

PERFORMANCE COMPARISON BETWEEN A STATIC AND DYNAMIC UTILITY FUNCTION WITHIN A SEQUENTIAL GROUP DECISION- MAKING EXPERIMENT

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ABSTRACT

Nowadays most enterprises' decisions are made in groups, of which may arise conflicts since each stakeholder has his own preferences and can present different perceptions about criteria. However, within a group decision-making process, individuals may behave differently, demonstrating the importance of considering cognitive aspects in the decision model. In this study, we propose to compare the performance of a utility function, which include psychological aspects of altruism and reciprocity, and another that doesn't take these factors into account, in forecasting agreements for group decision and the individual choice of each decision maker within a group decision-making experiment. The contribution of this study is to provide evidences about the impact of psychological factors on modeling conflicts through a performance comparison between a static utility function and a dynamic one. These results will be important for guiding group decision-making process in organizations and structuring the decision process more efficiently.

KEYWORDS. Utility functions. Game theory. Group decision making.

Paper topics: ADM - Apoio à Decisão Multicritério

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1. Introduction

Nowadays most enterprises' decisions are made in groups [Goodwin and Wright 2014; Lunenburg 2011], of which may cause financial, social, political and environmental impacts or even a set of these factors [Leoneti et al. 2015]. In this scenario, conflicts can arise within the process because of different goals and value systems of decision-makers, since each decision maker has his own preferences and can address different levels of importance to the criteria [Hipel and Fang 2005]. Hipel and Fang [2005] exemplify that participant can take into account different criteria (i.e. aesthetics, ethical issues, environmental impacts, cost and monetary benefits) when making decisions in group and each stakeholder can present different perceptions about them. Furthermore, decision problems generally aim to reach different and conflicting goals (i.e. to maximize profit, to minimize costs, to improve the company visibility and to increase customers' satisfaction). Then, decision makers need to consider the trade-offs between the benefits each alternative offer to identify which one will match their goals [Goodwin and Wright 2014].

Therefore, methods that are able to jointly aggregate the preferences of all decision makers should be considered because, in case of conflicts among agents, the application of the group decision analysis will make feasible a greater comprehension of each participant about the possible origins that caused the conflict [Goodwin and Wright 2014]. As an example, the following are some methodologies that can be applied on group multicriteria decision problems: (i) MAMCA (Multi-Actor Multi-Criteria Analysis) [Macharis 2005; Macharis et al. 2008], which is an iterative approach that allows to incorporate different stakeholders' opinions in a very early stage and provides a deeper analysis of each decision maker's points of view; and (ii) SAVEPO-M (Simple Aggregation of Preferences Expressed by Ordinal Vectors - Multiple Decision Makers) [Gomes et al. 2020], which is an ordinal methodology that allows the aggregation of stakeholders' preferences into a consensus ranking.

Alternatively, [Leoneti 2016] proposed a utility function to model group multicriteria decision problems as games whose main advantage is the possibility of evaluating conflicts among decision makers through a strategic approach. The application of this utility function takes into account the following strategies for each player: (i) keeping the initial alternative when another is offered by another player; (ii) changing the initial alternative for the one offered by another player; and (iii) changing the initial alternative for another different from that offered by another player. Therefore, the utility function presented by [Leoneti 2016] enables decision makers take into account the choices of the others players in order to identify the strategy that will produce the highest payoff for them. Since this methodology does not consider residues from past decisions, the utility function proposed by [Leoneti 2016] can be considered a static approach.

On the other hand, within a group decision-making process, individuals may behave differently. Thus, intrinsic factors, cultural aspects, beliefs and ethical principles should be included in the model to understand how participants make decisions [Carneiro et al. 2016; Carneiro et al. 2018; Hipel and Fang 2005; Martinho et al. 2015]. Therefore, when cognitive aspects are not considered in the model, decision process' performance and the results obtained will be impacted [Carneiro et al. 2016; Fenton et al. 2011]. In this sense, by analyzing the influence of subjective factors on strategic interactions, [Gimon and Leoneti 2020] proposed the development of a refined utility function that models psychological components as a combination of two parameters, such as: (i) altruism, which it is the participant's kindness to the others, i.e. unconditional altruism; and (ii) reciprocity, which it is the reaction of participant towards how kind the others are being to him/her, i.e. reciprocal altruism. The researchers' purpose was to provide more realistic method to model multicriteria group decision-making as repetitive games. Consequently, preferences over different criteria and the combination of unconditional and reciprocal altruism are considered together and could be dynamic.

Based on the negotiation styles of the decision makers, [Silva and Leoneti 2020] evaluated the expectation towards the outcome of the decision-making process and the influence of the counterparts perceived by each of the participants, besides analyzing how their behavior can be influenced by the levels of assertiveness and cooperativeness presented by them. In view of the importance in analyzing sense of justice and satisfaction towards group decision problems, [Ziotti and Leoneti 2020] verified that both perceptions are higher when the agreement is supported by mathematical methods. The researchers also validated that commitment to agreements (i.e. group decision matches voting of all participants) in a group decision is higher when the decision process is supported by such methods. In its turn, [da Silva et al. 2020a] proposed the application of a refined utility function, which includes psychological aspects of altruism and reciprocity, to validate how such variables can improve the predictability of a utility function that doesn't use these factors. In parallel, [da Silva et al. 2020b] suggested to analyze if the refined utility function's accuracy within a heterogeneous sequential decision-making process can be enhanced by the knowledge of the negotiation style, measured by TKY[®] scale [Kilman and Thomas 1977]. This instrument assesses individual's behavior in conflict situations and describes it along two dimensions: (i) assertiveness, the level to which the participant attempts to satisfy his or her own concerns; and (ii) cooperativeness, the level to which the participant attempt to satisfy the concerns of another person [Thomas 2008].

In our study, we aim to compare the performance of a refined utility function, developed by [Gimon and Leoneti 2020], and the original one, proposed by [Leoneti 2016], in forecasting agreements for group decision and the individual choice of each decision maker as well. We propose to apply these utility functions on a sequential group decision process, according to methodology proposed by [Leoneti and de Sessa 2017], with new cases created by [Ziotti & Leoneti 2020]. The sequential group decision was tested in a negotiation experiment where a group of five participants was asked to make a group decision in three different cases. We argue that the inclusion of psychological variables can improve the efficiency in predicting individual choice and group agreements throughout the negotiation experiment. The contribution of this study is to provide evidences about the impact of psychological factors on modeling conflicts through a performance comparison between a static utility function and a dynamic one. These results will be important for guiding group decision-making process in organizations, since it is a common place where conflicts are identified nowadays.

2. Method

2.1. Study design, participants and questionnaires

The negotiation experiment was planned based on the methodology presented by [Leoneti and de Sessa 2017], with two new cases created by [Ziotti & Leoneti 2020]. [Ziotti & Leoneti 2020]'s purpose in structuring these two new cases was to provide a sequential negotiation experiment with decision environments that vary in level of complexity and time horizon, since it was considered in the experiment a short-term decision (choosing a travel destination), a medium-term decision (choosing an English school) and a long-term one (choosing a CEO for a company). Participants were recruited using an online form which was sent to undergraduate and graduate departments from Campus Ribeirão Preto of University of São Paulo, that were responsible to share it with students through the institutional e-mail. The inclusion criterion was that participants had to be regularly enrolled students from this campus. Students with any academic background and enrolled in any semester could participate.

Students who interested in participating were arranged in groups of five according to their availability. They were arranged in groups of five because this methodology was presented by [Leoneti and de Sessa 2017] and it was also already applied on other studies [da Silva et al. 2020a; da Silva et al. 2020b; Silva and Leoneti 2020; Ziotti & Leoneti 2020], demonstrating to be suitable to evaluate decision makers' behavior in conflicting situations. Each application session

of this negotiation experiment lasted around two hours and was performed at a meeting room from School of Economics, Business Administration and Accounting at Campus Ribeirão Preto of University of São Paulo. In total, three groups of five undergraduate students participated in this experiment. It was considered three groups because this study was a preliminary one that was developed in order to test the methodology presented in the literature and verify if some structural modification was necessary before applying it on a larger sample research.

The stages followed by each participant, from the beginning to the end of the experiment, are detailed in Table 1. As it can be seen, after agreeing in participating, a contextualization presentation about the multicriteria method, instructions and rules that had to be followed were presented. Then, students provided some personal information and, next, the simulation of each case was started. Each case was solved upon in a sequence using three phases: (i) individual phase; (ii) group phase; and (iii) final phase.

Table 1 - Experiment Flowchart

Experiment Stages	Description
Informed Consent Form	Participants read the Informed Consent Form and agreed to participate in this research.
Application Presentation	This presentation was performed to contextualize the study's applicability and its goals. It was also presented some general information about multicriteria decision method, instructions and rules of the experiment. Instructions: (i) Participants should follow three different phases (individual phase, group phase and final phase) in order to solve each case; (ii) Participants would have to decide after analyzing a set of criteria and alternatives which would be presented in each case through a decision matrix. Rules: (i) Coalitions were not allowed during the individual phase; (ii) Participants could not veto during the negotiation; (iii) In the end of the negotiation, the group had to present an agreement; (iv) After finishing the negotiation, participants would have to vote secretly to confirm or not the group decision.
Personal Identification	Participants filled out the Identification Form to provide personal data such as name, age, e-mail, undergraduate course and semester. This Identification Form also introduced a summary of the topics discussed previously throughout the Application Presentation.
Individual Phase	Throughout this phase, participants read and analyzed both the case contextualization and decision matrix in order to rank criteria and alternatives according to their preferences. The decision matrix which was used in each case is presented in Table 2.
Group Phase	During this phase, participant had to negotiate and persuade others in order to convince them that his most preferred alternative should be chosen as the solution of the case. Participants had a period of 15 minutes to negotiate. In the end of the negotiation, the group had to present an agreement.
Final Phase	Individual voting happened during the Final Phase. This voting was secretly and if a breach of contract occurred, the alternative suggested by the method proposed by [Leoneti 2016] would be selected as the final decision. Otherwise, the group decision would be maintained.

Source: Developed by the authors based on [da Silva et al. 2020b]

The simulation of cases proposed to this group decision-making experiment was performed using the following sequence: (1st) Choosing a Travel Destination (adapted from [Leoneti and de Sessa 2017] by [Ziotti & Leoneti 2020]); (2nd) Choosing an English School; and (3rd) Choosing a CEO for a Company (both of them were created by [Ziotti & Leoneti 2020] from the structure of [Leoneti and de Sessa 2017]). For each case, participants had a decision matrix, according to Table 2, composed by eight criteria and five alternatives. Since the purpose of this study was to evaluate how decision makers behave in conflicting situations, participants were not involved in the building of the value tree (i.e. to select criteria, alternatives and descriptors of performance) for each case. All decision matrices used in this research were previously structured and tested by [Ziotti & Leoneti 2020]. The following are some points that were taken into account by [Ziotti & Leoneti 2020] when decision matrices were built: (i) hypothetical alternatives were used to avoid biased decisions and the possibility that participants could consider criteria that were not presented for their decision; (ii) alternatives' performance in

each criteria were balanced to avoid that some alternative could be dominant, so weaknesses and strengths were compensated to guarantee that all alternatives could be considered by the group depending on its preferences; and (iii) each case was formed by four quantitative criteria (from the 1st to 4th criteria of each decision matrix) and four qualitative criteria (from 5th to 8th criteria of each decision matrix).

Table 2 - Decision Matrix for each case

Case 1 - Choosing a Travel Destination								
Alternatives	Criteria							
	Hotel Evaluation	Travelling Duration (hours)	Number of Nights (days)	Exchange Rate	Shopping	Cultural Attractions	Nature	Infrastructure
Destination A	2,5	8	4	R\$ 0,9	5	3	7	8
Destination B	3,5	2,5	6	R\$ 3,1	9	7	3	6
Destination C	3	4	7	R\$ 4,7	4	5	9	7,5
Destination D	5	13	5	R\$ 3,3	3	9	6	7
Destination E	4	16	8	R\$ 1,1	6	8	5	5
Case 2 - Choosing an English School								
Alternatives	Criteria							
	Distance (Km)	Courseware	Class Size	Class Hours	Infrastructure	School Reputation	Extra Activities	Course Quality
School A	14	R\$ 450	15	2	10	6	4	9
School B	7	R\$ 650	12	3	9	8	5	8
School C	16	R\$ 590	4	2,5	8	7	9	7
School D	6,5	R\$ 570	8	6	5	8	6	8
School E	10	R\$ 300	18	4	7	9	8	5
Case 3 - Choosing a CEO for a Company								
Alternatives	Criteria							
	Professional Qualification (Years)	Years of Company	Years in the Area	Leadership Positions	Ethic	Adaptation to Change	Commitment	Professional Influence
Candidate A	8	7	7	3	10	4	6	9
Candidate B	7	4	10	3	9	9	4	8
Candidate C	6	6	15	4	8	7	7	4
Candidate D	5	8	12	7	7	8	8	4
Candidate E	4	10	9	6	5	7	10	7

Source: Based on [Ziotti and Leoneti 2020]

2.3 Models and data analysis

The utility function for multi-criteria decision problems presented in [Leoneti 2016] was used to calculate utility values for each alternative. For that, it was used the criteria ranking preferences of the participants for calculating their weighting vectors by using the Rank Ordered Centroid method. The decision matrices presented previously were also used to calculate alternatives' utility, but, firstly, criteria were normalized to standardize the descriptors of performance in the same direction. Based on this data, the alternatives would be evaluated according to the preferences of all decision makers. These calculations were not presented to the participants during negotiation, so they were free to evaluate the alternatives using their own

method. For translating the decision matrix M into a decision game $\langle P, A, C, \pi_i \rangle$, where P is the set of p players, A is the set of m strategies (alternatives), C is the set of n criteria, and π_i is the preference set over A for each player i , we use the numeric representation of the set of preferences π_i jointly as a utility function $\mathcal{R}_+^{p \times n} \rightarrow [0,1]$ presented in [Leoneti 2016], which calculates the payoff for an alternative x_i of player i when trading it with another alternative proposed by the other players $j \neq i$, given by the utility function presented in the Equation

$$\pi_i(x_i, x_{j \neq i}) = \varphi(x_i, IA) \cdot \prod_{i \neq j, j=1}^p \varphi(x_i, x_j) \cdot \varphi(x_j, IA) \quad (1)$$

where p is the number of players, x_i is a vector alternative composed by c criteria that represents the initial choice of an agent i , $x_{j \neq i}$ is the set of vector alternatives from the remaining $p - 1$ players, IA is the utopic alternative that the player i aim to reach (the alternative composed with the best scores for each criteria), and $\varphi(x, y)$ is given by the pairwise comparison function φ , according to the Equation

$$\varphi(x, y) = \left[\frac{\alpha_{xy}}{\|y\|} \right]^\delta \cdot \cos \theta_{xy}, \text{ and } \delta = \begin{cases} 1, & \text{if } \alpha_{xy} \leq \|y\| \\ -1, & \text{otherwise} \end{cases} \quad (2)$$

where, $\alpha_{xy} = \|x\| \cos \theta_{xy}$ is the scalar projection of the alternative vector x onto the alternative vector y , $\cos \theta_{xy}$ is the angle between the two alternative vectors, $\|y\| = \sqrt{y_1^2 + y_2^2 + \dots + y_n^2}$ is the norm of the respective vector. The image of φ (range of the function values) varies between zero and unity (due to the conditional δ), meaning the closer it is to unity, the more similar are the alternatives. The utility function π_i is defined therefore as the potential to swap x_i to $x_{j \neq i}$. The utility function provides the payoff values to all p players for every possible agreement that the group of agents might agree to, named henceforth the payoff tables. After obtaining the payoff tables, an equilibrium solution concept is applied and, in the case of finding multiple equilibria, a social welfare ordering function is used to select the equilibrium that will represent the so-called method's solution.

Following, the refined utility function proposed by [Gimon and Leoneti 2020] $\Psi_i: \mathcal{R}_+^3 \rightarrow [0,1]$ was used to model the “me” vs. “us” strategic allocation for a player i defined as Equation

$$\Psi_i(x_i^t, x_j^t, H_i) = \pi_i(x_i^t, x_j^t)^{(1-\omega_i(H_i))} \cdot \bar{\pi}(t)^{\omega_i(H_i)} \quad (3)$$

where Ψ_i is the refined utility function for player i at round t of a group decision making sequence. In this refined utility function, the first factor represents the payoff of player i (“me” factor) given by the utility function π_i and the second factor is the average of all players payoffs (“us” factor). When $\omega_i(H_i) = 0$ (lowest altruism willingness level), player i gets what is calculated by function π_i , which represents the allocation to the material part of the refined utility function. When $\omega_i(H_i) = 1$ (highest altruism willingness level), player i gets the average of all players utilities at round t . Consequently, an interesting mathematical property of the proposed model is that highest altruism willingness level may be observed when either player is unconditionally altruistic ($\beta_i > 0$), or when she is acting in reciprocity to his counterpart's kindness ($\alpha_i > 0$).

Both utility functions were compared through the matches in predicting the group decision. Therefore, it was possible to evaluate the performance of both methods and identify which one was more assertive. It was also evaluated the performance of both methods in predicting the individual choice for each participant comparing the alternative with the highest utility and the one which was chosen by each participant during the individual voting. It was

expected that the refined utility function, proposed by [Gimon and Leoneti 2020], would have a higher performance since it considers psychological aspects when modeling decision process which could improve its predictability.

3. Results and discussion

Based on the data obtained from the group decision-making experiment, Table 3 presents the results of the negotiation steps (initial preference, group decision, individual voting and final decision). The initial preference corresponds to the most preferred option of each participant and it was defined during the Individual Phase of each case. The group decision was determined after the Group Phase's negotiations and it corresponds to the group's agreement. Individual voting happened during the Final Phase and, if a breach of contract occurred, the final decision would be the alternative suggested by the utility function proposed by [Leoneti 2016].

Table 3 - Results of negotiations

	Group 1					Group 2					Group 3				
Participant	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15
Case 1 - Choosing a Travel Destination															
Initial Preference	D	E	D	B	C	E	B	D	E	C	A	A	E	E	B
Group Decision	D					D					E				
Individual Voting	D	D	D	D	D	C	D	D	D	D	E	E	E	E	D
Final Decision	D					E					C				
Case 2 - Choosing an English School															
Initial Preference	A	A	D	D	E	D	B	B	B	B	D	D	B	B	A
Group Decision	B					B					B				
Individual Voting	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Final Decision	B					B					B				
Caso 3 - Choosing a CEO for a Company															
Initial Preference	D	B	D	A	A	D	D	A	D	A	A	D	D	D	D
Group Decision	D					D					D				
Individual Voting	D	D	D	D	D	D	D	A	D	D	D	D	D	D	D
Final Decision	D					E					D				

Source: Developed by the authors

As an example of how to interpret the data presented in Table 3, analyzing the results obtained by Group 1 in Case 1 we can see in the Initial Preference line that the most preferred alternative, which was determined during the Individual Phase, of participants P1, P2, P3, P4 and P5 was, respectively, D, E, D, B and C. Then, participants had a period of time to negotiate, which was performed during the Group Phase, in order to share their preferences, points of view and reach a consensus. The agreement reached by this group was the alternative D as it is presented in the Group Decision line. After this, during the Final Phase, participants could vote secretly to ratify or not the group decision determined previously. As it is presented in Individual Voting line, all participants voted alternative D. As a consensus (i.e. group decision matches voting of all participants) occurred, the final decision of the Group 1 in Case 1 was alternative D, as shown in the Final Decision line. On the other hand, analyzing the results obtained by Group 2 in Case 1, we can see that participants P7, P8, P9 and P10 voted alternative D and participant P6 voted alternative C. Then, as a breach of contract occurred, the final decision of the Group 2 in Case 1 was the alternative suggested by the utility function proposed by [Leoneti 2016], which was the alternative E. According to the results in the referred Table 3, it can be seen there was at least one consensus in each group.

In order to evaluate the efficiency of the original utility function, presented by [Leoneti 2016], and the refined one, proposed by [Gimon and Leoneti 2020], in predicting the individual decision of each participant, the alternative which was chosen by each one during the individual

voting and the ideal choice suggested by each method, which was the alternative with the highest utility, were compared. The results are presented in Table 4.

Table 4 - Comparison of the individual voting and methods' recommendation

		Group 1					Group 2					Group 3				
Participant		P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15
Case 1	Individual Voting	D	D	D	D	D	C	D	D	D	D	E	E	E	E	D
	MR* [Leoneti 2016]	D	A	D	D	B	E	B	D	D	C	A	C	E	E	A
	MR [Gimon e Leoneti 2020]	D	E	D	D	B	C	B	D	D	C	E	C	E	E	A
Case 2	Individual Voting	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
	MR [Leoneti 2016]	A	C	D	D	B	D	B	A	B	B	D	D	A	A	A
	MR [Gimon e Leoneti 2020]	B	B	B	B	B	B	B	B	B	B	D	D	A	A	A
Case 3	Individual Voting	D	D	D	D	D	D	D	A	D	D	D	D	D	D	D
	MR [Leoneti 2016]	E	B	E	C	A	E	A	E	B	C	A	C	E	E	E
	MR [Gimon e Leoneti 2020]	D	D	D	D	D	D	D	E	D	D	D	D	E	E	E

*MR = Method's recommendation

Source: Developed by the authors

A summary of the performance of both methods in predicting the individual choice throughout the cases is presented in Table 5. According to the results in Table 5, of the 45 possible matches, the refined utility function correctly predicted 30 while the original one 11, what represents an improvement of, approximately, 2.7 times in predictability performance of the individual choices. It is also important to point out that while the method presented by [Leoneti 2016] had a decreasing performance throughout the cases, the method proposed by [Gimon and Leoneti 2020] exhibited an increasing performance. These outcomes evidence that when psychological factors are included in mathematical tools which support multicriteria decision problems can improve their predictability and assertiveness.

Table 5. Methods' performance in predicting the individual choice

	UF* proposed by [Leoneti 2016]	UF proposed by [Gimon e Leoneti 2020]
Case 1	7 matches	9 matches
Case 2	4 matches	10 matches
Case 3	0 match	11 matches
Total	11 matches	30 matches

*UF = Utility function

Source: Developed by the authors

Similarly, group decision and method's recommendation were compared. A summary of the efficiency of both methods in predicting the group decision was also performed. The results are exhibited in Table 6. As shown in the Table 6, the method proposed by [Gimon and Leoneti 2020] had an equal or a higher performance than the one proposed by [Leoneti 2016]. According to the results in Table 6, of the 9 possible matches, the refined utility function correctly predicted 7 while the original one 5. In order to identify the alternative suggested by [Gimon and Leoneti 2020]'s method was established the criterion of the majority (i.e. when there wasn't consensus, e.g. the ideal alternative suggested for all participants wasn't the same, it was considered as method's suggestion the alternative which was suggested for, at least, three participants). Specifically in Case 1 of Group 2, as there were two participants with alternative D as suggestion and two participants with alternative C, both of them were considered as method's

recommendation. In this case, as, at least, one of the alternatives matches the group decision, it was considered as a match in the data presented in the Table 6.

Table 6 - Comparison of the group's decision, methods' recommendation and method's performance

		GD*	MR** [Leoneti 2016]	MP*** [Leoneti 2016]	MR [Gimon and Leoneti 2020]	MP [Gimon and Leoneti 2020]
Case 1	Group 1	D	D		D	
	Group 2	D	E	2 matches	D	3 matches
	Group 3	E	E		E	
Case 2	Group 1	B	B		B	
	Group 2	B	D	2 matches	B	2 matches
	Group 3	B	B		A	
Case 3	Group 1	D	D		D	
	Group 2	D	C	1 match	D	2 matches
	Group 3	D	E		E	
Total				5 matches		7 matches

*GD = Group Decision ; **MR = Method's recommendation ; ***MP = Method's performance in predicting the group decision

Source: Developed by the authors

These results complement the hypothesis that inclusion of psychological variables in mathematical tools which support multicriteria decision problems can improve their assertiveness and performance in predicting the choices made by the group, mainly when decisions are made sequentially, so possible residues from past decisions are implicitly incorporated into each new decision.

4. Conclusion

When comparing the performance of the refined utility function, presented by [Gimon and Leoneti 2020], and the original one, proposed by [Leoneti 2016], it was identified a higher assertiveness of the refined utility function both in predicting the group agreement and the individual choice of each participant.

These results raise the question whether the inclusion of psychological aspects in the model could enhance mathematical methods' predictability that support sequential group decision-making. We have demonstrated that a dynamic approach could present a higher performance since possible residues from past decisions are implicitly incorporated into each new decision. Therefore, we aim to make a contribution to managers in order to structure the decision process more efficiently, since multicriteria decision problems in the organizational environment are very common nowadays.

On the other words, since this research is a preliminary study, whose results were obtained from a small-scale experiment, we point out the importance of expanding the analyzes to a larger sample in order to validate the assumptions proposed here and generalize the obtained results. In a future research, it would also be interesting to evaluate how individual psychological profiles and academic background, when considered together, could influence on participants' behavior in a group decision-making environment and verify if the utility function's performance is sensitive to these variables.

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