a game mechanism for generating a sense of enjoyment in the decision-making process through communication and a sense of acceptance of the final decision. We experimentally compared two ways to make decisions about beverages: 1) majority voting and 2) the proposed game. In the latter case, the participants enjoyed playing the game and were satisfied with the decision-making process.

Keywords: Game design, Communication, Decision-making

INTRODUCTION

Consensus building is the process of reaching an acceptable decision through communication among the participants in a group. The goal of consensus building is to maximize the sum of the participants' evaluations of the targets or to draw compromises from them. Research on consensus building and decision-making has been conducted from various viewpoints (Taniguchi et al. 2009, Judith E. Innes 1996, Fang-Ming et al. 2012). One familiar opportunity for decision-making among multiple participants is a discussion regarding which restaurant to go to for lunch or dinner. However, in such casual decision-making, which frequently arises in our daily lives, there are cases where participants do not have strong preferences. However, in such casual decision-making, which frequently arises in our daily lives, there are cases where participants do not have strong preferences. In addition, even though the participants have their potential preferences, they often also do not firmly insist on their preferences. In this situation, major decision-making methods such as majority voting and dice-roll help us decide on one solution. However, these methods cannot deal with user's opinion and participant's preferences are not considered in the decision-making process.

Moreover, these decision-making methods have another drawback of not supporting enjoyable interactions in the decision-making process. The process of decision-making among several people is part of the time spent with

them. Thus, it is important for participants to feel enjoyment in the process and a sense of acceptance regarding the final decision. In a previous study (Stejić et al. 2003), a method for reducing the cost of inputting evaluation values and discussions was developed; however, the enjoyment of the decision-making process was not considered.

In this study, we examine a casual decision-making situation in which multiple participants decide on a place to visit or a product to buy. For this purpose, we propose a game for enhancing playful interaction and satisfaction with the process in casual decision-making among a group of participants, which frequently occurs in daily life. Then, we evaluated the effectiveness of the proposed game design from the perspective of a sense of acceptance of the final decision. In a previous study (Suto et al. 2013), a card game was applied to teamwork, whereas we focused on introducing a game to the decision-making process.

PROPOSED GAME

The game is based on a card game called *Hol's der Geier*, which was sold by the company Ravensburger in 1988. First, participants are given cards numbered from 1 to 15. A scoring card with a number of points between 1 and 10 is shown; the participants play their cards, and the participant with the highest-numbered card wins the scoring card. This process is repeated, and the participant with the most points is the winner. Moreover, the game has the following rules:

1. If more than one participant plays the same numbered card, none of them obtains the scoring card. In this case, the participant with the next highest-numbered card wins the scoring card.
2. There were five scoring cards with negative points (from -5 to -1). For these negative cards, the participant who played the lowest-numbered card had a corresponding point deduction.

Thus, there were a total of 15 scoring cards, including negative cards. The game was played for 15 turns, i.e., until all the scoring cards were removed from the deck.

We used this game for decision-making. Specifically, we considered scoring cards with points as the target to build a consensus. For example, in the case of deciding which restaurant to go to, candidate restaurants were assigned cards with points. The winner decided where to go among the restaurants listed on the card that he/she got. To use this game for deciding where to go, it was necessary for the scoring cards to correspond to the candidate destinations. In this study, each participant voted for the candidate destinations in advance, and the candidates were assigned to scoring cards with the points according to the votes.

We explain the correspondence between actions in the decision-making and in the game. In this game, the winner determines the final destination. To win the game and decide on a desired destination, a participant must obtain a scoring card assigned to the destination and scoring cards with the largest total number of points. To win the scoring card assigned to the destination,

the participant must play a high-numbered card on the scoring card; i.e., the number of cards represents the strength of the request (i.e., the evaluation value) for the destination. Because the winner knows the number of cards played by the other participants, the winner knows their evaluation values for the destination and can select the final decision according to their evaluation values.

However, negative-scoring cards play different roles in the game. To avoid getting a negative card, the participants played a high-numbered card on the negative card. Considering that the value of the numbered card is the evaluation value, this rule appears to be inconsistent with our intentions. However, this rule allows a player to help another player who owns the desired card win by purposely obtaining negative cards.

Participants can always keep track of the game situation, which represents the decision-making process. If more than one participant plays the same numbered card, none of them obtains the scoring card. Thus, even if a participant plays a high-numbered card, he/she may not obtain the desired card. As a result, participants do not always obtain the card they desire, and the right to choose the card may be given to other participants. Depending on the flow of the game, any candidate can be selected as the final decision.

EVALUATION EXPERIMENT

To evaluate the efficiency of the proposed game for decision-making, we experimentally compared it with the majority voting method. In the experiment, we considered a situation where a group of five participants decided on one beverage to drink among 10 available beverages.

Experimental Procedure

Each group performed decision-making in two ways: playing the proposed game and using the majority voting method. The beverages decided by the majority voting method and the game may be different. To eliminate order effects, the order of the experiments using the majority voting and the game was swapped for each group.

The flow of the experiment was as follows. First, the experimental procedures were explained to the participants, all of whom provided informed consent. To assign the scoring cards for the game to the beverages, the participants were asked about their preferred beverages using a Google form in advance. On another day, five participants from each group gathered in one room. Ten candidate beverages were placed on a table in the room. In the majority voting experiment, all the participants voted for the beverage they wished to drink by writing the name of the beverage on a blank sheet. At this time, they were unable to see the votes of other participants. The beverage that received the most votes was selected. In the case of a tie vote, a final vote was taken. Subsequently, the participants were asked to answer a questionnaire regarding their enjoyment and satisfaction with the decision based on the majority vote. In the game experiment, we used an original app for the game that implemented our proposed method. The rules of the game and

Table 1. Questionnaire results for the majority voting and the game.

Question	Vote	Game	
Q1 How much did you enjoy this decision-making process?	62.8	90.0	**
Q2 How satisfied are you with this decision-making process?	74.4	85.5	**
Q3 How happy are you with this decision?	70.7	75.7	n.s.
Q4 How satisfied are you with this decision?	73.4	80.5	n.s.
Q5 How much do you want to use this method to decide which beverage to drink again?	71.6	74.2	n.s.

*: $p < 0.1$; **: $p < 0.05$; n.s.: not significant.

the precautions to be taken were explained to the participants, and then the game was played to decide which beverage to drink. At the end of the game, the winner was asked to select a beverage among the beverages on the cards that he/she won. We then asked the participants to answer the same questionnaire that was used for the majority voting method. Additionally, in the game experiment, participants were asked to complete a questionnaire regarding their strategy in the game. Finally, according to the questionnaire results, group interviews were conducted to discuss their strategies and thoughts on the game.

Results

Twenty participants (four groups) participated in the experiment. They were asked to complete a questionnaire after the majority voting and the game to report whether they enjoyed the decision-making process and were satisfied with the final decision. Table 1 presents the results of the questionnaire. The responses were based on a visual analog scale ranging from 0 to 100. The table shows the average answers for all the participants.

The results differed significantly between the two methods for Q1 and Q2, which pertained to the enjoyment of the decision-making process and satisfaction with the process. The game method achieved good evaluation results for these questions. While the results of the two methods were similar for questions Q3–Q5, the ratings for the game were higher than those for the majority voting method. In response to Q5, several participants indicated that “the decision-making process playing the game was fun, but it took too much time.”

Table 2 presents the results of the game strategy questionnaire. The results of Q1 indicated that approximately half of the participants did not always try to win the game. According to the interviews, the reasons for this were that they did not care about the final beverage selected, that they did not think they could win considering the score, and that the beverage they wanted was taken by another participant. The answers for Q2 indicated that on average, one participant in each group purposely obtained negative cards. As mentioned previously, we expected the inclusion of negative cards to allow participants to help other participants with the desired card win by purposely obtaining negative cards. In the interviews, some participants reported

Table 2. Questionnaire results for the game strategies.

Question	Yes	No
Q1 Did you always try to win this game?	11	9
Q2 Did you purposely get the negative cards in this game?	4	16

this intent; i.e., they wanted to make a certain participant win by purposely obtaining negative cards, or they wanted to obtain a specific beverage card and negative cards for eliminating the beverage as a candidate.

DISCUSSION

In this section, we discuss the experimental results. As indicated by Table 1, while the majority voting method was highly rated, the decision-making process of playing the game received more positive evaluation results. In particular, for Q1 and Q2, there were significant differences between the results for the majority voting and the game. For the game, the process of making decisions about beverages was enjoyable and satisfying for the participants. For Q3 and Q4, there were no significant differences between the results for the voting and the game, but the game achieved higher ratings than the voting. The results indicate that playing the game gives participants happiness and satisfaction with the final decision. For Q5, the game was evaluated as positive, but in the interview, the most common answer was, “I want to play the game again, but it takes too much time.” Therefore, we should consider ways to shorten the playtime.

In addition, we analyzed the participants’ conversations during the game. The results indicated that some participants changed their target beverage when the cards assigned the beverage they wanted to drink was obtained by another participant. However, the degree of satisfaction with the selected beverage in the game was high. The fact that the participants were highly satisfied with the selected beverage even if it was different from the one that they wanted initially can be attributed to the game. In this game, the winner has the right to make the final decision. However, the number of possible choices for the winner is narrowed down throughout the game process. In addition, even if a player cannot be the winner of the game, he/she can use a minus card in his or her turn to transfer the right to choose a candidate to another player who has a better chance of winning. These game elements, along with the verbal interaction in the game, provide a means for players with no chance of winning to participate indirectly in the decision-making process. In other words, the proposed game recommends valid result selection that indirectly reflects the participants’ opinions even when the final winner is choosing from candidate items. Therefore, the experiment results suggest that the design of proposed game contributes to increased satisfaction, even among users who did not win the game.

As for the complexity of the game, we know that the game is simple enough to be quickly learned by beginners. At the beginning of the game,

the participants checked the game rules; however, no participants checked the rules at the end of the game. In addition, for all groups, excitement was observed when participants lost the right to obtain cards because cards of the same number were played. These results indicate that the game rules were not too complex and that the participants learned the rules quickly and enjoyed the game. In this game, participants have an opportunity to understand other players' preferences through interaction in the game and understanding of others' strategies during the game. Therefore, the game's emphasis is not on determining a winner who has the final choice but on providing an opportunity to understand the potential thinking of others. The game shows that the game has a different value from other decision-making paradigms (e.g., dice roll or majority voting), which do not reflect the potential intentions of the participants and determine the outcome instantaneously. For example, in a group sightseeing situation, the paradigm may be a means to enhance group collaboration by making the boring time in the car or airplane on the way to the destination sightseeing spot more enjoyable and facilitating understanding of each other's opinions and personality.

CONCLUSION

We proposed a game for enhancing playful interaction and satisfaction with the process in casual decision-making among a group of participants, which frequently occurs in daily life. To verify the effectiveness of the proposed game design, we experimentally compared it with the majority voting method. The results indicated significant differences in the enjoyment of the decision-making process and satisfaction with the process, and the game was evaluated more positively by participants than the majority voting. Additionally, the results indicated that the game was easy to learn.

The introduction of the game to support decision-making resulted in an increase in time cost. However, the time cost of this game is reduced as time for playful interaction and understanding of others in the group through it. Therefore, our proposal as a game to support consensus building is expected to be a means of building opportunities for interaction with others and inducing interest in making decisions in common. This is an advantage not found in existing consensus building methods such as majority rule or dice roll. In a future study, we plan to evaluate the game when it is played multiple times and shorten the game playtime.

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