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POLICY CONFLICT AS A FUNCTION OF POLICY SIMILARITY AND POLICY COMPLEXITY

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The experiment tests the hypotheses, derived from the results of earlier studies on policy conflict, that subjects with similar policies will decrease their agreement in a policy conflict situation, and that subjects with cognitively complex policies will decrease their agreement more than subjects with cognitively simple policies. The results support the hypotheses, and show that the decrease in agreement is due to the decrease in policy consistency which, in turn, is due to the manner in which the subjects change their policies in the conflict situation.

Although interpersonal conflicts are often the result of differences in interest, such conflicts may also arise from policy differences (see Hammond, 1965; Hammond & Brehmer, 1971). The term "policy" refers in this context to a person's rules for making judgments and decisions.

Policy conflicts differ from the kinds of conflicts usually studied by behavioral and social scientists, e.g., within the game theory framework, in two respects. First, policy conflicts may occur even if there are no differences in interest between the parties to the conflict. The differences in policy will cause persons to make discrepant decisions about the appropriate course of action. Thus, policy differences will make cooperation difficult, or impossible, also in situations where the outcome is dependent on a mutually agreed upon course of action, and where no party can make any gains at the expense of the other party.

Second, policy conflict situations do not, as do the game theory conflict situations, involve only two persons; they also include an environment. Thus, a person in a policy conflict situation has to consider, not only the demands made upon him by the other person(s) but also the demands made upon him by the environment. Agreement, then is not all. The decisions also have to have a reasonable degree of correctness.

Hammond (1965) has developed a paradigm for the study of policy conflicts. Experiments in this paradigm simulate a situation where (1) two persons are working together to solve a number of problems which require them to make inferences about the state of a criterion variable from the state of a set of cue variables which are only probabilistically related to the criterion variable (thus incorporating into the experiments an important feature of "real world" policy decision tasks), but (2) where the persons have different opinions as to what the appropriate solution to the problem is, due to the fact that they use the available information in different ways, i.e. they have different policies.

Formal analysis shows that the amount of agreement reached in a policy conflict situation is a function of two factors: (1) the extent to which the persons manage to reduce the systematic differences between their policies, that is, the extent to which they manage to reduce the differences in how they use the information available for the judgments, and (2) the consistency of their policies, that is, the extent to which the persons use the information in a similar way from occasion to occasion (Brehmer, 1970, 1971). The relations among agreement, policy similarity, and policy consistency are given in Equation 1 for the case when the cues, as well as the decisions, are metric variables. Equation 1 is the "lens model Equation", originally developed by Hursch, Hammond and Hursch (1964), as modified by Tucker (1964) and Naylor and Schenck (1966) which has been adapted to the problem of policy agreement (Brehmer, 1970, 1971)

$$r_A = G R_{S1} R_{S2} \quad (1)$$

where r_A is the correlation between the judgments made by subject S1 and those made by subject S2. G is the correlation between the linearly predictable variance in the policy of subject S1 and that in the policy of

subject S2, i.e. $G = r_{\hat{J}_{S1} \hat{J}_{S2}}$, where $\hat{J}_{S1}$ is the judgment predicted from a regression equation fitted to the judgments of S1 and $\hat{J}_{S2}$ the judgment predicted for S2. R_{S1} is the multiple correlation between the n sources of information and the judgments made by subject S1 and R_{S2} the multiple correlation between these sources of information and judgments made by subject S2.

In Equation 1, r_A is an index of the amount of agreement between the two persons S1 and S2, G indicates the extent to which the policies are similar with respect to their systematic aspects, and R_{S1} and R_{S2} show the consistency in the policies, i.e., the extent to which the judgments made by the persons are controlled by the information available. As can be seen from the equation, there are two necessary conditions for perfect agreement: (a) that the policies are identical ($G = 1.00$) and (b) that the policies are consistent ($R_{S1} = R_{S2} = 1.00$). Neither of these conditions is sufficient in itself, however. Consequently, policy similarity and policy consistency can substitute for each other to produce a given level of agreement. Disagreement, then, does not necessarily imply that there are fundamental differences between the policies of the persons. It is sufficient that the policy of one, or both, of the persons is inconsistent. For further discussion, the reader is referred to Brehmer (1970, 1971) and to Hammond and Brehmer (1971).

A series of recent studies (Brehmer, 1969, 1970, 1971; Brehmer & Kostron, 1970; Brehmer, Azuma, Hammond, Kostron, & Varonos, 1970; Hammond & Brehmer, 1971) show that as two subjects interact, the structure of their disagreement changes. Thus, in the beginning of the interaction, most of the disagreement is caused by the systematic differences between their policies. These differences are, however, rapidly reduced. But as the subjects reduce their policy differences, the consistency of their policies also goes down, and to such an extent that the lack of consistency accounts for most of the disagreement at the end of the interaction.

The decrease in consistency is due to the manner in which the subjects change their policies. Thus, the subjects give up their initial policies at a faster rate than they manage to acquire new policies (Brehmer, 1970, 1971; Brehmer & Kostron, 1970; Brehmer, et al., 1970; Hammond, 1970).

Specifically, the results show that when subjects start out depending heavily on certain cues to the exclusion of other cues, and when conditions force them to reweight the cues, they decrease their dependency on the cues which were heavily weighted initially at a faster rate than they increase their dependency on the cues which were initially given no weight in their decisions. This necessarily leads to a decrease in consistency, for the consistency index, R_S is a positive function of the sum of the individual cue-judgment correlations which define the weights given to the cues. In addition, the results show that when the initial policies are predominantly nonlinear, the decrease in consistency is greater than when the initial policies are predominantly linear. The reason for this is that subjects with nonlinear policies decrease their dependency on the initially heavily weighted cues at a faster rate than subjects with predominantly linear policies do. These results are not restricted to conflict situations; policy change in individual subjects facing changing task conditions follow the same principles (Brehmer, 1970).

These results suggest that policy change occurs according to simple principles. If these principles are generally valid, they lead to two interesting predictions: (1) when conditions induce subjects with identical policies to change their policies, agreement will decrease, and (2) subjects who start out with predominantly nonlinear policies will decrease their agreement more than subjects who start out with predominantly linear policies.

The basis for these predictions is as follows. When subjects start out with identical policies, they cannot increase their policy similarity (G). If they start changing their policies according to the principles described above, their consistency (R_S) will decrease. This will lead to a decrease in agreement (r_A) (see Eq. 1). Since the decrease in consistency should be more pronounced for subjects who start out with predominantly nonlinear policies than for subjects who start out with predominantly linear policies, the decrease in agreement will be greater for the former kind of subjects than for the latter kind. The present experiment was designed to test these predictions. In addition, the experiment will compare policy consistency and policy change for subjects

who start out with similar policies and subjects who start out with different policies.

Method

The experiment followed the "lens model" interpersonal conflict paradigm, developed by Hammond (1965). Experiments in this paradigm are conducted in two stages: a training stage and a conflict stage. In the training stage, subjects are trained to acquire policies, which involve making decisions about the state of a criterion variable from the state of a number of cue variables. In the conflict stage, subjects are then brought together in pairs to work jointly on a task of the same general kind as those used in the training stage. In the conflict stage, as well as in the training stage, the relations between the cues and the criterion variable are probabilistic, as demanded by the fundamental principles of Brunswik's probabilistic functionalism (e.g., Brunswik, 1955), upon which the paradigm is founded.

Subjects. Ninety six undergraduate students from the University of Colorado participated in the experiment to fulfill a course requirement. The subjects were randomly assigned to the experimental conditions.

Design. The experiment used a two cue conflict task, which required the subjects to learn to infer the future level of democracy in a country from two variables: the present level of state control over the individual, and the extent to which government was determined by elections. In one condition (the similar policies condition) both subjects in each pair were trained to rely on the same cue when making their predictions. In the other condition (the different policies condition), the subjects were trained to rely on different cues. The state control cue was nonlinearly related to the level of democracy while the elections cue was linearly related to the criterion variable. Thus, the factor of policy complexity was also introduced into the design. Half of the subjects were trained to depend on the nonlinear cue (complex policy), and half to depend on the linear cue (simple policy). Consequently, cognitively different pairs were different both with respect to what cue they used and with respect to policy function form (policy complexity), while the

cognitively similar pairs were similar in both these respects.

Three blocks of trials were included in the analyses. Thus, for purposes of analyzing agreement and policy similarity the design was a 2 (levels of policy similarity) by 3 (blocks of trials) factorial design, while for purposes of analyzing policy change and policy consistency in the individual subjects, the design was a 2 (types of subjects: cognitively complex vs. cognitively simple) by 2 (levels of policy similarity) by 3 (blocks of trials) factorial design.

Procedure. (a) Training stage. The subjects appeared two at a time to participate in an experiment on political decision making. They were instructed that their task was to learn a policy which would enable them to predict the future level of democratic institutions in a country from two variables: the present level of state control over the individual, and the extent to which government was determined by free elections. They were informed that the relation between level of democracy and state control was nonlinear ("neither a high, nor a low, level of state control means that the level of democracy is going to be high"), and that the relation between level of democracy and elections was linear ("the more government is determined by elections, the higher the level of democratic institutions is going to be"). The subjects were further informed that one of these variables was more important than the other in determining the future level of democracy, but they were not told which one of the variables was the more important.

In the condition where the subjects were to have different policies, one subject (hereafter called the "nonlinear subject") in each pair was given a training task where the correlation between the state control variable (hereafter called the "nonlinear cue") and the level of democracy was .98, and where there was no correlation between the elections variable (hereafter called the "linear cue") and level of democracy. For the other subject (hereafter called the "linear subject") in each of these pairs, these conditions were reversed. The relation between the amount of state control and level of democracy was inversely U-shaped, and that between elections and the level of democracy was a positive linear function. For neither training task was there any intercorrela-

tion between the cues. In the condition where the subjects were to have similar policies, both members of the pair were given the same training task.

The training task consisted of 60 different cards. On the face of each card, the values of the elections and state control cues were given in the form of bar graphs. On the back of each card, the future level of democracy was printed. Each cue variable could take on 10 different values. There were 20 different levels of democratic institutions. (A sample card is shown in Hammond, Bonaiuto, Faucheux, Moscovici, Fröhlich, Joyce, & DiMajo, 1968). The subjects went through the cards at their own pace.

The subjects were trained to a criterion of having a correlation of $\geq .75$ between their judgments and the cue that was relevant in their training task and correlation of $\leq .25$ between their judgments and the cue that was irrelevant. If this level had not been reached after 60 trials, the subjects were given additional trials. At the end of the training stage, the performance level was generally higher than that demanded by the criterion. In the last 15 trials, the correlation between the judgments and the relevant cue was .98, and that between the judgments and the irrelevant cue $-.13$. The squared multiple correlation between cues and judgments was .96. An analysis of variance indicated no differences among experimental conditions at the end of training for any of the above indices ($p > .05$).

(b) Conflict stage. In the conflict stage, the members of each pair were brought together and informed that they had acquired the desired policies and that the experimenter was now interested in seeing "whether two heads are better than one". Therefore, they were to cooperate on a new series of problems. The new set of countries differed from the set used in the training stage, however, in that the new set was composed of real nations, while the countries used in the training stage had been fictitious nations. Thus, the new task might prove harder than the training tasks, and the subjects might not always agree in their judgments. In case of disagreement, they were to discuss the case until they could reach a joint answer, agreeable to both of them. Then they would receive the correct

answer for the problem. Thus, for every country, the subjects (1) gave individual judgments, (2) discussed, until (3) they reached a joint judgment, after which (4) they were given the correct answer.

The conflict stage consisted of 20 trials. The statistical structure of the conflict task differed from that of the training tasks in that the cues now had equal correlations ($r = .67$) with the criterion variable level of democracy. The functions relating the cues to the criterion variable were, however, the same. As in the training tasks, the cues in the conflict task were uncorrelated. The subjects were not informed of the change in the task, nor of whether they had been similarly or differently trained.

Results

In this section, the results of the comparison between subjects with similar and subjects with different policies will be presented first. For these analysis subjects with simple similar policies and subjects with complex similar policies were combined into one group. After these results those of the comparison between subjects with simple similar policies and subjects with complex similar policies will be presented.

Effects of policy similarity

Agreement. For every pair of subjects and the blocks of (1) the last 15 trials in training, (2) trials 1-10, and (3) trials 11-20 in the conflict stage, the correlation between the judgments made by the subjects in each pair was computed. These correlations were then transformed to Fisher's Z scores and analyzed by a 2 (levels of Cognitive Similarity) by 3 (Blocks of trials) analysis of variance with repeated measures on the second factor. This analysis yielded a reliable effect of Cognitive Similarity ($F_{1/46} = 223.27, p < .01$), as well as a Cognitive Similarity by Blocks interaction ($F_{2/92} = 67.40, p < .01$). These results are illustrated in Figure 1. As can be seen from this figure, cognitively different subjects increase their agreement, while cognitively similar subjects decrease their agreement. One way trend analyses, performed on the block means for the two conditions separately

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indicated that the negative linear trend for the cognitively similar subjects, as well as the positive linear trend for the cognitively different subjects, were reliable ($F_{1/46} = 70.64$, $p < .01$, and $F_{1/46} = 56.29$, $p < .01$ for cognitively similar and cognitively different pairs, respectively). These results are consistent with the prediction that cognitively similar subjects will decrease their agreement.

Policy similarity. For every pair of subjects and the three blocks used in the preceding analysis, G , the index of policy similarity, was computed. The G values were transformed to Fisher's Z scores and analyzed by means of a 2 (levels of Cognitive Similarity) by 3 (Blocks of trials) analysis of variance with repeated measures on the second factor. The results of this analysis showed that there was a reliable difference between cognitively similar and cognitively different pairs ($F_{1/46} = 287.39$, $p < .01$) as well as Cognitive Similarity by Blocks interaction ($F_{2/92} = 31.92$, $p < .01$). These results are shown in Figure 2.

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Figure 2 shows that policy similarity increases for the cognitively different pairs while it stays approximately constant for cognitively similar pairs. The decrease in agreement for the latter pairs, then, is not caused by a decrease in policy similarity.

Policy consistency. The relations between the nonlinear cue and the judgments made by the subjects were reduced to linear relations by a transformation of the values of the nonlinear cue. This transformation was such that it reduced the relation between the values of the nonlinear cue and the criterion values to linear form. Previous studies (Brehmer, 1971; Brehmer & Hammond, 1970; Brehmer & Kostron, 1970) have shown that this transformation is adequate for this kind of task. For every subject

and the three blocks used in the preceding analyses, the multiple correlation between his judgments and the cue values was computed. The multiple correlation coefficients were then squared and analyzed by means of a 2 (Types of Subjects: linearly and nonlinearly trained) by 2 (levels of Cognitive Similarity) by 3 (Blocks of trials) analysis of variance with repeated measures on the third factor. This analysis yielded no significant effects of Cognitive Similarity. There were, however, reliable ($p < .01$) effects of Type of Subjects ($F_{1/95} = 18.10$) and Blocks ($F_{2/192} = 55.87$), as well as a Type of Subjects by Blocks interaction ($F_{2/192} = 5.09$). The results are illustrated in Figure 3. As can be seen from Figure 3, consistency decreases for both linear and

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nonlinear subjects, although faster, and to a greater extent, for the nonlinear subjects. This is in agreement with previous results (Brehmer, 1970, 1971).

The decrease in policy consistency explains the decrease in agreement for the cognitively similar pairs. As can be seen from Equation 1, a decrease in consistency must lead to a decrease in agreement, even if policy similarity does not change.

Policy change. For every subject, the correlation between his judgments, and each cue was computed for the three blocks of trials used in the preceding analyses. Before these computations, the relations between the judgments and the nonlinear cue were reduced to linear form, using the transformation described above. The correlation coefficients were transformed to Fisher's Z scores and analyzed by means of two 2 (Types of Subjects: linear and nonlinear) by 2 (levels of Cognitive Similarity) by 3 (Blocks of trials) analyses of variance. The first analysis was performed on the correlations between the judgments and the cue that the subject had been trained to utilize, that is, the nonlinear cue for the nonlinear subjects and the linear cue for the linear subjects. The second analysis was performed on the correlations between the judgments and the

cue that had been irrelevant in the training stage, that is, the linear cue for the nonlinear subjects and the nonlinear cue for the linear subjects.

The results of the first analysis indicated reliable ($p < .01$) effects of Type of Subjects ($F_{1/92} = 34.34$), Cognitive Similarity ($F_{1/92} = 14.62$), and Blocks ($F_{2/184} = 179.07$), as well as an interaction between Type of Subjects and Blocks ($F_{2/184} = 4.17$). These results are illustrated in Figure 4. This figure shows that nonlinear subjects

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changed their policies more than linear subjects in both Cognitive Similarity conditions, and that the amount of policy change was less for cognitively similar pairs than for cognitively different pairs. The Type of Subjects by Blocks interaction is due to the fact that while linear and nonlinear subjects start out with the same dependency on the trained cue, they differ appreciably in the conflict stage. In this stage, the nonlinear subjects give up their dependency on the trained cue at a faster rate than the linear subjects do. This is consistent with earlier results (Brehmer, 1970, 1971; Hammond, 1970).

The analysis performed on the correlations between the judgments and the cue that had been irrelevant in the training stage yielded reliable ($p < .01$) effects of Type of Subjects ($F_{1/92} = 9.01$), Cognitive Similarity ($F_{1/92} = 14.65$), and of Blocks ($F_{2/184} = 87.24$), as well as a Type of Subjects by Blocks interaction ($F_{2/184} = 5.67$). These results are also illustrated in Figure 4. As can be seen from this figure, nonlinear subjects change more than linear subjects, cognitively different subjects change more than cognitively similar subjects, and nonlinear subjects change at a faster rate than linear subjects. Note that the correlation between judgments and the trained cue decreases at a faster rate than the dependency on the formerly irrelevant cue increases. This explains the decrease in consistency, for the consistency measure, R_S^2 , is simply the sum of squared cue-judgment correlations.

Effects of policy complexity for subjects who start with similar policies.

To test the second hypothesis, that is, the hypothesis that cognitively complex subjects will decrease their agreement more than cognitively simple subjects, separate analyses comparing linear and nonlinear pairs in the similar policy condition were carried out.

Agreement. The 2 (levels of Cognitive Complexity) by 3 (Blocks of trials) analysis of variance performed on the r_A scores (after they had been transformed to Fisher's Z scores) yielded reliable effects of Cognitive Complexity ($F_{1/23} = 18.25, p < .01$), and of Blocks ($F_{2/48} = 43.20, p < .01$). These effects are illustrated in Figure 5. The figure shows that both linear and nonlinear pairs decrease their agreement, but that

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nonlinear pairs decrease their agreement more than linear pairs.

Policy similarity. The analysis performed on the G scores indicated no difference between cognitively complex and cognitively simple subjects. There was, however, a reliable effect of Blocks ($F_{2/48} = 8.41, p < .01$), indicating a decrease in policy similarity for both types of pairs. Although this effect is statistically significant for the G scores expressed in terms of Fisher's Z scores, the effect in terms of correlation coefficients, which are the values which enter into Equation 1, is of no importance: the decrease in G is from 1.00 in the training block to .99 in the last conflict block, see Figure 2.

Policy consistency. With respect to policy consistency, R_S^2 , nonlinear subjects were found to be reliably less consistent than linear subjects ($F_{1/46} = 6.96, p < .01$). In addition, the analysis of variance indicated that there were significant differences among blocks ($F_{2/92} = 26.78, p < .01$). These results parallel those in the previous analysis of consistency scores. see Figure 3.

The results of these analysis, then, indicate that for cognitively similar subjects, cognitive complexity is detrimental to agreement when task conditions change. The inability of cognitively complex subjects to maintain consistent policies causes agreement to be lower for these subjects than for cognitively simple subjects. With respect to policy similarity, on the other hand, the two types of subjects do not differ.

Police change. Policy change for the cognitively similar pairs was analyzed in the same way as for the total experiment. The results of the analysis performed on the cue dependencies for the trained cue indicated that nonlinear subjects gave up significantly more of their dependency of the trained cue than linear subjects ($F_{1/46} = 17.51, p < .01$) and that there was a reliable decrease in cue dependency over blocks of trials ($F_{2/92} = 99.49, p < .01$). The analysis of the dependencies on the nontrained cue yielded no significant main effect of Cognitive Complexity. There was, however, a reliable effect of Blocks ($F_{2/92} = 47.37, p < .01$), as well as a Cognitive Complexity by Blocks interaction ($F_{2/92} = 5.28, p < .01$). These results are illustrated in Figure 4 above. As can be seen from this figure, the Cognitive Complexity by Blocks interaction stems from the fact that the nonlinear subjects change their dependency on the nontrained cue at a faster rate than the linear subjects do.

Discussion

The results of this experiment clearly support the hypothesis that cognitively similar pairs will decrease their agreement when task conditions change, as well as the hypothesis that cognitively complex subjects will decrease their agreement more than cognitively simple subjects. The results also show that the sole reason for this decrease in agreement is the decrease in policy consistency. Policy similarity, on the other hand, does not decrease. In accordance with earlier results (Brehmer, 1970, 1971; Brehmer, et al., 1970), the decrease in consistency in the present experiment is due to the manner in which the subjects change their policies. Rather than changing at the same rate with respect to both cues, the subjects give up their dependency on the trained cue at a faster rate than they learn to depend on the cue that

was irrelevant in training. This necessarily leads to a decrease in policy consistency. The effect is especially pronounced for the nonlinearly trained subjects, who change their policies more, and at a faster rate, than the linearly trained subjects.

Some earlier results indicate that the effects of cognitive similarity on agreement, demonstrated in the present experiment, are not limited to the case when the subjects have been trained to have certain policies, and when the task is changed. From the Hammond and Brehmer (1971) analysis of the results from the experiment by Brown and Hammond (1968), it can be shown that effects, similar to those in the present experiment, can be observed also when the policies have been acquired in the natural social environment, and when no task feedback is given.

In the Brown and Hammond study, the policies of two political factions with respect to the desirability of a presidential candidate were captured. Groups of four subjects, composed of two members of each faction, were then required to discuss each of a series of fictitious presidential candidates until they could reach a joint judgment with respect to the desirability of the candidates. The results the Hammond and Brehmer analysis show that policy similarity between factions increased, but remained constant within factions. Policy consistency, on the other hand, decreased for all subjects. From these results, it can be calculated by means of Equation 1 that agreement within factions decreased while agreement between factions increased. These results parallel those of the present experiment, and add to their generality.

With respect to policy consistency and policy change, the results from cognitively similar and cognitively different pairs are similar. Thus, linear as well as nonlinear subjects give up more of their dependency on the cue that they had been trained to rely on than they learned to depend on the cue that was irrelevant in training. As already indicated, this leads to a decrease in policy consistency. The effects are more pronounced for the nonlinear subjects than for the linear subjects. These results replicate earlier findings (Brehmer, 1970, 1971; Hammond, 1970). With respect to the differences between linearly and nonlinearly

trained subjects, previous results indicate that these differences are due to an inherent instability in nonlinear policies; differences comparable to those in the present experiment have been obtained also in a situation where nonlinear and linear subjects were compared in a test stage, involving neither feedback from a task, nor communication from another subject (Brehmer, 1970).

There are, however, clear differences between the cognitively similar and cognitively different subjects with respect to amount of policy change. Thus, cognitively different subjects give up more of their dependency on the trained cue than cognitively similar subjects. They also learn to depend on the cue that was irrelevant in training to a greater extent than the cognitively similar subjects. Since the task was the same in both conditions, these differences must be taken as an indication of the effects of the interaction between the subjects, and show that this interaction has effects on the policies of the subjects over and above those of the feedback from the task. This is in accordance with earlier results (Brehmer, 1970; Brehmer & Kostron, 1970; Earle, 1970). When the subjects have different policies, each subject has, so to speak, half of the truth (cf Earle, 1970) and there are, therefore, opportunities for relevant communication which may aid the subjects in changing their policies. When the subjects have similar policies, on the other hand, there are no opportunities for task relevant verbal exchange, and the subjects have to rely on task feedback, a factor which have been shown to be relatively inefficient as a source of information in inductive policy formation (e.g., Summers & Hammond, 1966; Todd & Hammond, 1965). However, it might also be that the mere fact that the subjects have different policies set up some forces which induce faster policy change, regardless of the relations between the policies and the outcome feedback from the task (see Brehmer & Kostron, 1970).

The results of the present experiment provide a clear demonstration of the effects of purely cognitive factors in producing disagreement between persons. Thus, for subjects with similar policies, disagreement is found to increase due to the manner in which subjects change their policies, which leads to inconsistency (randomness) in their cognitive systems. For subjects who start out with different policies, on the

other hand, the same principles of policy change apply, and prevent the subjects from reaching the level of agreement possible from the degree of similarity between their policies. Disagreement, and hence conflict, then, can be caused by the limitations in the subjects cognitive capacity. This point is further discussed in Hammond and Brehmer (1971).

In addition, these results suggest some new aspects on the disintegration of groups. It is a common observation that groups which, at a given time, appear to be highly homogeneous ideologically, tend to disintegrate into factions when their environment changes. Usually, this factioning of a group is explained in terms of changes in the motivation of the group members, or in terms of systematic differences in policy which develop for one reason or other. The present results suggest that the explanation might at times be quite different. Thus, the results suggest that the group disintegrates because disagreement, caused by increasing inconsistency, develops as the group members start changing their policies in the light of the changed environmental conditions. The results also suggest that disagreement might be more profound and develop faster if the initial policies of the group are complex than if they are simple. These hypotheses should be testable with standard social psychological methods, supplemented by the methods of policy analysis developed within the "lens model" framework (see, e.g., Hammond, 1970).

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References

- Brehmer, B. Sequence effects in policy conflict. Umeå Psychological Reports, No. 17, 1969.
- Brehmer, B. Effects of communication and feedback on policy similarity and policy consistency in a cognitive conflict situation. Institute of Behavioral Science, University of Colorado: Program on Cognitive Processes Report No. 126, 1970.
- Brehmer, B. The roles of policy differences and inconsistency in policy conflict. In L. Rappoport & D. Summers (Eds.), Human judgment and social interaction. New York: Holt, Rinehart & Winston, 1971 (in press).
- Brehmer, B., & Hammond, K. R. Policy conflict and policy change as a function of task variables: II. The effect of function form. Umeå Psychological Reports, No 31, 1970.
- Brehmer, B., & Kostron, L. Policy conflict and policy change as a function of task variables: I. The effects of cue validity and function form. Umeå Psychological Reports, No. 30, 1970.
- Brehmer, B., Azuma, H., Hammond, K. R., Kostron, L., & Varonos, D. D. A cross-national comparison of cognitive conflict. Journal of Cross-Cultural Psychology, 1970, 1, 5-20.
- Brown, L., & Hammond, K. R. A supra-linguistic method for reducing intra-group conflict. Institute of Behavioral Science, University of Colorado: Program on Cognitive Processes Report No. 108, 1968.
- Brunswik, E. Representative design and probabilistic theory in a functional psychology. Psychological Review, 1955, 62, 193-217.

- Earle, T. C. Task learning, interpersonal learning, and cognitive complexity. Oregon Research Institute Research Bulletin, 1970, 10, No. 2.
- Hammond, K. R. New directions in research on conflict resolution. Journal of Social Issues, 1965, 21, 44-66.
- Hammond, K. R. Inductive knowing. In J. Royce, & W. Rozeboom (Eds.), The psychology of knowing. New York: Gordon & Breach, 1970, (in press).
- Hammond, K. R., & Brehmer, B. Distrust among nations: A challenge to scientific inquiry. In L. Rappoport, & D. Summers (Eds.), Human judgment and social interaction. New York: Holt, Rinehart & Winston, 1971 (in press).
- Hammond, K. R., Bonaiuto, G., Faucheux, C., Moscovici, S., Fröhlich, W. D., Joyce, C. R. B., & DiMajo, G. Cognitive conflict between persons in Western Europe and the United States. International Journal of Psychology, 1968, 3, 1-12.
- Hursch, C. J., Hammond, K. R., & Hursch, J. L. Some methodological considerations in multiple-cue probability studies. Psychological Review, 1964, 71, 44-60.
- Naylor, J. C., & Schenck, E. A. p_m as an "error-free" index of rater agreement. Educational and Psychological Measurement, 1966, 26, 815-824.
- Summers, D. A., & Hammond, K. R. Inference behavior in multiple-cue tasks involving both linear and nonlinear relations. Journal of Experimental Psychology, 1966, 71, 751-757.
- Todd, F. J., & Hammond, K. R. Differential feedback in two multiple-cue probability learning tasks. Behavioral Science, 1965, 10, 429-435.
- Tucker, L. R. A suggested alternative formulation in the developments by Hursch, Hammond, and Hursch, and by Hammond, Hursch, and Todd. Psychological Review, 1964, 71, 528-530.

Fig. 1. Agreement as a function of initial policy similarity and blocks.

Fig. 2. Policy similarity as a function of blocks.

Fig. 3. Policy consistency as a function of initial policy similarity and blocks.

Fig. 4. Cue dependency for the trained and nontrained cues as a function of policy similarity and blocks.

Fig. 5. Agreement as a function of cognitive complexity and blocks.