Performance Expectations and Behavior in Small Groups*

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When given a collective task to accomplish, a group of strangers will evolve patterns of interaction that clearly reflect differences in power and prestige among the members. Some members will be more active than others, exercise more influence than others, and be rewarded more often than others. It is our purpose to set down in formal axiom form some of the processes that underly such patterns of inequalities and that account for their maintenance.

Bales and his associates (Bales et al., 1951; Bales, 1953; Bales and Slater, 1955; Heinicke and Bales, 1953) found in their observation of ad hoc college student discussion groups that, through time, marked inequalities develop in the overall rates of initiation of activity by each member. Further, they found that those who initiate activity most frequently also receive activity most frequently and tend to be ranked highest by group members on the criteria of who had the best ideas, who guided the group discussion, and who demonstrated leadership. Norfleet (1948) found similar regularities in her examination of adult discussion groups which met together over a period of three weeks. Ratings, by the members, of those individuals seen as having contributed most to the "productivity" of the group became concentrated, with a high degree of agreement, on a few individuals. Those who were rated as the best contributors also tended to be high on both initiation and receipt of interaction.

These investigations indicate that a cluster of correlated inequalities develop in discussion groups. If we assume that the "guidance" ratings reflect primarily successful influence and that the "best ideas" and "contribute to productivity" ratings reflect judgments of ability at the discussion task, then the cluster of inequalities includes at least initiation of activity, receipt of activity, task ability and social influence.

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The characteristics of these groups and their activities which we believe were crucial to the formation of inequalities were that:

- a) they were given a collective task to accomplish;
- b) it was reasonable to think of members having differential capacity to contribute to completing the task;
- c) the completion of the task was of central importance to the members.

Under pressure to complete the task successfully, those thought to be more able were given more opportunities to contribute (questions, inquiring glances, etc.) and were allowed to exercise more influence both in terms of persuading others and having contributions accepted; and, since the members of these groups were originally undifferentiated in status, judgments about ability were based on evaluations of contributions early in the discussions.

Harvey (1953) and Sherif, White, and Harvey (1955) found in groups with an already established power and prestige ordering that expectations for quality of future performance on the group's task and positive evaluations of past performance were correlated with the power and prestige ordering. Whyte (1943) found very similar things were true of the bowling activities of a street corner gang. Our interpretation of these investigations is that performance expectations directly reflect beliefs that members hold about task ability, and that those thought to be more able were more likely to be perceived as having performed well.

The set of relationships we have inferred from the above investigations are only gross "tendencies" and correlations. Presumably there are processes in the social interaction that takes place in task performing groups that underly these tendencies. We have only hinted at what some of the processes might be. Our task now is to set down systematically what these processes are and how they combine to produce differences in activity rates, influence, etc.

The Structure of Interaction

Our analysis applies to a group of at least two persons who have a task to accomplish together. We assume the members are all oriented toward successful, collective completion of the task in a finite time period. The group is thus assumed to be "task focussed" and "collectively oriented."

As such a group attempts to complete their task, they partition their activities into the completion of a series of smaller "tasks" or subtasks. For example, if the group has met together to consider their budget for some coming period of time, they may partition their meeting into review of the previous budget, consideration of future needs, and construction of a new budget. These in turn will be broken down into smaller and smaller questions. This, of course, is not a "rational" process in the sense that subtasks are explicitly defined before they are discussed. Rather, it is a process that takes place as the group proceeds, and in "natural" settings the division of the task into subtasks is a product and not a precondition of the interaction.

In most cases the division of the task into subtasks results in a series of "smallest" subtasks which can be defined by a fundamental sequence of behavior that is repeated for each subtask. The nature of this sequence is considered in detail below. For our present purposes it will suffice to indicate that the sequence begins with the presentation of an idea or suggestion or fact (perhaps preceded by a question) to which the members must react, and the sequence ends with consensus (probably only public consensus) on the quality of the idea or acceptability of the suggestion or accuracy of the fact.

For the sake of clarity let us label the larger task the group must accomplish by T and the set of smallest subtasks by t_i . Our conception, then,

of the interaction process is that the group proceeds from dealing with t_1 to dealing with t_2 to dealing with t_3 , etc., however they have defined the t's for themselves, and that the completion of T has been accomplished when all of the t's have been dealt with.

Kinds of Behavior

In analyzing the interaction in task performing groups we will pay attention only to certain kinds of behavior and only to certain characteristics of those kinds of behavior. Our focus is upon "task" behavior as opposed to "social-emotional" or "process" behavior (Bales, 1953). That is, we exclude from analysis behavior that is related exclusively to social and emotional relationships in the group. So, for example, behavior aimed at increasing morale or commitment to the task, or smoothing tension, or establishing friendship does not fall within the scope of our theory.

We begin as Bales and others have by dividing all of the behavior which is reasonably classified as social into small units called acts. An act is usually a simple verbal sentence but could be a gesture, a look, or some other form of non-verbal communication. More strictly, an act is the smallest unit of social behavior that can be classified within our system. Any behavior that is not an instance of one of our concepts is, of course, ignored. The kinds of acts we are primarily concerned with are action opportunities, performance outputs, and reward actions.

An action opportunity is a request for an activity, such as when x asks y a question, or x looks inquiringly at y. For our purposes an action opportunity may be directed at a particular person or not, and may specify the kind of activity requested or not. We will also be interested in the initiator of an

action opportunity and, if it is directed, the receiver of an action opportunity. A performance output is an act which is an attempt to solve or partially solve a subproblem. Included would be giving information or facts, and providing suggestions or ideas. As with action opportunities, performance outputs may be directed at a particular person or not, and both the initiator and the receiver are of interest. A reward action is any act which communicates the evaluation of a performance output, such as agreeing with a suggestion, concurring with a fact, or disputing an idea. A reward action may also be directed or undirected and have both an initiator and receiver. As well, it may be either positive or negative in content.

Cognitive Constructs

The above terms are all observable behaviors. Not all of the terms of our theory are observable, however. Some of them refer to unobservable cognitions that persons may have that are related to the kinds of observable behavior we are concerned with. The first of these is the concept performance expectation, which is a general belief or anticipation about the quality of future performance outputs. Performance expectations are ordinarily in a one-to-one relation to beliefs about task ability. Those high in ability will be expected to perform well, and vice versa. We will be concerned with whether the expectations are held for self or other(s) and will usually deal only with relative expectations, that is, rankings rather than some concept of absolute expectations.

The term "reward action" usually has a broader meaning than what we intend here. We are concerned only with those acts in which one actor communicates to another his acceptance or rejection of specific performance outputs.

A <u>unit evaluation</u> is a momentary evaluation of whatever composes the unit. By momentary we mean the evaluation is relatively temporary rather than enduring, thus leaving out sentiments such as liking, loving, hating, etc. The unit evaluated can be either a performance output or a person. Evaluation of a performance output would be thinking a fact is accurate, an idea unsound, or a suggestion acceptable. Evaluation of a person would be thinking some <u>person</u> made a good suggestion or presented a good idea. Obviously an evaluation of a person and of his performance are rarely going to differ, but which gets evaluated first may be of importance, such as when the quality of a performance is decided upon by referring first to the performer. We will distinguish only positive and negative evaluations.

Defined Terms

Defined Terms

The terms above are all really primitive terms whose meaning is given by general understanding and example. Other terms that we use can be formally defined using the primitive terms. We will now briefly state them for later use.

Acceptance of an action opportunity occurs when an action opportunity is directed at some person x and he responds with some other categorizable behavior such as a performance output. Otherwise the action opportunity is declined. If some person x initiates a performance output, then an influence attempt is a negative reward action directed at x or any reward action directed at someone other than x. Acceptance of an influence attempt is any change of the evaluation of a performance output following an influence attempt.

Informal Characterization of the Interaction

Let us imagine that some group of persons, all strangers of equal status, come together to collectively complete some task -- say a discussion problem. As they concern themselves with their task, they are continually initiating performance outputs and giving others action opportunities. As this takes place they are also engaged in evaluating each other's performance outputs and communicating these evaluations with reward actions. During the early phases of this process we believe that most of this behavior takes place in a random manner--particularly the distribution of action opportunities and whether these opportunities are accepted. However, as the members continue to interact, evaluations of performances become significant, and under some circumstances become the bases for a socially known ranking of the members by task ability -- a ranking of performance expectations. Should this happen, it will markedly affect the future behavior of the members. Specifically, it will affect who is given action opportunities, who will on his own initiate performance outputs, whose performance outputs are positively or negatively evaluated, and who will be influenced by whom. We further believe that the patterning of these behaviors will in general maintain the performance expectation ranking and that there are several processes by which behavior inconsistent with the rankings is "explained away" and hence has no significance for altering the ranking.

Sequences of Kinds of Behavior

Our analysis rests upon two fundamental assumptions. First, that the behavior that takes place concerning any particular subtask is patterned. Kinds of behavior follow each other in specifiable orders. Second, that the likelihoods of certain kinds of behavior will differ by the position of persons in the performance expectation ranking. We will deal with the former here and delay the latter till the next section.

Let us imagine that we are examining a group as it is ready to begin working on a particular subtask. We will analyze what takes place from the standpoint of some arbitrary reference person, call him p. He faces a decision at this point. If he decides to act, he may initiate either a performance output or an action opportunity; or if someone else acts, he may receive an action opportunity or not. These four events—p initiates a performance output, p initiates an action opportunity, p receives an action opportunity, or someone else acts—are mutually exclusive and exhaustive at this time. We will represent the situation at this point by a simple tree diagram as shown in Figure 1. As we continue the analysis we will add further branches to the tree.

[Figure 1 about here]

If p initiates a performance output, a specifiable pattern of possibilities will follow. He may initiate a second performance output, but that

Henceforth, when we write "subtask" we mean "smallest subtask."

would be the start of a new subtask and we want to confine ourselves to those behaviors relevant to the present subtask. What will follow p's performance--either immediately or eventually--is an evaluation-influence process. Others in the group will now be considering how to evaluate p's performance. To simplify the analysis, for the moment assume that the only members of the group are p and q. If q reacts positively to p's performance--p receives a positive reward action from q--then consensus has been achieved and work on the subproblem has been completed. If q reacts negatively--p receives an influence attempt from q--then consensus will be achieved only if one of p and q changes his mind. P may change his mind right away or counter with an influence attempt directed at q. Eventually, however, if p and q are strongly committed to completing the larger task T, they will reach consensus-that is, one of them will be influenced.

Suppose now that the group has three members, p, o, and q, and that p's performance is still up for evaluation. Now, whether p is influenced or not depends upon the evaluations of both o and q. Either o or q or both may initiate an influence attempt toward p and precipitate the necessity for further discussion before consensus is achieved. Further, o and q may attempt to influence each other by persuading the other to change an already expressed evaluation.

We will specify the parts of the evaluation-influence process as follows. Following p's performance output he may receive one or more positive reward actions only, or he may receive at least one negative reward action. In the former circumstances, consensus is achieved; in the latter circumstance, the question of whether p is influenced or whether those who expressed negative evaluations are influenced must be resolved. When p is influenced, there is

consensus on the negative evaluation. When he is not, there is consensus on the positive evaluation. Figure 2 shows the tree diagram of the evaluation-influence sequence.

[Figure 2 about here]

Returning to Figure 1, if p receives an action opportunity he must decide whether to respond or not by initiating a performance output. If p initiates a performance output after having been given an action opportunity, that is, accepts the opportunity, all behavior during and after that sequence will be the same as when p initiates a performance without an action opportunity. If p declines the action opportunity, then presumably someone else, say q, will initiate a performance output. But our description of the interaction will not change; only the reference person will change. Figure 3 below shows the sequence when p has received an action opportunity.

[Figure 3 about here]

Figures 1, 2, and 3 together describe the entire set of behavior possibilities that define a subtask. Figure 4 shows the tree diagram which contains all the possibilities.

[Figure 4 about here]

The notion of a smallest subtask defined by sequences of behavior is an analytic construct and it is not assumed that the behavioral elements of a subtask will necessarily occur within a contiguous temporal unit.

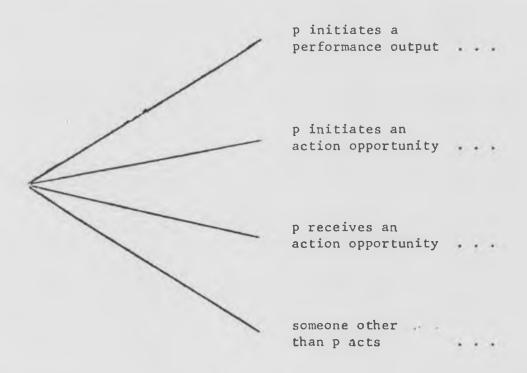


Figure 1

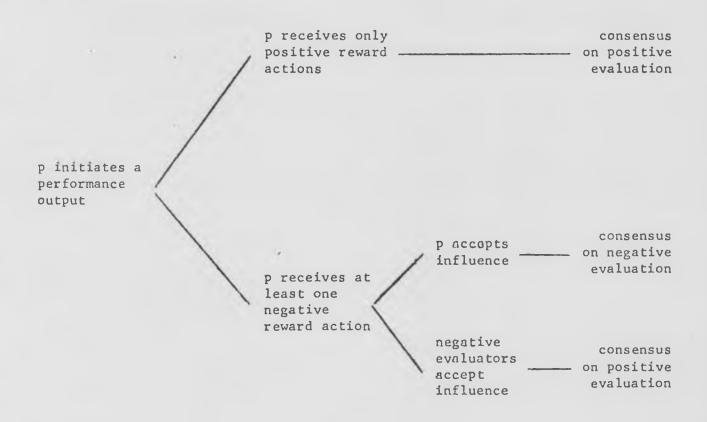


Figure 2

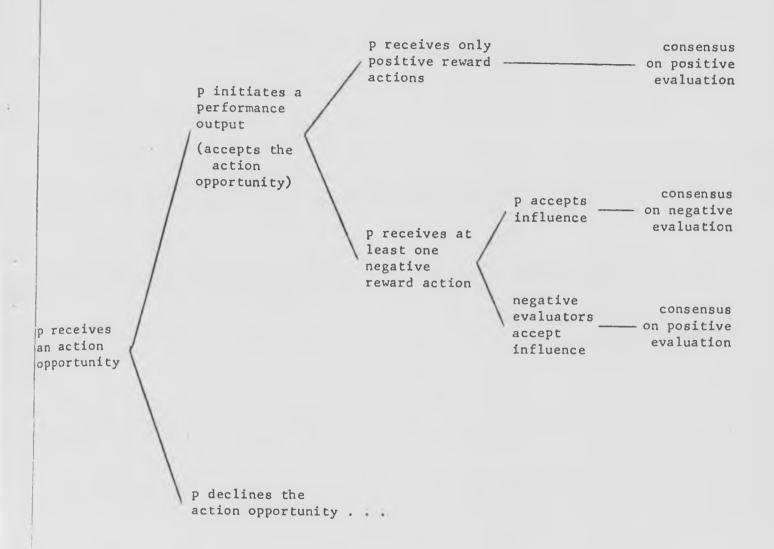


Figure 3

		consensus on positive evaluation
p accepts influence		consensus on negative evaluation
negative evaluators accept influence		consensus on positive evaluation
p receives onl positive reward actions		consensus on positive evaluation
p receives at least one	p accepts influence	consensus on negative evaluation
negative reward action	negative evaluators accept influence	consensus on positive evaluation

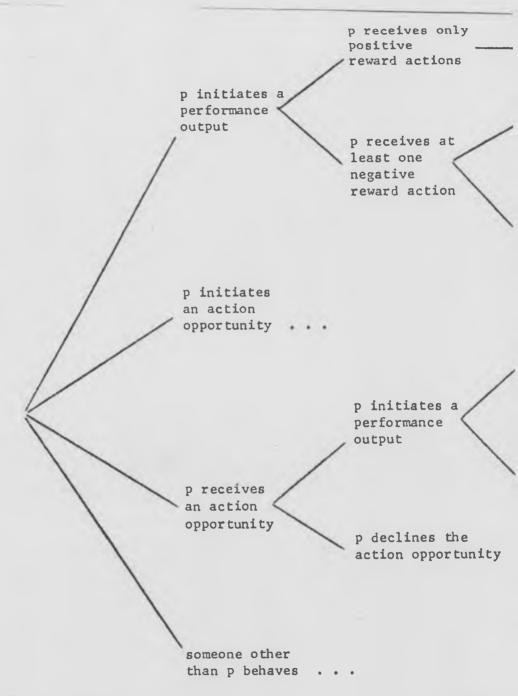


Figure 4

The Ranking Of Performance Expectations

Probability Axioms

Let us now consider a group of n individuals, p_1 , p_2 , . . . p_n , each ranked by expected level of performance at their collective task T. We assume that this expectation structure is regarded by the group as relevant to task completion, that there is one ability or a perfectly correlated collection of abilities that define the ranking, and that there is complete agreement on the ranking by all members.

As the members begin work on some subtask t, the sequences of behavior possibilities in Figure 4 describe their activity. The selection of a branch in the tree by any particular person is not completely capricious, however. His selection will depend upon his performance expectation ranking, and, we believe, will be probabilistically determined. Thus, we assume that a well defined probability, ranging from 0 to 1, exists corresponding to each possibility in the sequence of possibilities of Figure 4 and that for any particular possibilities the probabilities associated with each member of the group will be ordered. Figure 5 shows the probabilities in question.

[Figure 5 about here]

The assertions below directly order the value of α_1 , α_3 , ϵ_1 , δ_1 , and δ_2 . In all cases, it will be asserted that persons higher in the ranking of expected performance will have larger values of the probability being considered. This means that where the probabilities being considered refer to one branch of a two branch part of Figure 5, the probabilities

		consensus on positive
		evaluation
p accepts		consensus
, influence		on negative evaluation
negative		consensus
evaluators		on positive
accept influence		evaluation
	-	
p receives only positive reward actions		consensus - on positive evaluation
	p accepts	consensus
3	influence	on negative
p receives at 1 least one negative		evaluation
reward action λ_2	negative evaluators	consensus - on positive
	accept influence	evaluation

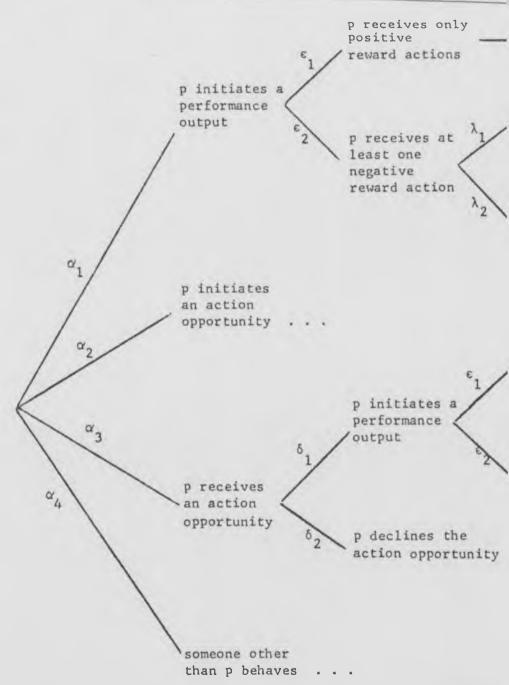


Figure 5

for the second branch are being inversely ordered to the ranking of expected performance.

The first axiom concerns α_1 . It asserts that the higher a person's expectation rank, the more likely he is to initiate an unrequested performance output at the beginning of a subtask.

Axiom 1. If p_i is ranked higher than p_j on expected performance, then p_i is more likely than p_j to initiate a performance output at the beginning of any subtask t_k .

Once a person performs, the question of performance evaluation arises.

Axiom 2 states that the higher a person's expectation rank the more likely he is to receive a positive reward action from any particular other person. It follows from that axiom that the higher a person's expectation rank the more likely he is to receive only positive reward actions for any given performance output.

Axiom 2. For any given performance output, if p_i is ranked higher than p_j on expected performance, then p_i is more likely to receive a positive reward action than is p_j .

If a member receives at least one negative reward action, the person who is lower in expectation rank should be influenced more often. Axiom 3 asserts this.

 $\Delta xiom \ 3$. For any given number of influence attempts, if p_i is ranked higher than p_j on expected performance, then p_i is more likely to accept influence than p_i .

If at the start of a subproblem t_k , all members refrain from initiation of a performance output, then an action opportunity will almost certainly be initiated. The allocation of action opportunities should be related to the expectation structure.

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Axiom 4. For any subtask t_k , if p_i is ranked higher than p_j on expected performance, p_i is more likely than p_j to receive an action opportunity.

And finally, not only are higher ranking members more likely to receive action opportunities, they are also more likely to accept them.

 $\frac{\text{Axiom 5}}{\text{on expected performance, then p}_i} \text{ is ranked higher than p}_i$ on expected performance, then p}_i is more likely to accept an action opportunity at the beginning of tk.

Some Consequences

To further display the nature of this axiom structure as well as illustrate its use, we now consider two fairly direct consequences of these assertions.

These consequences are also of substantive interest in their own right.

Performance Outputs

The likelihood of a person making a performance output is determined by the likelihood that he initiates a performance output without being requested, the likelihood that he is requested to perform, and the likelihood that he performs when he is requested. The probability that he initiates a performance output without a prior action opportunity is α_1 ; that he is requested to perform is α_3 ; and that he responds to an action opportunity is δ_1 . Thus the probability that a person initiates a performance output is

$$\alpha_1 + \alpha_3 \delta_1$$
.

Since α_1 (Axiom 1), α_3 (Axiom 4), and δ_1 (Axiom 5) are all larger for higher ranked persons, it follows that for p_i ranked higher than p_i ,

(1.1)
$$(\alpha_{1i} + \alpha_{3i} \delta_{1i}) > (\alpha_{1j} + \alpha_{3j} \delta_{1j}).$$

That is, the higher the rank of a person in the expectation ranking, the greater the likelihood that he will make performance outputs.

Acceptance of Performance Outputs

Whether or not a given performance output is accepted (positive consensus on evaluation of the performance output) depends both upon the reaction to it (whether all positive or some negative) and upon the outcome of the influence struggle in the case of at least one negative reaction. The probability that a person's performance output is accepted has four additive components:

1.
$$\alpha_1 \in \alpha_1$$

2.
$$\alpha_1 \in \lambda_2$$

3.
$$\alpha_3$$
 δ_1 ϵ_1

4.
$$\alpha_3$$
 δ_1 ϵ_2 δ_2

Components 1 and 3 are directly ranked by the axioms, but components 2 and 4 are not ranked by anything in the formulation up to now. So an additional assumption is required before the probability of having a performance output accepted can be ranked.

A substantively reasonable assumption is that the success of higher ranked persons at influencing others compensates for the higher frequency of received influence attempts for a given performance of lower ranked persons.

Thus,

(1.2)
$$\lambda_{2i} / \lambda_{2j} > \epsilon_{2j} / \epsilon_{2i}$$
.

From (1.2) and the axioms, we have:

Theorem 1. For p ranked higher than p on expected performance,

a.
$$\alpha_{li} \in \alpha_{lj} \in \alpha_{lj} \in \alpha_{lj}$$

b.
$$\alpha_{1i} \stackrel{\varepsilon}{\underset{2i}{\sim}} \lambda_{2i} > \alpha_{1j} \stackrel{\varepsilon}{\underset{2j}{\sim}} \lambda_{2j}$$

c.
$$\alpha_{3i}$$
 δ_{1i} ϵ_{1i} δ_{3j} δ_{1j} δ_{1j}

d.
$$\alpha_{3i}$$
 δ_{1i} ϵ_{2i} δ_{2i} δ_{3j} δ_{1j} δ_{2j} δ_{2j}

If Theorem 1 is true, then the acceptance of performance outputs is ranked by performance expectations.

Maintenance of Expectation Rankings

Theorem 1 plays a fundamental role in the maintenance of ranking structures based on performance expectations. The four assertions of the theorem represent <u>sufficient</u> conditions for such a structure to remain unchanged. So if all four conditions held for all pairs of members, no change of positions in the ranking structure would be anticipated. However, these conditions are undoubtedly not the minimum conditions <u>necessary</u> for maintenance. Some amount of violation of them would probably be tolerated without resultant change.

The role of the four conditions in maintaining expectation structures follows from their role in the creation of such structures. We believe that if for some p_i and p_j , initially not distinguished by expected performance, p_i emerged as having had more performance outputs accepted than p_j , then p_i would be ranked higher by the group than p_j on expected performance. In other words, evaluations of past performances are the basis for expectations about future performances, and once such expectations are established, evaluations of present performances are crucial to the maintenance of those expectations.

An Experiment

We will present experimental evidence in support of the assertion that if p_i is ranked higher than p_j on expected performance, then p_i is less likely to accept influence, Axiom 3. The experimental situation was constructed so that who initiates performance outputs and action opportunities, who receives action opportunities, the number of consecutive performance outputs, and the number of influence attempts per performance have all been controlled and fixed. Performance expectations for two persons were manipulated and acceptance of influence was examined as a dependent variable.

The experiment consisted of two parts, called phase 1 and phase 2. Two subjects participated in each experiment. In phase 1 they were both publicly given fictitious scores on a test which was purported to measure their ability at the phase 2 task. This was the manipulation of performance expectations. In phase 2 they were required on repeated occasions (i.e., trials) to select one of two alternatives as the correct answer to a word association problem. The selection of a correct answer had two stages. Every time a subject was presented with a set of alternatives, he first made a preliminary selection and exchanged information with his partner as to which alternative each initially selected. The subjects could not verbally communicate nor even see each other but indicated their choices to the experimenter and each other using a system of lights and push-button switches. Following the initial choice, each made a private final choice taking the information he had received from the other into account. The purpose of this initial choice final choice sequence was defined as seeing how well they worked together "as a team." They were told, moreover, that their final decision would be evaluated in terms of a "team score." The team score was simply the sum of the number of "correct" final decisions which each made, with no record kept of the

relative contributions of each. The requirement that subjects make a communicated initial choice is equivalent to their having been given a mandatory action opportunity, and the choice itself constitutes a performance output. Thus action opportunities could not be unequally distributed nor could a subject decline to make a performance output.

To create the possibility for each subject to accept influence from the other and to standardize receipt of influence attempts, the experimenter controlled the exchange of initial choice information. Except for three trials of the total of twenty-five (6, 13, 20), the subjects were led to believe that they initially disagreed. They had to decide each time whether "he's right and I'm wrong," which would be a change of evaluation and hence acceptance of influence, or whether "I'm right and he's wrong," which would be non-acceptance of influence.

The phase 2 task problems consisted of sets of words such as the one shown below.

YESTERDAY

(A) (B) TA-KIN TU-SAK

Subjects were instructed that the non-English words in the bottom row were phonetic spellings from a language unknown to them but that one of the words had the same meaning as the English word given. They were told that by comparing the sounds of the non-English words with the meaning of the English word they could decide which word was correct. The ability to do this was called 'Meaning Insight Ability." Both the ability and the language, of course, were fictitious. Subjects were shown a total of twenty-five different word sets.

Each word set was selected, on the basis of a pretest, so as to represent as ambiguous a choice as possible. Only those word sets which elicited

selection of one alternative 40-60% of the time when shown to approximately 100 pretest subjects were used in the task sequence. The order of presentation of the word sets was randomized.

The manipulation of competence at 'Meaning Insight," hence the manipulation of performance expectations, was accomplished in phase 1 by showing the subjects a series of twelve word sets very similar to those described above. In each of these word sets the role of the English and non-English words was reversed as in the example below.

LU-BOYEL

(A) (B)
LOVE SOFTNESS

Subjects were given fictitious scores for their choices on those twelve word sets. Their scores were interpreted to them as representing rare occurrences and as being either superior or poor, so that each subject was let to believe either that he was exceptionally good or exceptionally bad, and either that his partner was exceptionally good or exceptionally bad. Hence, there were four performance expectation conditions:

- (a) high self, low other
- (b) high self, high other
- (c) low self, low other
- (d) low self, high other

It was predicted that the rate of acceptance of influence would be greatest in condition (d), least in (a), and that conditions (b) and (c) would have the same rate.

The subjects were 162 Stanford University undergraduates who volunteered from various university classes. They were paid \$1.25 per hour for participating. Forty-two were eliminated from the analysis for becoming suspicious or failing to accept one or more of the manipulations in the experiment.

Table 1 presents the mean proportion of final choices, for all trials, where subjects in each condition declined to accept influence (i.e., their final choice was the same as their initial choice).

[Table 1 about here]

It is clear that the data confirm the order predicted by the theory and that those who were expected to perform relatively better decline to accept influence more.

The above ordering also holds true throughout the series of trials.

Chart 1, shown below, is a graph of the proportion of non-acceptance of influence for blocks of three trials.

[Chart 1 about here]

The rates for all conditions are constant, they never overlap [except, of course, for (b) and (c)], and the ordering is as predicted. It is especially interesting to note how similar conditions (b) and (c) are. The curves very clearly suggest that in this situation, at least, relative, not absolute, performance expectations affect acceptance of influence.

Summary

We began this paper with some speculations from the literature that power and prestige orderings in small groups are related to participation rates, distributions of rewards and evaluations, and to exercise of influence. We formalized these speculations in a set of Axioms which describe the process of problem solving interaction in small groups. Experimental evidence was presented which confirms one assertion—that a person expected to perform well relative to another person will accept influence less than if expected to perform relatively poorly.

Condition	Proportion	Number
high self, low other	.78	29
high self, high other	.67	31
low self, low other	.65	32
low self, high other	.44.	28

Table 1

Proportion of final choices where subjects declined to accept influence

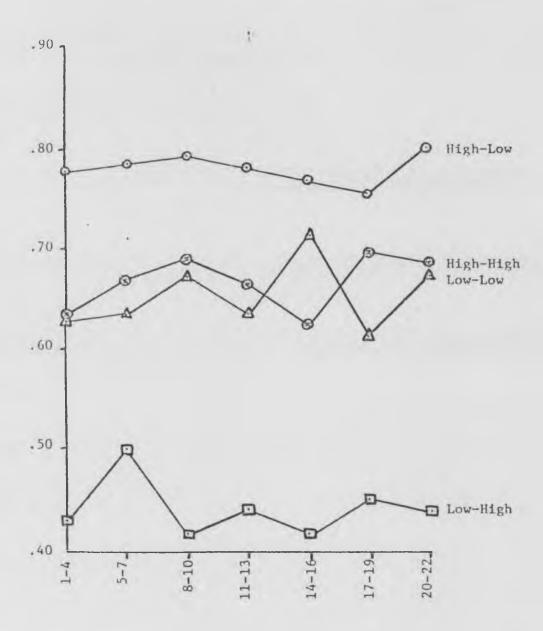


Chart 1. Proportion of non-acceptance of influence for blocks of three trials

What remains to be done is to gather additional evidence for other assertions of the theory and for specific derivations from the theory. The experimental situation described can be easily modified to carry out such experiments. In addition to providing evidence for the theory, such experiments should lead to refinement of the theory and more precise statements of its axioms.

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