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COMMITTEE DECISIONS UNDER MAJORITY RULE: DYNAMIC THEORIES AND EXPERIMENTAL RESULTS

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I. INTRODUCTION

For committees operating under majority rule and certain other reasonably well-defined conditions, the Majority Rule Equilibrium (MRE) is a very good predictor of the committee's choice (Berl et al., 1976; Fiorina and Plott, 1978; Isaac and Plott, 1978). The dynamics of the committee decision process which underlie this outcome have never been adequately explained. This might not be so serious a problem if an accessible MRE tended to exist for most possible configurations of committee members' preferences. However, the MRE usually does not exist (Rubenstein, 1979) and, furthermore, generalizations of the MRE are the subject of considerable theoretical speculation.

Some evidence suggests that regularities do exist in the pattern of committee choices when an MRE does not exist (Fiorina and Plott, 1978; McKelvey and Ordeshook, 1978a, 1978b). Many scholars believe that the key to characterizing these regularities lies in

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explicitly modeling the dynamics of committee choice. A natural and tractable approach which we shall call the "Simple Agenda Assumption" (SAA) is to assume that a committee will accept an amendment to the current motion on the floor only if a majority of members prefer the amendment to the current motion. A number of researchers have demonstrated the theoretically unsettling point that such a process could connect almost any two alternatives in a social choice space (Cohen, 1977; McKelvey, 1976). Following similar intuitive arguments Schofield (1978) characterizes points connected by a particular set of "paths." Kramer (1977) explored the dynamics of the case for which the move from a point is to the point which can receive the maximal number of votes. He demonstrates that these "maximally dominating" sequences always enter the minimax set. More recently, Ferejohn, Fiorina, and Packel (FFP) (1978) have investigated the Simple Agenda Assumption within a stochastic framework. They assume that a committee will move from y to x with some positive probability if a majority of members prefer y to x and that it will never more to y from x if a majority does not prefer y to x. They prove that a probability distribution over final outcomes generally exists and that it has all its mass on the MRE if it exists and dominates all other points. In summary, theoretical results suggest that the Simple Agenda Assumption may provide a reasonable direction in which to investigate the dynamics of committee choice.

An analogous dynamic theory to those above could be constructed by beginning with the motivating assumption behind the bargaining

set (Isaac and Plott, 1978; McKelvey and Ordeshook, 1978b) instead of the MRE, although to the best of our knowledge this has not yet been done. That is, we would assume that a committee will only accept an amendment over the motion on the floor if the amendment is an objection which has no counterobjection. We will call this the Bargaining Set Assumption (BSA). Following this idea one can then investigate the properties of the implied dynamic model to see if the resulting predictions are plausible.

Matthews (1977 a, b) has suggested a third dynamic structure for the committee choice process by examining undominated directions of change. We will call this the Undominated Directions Assumption (UDA).

The purpose of this paper is to report the results of an experiment designed to check the empirical reliability of these assumptions about dynamic behavior. Since the three competing hypotheses are closely related, often differing only "slightly" in axiomatic structures, we can also gain some insight into the usefulness of individual assumptions with an eye towards possibly constructing new composite models. We report not only the specific results regarding the hypotheses we are examining, but also other regularities which appear to lie in the data. We speculate on the nature of these regularities as a guide to future experimentation and theoretical results.

II. THEORETICAL BACKGROUND

Theoretical analysis begins with a finite number of committee

members and a set of possible outcomes, X, over which the committee must choose. Each committee member has a preference relation over the set of possible outcomes; for every two points x and y in X he either prefers x to y, prefers y to x, or is indifferent. We construct the dominance relation, D, over X by asking whether a majority of members prefer one point to another. Formally,

$$xDy \Leftrightarrow \text{more than } n/2 \text{ members prefer } x \text{ to } y.$$

The MRE is then the set of points that are undominated. That is, x is in the MRE if there is no y in X such that yDx.

The FFP theory views the committee as always being faced with a status quo outcome--the outcome which would be received if the committee currently dissolved. The committee votes on whether to change the status quo. This movement is modeled as a time stationary stochastic process with the following characteristics:

(i) The probability of leaving an MRE point is 0.

(ii) The probability of leaving a non-MRE point is 1.

(iii) The probability of moving from x to y is 0 if y does not dominate x.

FFP also suggest plausible ways to assign values to these probabilities based on relative numbers of coalitions supporting various alternatives over the status quo. However, their major theorems are proven at a satisfying level of generality; the values of the probabilities are unspecified. For a wide class of committees the stochastic process

converges to an equilibrium probability distribution. When an MRE exists and dominates all other points, the equilibrium probability distribution places all its mass on the MRE. FFP interpret the equilibrium probability distribution as the probability distribution over the committee's final choice. Intuitively, the equilibrium probability distribution approximates the likelihood of points being the status quo at any particular time. Therefore if the committee is equally likely to quit at any time, the equilibrium probability distribution also approximates the likelihood of points being the final outcome. The approximation becomes more exact as the time horizon is lengthened. (This argument is formalized in their paper.)

The important consequence of this approach is that the notion of a point being "in" or "out" of the equilibrium set is replaced by a more continuous notion of a point being more or less stable. We believe that this is an important insight which our experimental results in no way contradict. Rather, our results suggest that the extremely simple stochastic process described by rules (i), (ii), and (iii) is not adequate to predict committee behavior. If a stochastic process model is to be used, then the stochastic process must be more complex. Section VI speculates on ways to enrich the theory which are suggested by our observations.

The bargaining set was originally suggested as a solution concept for games with transferable utility and side payments in characteristic function form. A number of possible adaptations to games without side payments are possible. See Isaac and Plott (1978)

for a fuller discussion. We present here a particularly simple version but it will be easily seen in Section IV that our results are robust to any of the possible adaptations. A proposal, p, is an ordered pair (x,C) consisting of a point x in the state space and a coalition C larger than n/2. An objection to p is another proposal, p' = (x',C'), such that every member of C' prefers x' to x. A counterobjection to p' is a third proposal, p" = (x",C"), such that p" is an objection to p and every person in C' ∩ C" prefers x" to x'. The bargaining set is then all proposals such that every objection has a counterobjection.

The natural implicit dynamic of such a theory that a committee will move from x to y only if y is an objection to x and there is no counterobjection to y. This is a simple dynamic extension of the Bargaining Set Assumption (BSA). Theoretical analysis of this assumption could presumably be carried out in a fashion similar to that done for the SAA.

Matthews proposed his dynamic theory for the case where X is R^n. He bases his theory on two interrelated assumptions:

(i) A committee is selecting a change of the status quo from a set of possible changes. (The null change is a possible change.) Any change which is selected must be undominated in the set of possible changes. If a change is made, then there does not exist an alternative change from the set of possible changes which is preferred by a majority to the change chosen.

(ii) In any time period, only alternatives a "small" distance from the previous outcome are presumed to be feasible. Taken to its logical and mathematically tractable extreme, this assumption converts the problem into one involving a continuum of social decisions, each of which determines a direction in which to marginally shift the current statuss quo. In the discrete space in which we will be working, no natural definition of closeness exists. Therefore it seems most natural to replace Matthews' assumption (ii) by (ii)'.

(ii)' In any time period any alternative (including the status quo) is a feasible choice.

Therefore, our UDA is somewhat different from the Matthews' model. However, it seems to be the natural extension of his reasoning to a discrete case where no natural definition of closeness exists.

III. EXPERIMENTAL PROCEDURES: SETTING AND DESIGN

The general experimental procedures' setting and design were faithful to those in general use by Fiorina and Plott (1978). The same design was run seven times. The committees were six person and made decisions by strict majority rule (more than half of those voting). Subjects were students from Pasadena City College recruited from the classes of cooperating instructors. Each subject was permitted to participate in only one experimental setting. Subjects only knew that they were going to participate in a "committee decision experiment" before reading the instructions.

The substance of the decision was simple. Each committee was asked to select a single letter from the set of letters {A,B,C,D,E,F,G}. Each subject was assigned a payoff table over the seven letters. The table indicated the amount of money that he or she would receive from the experimenter expressed as a function of the committee's choice. These functions are on Table 1. If, for example, the committee choice was A, then individuals 1 and 2 received $30.25, individual 3 received $25.00, etc.

The committees made their decisions under a simple set of parliamentary procedures. Each committee began deliberations with an option designated by the experimenter as the "initial motion on the floor." The letter so designated differed across experiments as discussed below. Subjects could propose amendments to the motion on the floor. Possibly after discussion, the amendment was voted on. If it passed, it became the new motion on the floor. If it failed, the motion on the floor was unchanged. In either case, new amendments were now in order. If no amendment was on the floor, subjects could vote on the motion on the floor. If it passed, the experiment ended and the motion on the floor was the committee's choice. If it failed, the experiment continued with the same motion on the floor.

Subjects were not allowed to reveal the monetary value of their payoffs or to make agreements to split up payoffs afterwards. Besides this, subjects were free to discuss anything they wished.

Of particular importance was the letter designated as the "initial motion on the floor." Choice of this parameter was a key

TABLE 1

Subject / $ Payoff	1	2	3	4	5	6
34.75	G	B	C	D	E	F
30.25	A	A	B	G	D	E
25.00	F	G	A	C	C	D
19.00	E	F	F	B	B	C
14.75	D	E	E	A	A	G
10.50	C	D	G	F	F	B
5.00	B	C	D	E	G	A

to differentiating among competing theories. For experiments 1 to 4, letter D was the initial motion on the floor. For experiments 5 to 7, letter G was so designated.

IV. APPLICATION OF THEORY

Beside the fact that they were well tested and "debugged" the Fiorina-Plott rules were used because the FFP theory was presumably meant to apply to this case, if no others. Following this logic, the actual selection of the outcome space and preferences of committee members was essentially drawn from their paper. Example 5 in their paper is a four-person committee in a five-letter space exhibiting an "inaccessible" MRE in the sense that the MRE dominates nothing. The dominance relation cycles over the remaining outcomes. We constructed a six-person committee in a seven-letter space with the same characteristics, taking care that the MRE point, G, was not an obvious "fair point" so as to gain an experimental separation of the concepts of MRE and fairness.

The majority rule dominance relation for the committee is best conceptualized as three parts over the set of all letters. The first part is point G alone. Point G is the MRE. It is dominated by nothing and dominates nothing. The other two parts involve the remaining letters {A,B,C,D,E,F}. First, notice as shown on Figure 1 that each letter is preferred to the one immediately "before" it by a 5 to 1 vote (view A as occurring "after" F). Second, as shown on Figure 2, each letter is preferred to the letter two places "before" it by a 4 to 2 vote.

Regarding the bargaining set, it is easy to see that G is the sole point in the bargaining set; there are no objections against G, so it is true that for every objection (that exists) to G there is a counterobjection. Thus G is in the bargaining set. Now let x be any one of the other six letters. Let y be immediately "after" (once again, view A as occurring "after" F) x and let z be immediately after y. The letters y and z provide the only objections to x. An objection using y can be counterobjected to by a proposal using z. However, no counterobjection exists to an objection using z. For example B and C are both objections to A but C is a counterobjection to B and there is no counterobjection to C. Since z is an objection to x for which no counterobjection exists, x cannot be an element of the bargaining set. It follows immediately that G is the unique element of the bargaining set. This result is robust against variations of definitions of objections and counterobjections found in Isaac and Plott (1978).[1]

The Matthews' model can be applied as follows. Suppose the status quo is x. A change from x to y is dominated by a change from x to z if and only if a majority of the individuals prefer z to y. The Matthews' path from a point is in the direction which is undominated by any other direction. An examination of the preferences above will show that from any status quo x, the move from x to G is the unique undominated direction. Thus, the unique Matthews' path from any point (including G) is directly to G.

Before reviewing the results, it is useful to indicate what predictions the SAA, BSA and UDA would make about the choice of

FIGURE 1

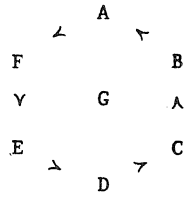
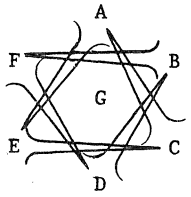


FIGURE 2



any committee with the preferences above. Predictions in the first set (1-SAA, 1-BSA, and 1-UDA) deal in general with the path taken by amendments. The second and third set of predictions deal with the final choice of the committee.

Prediction 1-SAA: Any amendment adopted by the committee will be to a letter immediately "after" the motion on the floor or two places "after" the motion on the floor. For example, if the motion on the floor were A, the committee might move to B or C but never to D, E, F, or G.

Prediction 1-BSA: Any amendment adopted by the committee will be to a letter two places "after" the motion on the floor. For example, if the motion on the floor were A, the committee might move to C but nowhere else.

Prediction 1-UDA: The committee will adopt the amendment G over any status quo other than G and stay at G if the status quo is G.

Prediction 2-SAA and 2-BSA: If the committee begins at a point other than G, G will not be the final choice.

Prediction 2-UDA: If the committee begins at a choice other than G, G will be the final choice.

Prediction 3: If the committee begins at G, G will be the final choice (all three assumptions lead to this prediction).

Note that Predictions 2-SAA and 2-BSA contradict the standard

static theories of the MRE and bargaining set which predict that G will be chosen. On the other hand, Prediction 2-UDA is consistent with the static theories. The static theories are in agreement with all of the dynamic theories on Prediction 3.

V. RESULTS

Seven committee experiments were run. In the first four, initial motion on the floor was D. In the last three it was G. The results are fully reported in Appendix II. A record of the accepted amendments for the experiments is as follows (x → y means a motion was accepted by a majority to move the motion on the floor from attention x to attention y:

Initial Motion D	Experiment 1:	D → E → B
	Experiment 2:	D
	Experiment 3:	D → F → A → B → F
	Experiment 4:	D → A → B
Initial Motion G	Experiment 5:	G → F
	Experiment 6:	G → A → F
	Experiment 7:	G → A → G

We now have enough information to determine how the predictions fared.

Prediction 1-SAA: Results

The above summary of the results as well as the fuller report of results in Appendix II suggests that much behavior occurs which is contrary to this prediction. Consistent with the prediction, no committee refused to adopt an amendment which dominated the status quo. However, eight of the thirteen amendments which were adopted did not dominate the status quo, in violation of this prediction. Two of these eight moves were actually in a direction opposite the dominance relation. Therefore, 62 percent of the actual moves and 29 percent of the suggested moves occurred in violation of this prediction. As well, 24 percent of individual members' votes on amendments violated their own individual preference relations.

Prediction 1-BSA: Results

This prediction fared even worse than 1-MRA. Only one of the thirteen moves was in accord with the prediction. Note that of the five moves which did follow the dominance relation, four were to the point immediately after. Only one was to the point two places after. The point one place after won by a 5 to 1 majority, the point two places after won by a 4 to 2 majority. This result therefore suggests that the size of majority supporting a move may be a more important determinant of committee choice than the existence or non-existence of a counterobjection. It is thus somewhat supportive of Kramer's (1975) use of the "maximally dominating" sequence.

Prediction 1-UDA: Results

This prediction fared worst of all. Too many amendments other than G were adopted for it to be plausible. A committee may well select y over x even if some third point z dominates y. One might still hope that Matthews' theory performs better when the outcome space is R^n and some notion of closeness exists. However, a theory whose qualitative results hinge crucially on assuming the existence of a continuum as opposed to a discrete space (rather than merely employing it as a technical convenience) may be suspect for this reason alone.

Prediction 2: Results

Since the two variants of prediction 2 contradict one another, only one can be true, and it is easiest to deal with them together. Predictions 2-SAA and 2-BSA were verified; Prediction 2-UDA was contradicted. In all four cases where the committee began at D, G was not the final choice. Our results also demonstrate that the static models of the MRE and bargaining set are not generally accurate when the equilibrium does not dominate other points. The general notion of requiring dominance of x over y for motion from y to x (rather than x merely not being dominated by y) seems to be useful for predictive purposes. An MRE may be quite stable if reached, but if it does not dominate other points, it may never be reached. In accord with this insight, we might hope to improve the UDA's predictive value by requiring that any selected change dominate all possible changes instead of merely be undominated by them.

However, no such change ever exists for our committee, so this alternative theory is not applicable to our committee. (For some committees, even an undominated direction does not always exist.) The general non-existence of a dominating direction is a large problem with the Matthew's theory if the notion that "motion requires dominance" is correct.

Prediction 3: Results

This prediction was wrong two of three times. In two of the three cases where the committee began at G, it finally selected a different point. Since prediction 3 is also a prediction of the static MRE and bargaining set theories, our results also contradict them.

Our results demonstrate that the SAA, BSA and UDA cannot be used exclusively as a general model for predicting committee choice. The BSA and UDA are particularly suspect. In the next section we speculate on reasons for its fialure and identify implied modifications to the theory.

VI. FURTHER SPECULATIONS

Although our experiment was only designed to yield "hard" evidence regarding the SAA, BSA and UDA, we could not help but notice certain regularities in the committee's choice procedure. In this section we speculate on the nature of these regularities as a guide to future experimentation and research.

In particular, much of the seemingly anomalous behavior of committee members is consistent with the theory that committee members

possess subjective probability distributions over the final outcome conditional on their own vote. Members may then perceive opportunities for strategic action and act accordingly.

Two similar types of behavior on amendment votes were observed.

(i) Members who ranked the current motion on the floor very highly often were willing to accept amendments they ranked lower. Over twenty examples of such behavior can be identified by referring to Appendix II.

(ii) Members who ranked the current motion on the floor very low often voted against amendments offering a small improvement. Six examples of this behavior can be identified by referring to Appendix II.

Case (i) is consistent with the idea that subjects perceived a reasonable hope of the lower ranked alternative being the final outcome if they supported it, but saw very little hope for having the current motion on the floor accepted even if they supported it. That is, the expected payoff from supporting the lower ranked alternative may have appeared to be larger. As an example of the type of rationale we have in mind, consider the eighth vote of experiment six or the fourth vote of experiment seven. In both cases member number one voted for the amendment A over the status quo G even though A was worth less to him. (See the payoff tables in Section III.) Suppose that member one suspected that if he voted for A, it would be accepted by the committee. However, if he voted against A, he suspected G would be the final choice

with probability 1/2 and all other outcomes would be equally likely. He was therefore faced with evaluating two gambles.

Gamble 1: A with probability 1

Gamble 2: G with probability 1/2

other letters with probability 1/12

The expected value of gamble 1 is of course $30.25. The expected value of gamble 2 is $26.08. Therefore an expected value maximizer with these subjective probabilities conditional on his vote would vote for A.

Furthermore, even if the expected payoff from supporting the lower ranked alternative was smaller, a risk averse member might have opted for it because it was more certain (i.e., its expected utility was higher even though its expected value was lower). Behavior of type (i) suggests that the committee decision process is likely to be more "sticky" than sometimes thought. If support appeared to be gathering for the current motion on the floor, a risk averse expected utility maximizer would place value on the certainty associated simply with accepting it. Once support has begun to coalesce for a point, there may be a natural tendency for the process to accelerate.

Type (ii) behavior is consistent with the same type of argument as with type (i). Suppose a member believed that if he supported the higher ranked alternative, it would be quite likely to become the committee's final choice. However, if he did not support

it, a third point better than either would be more likely to be chosen.

We do not find the expected utility theory convincing solely because it is consistent with the data. Subjects themselves offered crude versions of the theory to explain their behavior in postexperiment discussions.

Another regularity in behavior which we observed was that members were more likely to suggest and support a motion to accept the current motion on the floor when they ranked it above average. In particular, members were repeatedly observed supporting a status quo which gave them a medium payoff. When questioned, they explained that they preferred the medium payoff now to taking their chances on further amendments. Crude versions of the expected utility theory were used by the subjects to explain their behavior. The import of this point is more than that it is another piece of evidence for the expected utility or strategic approach to the dynamics of committee decision-making; it also means that the committee will exhibit differential propensities to stop at various status quos. A point at which a majority receive fairly high payoffs may be a very likely candidate for an equilibrium even if it is dominated by another point. The FFP assumption that the process is equally likely to stop at every stage is inconsistent with this line of theoretical development and is thus an aspect of their model which should receive attention.

One final observed regularity was that in the "first move" of the experiment, participants were particularly prone to vote contrary to their simple preferences. While 16 percent of all votes cast were

contrary to the voters' preferences, this was true for 28 percent of the votes cast on the first amendment accepted. We first noticed this phenomenon after running experiments one through four where participants began at point D. However, evidence from the first four experiments was really only derived from listening to the conversations. Notions such as fairness or establishing a "fairly good" payoff level for everyone were brought up by subjects with much more frequency in discussions preceding the first move than after it. Subjects seemed more willing to compromise at the first stage.

This encouraged us to run three more experiments beginning at the MRE, G. If there is a tendency for the first move of a committee experiment to be particularly independent of the dominance relation, we might in fact observe the committee moving away from the MRE if it starts there. This in fact occurred in all three experiments. Furthermore, in all three cases the committee's initial move was to a more palatable status quo in the sense defined above; almost everyone did "fairly well." In the case of F, no one received his minimum payoff. In the case of A, although one person did receive his lowest payoff, everyone else was near the middle. During the experiment, points F and A were repeatedly suggested as "fair" points and no other points were.

A number of possible reasons for this observed behavior exist. Possibly players simply have an initial reaction to be fair. Possibly they want to establish a fairly good payoff for themselves before worrying about anything else. Possibly they want to establish a rapport

and "working relationship" with the other committee members. Members suggested all three reasons for their behavior in postexperiment discussions. The fact remains, however, that regardless of the reason, the first move of a committee seems to be less related to the dominance relation than subsequent moves.

Incidentally, this result suggests a particularly interesting method for manipulating a committee, analogous to the agenda control methods suggested by other papers (Cohen, Levine, Plott 1978; Levine and Plott 1977; Plott and Levine 1978). An obvious "fair point" should be inserted into the outcome space so that the point the manipulator desires to be chosen dominates the fair point. Hopefully, the committee's initial move to a "palatable" status quo would move it to the fair point. The experiments reported here suggest that after this initial move the dominance relation will become more relevant; therefore, the point desired by the manipulator may be the next point chosen.

V. CONCLUSION

Our data suggest that the SAA, BSA, or UDA assumptions when taken alone are not generally characteristic of dynamic committee behavior. Members perceive opportunities for strategic action and act accordingly. Rational behavior frequently involves voting for points individuals prefer less than some motion "on the floor" or against points they prefer more. Our committees were small (six individuals) so the possibility remains that the assumptions become more characteristic of committee dynamics as the committee size grows.

Our data also suggest that the first move of a committee may be qualitatively different from subsequent moves. More experimentation is needed to identify precisely why this may be the case.

Finally our data suggest that to the extent the dominance relation does apply, the relative size of winning coalitions supporting various amendments may be more important in determining committee choice than the existence or nonexistence of counterobjections.

APPENDIX I

INSTRUCTIONS FOR COMMITTEE MEMBERS

1. We would like to have you participate in a committee process experiment. The purpose of the experiment is to help us understand certain technical aspects of the generally complex ways in which committees operate. The instructions are simple. If you follow them carefully and make good decisions, you might earn a considerable amount of money. You will be paid in cash. Support for this research was supplied by the National Science Foundation.

2. All you have to do is to attend a committee meeting and for this participation you will be paid. The purpose of the meeting is to choose a letter from the set of letters [A,B,C,D,E,F,G]. Only one of the seven letters will be chosen by the committee and the payment you receive for participation depends entirely upon which one it is. For example, on the enclosed compensation table, the amount listed beside the letter A is the amount you will receive if it is chosen by the committee; the amount beside B is the payment you will receive if it is the choice, etc. The compensation tables may differ among individuals. This means that the patterns of preferences differ and the monetary amounts may not be comparable. The option which would result in the highest payoff to you may not result in the highest payoff to someone else. You should decide what choice you want the committee to make and do whatever you wish within the confines of the rules to get

things to go your way. The experimenters, however, are not primarily concerned with whether or how you participate so long as you stay within the confines of the rules. (Under no circumstances may you mention anything quantitative about your compensation. You are free, if you wish, to indicate which ones you like best, etc., but you cannot mention anything about the actual monetary amounts. Under no circumstances may you mention anything about activities which might involve you and other committee members after the experiment, i.e. no deals to split up afterward and no physical threats.)

3. Procedures. All votes will be decided by a strict majority of those voting.

The process begins with an existing motion _____ on the floor. You are free to propose amendments to this motion. Suppose, for example, X is the motion on the floor and you want the group to consider the letter Y. Simply raise you hand and when you are recognized by the chair, say "I move to amend the motion to Y." The group will then proceed to discuss the amendment. After discussion, a vote on the amendment takes place. If the amendment passes, the letter proposed in the amendment is the new motion on the floor. If the amendment fails, the old motion is once again on the floor. In either case, new amendments may now be submitted. As you can see, amendments simply change the motion on the floor. You may pass as many amendments as you wish.

When no amendment is currently under consideration by the committee, a vote on the motion on the floor may take place.

If the motion passes, it becomes the committee's decision and you each receive the amount on your compensation sheets associated with the chosen letter. If the motion fails, it remains as the motion on the floor and is subject to further amendments or votes.

Discussions on an amendment (or the motion on the floor) are terminated by a motion to end debate. If there are no objections to the motion to end debate, an immediate vote on the amendment (or motion) will take place. If there are objections, the motion to end debate will itself be put to a vote. If the motion to end debate fails, the discussion continues. If it passes, a vote on the amendment (or motion) immediately takes place.

To sum up, the existing motion on the floor is _____. You are free to amend this motion as you wish. The meeting will not end until a strict majority of those voting consent to end debate and accept some motion. Your compensation will be determined by the motion on the floor finally adopted by the majority.

4. Are there any questions?
5. We would like you to answer the questions on the attached page. These should help you understand the instructions.

TEST

1. At _____ I would make the most possible money. The amount I would receive is _____.

2. At _____ I would make the least possible money. The amount I would receive is _____.

3. Suppose B is the motion on the floor and an amendment to move to point D passes (fails)? Then the new motion on the floor is _____ (_____).

4. Suppose an amendment to move to A passes and no further amendments pass. If the motion on the floor is then adopted by a majority, my compensation is _____.

APPENDIX II

RESULTS

Experiment Number 1

Starting Letter D

Motion or Amendment	In Favor	Opposed	Abstained
Amend to E	1 2 3 $4^{(5)*}$ 5		$6^{(1)*}$
Amend to B	2 3 4 $5^{(3)*}$	1 6	
Accept B	2 3 4 5	1 6	

*A circled superscript indicates that the member voted contrary to his preference relation. The number in the circle corresponds to the number of places at which the chosen point was ranked below the other point.

Experiment Number 2

Starting Letter D

Motion or Amendment	In Favor	Opposed	Abstained
Accept D	1 2 4 5 6	3	

Experiment Number 3

Starting Letter D

Motion or Amendment	In Favor	Opposed	Abstained
Amend to B	2 3	1 4 5 6	
Amend to F	1 2 3 $4^{⑤*}$ $5^{④*}$ 6		
Amend to A	1 2 3 4 5	6	
Amend to B	2 3 4 5 6	1	
Amend to F	1 $2^{③*}$ $3^{②*}$ 6	4 5	
Accept F	1 2 3 4 5 6		

*A circled superscript indicates that the member voted contrary to his preference relation. The number in the circle corresponds to the number of places at which the chosen point was ranked below the other point.

Experiment Number 4

Starting Letter D

Motion or Amendment	In Favor	Opposed	Abstained
Amend to G	1 2 $4^{\textcircled{1}*}$	$3^{\textcircled{1}*}$ 5 6	
Amend to A	1 2 3 $4^{\textcircled{4}*}$	5 6	
Amend to B	2 3 4 5 6	1	
Accept B	2 3 4 5	1 6	

*A circled superscript indicates that the member voted contrary to his preference relation. The number in the circle corresponds to the number of places at which the chosen point was ranked below the other point.

Experiment Number 5

Starting Letter G

Motion or Amendment	In Favor	Opposed	Abstained
Amend to E	5	1 2 $3^{(1)*}$ 4 $6^{(3)*}$	
Amend to F	$1^{(2)*}$ $2^{(1)*}$ 3 $4^{(4)*}$ 5 6		
Accept F	1 3 4 5 6	2	

*A circled superscript indicates that the member voted contrary to his preference relation. The number in the circle corresponds to the number of places at which the chosen point was ranked below the other point.

Experiment Number 6

Starting Letter G

Motion or Amendment	In Favor	Opposed	Abstained
Amend to E	5	1 2 $3^{\textcircled{1}*}$ 4 $6^{\textcircled{3}*}$	
Amend to F	3 6	1 2 4 $5^{\textcircled{1}*}$	
Amend to D	4 5 6	1 2 3	
Amend to A	$1^{\textcircled{1}*}$ 2 3	4 $5^{\textcircled{2}*}$ 6	
Amend to B		1 $2^{\textcircled{2}*}$ $3^{\textcircled{4}*}$ 4 $5^{\textcircled{3}*}$ 6	
Amend to F	$2^{\textcircled{1}*}$ 3 6	1 4 $5^{\textcircled{1}*}$	
Amend to D	4 5 6	1 2 3	
Amend to A	$1^{\textcircled{1}*}$ 2 3 $4^{\textcircled{3}*}$	$5^{\textcircled{2}*}$ 6	
Amend to E	5	1 2 3 4 $6^{\textcircled{5}*}$	
Amend to F	$1^{\textcircled{1}*}$ $2^{\textcircled{2}*}$ $3^{\textcircled{1}*}$ $4^{\textcircled{1}*}$ $5^{\textcircled{1}*}$ 6		
Accept F	1 2 3 4 5 6		

*A circled superscript indicates that the member voted contrary to his preference relation. The number in the circle corresponds to the number of places at which the chosen point was ranked below the other point.

Experiment Number 7

Starting Letter G

Motion or Amendment	In Favor	Opposed	Abstained
Amend to B	2 3	1 4 $5^{\textcircled{3}*}$ 6	
Amend to D	4 5 6	1 2 3	
Amend to E	5 6	1 2 $3^{\textcircled{1}*}$ 4	
Amend to A	$1^{\textcircled{1}*}$ 2 3 5	4 6	
Amend to F	$1^{\textcircled{1}*}$ $3^{\textcircled{1}*}$ 6	2 4 5	
Amend to G	1 $2^{\textcircled{1}*}$ $3^{\textcircled{3}*}$ 4 6	5	
Accept G	1 2 3 4 6	5	

*A circled superscript indicates that the member voted contrary to his preference relation. The number in the circle corresponds to the number of places at which the chosen point was ranked below the other point.

FOOTNOTE

1. To see this, consider without loss of generality the letter A. The letter used in an objection to A must dominate A; therefore it must use either B or C. If the objection uses B, C dominates A and B so can always provide a counterobjection. If C is an objection, the only proposals which can be counterobjections must use B since the letter of the counterobjection must dominate A. However, C dominates B by a 5 to 1 majority. The intersection of people in the objection and counterobjection coalitions must contain at least two people. Therefore at least one person in the intersection must prefer C to B. Therefore B cannot be a counterobjection.

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