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An experiment was designed to test a model of jury decision making. This model, the linear discrepancy model, is an information-processing model which posits that when jurors hear an argument during deliberation, they adjust their opinion toward the message. The amount of change is a linear function of the discrepancy between the opinion expressed in the message and the jurors' opinions. An unequal-speaking version of this model, contrasting the speaking frequency of the foreperson and other jury members was constructed. Trial outcomes and postdeliberation variances were predicted accurately by the model in an experiment employing impaneled jurors.

Frequently communication scholars perform experiments to examine the impact of various features of the legal environment on jury decisions (e.g., see Miller & Fontes, 1979). The results of these studies are employed to draw inferences concerning the dynamics of jury decision making. An alternative research strategy involves building mathematical models of the jury decision-making process. From models, the effects of aspects of the legal environment on trial outcomes may often be derived, and data may be gathered to evaluate these derivations.

Although the legal system provides a setting sufficiently unique to merit independent inquiry, certain features of this environment are likely to be affected by processes found commonly in other communication contexts. So, for example, jury deliberation is similar in many respects to other types of group decision making, and the process (or processes) that generates group decisions may also generate jury judgments, such as verdicts, sentences, and awards.

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In this article a model of jury decision making is presented. This model may be classified as an information-processing model (Hunter, Danes, & Cohen, 1984). Specifically, it is a variant of Anderson's information integration theory (1971, 1974a, 1974b), and it is commonly referred to as the linear discrepancy model (Boster, Mayer, Hunter, & Hale, 1980; Boster, Fryrear, Mongeau, & Hunter, 1982). Following the introduction of the model, pertinent evidence is reviewed, and the results of an experiment designed to test it are presented.

The Linear Discrepancy Model

Some messages advocate opinions, and the linear discrepancy model treats those that do not as unimportant to the decision-making process. So, for example, during deliberation a juror may argue or assert that a plaintiff deserves $10,000, $100,000, or perhaps nothing in a claim of damage.

Certainly, messages that are not arguments can have an impact on group process and group decision making. In the context under consideration (jury deliberation), however, such messages are not likely to be crucial. In fact, our informal observations indicate that few messages, other than arguments, are delivered during deliberation. In any event, to the extent that nonargument messages affect jury decisions, the linear discrepancy model will provide an inaccurate account of trial outcomes. Thus the data may be used to judge the accuracy of the model's assumption.

Subsequent development of the model will show that the jurors' initial attitudes are a strong determinant of the arguments that they offer, especially during the early stages of discussion. Thus it is important to note that the model does not address the issue of how jurors form these initial attitudes. Although one popular explanation of argument generation is that it is a function of the pool of arguments, a construct that is central to persuasive arguments theory (Burnstein, 1982; Burnstein & Vinokur, 1973, 1977; Vinokur & Burnstein, 1974), recent work raises questions concerning the veracity of this explanation. For example, Stasser and Titus (1985, 1987) show that a principle central to persuasive arguments theory, that initially unshared arguments are shared during discussion, is questionable. Furthermore, Meyers (1989a, 1989b) argues that unique arguments, those not possessed by group members prior to discussion, arise during discussion, a possibility not considered by persuasive arguments theory. Therefore, the utility of persuasive arguments theory for explaining initial positions is moot.

Alternatively, our earlier work has produced a causal model that predicts initial juror attitude accurately (Boster & Hunter, 1979; Boster, Miller, & Fontes, 1978).

Because messages advocate opinions, they may be scaled on the same continuum as opinions (Thurstone, 1929). For instance, suppose that a plaintiff requests $50,000 in a civil action. Jurors' opinions of the award may be arrayed on a continuum ranging from $0 to $50,000. Because the same continuum may be employed to scale both messages and opinions, it is reasonable to speak of persons comparing them. The linear discrepancy model asserts that this comparison process generates opinion change. French (1956) asserts that "the strength of the force that an inducer A exerts on an inducee B, in the direction of agreeing with A's opinion, is proportional to the size of the discrepancy between their opinions" (p. 184).

Three postulates may be extracted from French's analysis. First, opinion change is always in the direction of the message, whether the message is an argument or an assertion. Hence, if one's opinion is more positive than the opinion expressed in the message, then one exhibits negative opinion change; whereas, if one's opinion is more negative than the opinion expressed in the message, then one exhibits positive opinion change.

Notice that it is difficult to distinguish assertions and arguments. Rarely is a juror's speech organized as a syllogism, a propositional logic argument, or a predicate calculus argument. Nevertheless, the overwhelming majority of assertions contain some accompanying reason, so that other jurors can construct an argument from the spoken content. Furthermore, as Boster and Mayer (1984, p. 395) have noted, group members may infer arguments from assertions.

French's second proposition is that the magnitude of opinion change is directly proportional to, or a linear function of, the discrepancy between one's opinion and the opinion expressed in the message. Third, French's position implies that persons' messages reflect their opinion at the time they are spoken. It is this proposition that advocates the importance of initial attitudes in determining the position jurors advocate.

Translating these ideas into equations is facilitated by denoting the opinion of group member i as x_i, and assuming that some other group member, j, speaks. The opinion change resulting from j's message is

$$\Delta x_i = \alpha(m_j - x_i) \tag{1}$$

where m is the value of the message on the continuum that scales opinions. Because j's message reflects j's opinion, it follows that $m_j = x_j$. Substituting into Equation 1 yields

$$\Delta x_i = \alpha(x_j - x_i) \tag{2}$$

Hunter, Danes, and Cohen (1984) describe this model in the following manner: "This model is formally equivalent to the simple linear servomechanism or homeostat of cybernetics (Ashby, 1956, 1963). The message is analogous to input from the environment and the receiver adjusts his position toward the input value" (p. 37). Subsequently, Hunter et al. (1984) and others (e.g., Anderson & Hovland, 1957; Carlsson, 1972) have derived statistical predictions from the model.

Both Abelson (1964) and Taylor (1968) formalize this model in the context of a community controversy, but group discussion differs from community controversy in two important ways. First, everyone is able to communicate with everyone else, and second, each group member is exposed to every message. These characteristics simplify the Abelson and Taylor models and allow Equation 2 to be generalized to a model of group discussion. There are two ways of accomplishing this task, by assuming that all group members speak equally often or by weighting members' opinions by speaking frequency.

If everyone speaks equally often, then the net impact of an average round of discussion is the sum of the change produced by each speaker. Translating this idea into an equation yields

$$\Delta x_i = \sum_{j=1}^{N} \alpha(x_j - x_i) \tag{3}$$

The mean prediscussion group opinion, M, is defined as

$$M = 1/N \sum_{i=1}^{N} x_i \tag{4}$$

Boster et al. (1980) show that Equation 4 implies that $\Delta M = 0$, so that if the equal-speaking version of the linear discrepancy model is correct, and if the mean group opinion is reached, then there will be no further change.

If the discrepancy between a group member's opinion and the mean group opinion is denoted D_i, then it follows that

$$D_i = x_i - M \tag{5}$$

Boster et al. (1980) show that

$$\Delta D_i = -N\alpha D_i \tag{6}$$

which implies that

$$D_{i,N} = (1 - N\alpha)^N D_{i,0} \tag{7}$$

Equation 7 converges exponentially to zero, indicating that if the equal-speaking version of the linear discrepancy model is correct, each group member's opinion converges to the mean of the prediscussion group decision.

In summary, the equal-speaking version of the linear discrepancy model implies that group opinion converges to the mean of the individual prediscussion decisions and that once that value is reached, there will be no further change. Thus the equal-speaking version of the linear discrepancy model predicts that the group decision will be the mean of the group members' prediscussion decisions. Denoting the predicted group decision as G^*, this prediction may be written

$$G^* = M \tag{8}$$

If, on the other hand, group members do not speak with equal frequency, then it is necessary to incorporate differential speaking frequency into the model. A constant, f, which measures the number of messages that a person offers to the group in the average period of time necessary for everyone to have a chance to speak, may be assigned to each person. Focusing on person j, j's impact on each member i in a round of discussion is

$$\Delta x_i = f_j \alpha (x_j - x_i) \tag{9}$$

In a round of discussion, the change in person i is the sum of each speaker's impact, so that

$$\Delta x_i = \sum_{j=1}^{N} f_j \alpha (x_j - x_i) \tag{10}$$

Boster et al. (1980) show that this model implies that group opinion converges to the mean group member prediscussion decision weighted by speaking frequency and that when this value is reached, there will be no further change. Therefore, the unequal-speaking version of the linear discrepancy model predicts that

$$G^* = M_f \tag{11}$$

where

$$M_f = \sum_{i=1}^{N} x_i f_i \tag{12}$$

In addition to predicting the decision to which group members converge, the linear discrepancy model can be employed to derive a prediction concerning variances. Boster et al. (1982) show that Equations 3 and 10 imply that

$$\sigma^2_t = \beta^2 \sigma^2_0 \tag{13}$$

where σ^2_t is the posttest variance, σ^2_0 is the pretest variance, and $\beta = (1 - N\alpha)$, although the estimate of the parameter, α, differs in the cases of equal and unequal speaking (see Boster et al., 1982, pp. 400-401). In the main, Equation 13 indicates that the posttest variance will be less than the pretest variance, because α is likely to be small. Under certain conditions, however, the posttest variance may exceed the pretest variance (see Boster et al., 1982, p. 416, note 6).

The picture of group discussion painted by this model is one in which persons argue for the opinion that they hold at the time they speak. Because these arguments cause others to change their opinions in the direction advocated by the argument, the next time these others speak they hold, and hence argue for, a different opinion, although the difference is often relatively small. Iterating this interaction process ultimately produces convergence to a single value on the opinion continuum. When this value is reached, the group will be in consensus.

Tests of the Linear Discrepancy Model

Numerous experiments report the effect of message discrepancy on attitudes in the passive communication context. Most reviews (e.g., Cappella & Folger, 1980; Eagly, 1974; Insko, 1967; Kiesler, Collins, & Miller, 1969; Laroche, 1977; McGuire, 1985; Petty & Cacioppo, 1981; Whittaker, 1967) agree that experimental results differ across studies; most experiments report that conformity to message recommendations increases with increasing discrepancy (e.g., Anderson, 1959, 1965, 1971; Danes, Hunter, & Woelfel, 1978; Freedman, 1964; Goldberg, 1954; Hovland & Pritzker, 1957; Zimbardo, 1960); a few find that persuasion decreases with increasing discrepancy (e.g., Hovland, Harvey, & Sherif, 1957; Sherif & Hovland, 1961; Whittaker, 1957); an occasional curvilinear relationship has been reported (e.g., Insko, Murashima, & Saiyadain, 1966; Whittaker, 1963); and at least one study indicates that the effect of discrepancy on attitudes is moderated (e.g., Aronson, Turner, & Carlsmith, 1963). Interpretation of these differences varies, both social judgment theory and dissonance theory being commonly evoked explanations. Both theories predict that the regression of attitudes onto discrepancy is linear when the source of the persuasive message is at least moderately credible and the issue is not highly ego involving to the audience. Our observations are that both conditions are characteristic of jury deliberation. Because juries have no history, one's fellow jurors are generally regarded as being reasonably expert and trustworthy, and the legal judgments that must be made do not often require the activation of attitudes that are coupled with important values (see Johnson & Eagly, 1989, p. 290). In fact, were the latter condition to be the case, the juror would likely be dismissed during the voir dire process. Therefore, the assumption that the regression of attitudes onto discrepancy is linear is reasonable, although to the extent that the assumption is false, the data will be inconsistent with the model.

In addition, several experiments have tested the linear discrepancy model in the context of group discussion, an active communication context. For example, Anderson and Graesser (1976) performed two experiments in which members of dyads (Experiment 1) or triads (Experiment 2) were provided with varying pieces of information that were very favorable, favorable, unfavorable, very unfavorable, or some combination of these valences concerning several former presidents of the United States. Experimental participants' attitudes toward these presidents were measured prior to exposure to the information, after exposure to the information, after being exposed to a summary of the information given to the other participant or participants, and after group discussion. Subsequent analyses demonstrated that the data were consistent with information integration theory and, hence, the linear discrepancy model.

Boster et al. (1980) tested the linear discrepancy model with choice dilemma (CD) items. Subjects responded to both a risky CD item and a cautious CD item, participated in a group discussion of each item (group sizes varying from 3 to 8), and subsequently responded to the items again. Group decisions were consistent with the predictions of both the equal-speaking and unequal-speaking versions of the linear discrepancy model, there being insufficient variance in speaking frequency to distinguish the two versions. Furthermore, as predicted by the linear discrepancy model, the postdiscussion variance was substantially smaller than the prediscussion variance. Finally, examination of the postdiscussion responses were consistent with the hypothesis that the group decisions were primarily a result of attitude change during discussion.

Boster et al. (1982) extended the Boster et al. (1980) experiment by varying both the item discussed (risky or cautious) and the distribution of initial opinions (majority risky, majority cautious, symmetrical). Once again, the data were consistent with the linear discrepancy model, although the unequal-speaking model fit the data much better than did the equal-speaking model. Moreover, the variances decreased as predicted, and the data were consistent with the hypothesis that group decisions were primarily a result of attitude change during discussion. Finally, the linear discrepancy model provided accurate prediction of the treatment means and accurately estimated the size of both the item and distribution effects.

Because the linear discrepancy model accurately predicts the results of several group discussion experiments, and because jury decision making is a group discussion task, it is reasonable to expect the linear discrepancy model to provide an accurate account of jury deliberation outcomes. Hence Boster, Roberson, and Hunter (1985) tested the model by presenting mock jurors with legal case materials, observing their subsequent deliberation, and measuring the pertinent outcomes. Once again, both the group decisions and the postdeliberation variances were consistent with the model's predictions, although there was insufficient variance in speaking frequency to distinguish between the equal- and unequal-speaking versions of the model.

The most serious limitation of this experiment is its external, or ecological, validity. Miller, Fontes, Boster, and Sunnafrank (1983) detail the problem of ecological validity in legal studies, discussing issues such as mock jurors' and impaneled jurors' frequently differing in background characteristics and in the expectations they bring to the experimental setting, the laboratory and the courtroom environments' differing in the amount of information presented and the medium in which the information is presented, and differential juror and mock juror perceptions of the dignity or majesty of the setting (see Miller & Boster, 1977, pp. 34-36).

In the Boster et al. (1985) experiment, student mock jurors were employed. They deliberated in juries of three members, whereas the size of impaneled juries is generally larger. The study was conducted in a laboratory cluttered with one-way mirrors and apparatuses, rather than the stark and formal ambiance of a courtroom. The participants read a trial synopsis, instead of being exposed to a longer trial with its accompanying rich auditory and visual environment. Finally, the juries were relatively leaderless, as opposed to impaneled juries that must elect a foreperson and generally do so immediately upon reaching the deliberation room. The last point is particularly crucial, because Strodtbeck, James, and Hawkins (1957) show that the foreperson is an extremely influential group member. To enhance the ecological validity of the Boster et al. (1985) experiment, the linear discrepancy model was expanded to include the expected disproportionate impact of the jury foreperson, and a study was designed to reduce many of the limitations mentioned previously. The extension of the model is presented in the next section of the article, followed by a description of the experiment.

Model of Jury Deliberation

The jury deliberation model is a special case of the unequal-speaking linear discrepancy model, in which the contrast in speaking frequency is between the foreperson and all other jurors—the latter assumed to speak with equal frequency. If the foreperson's opinion is denoted f (unsubscripted to distinguish it from speaking frequency), then the change in opinion for juror i is

$$\Delta x_i = \sum_{j=1}^{N-1} \alpha(x_j - x_i) + \beta(f - x_i) \tag{14}$$

including the zero term, $\alpha\,(x_i - x_i)$, for algebraic simplification. The difference between α and β represents the difference in speaking time between an average member of the jury and the foreperson. If

$$M = (1/N-1) \sum_{j=1}^{N-1} x_j \tag{15}$$

then rewriting Equation 14 for group member change yields

$$\Delta x_i = (N-1)\alpha(M - x_i) + \beta(f - x_i). \tag{16}$$

The change in M is

$$\Delta M = (1/N-1) \sum_{j=1}^{N-1} x_j \tag{17}$$

$$= \beta(f - M) \tag{18}$$

The change in the foreperson's opinion is the same as any other group member, except that the foreperson's messages do not affect the foreperson's opinion. Thus

$$\Delta f = (N-1)\alpha(M - f). \tag{19}$$

Equations 18 and 19 form a bivariate system that has an equilibrium point when $M = f$. The corresponding eigenvector, $[(N-1)\ \alpha, \beta]$, implies that the weighted mean is constant. If

$$G^* = \{[(N-1)\alpha M + \beta f] \,/\, [(N-1)\alpha + \beta]\} \tag{20}$$

is the weighted mean opinion, or the mean for the jury (including the foreperson) weighted by speaking frequency, then $\Delta G^* = 0$. G^* is the value to which jury opinion converges; and when G^* is reached, there is no further change. Thus the model predicts that G^* will be the jury decision.

Again, the relationship between predeliberation variance and postdeliberation variance can be derived from the model, the relevant variance in this case being around G^*. It can be shown that the postdeliberation variance around G^*, σ^2_t, is expected to be

$$\sigma^2_t = (1-\tau)^{2t}\,\sigma^2_0 \tag{21}$$

where $\tau = [\beta + (N-1)\alpha]$.

To test these predictions impaneled jurors watched a re-creation of a trial in a courtroom. Subsequently, they elected a foreperson, and deliberated on the case in groups of 4 to 6 jurors. Details of this study follow.

Method

Subjects

Participants were 105 residents of Flint, Michigan, who were drawn randomly from the jury pool of the 68th District Court. From these jurors, nine 6-person juries, seven 5-person juries, and four 4-person juries were formed. The study was held over a 4-day period, with five juries drawn each of the 4 days.

Procedure

Upon entering the courthouse jurors were escorted to a courtroom that differed from the normal courtroom in two ways: First, an unusually large number of jurors were present; second, videotape equipment was visible. The presiding judge informed jurors that the trial was being conducted in cooperation with a National Science Foundation study of jury size and that the videotape equipment was being used to obtain a record of the trial—these remarks providing a rationale for the deviations from the normal courtroom environment. The judge went on to explain that the case before the court involved a change of venue and that because of the unusual circumstances surrounding the case, it had come to the attention of the National Science Foundation. Furthermore, the National Science Foundation had secured an agreement with the litigants to study the case. Finally, the judge assured the jurors that their decision was binding upon the litigants.

The case involved an automobile accident in which the defendant was admittedly at fault. The point of contention concerned injuries allegedly received from the accident. The plaintiff claimed that his wife sustained back injuries as a result of the accident, and the defendant claimed that the plaintiff's wife's back injuries resulted from a previous condition, inadequate treatment, negligence in following the instructions of the treating physician, and her obesity. The length of the trial was approximately 2 hours and 15 min.

Trial participants included two physicians, one testifying for the plaintiff and the other for the defendant; the plaintiff's wife; two attorneys; and the judge. The first three participants were trained actors. The attorneys included a lawyer and a third-year law student. The judge was a district court judge in the 68th District in Flint, Michigan.

Following the presentation of the trial, the jurors were asked to complete a predeliberation award measure, instructed not to discuss the case with anyone, and allowed to go to lunch. After lunch jurors were assigned randomly to juries. Each jury was assigned to a deliberation room and instructed to elect a foreperson and begin deliberating.

To explain the unusual number of juries, the judge instructed the juries to pick a representative who, at the conclusion of the deliberation, was to meet with the representatives from the other juries—the deviation from normal procedure being explained as part of the National Science Foundation study of jury size. Finally, the jurors were again reminded that the decision of the representatives would be binding upon the litigants.

When a jury reached a decision, the members were told that other juries were still deliberating, and they were asked to complete a postdeliberation award measure while they waited. When each juror had completed this measure, the experiment was terminated, and the jurors were debriefed.

Instrumentation

Three measures were taken: (a) a measure of individual juror predeliberation award, (b) the decision of each jury, and (c) a measure of individual juror postdeliberation award. Moreover, the foreperson of each jury was noted. The minimum award to the plaintiff was $0, the maximum award was $7,000.

Results

Observations of the videotapes of the trial sessions showed that the trial participants' performance was consistent across the 4 days of the study. The script was followed closely, and the nonverbal demeanor of the trial participants was uniform. Moreover, the jurors were convinced of the authenticity of the trial. There was little evidence of suspicion, and those suspicious comments that did occur tended to be dropped from consideration quickly. In sum, there is little evidence to suggest that either variance in participant performance or juror suspicion affected the results of this study.

The mean deliberation time was 41.30 min (SD = 23.40; low = 27 min, high = 120 min), although one jury's deliberation time was slightly more than three standard deviations above the mean (120 min). Deleting this outlier yields a mean deliberation time of 37.16 min (SD = 14.29; low = 20 min, high = 67 min). Deliberation time was neither a significant nor a substantial correlate of jury decision, predicted jury decision, or the model's error in predicting the jury decision.

Jury Decisions

Jury award was regressed onto both foreperson award and mean juror award (excluding foreperson) to obtain unstandardized ordinary least squares (OLS) estimates of α and β. Parameters were estimated for each group size separately, because α cannot be estimated apart from jury size (see Equation 16). For juries with 6 members, $\alpha = .11$, $t(6) = .91$, $p > .05$, and $\beta = .86$, $t(6) = 2.28$, $p < .05$; for juries with 5 members, $\alpha = .25$, $t(4) = 3.15$, $p < .05$, and $\beta = .63$, $t(4) = 3.57$, $p < .05$; and for juries with 4 members, $\alpha = .46$, $t(1) = .80$, $p > .05$, and $\beta = .27$, $t(1) = .14$, $p > .05$.

Given the parameter estimates, Equation 20 was employed to generate predicted jury awards. A scatterplot of the relationship between obtained and predicted jury awards indicated that the regression of G onto G^* was linear, with no evidence of outliers. OLS estimates of the G intercept and the slope of the regression of G onto G^* yielded the following equation, $G = 1.19G^* - 782.20$. The G intercept does not differ significantly from zero, $t(18) = -1.38$, $p > .05$; the slope does not differ significantly from one ($t(18) = 1.02$, $p > .05$; the correlation between G and G^* is substantial, $r = .83$, $t(18) = 6.31$, $p < .0005$; and the mean absolute value error is 882.44 (SD = 748.83; low = 0.00, high = 2442.98)—a mean error rate of 13%. These results are consistent with the hypothesis that the obtained jury awards do not depart substantially from their value predicted by the jury deliberation model.

Because of the small sample size, and the necessity of estimating parameters separately for each sized group, the OLS estimates of the parameters are relatively unstable (see Schmidt, 1971, 1972). Moreover, the statistical significance tests for these parameters lack power. Therefore, it is not surprising that α and β are not statistically significant for the 4-person juries, nor is it odd that α fails to reach acceptable levels of statistical significance for the 6-person juries. Nevertheless, because of the unstable estimates it is informative to test the model in an alternate manner. Specifically, because the mean juror has no statistically significant impact on award for the 6-person juries, one may set that parameter to zero, so that foreperson award is the only predictor employed to generate a predicted jury award. For

5-person juries the parameters are statistically significant, and the predicted jury awards remain unaltered. But for 4-person juries neither parameter is statistically significant. In this case the equal-speaking model (Equation 8) can be used to generate the predicted jury awards.

This model generates the following equation for the regression of obtained award onto predicted award, $G = 549.98 + .83G^*$. Although this model does not fit the data as well as the previous model, the intercept does not differ significantly from zero, $t(18) = 1.05$, $p > .05$; the slope does not differ significantly from one, $t(18) = .94$, $p > .05$; the correlation between G and G^* is substantial, $r = .73$, $t(18) = 4.55$, $p < .001$; and the mean absolute value error of 1,004.85 remains relatively low—a 14% error rate ($SD = 940.85$; low = 0, high = 3,000).

Variances

Of the 20 juries, 15 (75%) exhibited a decrease in variance from the pretest to the posttest; 4 juries (20%) increased in variance from pretest to posttest; and in the remaining jury (5%), the variance did not change. The probability of 15 or more of the variances decreasing by chance, given that the probability of a decrease equals the probability of other than a decrease equals .5, is less than .021.

The mean pretest variance was 5,792,804.55, and the mean posttest variance was 3,807,169.92. Therefore, the mean variance decreased by a factor of .66. The estimated value of $(1 - \tau)^2$ was a weighted average of .31 (.18 for 6-person juries, .41 for 5-person juries, and .42 for 4-person juries), indicating that the variance did not decrease by as much as predicted by the model.

Foreperson Effects

The ratio β/α is a measure of the influence of the foreperson relative to the mean juror. This ratio varies as a function of jury size. For 6-person juries, this ratio is 7.82, for 5-person juries 2.52, and for 4-person juries .59. Thus the larger the jury, the stronger the impact of the foreperson relative to the mean juror.

The ratio $\beta/(N - 1)\alpha$, measures the influence of the foreperson relative to the sum of other juror influence. This ratio also varies as a function of jury size. For 6-person juries $[\beta/(N - 1)\alpha] = 1.54$, for 5-person juries .62, and for 4-person juries .20.

Hence in 6-person juries the foreperson's influence was stronger than the sum of the influence of all other jurors, and it was almost 8 times as powerful as the mean juror. For 5-person juries the foreperson was over 2.5 times more influential than the mean juror, although not quite as powerful as the sum of the other 4 jurors. For 4-person juries the foreperson was actually less powerful than the mean juror and, hence, much less influential than the sum of the other jurors. All of these estimates are tenuous, given the small sample sizes, but interpreting the results for the 4-person juries requires special caution, because the estimates are based on only four observations.

Because, in the main, forepersons had a disproportionate impact on these jury decisions, it is useful to examine the factors that predict whether or not one will be elected foreperson. Three factors were found to be important: (a) sex, (b) racial identification, and (c) mentioning the task. Specifically, 75% of the forepersons were male, despite the sample being primarily female (57%); 80% were White (64% of the sample was White), and 45% of the forepersons first mentioned the task of foreperson selection. Sixty percent of the forepersons were both White and male, and 30% of the forepersons were White, male, and first mentioned the task of foreperson selection.

Discussion

These data are consistent with the linear discrepancy model. The model predicts both jury decisions and the reduction in the within-group postdiscussion variances accurately. Although the latter did not decrease by quite as much as predicted, this outcome could be attributed to jurors realizing the award value to which the discussion was leading and adopting this value prior to consensus.

Despite the success of the model in predicting key outcome criteria, some features of the model may raise questions concerning its accuracy in depicting group discussion. One such question revolves around the importance of discussion. Specifically, if group decisions can be predicted from knowledge of the distribution of predeliberation attitudes, then is discussion necessary or, put another way, efficient? Expanding upon the mathematics of the model, it becomes clear that discussion is indeed necessary. Neither speaking frequency nor the foreperson can be known prior to discussion, and these variables are central to the linear discrepancy model predictions. As the Boster et al. (1982) data demonstrate, the equal-speaking model predictions can be very much in error when there is even relatively small variance in speaking frequency.

Moreover, in the legal context there may be reasons to deliberate, even if the group decision could be predicted perfectly by knowledge of the distribution of predeliberation decisions and nothing else. For example, several scholars have argued that it is as important that the legal system create the impression that justice is being done as it is for just decisions to be rendered (Miller & Boster, 1977; Tribe, 1971). In Tribe's words,

> The presumption of innocence, the rights to counsel and confrontation, the privilege against self-incrimination, and a variety of other trial rights, matter not only as devices for achieving or avoiding certain kinds of trial outcomes, but also as affirmations of respect for the accused as a human being—affirmations that remind him and the public about the sort of society we want to become and, indeed, about the sort of society we are. (Tribe, 1971, p. 1392)

The right to be tried by a group of one's peers, who deliberate carefully on the case, may contribute to the impression that justice is being done. The absence of deliberation, on the other hand, may serve to thwart this goal.

It is informative to speculate on conditions that might produce group decisions that are inconsistent with the linear discrepancy model. Imagine a case in which members of a 4-person jury make individual predeliberation awards of $0, $7,000, $7,000, and $7,000, and the resulting group decision is $0. Unless the three members with predeliberation awards of $7,000 said nothing during the discussion, an unlikely circumstance, the linear discrepancy model's prediction would be very different from the observed outcome in this case.

Although there were no juries that behaved in this manner in this experiment, one can imagine conditions under which such a result might occur. Suppose that there was a critical argument, that it was an argument for acquittal, and that it was known only to the juror with a predeliberation award of $0. In such an instance the hypothetical result sketched in the preceding paragraph would likely occur. In fact, in some discussion tasks such critical arguments are likely to arise (e.g., Stasser, Kerr, & Davis, 1989, pp. 318-320; Wright, Luus, & Christie, 1990).

The fact that no such outcome occurred in the experiment suggests a different scenario. Specifically, trials contain testimony and arguments to which all jurors are exposed. Despite this uniformity these trial materials are not one-sided, and there is not a correct answer, so that there is no lack of variance in the predeliberation decisions. Instead, jurors hear the same factual claims and arguments but weigh them differently, and it is this difference that produces the variance in predeliberation opinions and the subsequent arguments that arise during discussion. Thus it is relatively rare that a critical argument occurs to only one juror, or a small subset of jurors, either prior to or during deliberation.

Although it is difficult to find models that are expressed with precision sufficient to compare them with the linear discrepancy model, it is informative to speculate on the fit of models that posit competing processes of jury decision making. A superficial analysis suggests that the social combination models, for example, social decision schemes and social transition schemes, are one such set of models (Davis, 1973; Stasser, Kerr, & Davis, 1980, 1989). Such an analysis is superficial because social combination modeling is better characterized as a perspective, rather than a substantive theory. Indeed, this characterization is recognized by those who developed the perspective. As Stasser et al. (1989) put it, "It is the special case model of course that carries the theoretical content; the general social decision scheme notion is only an approach to theoretical analysis" (p. 300).

Some studies that have employed the social combination modeling approach have generated the social decision scheme matrix (or the social transition matrix) from the data. Put another way, they seek the social decision scheme that yields the best fit with empirical outcomes. An alternative to this model-fitting strategy is the model-testing procedure. In this case the rule linking prediscussion preferences to individual or group outcomes is specified a priori. As Stasser et al. (1989) note, these rules represent the theory of group decision making being tested. And these rules, and the theories they represent, vary widely in the literature. One of the central differences between at least some of them and the linear discrepancy model is that the latter posits that persuasion, or informational influence, is the only important source of social influence in group decision making. Various social combination models posit other sources of influence and occasionally combinations of types of social influence.

Furthermore, these models were all developed for the case in which the group must choose between a set of discrete options, whereas the linear discrepancy model is constructed to explain choices along an opinion continuum. As Stasser et al. (1989) note, "The discrete choice models considered heretofore have not yet a counterpart in the continuous case" (p. 300).

Another possibility is the valence distribution model (DVM; Poole, McPhee, & Seibold, 1982). This model may be construed as an extension of the social combination models, namely, one in which the process mediating the relationship between social combination rules and group decisions is specified. Despite being more detailed than the social combination models, the DVM does not incorporate a description of the process or processes by which messages are generated during discussion into the model as does the linear discrepancy model. Clearly, however, Poole et al. are concerned with the issue. Addressing it, they assert,

> it is very likely that members will advocate most strongly those options they initially prefer but, as the discussion rolls on, change their preference in response to others' opinions, to the power structure of the group, or to an emerging consensus. (Poole et al., 1982, p. 8)

What is deemed likely by Poole et al. is one of the postulates of the linear discrepancy model, and it is incorporated into the equation that represents that model. One point of difference in the models is that the linear discrepancy model posits that persons change their preference only in response to the arguments of their fellow group members, whereas—as is clear from the preceding quotation—Poole et al. suggest several ways in which group members may influence each other.

We have noted that social combination models and the DVM do not model certain important features of interaction. We should make the same point about the linear discrepancy model. Most important, there is no model of how speaking frequency varies, nor is there a model that predicts the election of the foreperson. In addition, some might believe that the model is inadequate because other types of social influence are not included, although it is notable that in the past such forces have not aided in predicting the group decision (Boster et al., 1982). Each of these criticisms suggests ways in which this model may be expanded.

The Foreperson Effect

The finding that group size moderates the influence of the foreperson was serendipitous, although in retrospect it is not difficult to understand. Consistent with Strodtbeck et al.'s (1957) results, the foreperson was a very influential group member. Furthermore, the extent of this influence was a function of jury size, such that the impact of the foreperson relative to other jurors increased more than proportionally as jury size increased.

These data are consistent with established empirical generalizations in group dynamics. For example, Bales, Strodtbeck, Mills, and Roseborough (1951) found that as group size increased, the discrepancy in amount of participation between the most frequent participator and other group members increased and that the discrepancy in amount of participation between the second most frequent participator and other group members decreased. Put differently, as group size increased, the likelihood of one person dominating the discussion increased. Hemphill (1950) reports that for relatively large groups, this dominant person is likely to be the group leader. If, as the unequal-speaking linear discrepancy model (of which the jury deliberation model is a special case) posits, influence results from participation, then the foreperson is likely to be the most influential juror.

Several hypotheses for why this effect is enhanced with jury size can be generated. First, Gibb (1951) reports that as group size increases, persons feel increasingly threatened about speaking. There may be some trait, such as communication apprehension (CA), that predicts both who will become jury foreperson and the extent to which one will speak. Generally, our observation is that the first task jurors undertake is the election of a foreperson, and the juror first mentioning the task of choosing a foreperson is elected 45% of the time. A high-CA juror is less likely than a low-CA juror to mention the task of electing a foreperson, and given Gibb's (1951) data, the probability of a high-CA juror mentioning the task of foreperson election is likely to be even less in large juries than in small ones. Furthermore, CA has been found to correlate negatively with the extent to which one speaks in subsequent deliberation and, hence, the extent to which one is influential (Boster et al., 1985). Because the foreperson is likely to be lower in CA than the average juror, if not all jurors, the foreperson is likely to speak most frequently in subsequent deliberation. Hence this individual is likely to be one of the most, if not the most, influential juror, a tendency compounded in large juries.

Second, if there are not substantial individual differences in a trait, such as CA, then the demands of the foreperson role, in conjunction with Gibb's (1951) finding, may explain the effect. If every juror feels equally threatened about speaking, and this feeling increases with jury size, then the foreperson is thrust into a role that requires speaking more frequently than others. The extent to which the foreperson's speaking frequency exceeds the speaking frequency of other jurors increases with jury size, because as jury size increases, other jurors are more fearful of speaking, and their silence compels the foreperson to do the majority of the talking. The result of this process is for the foreperson to be the most frequent contributor to the jury deliberation and for this tendency to increase with jury size. Therefore, the foreperson is the most influential juror, and the influence is more pronounced in large juries than in small ones.

Third, the organization of the jury deliberation may change as group size increases. In small juries jurors may view the deliberation as a discussion among equals. On the other hand, in large juries increased inhibitions may cause them to view the proceedings more formally. For example, the discussion may begin by the foreperson orienting the deliberation. Subsequently, each comment by each juror is directed to the foreperson, who then comments on the contribution. In this scenario there is relatively equal speaking time among members of small juries, but vast discrepancies in speaking time in large juries, with the foreperson speaking a disproportionately large amount of the time. Thus for small juries there is relatively equal influence among jurors, whereas for large juries the foreperson is much more influential than others. Although any, or all, of these explanations reproduce the obtained results, the limitations of observation imposed by the setting made distinguishing among them impossible.

Limitations and Conclusions

Despite the naturalistic setting in which this experiment was conducted, all problems of ecological validity were not eliminated. For example, in order to obtain 20 juries, it was necessary to construct smaller juries than is the norm. Furthermore, the trial was shorter than the usual trial, and some features of the environment, such as the videotape equipment and the abnormally large number of jurors, were unusual. Finally, the trial was a civil case, and some have suggested that juries may decide criminal cases differently (Penrod & Hastie, 1979, pp. 464-465).

Additionally, the practical constraints of the setting required that some measures be sacrificed. Thus the facilities did not allow speaking frequency to be observed, and time limitations forced the deletion of the CA measure.

Nevertheless, the results are remarkably similar to those reported in other group decision-making contexts. The linear discrepancy model has now been found to predict diverse phenomena, such as discussions of past presidents, the choice shift, and jury decision making, with substantial accuracy. And the model predictions have been accurate for both the group decision and postdiscussion distributional properties. Consequently, in our view the portrait of group decision making sketched by this model provides important insight into the process by which groups make decisions.

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