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ABSTRACT

To provide a theoretical base for investigating the influence of inferential error on group decision making, current literature on both inferential error and decision making is reviewed and applied to the Watergate incident. Although groups tend to make fewer inferential errors because members' inferences are generally not biased in the same direction, group interaction may promote collective inferential error by encouraging (1) the mass acceptance of atypical cases as representative, (2) the specialization of knowledge in complicated issues, and (3) the development of a shared outlook or schema. A recent model suggests possible sources for these group characteristics. As group participants have less time to individually consider a given concept, and consequently less time to activate a wide range of significant associations, their formulation of the target concept will tend to be simplistic and selective. A taped conversation among President Richard Nixon, John Dean, and John Mitchell shows how group inference errors develop. After Nixon denigrated its significance, Mitchell and Dean quickly dismissed the grand jury investigation of the cover up as unimportant, accepting Nixon's simplification of a complex and very serious issue as a "can of worms." (MM)

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A THEORETICAL FOUNDATION FOR THE STUDY OF INFERENTIAL ERROR IN DECISION-MAKING GROUPS

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Introduction

In his now familiar investigation of foreign policy decisions, Irving Janis (1972) has reminded us that even presumably intellectually well equipped and well informed people make unwise, unwarranted, or otherwise unsound choices. Although he accounts for this phenomenon in terms of a lack of vigilance and the related "groupthink" syndrome, possibly the most consistent thread running through the series of decisions Janis selected to review was the apparent inability of the decision-makers involved to draw correct inferences from available information about matters pertinent to the choices among alternative courses of action being considered.

That people in general have difficulty making correct inferences has been amply demonstrated in a large volume of research recently summarized by Richard Nisbett and Lee Ross (1980). Given this widespread propensity for inferential error and its manifestation in actual instances of decision-making behavior, a more precise examination of the role it plays in decisional choice within the context of interacting groups would appear to be in order. The priority that this sort of inquiry should receive, however, is partially contingent on the existence of an appropriate theoretical foundation or on the demonstration that such a foundation can be established. This essay represents an attempt to show that the necessary foundational substance exists. The analysis that follows is an admittedly small step and pretends no more than to provide general theoretical guidance through the early stages of research on the issues raised. Still, it is a beginning that can do much to expedite initial inquiry.

Types and Sources of Inferential Error

If one thinks of inferences as "conclusions or claims drawn from observations assumptions, or other kinds of information" (Gouran, 1982, p. 96), then it is clear that the process of making an inference, in Bruner's (1964) words, entails "going beyond the information given" (p. 293). It is further evident from this conception that any such judgmental activity carries the risk of error. In other words, inference making is an inherently uncertain enterprise, and the mechanisms that guide it, as Newell (1968) observes, "are not necessarily rational" (p. 7).

From a purely logical and statistical perspective, the likelihood of inferential error is reduced in proportion to the amount of directly relevant and accurate information one has has and uses in reaching a conclusion. (See Hempel, 1965; Salmon, 1971) We have reason to believe that in everyday judgmental tasks, however, people will draw on limited amounts of information directly relevant to the particular inferences they make. Even under conditions in which individuals ostensibly would be concerned that inferences bearing on a given set of choices be correct, as Stein and Tanter (1980) point out, they "will simplify complexity and reduce uncertainty through cognitive shortcuts" (p. 76). In addition, according to these scholars, the process is often a collective one.

The general types of inferential error and the factors that contribute to their emergence have been subjects of growing concern among cognitively oriented psychologists who are more generally interested in the area of social judgment. From such a diverse background as Sherif and Hovland's (1961) early work on assimilation and contrast effects, Sarbin's (1960) assessment of the accuracy of clinical inferences, Jones and Davis' (1965) and Kelley's (1967, 1973) theories of causal attributions, and Kahneman and Tversky's (1973) explorations into subjective predictions has emerged a rich body of empirical data demonstrating something of the scope and nature of the problem of inferential error.

Drawing on the various strands of interest stimulated by the previously mentioned pioneering efforts and the research which that interest has prompted, Nisbett and Ross (1980) have generated a useful scheme for classifying the various species of inference and related errors that have been identified and studied. The major divisions consist of inferences involving errors of description (that is, characterizations of the individual datum, samples, and populations), the detection of covariation (correlational relationships), the assignment of causality, prediction, and theory testing. Contributing to the probability of judgmental error in each of these categories, according to Nisbett and Ross, is a reliance on certain judgmental heuristics (namely, representativeness and availability criteria) and knowledge structures (theories and schemas) that activate the sorts of "cognitive shortcuts" to which Stein and Tanter allude above.[1]

Although these five classifications of inferential error are distinctive in respect to the kind of judgment each names, they all nevertheless are essentially instances of inductive fallacies. Insofar as the individuals guilty of such errors draw conclusions about relationships among concepts (people, events, objects, and other phenomena) on the basis of given or assumed probabilities, they are part and parcel of the same overall problem. The importance of this commonality will perhaps become more evident as the theoretical perspective suggested forinvestigating inferential processes in decision-making groups is explained.

Implications of Research on Inferential Error for Understanding Ineffective Decision-Making in the Group Context

Although research on inferential processes has focused almost exclusively on the individual, the data gathered nevertheless have implications for enlarging our understanding of the sources of ineffectiveness in decision-making groups. If an individual draws erroneous inferences about matters germane to a particular choice, and those inferences lead to an unwarranted decision, then it appears to follow that collectively shared errors will have the same consequences for group decisions. The following examples should clarify the basis for this assertion.

If a person were to infer from the non-responsiveness of another individual on some occasion that he or she were being snubbed, the offended party might decide to respond in kind in future encounters. Were the other's behavior unrelated to any feeling of animosity toward the wounded party, however, then the decision to respond in the manner decribed would have been inappropriate and unnecessarily damaging to an otherwise healthy interpersonal relationship. Similarly, if the members of a group were to interpret the actions of another group as threatening when, in fact, they are not, it could well adopt a defensive posture that drains it of energy that might be more profitably expended on other concerns. Something of this mentality has been attributed to those in the Johnson Administration who saw a civil war in Vietnam as threatening to the security of the United States. (See Barber, 1972, pp. 32-57)

Of course, one has no basis for assuming that erroneous inferences necessarily lead to bad decisions. In the preceding illustrations, the offended party conceivably could ignore the perceived snub, and the threatened group might go about its business in spite of the members' judgment about the intentions of the "enemy." The point to be emphasized is that erroneous inferences--especially those that bear directly on the merits of a given choice--represent a source of influence that can predispose individuals and group members toward endorsement of given alternative and rejection of others. To the extent that the alternatives in question would not have been chosen in the presence of accurate inferences, then, misjudgment constitutes a source of ineffectiveness.

An obvious counter to the supposed similarity between individuals and groups is that inferential error is more likely to be held in check in the group context because of the presence of corrective influences and the low probability that all members' inferences would be be biased in the same direction or degree. Hence, such instances of collectively shared error as can be identified are apt to be atypical rather than representative. Davis et al. (1978) put the argument well in their observation that, "There is a strong intuitive feeling, even among the statistically naive, that in the long run collective errors should in some fashion be mutually cancelling and that collective judgments should be closer to the solution, optimum, or true value if there is one" (p. 33). There is, moreover, some weight to the argument that group judgment is superior to that of individuals. (See Shaw, 1981, pp. 57-60)

Even if group judgments are superior to those made by individuals in some situations, it does not follow from that fact that one should assume they are uniformly superior or that other factors contributing to shared erroneous inferences are always so well controlled that they are unlikely to affect the decisions which groups make. In the previously cited study by Davis et al. (1978), for instance, the investigators found that mock juries consisting of people sharing the perception that individuals accused of a given crime are probably guilty or probably not guilty reached verdicts following the trial of a person accused of rape consistent with the initial bias. In addition, there is some basis for suspecting that interaction among group members can actually function to facilitate collectively shared misjudgments and inferences. In other words, for all of the members of a group to draw the same inference does not require that they would have done so as individuals. At least, the rather large volume of research on polarization in groups seems to be consistent with this possibility. (See Lamm and Myers, 1978)

In another essay (Gouran, 1981), I have argued that there are at least three ways in which group interaction may promote collective inferential error. The first of these involves the progressive introduction of atypical information. This type of pattern is sometimes introduced by a single example of something that is generally unrepresentative of the class to which it is assigned. For instance, if a participant in a discussion were to describe a particular individual, say a police officer, in highly uncomplimentary terms, others in the group might begin searching for similar, if not even more extreme, representatives in their own experience. As input continues to develop within this pattern, the sample of instances, although increasing in number, becomes systematically biased toward the unrepresentative case. Even if the members of the group were drawing inferences from the sample data as individuals, the most salient information that each possesses at the moment would be similar. Hence, the likelihood that all of them would draw the same kinds of inferences about police officers in general at some future point might be considerably greater than would be the case had the intervening interaction not occurred.

The second way in which interaction may function to promote collective inferential error involves specialization, especially in the informational sense. That the membership of groups tends toward specialization is well substantiated in scholarship dealing with roles. (See Shaw and Costanzo, 1982) More pertinent to the present discussion, perhaps, is that information and knowledge specialties are often assigned in groups dealing with complicated issues where a division of labor appears to be both efficient and desirable.

An obvious difficulty in having expertise distributed in such a manner is that all members of the group are more reliant on and vulnerable to the judgments of area specialists than they would be if they were more knowledgeable about the task-related issues as a whole. In this sense, the peculiarity of the interaction pattern is such that while judgments proffered by informational specialists are not added to, they have a greater chance of going unexamined, except in the most general sort of way. The absence of competing inferences, therefore, would appear to have the same consequences as the augmentation of inferences described in the prior situation. That is, if the specialist's inference is erroneous, the group as a whole may unwittingly come to share in the error.

Yet another way in which interaction can contribute to the probability of collective inferential error and, hence, to inappropriate decisions represents a more creative and active process that involves the construction of schemas (scripts and personae). In the preceding situations, information serves as premises for subsequent inferences. Thus, the materials on which people draw tend to be propositional in form--at least, at the time they make an inference. Scripts (event schemas) and personae (person schemas), according to Nisbett and Ross (1980), are non-propositional structures, however (p. 34). Still, they can affect inferences in much the same way as information that has a more propositional form. (See Abelson, 1976)

As an illustration of how interaction might function to cultivate scripts that serve as the basis for subsequent inferences, consider a group discussing the question of whether or not to coalesce with another group in pursuit of an objective that appears to be otherwise unattainable. As a natural consequence of discussing this sort of issue, it seems reasonable to expect that the participants would begin speculating on the advantages and disadvantages of a possible alliance. While engaging in such speculation, the group conceivably might construct a series of scenarios in which the members envision what the other group will do when approached, how they themselves will fare in the coalition pursuant to its creation, how the coalition would go about achieving the objective of interest, and the like. All of this could occur without reference to any other kind of information. Through this type of exercise in imagination, therefore, the participants would be developing common perceptions that affect their assessment of the likelihood that certain kinds of event will occur. They might do this, moreover, without the aid of anything other than what they have been able to visualize as the possibilities involved.

The commonality fostered by the construction of schemas would increase the probability that all members of the group would make similar inferences under conditions in which a particular schema is invoked. Furthermore, if schemas serve as a surrogate for information that is more directly relevant to the inferences being drawn, then to the degree that they are at odds with such information, they constitute a source of collective inferential error.

The extension of individual construction of and reliance on schemas to the group context is suggested by previous work on interaction analysis, which has revealed that members of groups collectively develop dramatistic themes in which imaginary actions are carried out by the actors with whom they are associated. These actions, moreover, tend to be consistent with the traits that have become linked to the actors involved in the situations into which they are projected. Hence, evil people do evil things, and good people do noble things. (See Bales, 1970; Bormann, 1973)

A Theoretical Basis for Investigating Group Influence on Inferential Error

That interaction could function in the manner described above is not a sufficient justification for assuming that it does with any degree of regularity. To warrant investigations of the type that will shed light on the possibilities mentioned requires more than indirect evidence and the knowledge that inferential errors frequently occur. What is needed is a theoretical foundation from which not only to describe the factors that make probable occurrences like those discussed but also to understand the underlying mechanisms responsible for their presence.

Although they deal with the apparent impact of judgmental heuristics and knowledge structures on the likelihood of inferential error, Nisbett and Ross (1980), unfortunately, do not attempt to examine the phenomena of interest from a unified theoretical perspective. (See Seibold, 1981) Two people who have undertaken such a task are Robert Wyer and Donald Carlston (1979). Their model of person memory, like most of the scholarship on inferential error, is focused on individual rather than collective judgment and is primarily concerned with judgments about people rather than inductive inferences in general. At first, therefore, the principles encompassed by the model may appear to have limited applicability to the kinds of phenomena I have been discussing. As the analysis progresses, however, I hope that it will become clear that the model does have more general utility and that it can be extended both to the group situation and to inferences about things other than people even though some of its predictive value may be sacrificed in the process.

Memory, according to Wyer and Carlston, is organized in terms of concepts forming networks of relationships through a process of association. The meaning for any given concept is defined in terms of the other concepts with which it has somehow become linked. These networks, furthermore, constitute structures and substructures whose component linkages vary in strength. The concept "politician," for example, may be associated with numerous other concepts representing various dispositional and behavioral traits, such as "industrious," "corrupt," "honest," "social," "greedy," "likeable," "civic-minded," and "status conscious." For the general concept "politician," not all of these attributes would have equal strength of association, nor for any two individuals representing the classification would the pattern of association in terms of either the number of attributes or strength of relationship likely be identical. The precise character of any specific network is determined largely by experiential and semantic factors. In other words, the more one is exposed to or talks about a given concept in relation to other particular concepts, the stronger will be those associations within the relevant network, and the weaker will be other possible associations.

In Wyer and Carlston's model, concepts are represented as nodes joined by pathways that vary in diameter (width). The diameter of a pathway is an indicant of the strength of association between any given pair of concepts it connects. Strength, in turn, is largely determined by the frequency and recency of the association of a concept (A) with another concept (B). Concepts are, moreover, both directly and indirectly related to other concepts. A direct relationship exists when one can move from (A) to (B) along a single uninterrupted pathway. An indirect relationship exists between a concept (A) and another, say, (C) by virtue of their both being related to a third concept (B). Strength, therefore, is further affected by the number of intermediate pathways necessary to connect any two concepts. All other things being equal, the association between "educator" and "honest," for instance, will be stronger if the pathway from "educator" to "honest" is direct than if the link is a result of the association of "honest" with some intermediate concept, such as "industrious." That is, an "educator" is likely to be "honest" because "educators," in general, are "industrious," and industrious" people tend to be "honest." This is not as strong an association as "educators" are "honest"; hence, a particular "educator" is likely to be "honest." Finally, pathways between concepts are directional. In other words, it is more likely that a given concept will excite the attributes with which it is associated directly or indirectly than those attributes are likely to activate it. In the example above, if "educators" are believed to be "honest" because they are "industrious," and "industrious" people tend to be "honest," then "educator" is more likely to activate the concept "honest" than "honest" is likely to activate "educator." This characteristic of associations does not preclude of dual pathways between given pairs of concepts, however.

It merely suggests what in any given instance is likely to be the particular association(s) that a stimulus event will trigger.

The preceding characteristics of Wyer and Carlston's model are captured more formally in the following postulates:

> 1. The organization of concepts in memory may be represented in terms of a network of interconnected nodes. Each concept is represented by a node. The relation between any two concepts is represented by a path connecting the nodes pertaining to these concepts. (p. 70)
>
> 2. The strength of association between any two concept nodes in memory is (a) an inverse function of the number of intermediate pathways connecting them; and (b) a positive function of the diameter of these pathways. (p. 71)
>
> 3. The diameter of a path connecting two concept nodes is a function of both the frequency with which excitation has been transmitted along it, and the recency with which excitation has been transmitted along it. (p. 71)
>
> 4. A path between two nodes is directed. Its direction reflects the order in which the concepts have occurred in the relation as it has been encountered. (p. 72)

On the basis of the preceding principles and the types of concepts that represent objects of thought, Wyer and Carlston posit the existence of three cognitive structures: a superstructure, schema substructures, and a semantic structure (pp. 73-78). A superstructure is the total network of relationships among concepts that have reference to specific people or categories of people. One can extend this notion to events and other sorts of concepts, however, for as Wyer and Carlston note, "the model we propose is not restricted to any given type of schema."[2] A substructure, on the other hand, is a network involving a single concept within the superstructure and the particular set of concepts with which it is associated. Whereas the concept "United States Senator" would be central to a superstructure, "John Towers" and the network of concepts to which he is linked is an example of a substructure. The third classification, semantic structure, represents relationships among concepts that have become linked independently of the people or things with which they are eventually associated. Such networks tend to form as a consequence of the resemblance among concepts and/or implicit theories about what general characteristics go together. (See d'Andrade, 1965; Triandis, 1964) "Generous" and "social," as one illustration, are two traits that many people would have reason to feel are related; hence, to describe someone as "generous" in many instances also would be to think of him or her as being "social."

Interrelationships among the three types of structures just described are such that the stimulation of particular nodes has certain transformational consequences for not only the establishment of pathways between and among concepts but also their diameters. Basic to this transformational process is the notion of "spreading excitation," a term first brought into usage by Collins and Loftus (1975). In respect to this phenomenon, Wyer and Carlston postulate that:

> 5. When a judge is exposed to stimulus that contains the name of a concept, excitation builds at the node representing this concept. When this excitation reaches a certain minimal activation threshold, the concept node is activated. (That is, the judge thinks of the concept.) (p. 81)
>
> 6. When one concept node is activated, excitation emanates from this node along the paths connnecting it to other nodes. Excitation may be transmitted along a path in either direction. However, in any given period of time, less excitation can be transmitted through a narrow pathway than through a wide one, and less excitation can be transmitted in the reverse direction than in the forward direction. (p. 81)
>
> 7. The total amount of excitation emanating from an activated concept node is the same, regardless of the number of paths connected to it. (p. 81)

Collectively, these three postulates describe an elementary process in which (1) thinking about a concept activates thinking about other concepts with which it has been previously associated and (2) the likelihood that particular concepts will be more easily activated (that is, thought about or brought to consciousness) is a function of both their number and relative strength of association with the target concept.

Given the conditions specified in Postulates 5-7, one can more easily appreciate the fact that certain active associations are more probable than others and will, therefore, have greater dominance in given instances of cognitive activity. Additional effects of the "spreading excitation" of concepts and the means by which some associations achieve greater dominance than others are specified by Wyer and Carlston in Postulates 8-11:

> 8. Excitation will conctinue to emanate from a concept node as long as this concept is processed (i.e., as long as the judge continues to think about the concept).
>
> 9. When excitation from an activated node (A) reaches an unactivated node (B), it will accumulate at this node. When the excitation that has accumulated reaches activation threshold, this node (B) will also be activated. (p. 82)
>
> 10. Only a limited number of concept nodes will remain activated at any given time. (p. 82)
>
> 11. Once a node has been deactivated (i.e., once the judge no longer thinks about the concept to which it pertains), the excitation that has accumulated at the node decays over time. (p. 83)

Of these four postulates, perhaps the one most directly suggesting the selectivity of the process in which given associations become salient is Postulate 9. In conjunction with the other three, moreover, this postulate helps account for the means by which indirect associations among some pairs of concepts surface more readily than direct associations. As an illustration, say that the concept "police officer" has been strongly associated with "authoritarian" and less strongly associated with other more positively oriented concepts, such as "helpful" and "protective." Now further assume that "authoritarian" has been associated in a strong way with "abusive." The fact that excitation is likely to reach the "authoritarian" node more quickly than the "helpful" or "protective" nodes when "police officer" is activated suggests that a person thinking about a "police officer" will also be more apt to identify him or her as "abusive" than as either "helpful" or "protective." This occurs even though the pathway from "police officer" to "abusive" is indirect. The process here is analogous to the way in which water moves into channels an penetrates the tributaries of the wider channels more quickly than it moves into some of the larger secondary channels.

Postulates 12 and 13 suggest conditions under which relationships among the elements in one's cognitive structure tend toward simplification. In the case of Postulate 12, the simplification is a consequence of the time spent in processing a concept and the number of associations that will therefore be active at any given point. In formal terms, this postulate stipulates that:

> 12. When a judge is asked to make an open-ended inference about a concept, he activates the node pertaining to the target concept. The excitation at this node then spreads to others along the paths connecting them. When sufficient excitation has accumulated at another node for it to be activated, the judge will output the contents of the node as a description of the target concept. (p. 88)

The implication of this process, according to Wyer and Carlston, is that the more time one spends processing a concept, the more different associated nodes are likely to be activated. Since judgments of the type described tend to be made quickly, however, the description of the target concept will be less detailed that it conceivably might be. Especially in the context of ongoing interaction does this sort of simplification seem likely because the participation of others necessarily interferes with the amount of time an individual has to think about any given concept.

In addition, the associated concepts likely to be activated are those most frequently and recently in use (see Postulate 3). Once a concept has been activated by another, it is more easily activated by the same concept on future occasions. The active structure of a target concept, then, is typically less representative of the total configuration in which it is embedded than would be true if one were to think about the concept over a relatively long period of time.

Another way in which simplification of cognitive structures occurs is described by Postulate 13:

> 13. After a judge has associated two concepts by connecting them through one or more intermediate nodes, a direct path is established between them. As a result, activation of one concept may subsequently lead the other to be activated independently of the spread of excitation through intermediate nodes that first led to their association. (p. 91)

The principle of simplification here is that indirect associations among concepts will evolve into direct associations through use. A good example of this might be the way in which some people during the late 1960s came to associate political activists with a variety of undesirable qualities. Because protest was often taken as a sign of disloyalty and because political activists were often involved in protest, for instance, many of those upset by protest activities came to see political activists as disloyal.

The final entries in Wyer and Carlston's postulational scheme have to do with associations that will be activated in response to direct questions. Whereas Postulates 12 and 13 deal with a class of judgments that Wyer and Carlston refer to as "open-ended inferences," Postulates 14 and 15 focus on "directed inferences," that is, those necessitating a determination of whether a concept (A) is an instance of another concept (B). Precisely how such determinations are made is articulated in the following formulations:

> 14. When a judge is asked to infer the relation between two concepts A and B (i.e., to infer the likelihood that A is B), he will activate the nodes pertaining to each concept until either (a) until a period of time t has elapsed, or (b) the excitation of each node has activated k attribute nodes directly or indirectly related to it, whichever occurs first. (pp. 93-94)
>
> 15. Once the set of k (or fewer) attributes associated with A and B have been identified, the likelihood that the first concept is inferred to be an instance of the second is a function of the proportion of attributes pertaining to the second concept (B) that are also in the set pertaining to the first (A). (p. 94)

Since time and the number of attributes that can be active at any given point are limiting factors, Wyer and Carlston suggest that the inferences encompassed by Postulates 14 and 15 will probably be based on general attributes rather than on specific knowledge. More specifically, they hypothesize that: "The inference that the members of one group belong to a second group is more likely to be based on general attributes that are shared by the members of these groups than upon knowledge of the individual members or subgroups that they have in common" (p. 94). In other words, one would be more likely to infer that a person or thing has a given attribute on the basis of a presumed relationship rather than on the basis of a knowledge that individuals or things that fall into the same category as the target concept do, in fact, possess the attribute.

When viewed in their entirety, Wyer and Carlston's fifteen postulates suggest several important characteristics of the structure of associated concepts that will be active at any given moment of cognitive stimulation and that will serve to define the conceptualization of an event, person, or some other object of perception. First, the target concept will be associated with only a few other concepts compared to all of those that could or previously have been used to define it. Second, to the extent that a given concept is more strongly related than others to the target concept, it has a greater likelihood of being activated when an instance of thought about the target concept occurs. Third, the strength of the relationship between a particular concept and the target concept increases through use and therefore makes it increasingly probable that activation of the target concept will correspondingly activate the related concept on future occasions and less probable that less strongly connected concepts will be activated. Hence, the cognitive structure associated with a given concept tends toward simplification and selectivity. Fourth, concepts that are not initially either strongly or directly related to a target concept (often those in one's semantic structure) may become so as a consequence of their association with concepts that are strongly and directly related to the target. Finally, in thinking about a particular concept, one is more likely to associate it with general attributes than with specific knowledge of the phenomena such attributes have come to represent. For example, one is more likely to consider an "athlete" to be "dumb" on the basis of a presumed relationship between athletic activities and the intelligence of those who engage in them than on the basis of a knowledge of individual athletes who actually possess the quality in question. How these notions apply in situations involving collective judgment is the subject of the next section of this essay.

Applications of Wyer and Carlston's Model to the Problem of Collective Inferential Error

Given the ways in which relationships among concepts become established and activated in one's cognitive structure, it may now be easier to see how interaction in the small group context may function to promote collective inferential error. Although I previously suggested three ways in which such errors could come about, the explanatory principles would appear to be similar all three instances. Neverthless, it may be preferable to examine their applicability to each case separately.

In the first situation I described--that is, when interaction functions to increase the volume of atypical information--what gives this possibility a theoretically plausible basis is that any one instance in which a concept is verbally associated with another may activate similarassociations in the cognitive structure of other group members. As an illustration, if the concept "welfare recipient" were strongly associated in one's cognitive structure with "lazy," the mere offering of a specific example would call this association to the attention of others and, hence, make it more dominant than it might otherwise be. As a consequence of the communicative act, then, other participants would be slightly more predisposed toward the search for comparable examples rather than contradictory ones--unless, of course, some other association like "welfare recipient" and "victim of society" were already dominant. Successive examples (data), to the degree that they reinforce the association initially called into attention, would lead to an increased focus on the "welfare recipient"/"lazy" pairing and a weakening of relationships between the target concepts and others than may previously had served to define it. In addition, the concepts to which "lazy" is related in the participants' semantic structures would have an increased likelihood of becoming active.

The net result of the kind of interactional process just described is that participants can develop a collective impression that, while possibly unrepresentative of the class of objects (in this case people) to which it applies and partially constructed in semantic terms, nevertheless functions as a basis for making inferences both about the general class and specific members of it. In the example, any welfare recipient is more likely to be judged as lazy (and, therefore, as having whatever properties laziness suggests), and most welfare recipients are likely to be viewed as lazy. Were these types of inferences to be made in a decision-making group, they conceivably would have some effect on what the members might choose to recommend as a way of dealing with the "welfare problem."

The second situation to which I earlier alluded involves a less active verbal role among the members of a group than does the first. In this case, specialization is at the base of of the potential problem. It is important to remember here that specialization is being used in an informational sense, that is, as knowledge possessed by one participant about aspects of an issue which others in a group are not expected to have. One should probably add that specialization in this sense can exist in terms of presumed knowledgeability. In highly specialized groups, because members other than specialists in a given subject areaplay more passive roles, the likelihood of collective inferential is largely dependent on the specialists' making error that others through their comparative ignorance fail to notice. Still, the underlying process resembles the one sketched in the situation involving the progressive introduction of atypical information.

Say that a group consisting of several faculty members and the Dean of the Graduate School as some institution were discussing the problem of dissertation standards. At one point, the dean observes that, "We are getting a lot of pretty weak dissertations lately. We are especially having trouble in the Department of Speech Communication." In offering this assessment, the dean would have made the association "Department of Speech Communication" and "weak dissertations salient in the cognitive structure of the other faculty members present, many of whom may have given no previous thought to the quality of graduate research in any academic unit beyond their own. Moreover, inasmuch as the dean presumably would have expertise on the quality of dissertations being produced at his or her institution, the assessment might well go unchallenged.

Now suppose that "a lot" actually consists of a sample of five dissertations, two of which were done in the Department of Speech Communication and all of which were brought to the dean's attention at the same time by a secretary who has the responsibility of checking dissertations and reporting those which do not conform to the graduate school's stylistic requirements. It seems unlikely that other members of the group not aware of the specific facts prompting the dean's assessment would associate "a lot" with the number "five" and, in the case of the Department of Speech Communication, with the number "two." The dean himself or herself would have formed an impression on the basis of selective information, since the secretary probably did not bring properly completed documents to his or her attention. As a result, the associations "dissertations"/"weak" and "weak dissertations"/"Department of Speech Communication" could contribute to a collectively shared impression of a problem more serious than it actually is. Any further instance of a weak dissertation would have confirmatory value, and if it happened to be from the Department of Speech Communication, it would facilitate the judgment that most dissertations from that department are weak. Finally, the characterization "weak" might excite related concepts focusing on substantive rather than stylistic dimensions of quality. Hence, the group could be in a position of not only overestimating the scope of the problem but also of misjudging its nature. Acting on possibly erroneous inferences, then, the members might later agree to tighten dissertations standards in a way that is either unnecessary or that addresses the wrong aspect of the problem. The

Department of Speech Communication, moreover, could become the object of a costly graduate school review when a note from the dean to the departmental chairperson might easily solve what problem there is.

The remaining way in which interaction conceivably functions to promote collective inferential error, like the first one mentioned, represents a collaborative effort--albeit an unwitting one from the perspective of the interactants. In this situation, rather than biasing the information base, interaction functions to implant associations that are based on largely imaginary experiences. Once established, however, these associations may have the same consequences as those based on fact. In other words, even inventional acts can serve to make dominant in the cognitive structures of the members of a group associations that may influence subsequent inferences about the concepts involved.

What makes this probable is the fact that the members of a group, through the joint construction of imagined events, keep particular associations salient. Since it is frequency and recency that primarily determine the strength of association among concepts, the empirical validity of such associations may have little impact on subsequent inferences the interactants are predisposed toward making. Once an association becomes dominant, the manner in which it was formed loses significance. (See Nisbett and Ross, 1980, 34-35)

Consider, for example, the case of a fraternity group trying to decide how to dispose of unexpended funds. One member suggests a theme dance. In response, another observes, "Yah, we've never done that before. Should be fun." As the remaining members pick up on this suggestion and start to visualize the consequences of the proposal, the association between "theme dance" and "fun" becomes strengthened whereas associations with other concepts, such as "wasteful" and "costly" become increasingly less probable. In addition, if "fun" is strongly connected to other concepts in the participants' respective cognitive structures that are positively evaluated (say, "worthwhile" and "desirable"), continued interaction could lead to the establishment of direct pathways from the concept of interest to the others mentioned. By virtue of its being "fun," the proposed dance, therefore, has additional characteristics that make the suggestion an even more probable choice. The actual likelihood of the dance's being "fun" would be determined by a number of factors. However, because the interaction of the group is contributing to a limited focus, these factors might receive comparatively little attention. Furthermore, although the group might go on to consider other options, at the moment of choice, the "theme dance"/"fun" association would probably remain active. If the factors not considered suggested a more compelling reason for believing that the proposed dance would not be "fun" than for believing that it would be, then acting on the imagined outcome could prove to be an unfortunate choice.

In the example just presented, the parties involved undoubtedly would have some previous experiences with dances that might affect their projections of how much fun the proposed dance would be. Consequently, they would have a base in actual experience against which to test the projections. In situations in which this kind of base is limited, however, the construction of imagined events could well have significant impact on a group's judgment. That is, as the amount of directly relevant information decision-makers have available to contradict the associations made salient through the construction of schemas decreases, the greater the probability that such constructions will serve as the basis for subsequent inferences about the concepts on which the decision-makers are focusing. The degree of error in such cases would be directly proportional to the inaccuracy in the associations that interaction has established.

Precisely this sort of process appears to have been operative in the decision to allow United Nations Forces to cross the 38th Parallel during the Korean conflict. The Chinese were seen by President Truman and his advisors as weak puppets of the Soviet Union who would not act unilaterally in response to the violation. Since the Soviets were reluctant to become involved in a ground war, moreover, that made it all the more likely that the Chinese would not retaliate. The decision based on this kind of thinking proved to be one of the more costly ones in the President's term of office. (See Janis, 1972, pp. 50-74)

An Extended Illustration: The Watergate Coverup

Unfortunately, for many of the historical decisions that appear to have been based on questionable inferences about the consequences of given courses of action, records of the interaction among those involved are not available. A notable exception is the recordings (see The Presidential Transcripts, 1974) uncovered during the Senate investigation of the Watergate breakin and coverup. When one carefully examines some of the exchanges among President Nixon and his associates, he or she finds considerable evidence of communication functioning in a way that encouraged what later proved to be seriously deficient inferential judgments. The reconstruction of several different sequences from the transcripts, therefore, provides a useful illustration of many of the previously developed ideas. (See also Gouran, 1976)

The portion of the conversation that follows occurred on September 15, 1972 and involves President Nixon, John Dean, and H.R. Haldeman--although in the segment chosen, Haldeman remains silent. The three have been discussing the "bugging" of political figures when the president takes a call from Attorney General Mitchell (pp. 35-36 of The Presidential Transcripts):

President:

> Well you are still alive.
>
> I was just sitting here with John Dean and he tells me that you were going to be sued or something.
>
> Good, Good.
>
> Yeah.

Good.

Sure.

Well I tell you just don't let this keep you or your colleagues from concentrating on the big game. This thing is just one of those side issues and a month later everybody looks back and wonders what all the shooting was about.

OK, John, Good night. Get a goodnight's sleep. And don't bug anybody without asking me? OK?

Yeah.

Thank you.

Dean:

Three months ago I would have had trouble predicting that there would be a day when this would be forgotten, but I think I can say that 54 days from now nothing is going to come crashing down to our surprise.

President:

To what?

Dean:

Nothing is going to come crashing down to our surprise.

President:

Oh well, this is a can of worms as you know a lot of this stuff went on. And the people who worked this way are awfully embarassed. But the way you have handled all of this seems to me has been very skillful putting your fingers in the leaks that have sprung here and sprung there. The Grand Jury is dismissed now?

Note that the interactants in this segment are reinforcing the inference that the problem prompting a grand jury investigation is not a serious one and the prediction that interest in the situation will soon fade from public consciousness. The underestimation of the seriousness of the problem and the projection of a loss of interest would seem to make the policy of containment alluded to in the president's commendation of Dean all the more attractive as a course of action.

The next segment is from a conversation between John Dean and the president that took place several months later on February 28, 1973--a point in time well beyond the "54 days" when "nothing will come crashing down to our surprise." In the interim, the Senate Select Committee to investigate the Watergate case has been created, and we find a less confident John Dean attributing the committee's creation to political motives (The Presidential Transcripts, p. 54):

Dean:

I am convinced that he /Senator Ervin/ is merely a puppet for Kennedy in this whole thing. The fine hand of the Kennedys' is behind this whole hearing. There is no doubt about it. When they considered the resolution on the Floor of the Senate I got the record out to read it. Who asked special permission to have their Staff man on the floor? Kennedy brings this man Flug out on the floor when they are debating a resolution. He is the only one who did this. It has been Kennedy's push quietly, his constant investigation. His committee did the (unintelligible) subpoenas to get at Kalmbach and all these people.

President:

Uh huh.

Dean:

He has kept this quiet and constant pressure on this thing. I think this fellow Sam Dash, who has been selected Counsel, is a Kennedy choice. I think this is also something we will be able to quietly and slowly document. Leak this to the press, and the parts and the cast become much more apparent.

President:

Yes, I guess the Kennedy crowd is just laying in the bushes waiting to make their move. I had forgotten, by the way, we talk about Johnson using the FBI. Did your friends tell you what Bobby did?

Dean:

I haven't but I wouldn't be--.

President:

Johnson believed that Bobby bugged him.

Dean:

That wouldn't surprise me.

President:

Bobby was a ruthless (characterization omitted.) But the FBI does blatantly tell you that--or Sullivan told you about that New Jersey thing. He did use a bug up there for intelligence work. (inaudible)

The exchanges represented in the preceding interaction sequence provide a good illustration of how example can lead to example in such a way as to provide substance to particular sorts of inferences. With each successive mention of some Kennedy-related event, the president and Dean confirmed for themselves the notion that the imminent Senate hearings on the Watergate case were politically inspired. That a Southern conservative Republican would be a puppet for a liberal Eastern Democrat seems hardly probable, yet the invention of a scenario in which this possibility is made likely is quite clear in Dean's assertions and the president's responses. Whether a different inference ultimately would have led to some course of action other than "containment" is difficult to say. It seems reasonable to suggest, however, that the types of inferences being drawn reinforced the perception that such a policy was desirable.

The final segment of interaction occurred three weeks later on March 21, 1973. Present were President Nixon, H.R. Haldeman, John Ehrlichman, John Dean, and Attorney General John Mitchell. In the discussion, the group is considering the merits of preparing a falsified report that the president could turn over to the Ervin Committee. Presumably, this action would help establish that the White House was not involved in the Watergate Affair and that the president was making every effort to get to the facts. As the interaction unfolds, the participants construct a scenario centering on how John Dean might best develop the report and how the president might best present it (The Presidential Transcripts, pp. 161-162):

> President:
>
> You could write it in a way that you say this report was not comment on et cetera, et cetera, but, 'I have reviewed the record, Mr. President, and without at all compromising the right of defendants and so forth, [illegible] of whom are on appeal, here are the facts with regard to members of the White House staff et cetera, et cetera, that you have asked me about. I have checked the FBI record; I have read the Grand Jury transcripts--et cetera, et cetera.
>
> Ehrlichman:
>
> As a matter of fact you could say, 'I will not summarize some of the FBI reports on this stuff because it is my understanding that you may wish

to publish this.' Or you may allude to it in that way without saying that fact. Just say that I do not summarize all the FBI documents and so forth.

Dean:

It is my understanding that all FBI reports have been turned over to the Ervin Committee.

Haldeman:

Not everything. He has only seen half of them.

Dean:

Another vehicle might be, take the report I write and give it to Ervin and Baker under the same terms that they got the FBI reports. You could say, 'Now, this has innuendo in it--and from this the press might assume things that shouldn't be assumed, but I want you to know everything we know.' And publicly state that, 'I have turned over a Dean report to your Committee.' Then begin to say that, 'You see that various people have various ingredients which may be of assistance in testifying. But it is not worth their coming up here to be able to repeat to the Committee what is here in this report in some forum where they are going to be treated like they are in a circus. But I am willing, based on this document, to set some ground rules for how we can have these people appear before the Committee.'

Haldeman:

In case of that the Committee would issue a warrant on our phone calls. Bully!

President:

That's right.

Haldeman:

That is all I know about the damn thing is that the Secret Service at some point has been bugged.

Dean:

And that could go on forever with you on that tack. I could draw these things like this staff into this report and have Kleindienst come get it and give it to Ervin in confidence--I am not talking about documents you see. I am talking about something we can spread as facts. You see you could even write a novel with the facts.

President:

Inaudible

Dean:

Inaudible

President:

Inaudible

Ehrlichman:

My thought is--

President:

In other words, rather than fighting it, we are not fighting the Committee, of course--we are fighting the situation thing.

Ehrlichman:

And I am looking to the future, assuming that some corner of this thing comes unstuck, you are then in a position to say, 'Look, that document I published is the document I relied on, that is, the report I relied on.'

President:

This is all we knew.

Haldeman:

That is all the stuff we could find out--

Ehrlichman:

And now this new development is a surprise to me--I am going to fire A, B, C, and D, now.

Dean:

John, let me just raise this. If you make the document public the first thing that happens is the press starts asking Ziegler about it, expecting the document every day. 'Well, why did Ehrlichman receive the call? How did they happen to pick out Ehrlichman? What did he do with the information after he got it?' Keep in mind every item, there will be a full day of quizzing. It will keep up day after day after day.

Mitchell:

(Inaudible) I think that there should be a concerted judgment about when and under what circumstances this is put out.

By constructing a scenario in which the president can create the public appearance of concern and cooperativeness, the parties involved in the preceding discussion appear to have convinced one another that having John Dean and President Nixon perjure themselves is an idea worth acting on. At least, if Mitchell's comment is any indication, the issue has become not whether to implement the proposed action but when. The advantages envisioned in the dialogue and reinforced by descriptions of responses to possible inquiries appeared to minimize any serious consideration of the risks involved. Although other events subsequently conspired to prevent the report from ever being written, at the moment, the group was prepared to pursue a strategy that could only have made matters even worse than they already were.

None of the illustrations taken from the coversations about Watergate prove, of course, that communication functioned to promote collective inferential error. To be sure, one would have to know what inferences the individuals involved were drawing privately. The illustrations futther ignore the probable effects of other sources of influence that undoubtedly entered into what the president and his associates chose to do. The patterns of interaction, nevertheless, are consistent with the expectations one would have on the basis of Wyer and Carlston's suppositions about the manner in which concepts in a person's cognitive structure are both activated and strengthened, the implications that activated concepts have for the inferences one draws, and the resultant transformations that make the activation and re-activation of certain associations more probable under conditions in which some stimulus event evokes a given concept.

Future Research Needs

To demonstrate that communication has the sorts of consequences posited in this essay and suggested by many of the examples included will require extensive investigation under carefully thought out observational conditions. Inasmuch as prior research has clearly revealed that the manner in which experimenters introduce information to respondents systematically affects the inferences they draw and the impressions they form (see, for example, Meyer and Schvaneveldt, 1976; Valins, 1974; Higgins, Rholes, and Jones, 1977), there is a good basis for suspecting that more naturally occurring communicative acts can have similar effects in the context of group interaction. What seems to be most urgently needed for testing the possibilities described is the development of designs in which the stimulus materials that activate particular concepts are clearly described and whose influence can be mapped over continuous interaction sequences.

If the suspicions raised by Wyer and Carlston's model of person memory, and as extended to group interaction, are borne out, then we shall have achieved a much better understanding of an important source of ineffective decision-making. In addition, the knowledge uncovered would provide a potentially useful basis for devising the sorts of counteractive strategies that might bring such problems as exist under greater control when they start to surface. It may well be that people in groups are capable of acting much more rationally than the products of their efforts often seem to indicate. By learning more about the process by which erroneous inferences come about and, in turn, how they influence decisional choice, we may be able to move a step or two closer to bringing desired and actual behavior into substantially greater alignment.

FOOTNOTES

[1] The term *heuristic* has been borrowed from mathematics, where it is used to refer to shortcuts of various kinds. It should also be noted here that Nisbett and Ross break down the term *schema* into *scripts* and *personae*. The former represents cognitive structures dealing with events, whereas the latter refers to structures focusing on people. A persona in Nisbett and Ross' frame of reference is much like a stereotype but free of some of the negative connotations.

[2] It is important to note that Wyer and Carlston's use of the term *schema* is somewhat different from that of Nisbett and Ross. As Wyer and Carlston employ the term. a schema is simply an association between two concepts. Nisbett and Ross use the term in a broader sense to refer to a complex of associations. This usage is much closer to what Wyer and Carlston mean by a *substructure*.

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