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EFFECTS OF RELEVANT AND IRRELEVANT CHARACTERISTICS

OF LEADERS IN A COMMUNICATION

NETWORK

A Thesis

Presented to the

Department of Psychology

and the

Faculty of the Graduate College

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ABSTRACT

The present study involved groups of four Ss participating in a communication network, problem-solving task. Groups were assigned to one of two treatments involving an irrelevant leader characteristic, race, and one of two treatments involving a relevant leader characteristic, efficiency. Race was varied by informing some groups that their leader was White while the other groups were informed that their leader was Negro. Efficiency was defined by an efficiency index, which, through a script followed by a confederate leader, produced either a high or low degree of efficiency. Race of the leader had a non significant impact on all six dependent variables. Efficiency had a significant impact on all six dependent variables. Race and efficiency showed a significant interaction only on the variable involving the S's satisfaction with his role in the group.

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The relevant variables of group interactions have been studied in experimentally simulated laboratory research for the last two decades. Bavelas (1948) laid the groundwork for this research with the introduction of a mathematical model for the study of large organizations. In 1950 he introduced an entirely new approach to group studies with a shift of emphasis to small laboratory communication networks (Bavelas, 1950).

In order to examine small group interaction, Leavitt (1951) devised an apparatus which allows a small number of subjects, seated around a circular table, but separated by vertical partitions, to communicate with each other by written messages. The channels of communication, and therefore the nature of the communication network, can be manipulated by the experimenter.

Typically, groups studied by this method have numbered five members, although some authors, using different paradigms, investigated groups numbering from three to seven subjects (Bales & Borgatta, 1955). Limitation of groups to small numbers, especially five, was felt to be valid (Slater, 1958) since even the largest organizations are composed of small groups to facilitate information processing. In addition, members of large companies and military organizations are spread throughout the world physically separated from each other, with communication of information limited or

restricted in numerous ways. Even small informal groups re-
strict themselves to specific lines of communication through
the use of established friendships (Glanzer and Glaser, 1961).

In the Leavitt apparatus, the paths of communication
vary from the all-channel open (con con) to variously re-
stricted networks. The most commonly created networks are
the circle, chain, wheel and "Y". Diagrams of these various
arrangements are presented in Figure 1.

circle   chain   wheel   "Y"

Fig. 1. Diagrams of four common communication nets.
*Arrows represent the paths of communication.

One of these, the wheel, is a network in which four
members can only communicate with the fifth member who a-
lone can communicate with all four. This forces the fifth
member into a position of imposed leadership (Leavitt, 1951;
Guetzkow & Simon, 1955). This experimental situation re-
sembles that of a regional manager with his subordinate

division heads.

In order to investigate the interaction between these group members, research, typically has made use of a task first devised by Leavitt (1951). Each person in the group is given a card with five out of a set of six symbols and the group attempts to discover the one symbol held in common on each trial. The task has traditionally been kept at a very simple level in order to reduce the effects of the variable, intelligence (Leavitt, 1951).

Studies of the success of any organization, however, must examine many variables. Experimentally controlled communication networks have been useful in this regard because they allow a large number of variables to be investigated. These include composition of group (Mulder, 1960; Cohen, 1961; Clawar, 1966), status hierarchy (Cohen, 1961; Cohen, Bennis & Wolkon, 1962; Costello & Zalkind, 1963), noise effects (Heise & Miller, 1951), group and individual satisfaction (Leavitt, 1951; Cohen, 1961; Cohen, Bennis & Wolkon, 1962) stabilization of behavior (Guetzkow & Simon, 1955; Cohen, 1961), and problem complexity (Shaw, 1954b; Mulder, 1960).

Much of the research in these networks has involved comparisons between the various types of structures. Leavitt (1951) found that the more centralized networks such as the wheel, resulted in less errors, less time to

solution, and fewer messages, but less satisfaction on the part of the peripheral members.

It appeared that member satisfaction was directly related to position in the network and that the more centralized person experienced both power and independence and therefore more satisfaction than the peripheral members. But the satisfaction of the peripheral members is negatively correlated with the overall group efficiency (Costello & Zalkind, 1963). Others report similar findings when comparing various networks (Leavitt, 1951; Shaw, 1954b; Cohen, 1961).

The difficulty of the task has been shown by Vermillion (1964) to affect the efficiency of the network. Routine problems are easily handled by the centralized nets, wheel, chain, "Y", with results usually in accord with Leavitt's findings. However, more difficult problems and ambiguous situations apparently, are handled more efficiently by decentralized networks, circle and con com, (Shaw, 1954b). This effect is apparently due to the elimination of confusion as the information is handled by all the group members. Another explanation is that it may be due to information overload in centralized networks (Shaw, 1954b).

Although most communications network studies have used the Leavitt (1951) apparatus, there have been some modifications. For example, Heise and Miller (1951) used

separate booths connected by an intercom while varying different levels of noise. They found that no network is best in all situations, regardless of leader. Others have reached the same conclusion (Shaw, 1954a; Guetzkow & Dill, 1957; Cohen, 1961).

One of the variables which has been investigated by using communication nets is leadership. Shaw's (1955) work demonstrates that the centralized nets establish a position of leadership, essentially that link in the net through which all the information must pass and where it can easily be processed. The autocratic leader, he found as predicted, would promote better performance than the democratic leader in such a position, while causing lower morale among the peripheral members.

Collins and Guetzkow (1964) also noted that group members, unlike individuals working alone, must focus not only on the task, but also on the interpersonal relations they must build with each member of the interacting group. They further noted that the presence of other group members will often create problems irrelevant to the task or the group itself. These irrelevant obstacles such as race, religion, sex, etc. can be, and often are, detrimental to the efficiency of the group as a whole. No studies dealing with communication networks have concerned themselves with these irrelevant variables.

McGinnies and Altman (1959) showed the tendency of prejudiced subjects to limit or withhold communication to minority group members. This led Cohen (1964) to note that some individuals would be unable to overlook those characteristics in a leader, even though they are irrelevant to the situation, and thus they would be unable to concentrate only on the relevant aspects of the problem-solving situation.

The position taken by Cohen (1964) had been emphasized previously by Aronson and Golden (1962) in a different research paradigm. They suggested the importance of studying irrelevant variables when dealing with persuasive communications. The authors noted that past emphasis on only relevant variables of communicators such as intelligence, efficiency, and honesty, ruled out the interaction between affective and objective aspects within the subjects. Furthermore, according to Cohen (1964), most people involved in social situations such as group problem-solving, attempt to use all of the information they possess, including their attitudes and feelings.

This experiment concentrated on the effects of the wheel network (highly centralized) on the social-emotional relations between the members occupying peripheral positions. Since the task required pooling information from all members, successful problem-solving depended on the

subjects subordinating personal feelings in favor of a group goal. In the wheel network, this meant that dependent peripheral subjects would have to overlook irrelevant characteristics in the leader and concentrate only on his problem-solving techniques.

The questions explored concentrated on the perceptions and affects of the subjects under varying conditions of leader race and efficiency. It was suspected that subjects' perceptions of the leader's efficiency, following Cohen's (1964) suggestion, would depend, in part, upon the race of the leader. Although the latter variable is an irrelevant condition in a problem-solving task, results of a recent study (Aronson & Golden, 1962) raised the question that race might affect the subjects' perceptions, in this case, perception of the controlled relevant variable, efficiency.

It was further suggested that other dependent measures culled from subjects' ratings might also show this effect. Ratings of satisfaction with leader's performance, satisfaction with their (Ss') role in the group, satisfaction with group's performance, efficiency of the group, and leader's intelligence were all expected to vary along with the perceived efficiency of the leader depending upon the racial condition in affect at the time and the level of efficiency applied.

In particular, subjects in the low efficiency, Negro-

leader treatment were expected to rate their leader lower
than subjects in the low-efficiency, White-leader treat-
ment.

One further measurement expected to show a similar
dependency upon race and efficiency was the number of calls
initiated by subjects to the leader. This variable, since
it was a different type of measurement, was considered a
secondary variable and analysed separately.

These six items from the rating scale (see Appendix
A) and the sum of the calls were established as the dependent
variables for the study. Race and manipulated levels of
efficiency were the independent variables, the former vari-
able being irrelevant and the latter variable being relevant
in a problem-solving task.

It was further hypothesized, in accordance with
Aronson and Golden's (1962) results, that subjects who are
prejudiced would react differently than subjects who are
not prejudiced when forced to work under the leadership of
a Negro, regardless of the problem-solving ability of that
leader.

These differences were expected to emerge particular-
ly in lower ratings of the leader's efficiency, satisfaction
with their (Ss') role in the group, satisfaction with the
leader's performance and the number of calls sent to the
leader. The latter point would test McGinnies and Altman's

(1959) findings that prejudiced subjects limit communications to Negro leaders.

METHODS

Subjects

Each of the four cells in the 2 x 2 experimental design were composed of ten groups with four White volunteers per group. The subjects, who were all students in Psychology 101 at the University of Nebraska at Omaha, participated as partial fulfillment of course requirements. Subjects of both sexes ranged in age from 18 to 30 with the median age being 18.5 years. The majority were freshmen and native Nebraskans.

The leader for all groups was a White graduate student with a slight southern accent who remained out of view at all times and served as a confederate throughout data collection.

Problem

The task for each group was the standard Leavitt problem described earlier. Each S received a stack of ten cards numbered from one to ten. On the reverse side of each card, a set of five out of six symbols was presented. Instructions to the Ss provided them with the full set of six symbols. These are:

○ □ △ ◇ + ✳

Symbols were systematically arranged on each trial
so that the missing symbol varied on each S's card. By
this procedure, only one common symbol appeared on all of
the Ss' cards for each individual trial. The problem for
the group was to discover the symbol they had in common on
each trial.

Apparatus

Instead of using the usual Leavitt (1951) apparatus,
five small rooms were wired with special telephones, one
for each S including the leader. This apparatus was chosen
for use in order to eliminate physical contact between Ss
and thus control the racial variable associated with the
leader.

All communication was restricted to telephone usage.
Each S's telephone had a switch connected to it which al-
lowed the S to signal his desire to speak to the leader.
When the Ss pushed the switch on, a light on the leader's
coded switchboard lit up. The leader manually recorded this
as a call initiated by the S and otherwise ignored the call.
When the leader called the S, the S's telephone rang like a
standard telephone.

Instruments and Materials

Ss were also provided with a packet of symbol cards,
a pencil and tablet for recording each trial answer, writ-

ten instructions (see Appendix B) and a blank biographical
profile form (see Appendix C). Since Ss were separated from
each other, the profile served as an introduction to the lead-
er, the one person with whom each S could communicate. Ss
filled out profiles of themselves, ostensibly for the use of
the leader and, in turn, received a profile of the leader.
Profiles for both the White and Negro leader were identical
except for the variation in races and campus organizations.
The latter was varied because the majority of Negro students
on the University of Nebraska at Omaha campus belong to their
own groups.

The rating form given to each S after the comple-
tion of the set of ten trials, requested each S to rate the
following on a ten point scale where 0 was low and 10 was
high:

(1) the efficiency of the group.

(2) the efficiency of the leader.

(3) their satisfaction with their role in the group.

(4) their satisfaction with the group's performance.

(5) their satisfaction with the leader's performance.

(6) the intelligence of the leader.

Efficiency Index

Scripts (see Appendix D) were prearranged for either
low efficiency or high efficiency. The low efficiency
script was based on a 30-65% efficiency established from an

efficiency index (see Appendix E). The high efficiency script was based on a 65-100% efficiency.

The efficiency index was created after analysis of messages obtained from a pilot study. Messages naturally separated themselves into three general content categories; organization, noise, and information. Points were assigned to the various types of messages in each category depending upon the overall usefulness of each message in efficiently solving the problem. Efficiency was defined as accurate solution in the least amount of time with the fewest messages.

Points, assigned to each message, varied from 0 for the lowest efficiency to 5 for the highest efficiency per message. The following formula was used to arrive at points for intermediate range messages:

(1)   if $Q + K < 5$, then $Q + K = E$

(2)   if $Q + K > 5$, then $2[5 - (Q + K)] + 5 = E$

In these formulas Q refers to the number of symbols involved in the actual message; K refers to the number of symbols already known by the message sender; and E refers to the efficiency of the message. Total efficiency of messages per trial was based on the sum of the individual messages used. These sums were then applied to the following formula in order to arrive at the index of efficiency per trial:

$$\frac{\text{total efficiency of messages}}{\text{number of messages sent}} = \frac{\text{Efficiency}}{\text{Index}}$$

Procedure

In order to ascertain the degree of prejudice of the Ss, a questionnaire, ostensibly requested by the University of Nebraska at Omaha Speech Department was administered to all Psychology 101 students at least a week prior to the beginning of the experiment. The 26 item attitude survey (see Appendix F), created by Kelley, Person, and Holtzman (1958) has reliability and content validity of higher than average value (Shaw & Wright, 1967). The results of the survey were not used to assign subjects to treatments. Of the 160 Ss, attitude scale scores were available for 145. The remaining 15 were absent from class during the survey period.

Ss signed up for the experiment in groups of four to six per time period. As each S arrived, he was met individually and escorted to a separate room. Extra Ss were requested to fill out the College and University Environment Scale Questionnaire, in order to justify crediting them for research participation. Ss, directly involved in the experiment, were assigned randomly to one of four treatments: (1) low efficiency, White leader; (2) high efficiency, White leader; (3) low efficiency, Negro leader; (4) high efficiency, Negro leader.

Treatments, consisting of ten trials each, occurred in random order to avoid a set on the part of the leader. At no time did he know which race variable was in effect.

S̲s̲ were provided with written instructions, which specified the communication network being used and the problem to be solved, and the materials including the blank profile form which they were requested to complete. Several minutes later the experimenter returned to collect the profile for delivery to the leader. S̲s̲ were told that the leader would read their profiles in order to familiarize himself with his group members. In return, S̲s̲ were provided with the leader's profile. These forms were periodically replaced in order to assure a non-used appearance at all times.

At this time, the telephone apparatus was demonstrated and questions about the network and problem were answered. Speed to solution and group co-operation were emphasized. S̲s̲ were then requested to wait until the leader called them, at which time he would give them signals to be used for starting and stopping each trial. In all cases, two rings signaled the beginning of each trial and, after each S̲ had the answer, three rings signaled the end of each trial.

Following his script, the leader normally called each S̲ within one to three minutes, presenting each with identical messages. Calls continued until messages logical-

ly led to an answer, at which time the leader relayed the answer to each $\underline{S}$.

After the trials were completed, $\underline{S}$s filled out the rating form.

The ratings served as the dependent variables. In addition the leader kept a record of the number of calls initiated by each $\underline{S}$.

RESULTS AND CONCLUSIONS

Spearman Rho correlations were computed between the six rating scale variables to discover if items 1 and 2, dealing with efficiency or if items 3, 4, and 5, dealing with satisfaction were really measuring the same things (see Tables 1, 2, 3, and 4). The results show that the variables dealing with efficiency are moderately correlated but not to the extend that they are measuring the same aspects. A similar result is apparent in the correlations between the variables dealing with satisfaction. Again, the variables are definitely correlated with each other but not to the extent that they are measuring identical elements.

The low to moderate intercorrelations between the efficiency variables and the satisfaction variables suggest that the Ss were able to distinguish between efficiency and satisfaction.

The consistently high correlation found between ratings of efficiency of the group and efficiency of the leader suggest that the Ss saw the group's performance to be tied to the performance of the leader.

Although evaluations of leader and group efficiency were related, there seemed to be very little relationship between those variables and ratings of leader intelligence.

TABLE 1

CORRELATIONS BETWEEN DEPENDENT VARIABLES

FOR LOW EFFICIENCY—WHITE LEADER CONDITION

	1.	2.	3.	4.	5.	6.
Efficiency of Group . . . . 1.	1.00					
Efficiency of Leader . . . . 2.	.63	1.00				
Satisfaction with Role . . . . 3.	.50	.47	1.00			
Satisfaction with Group Performance . 4.	.38	.38	.44	1.00		
Satisfaction with Leader Performance. 5.	.10	.27	.16	.45	1.00	
Intelligence of Leader . . . . 6.	.05	-.02	.02	-.10	.32	1.00

r=.26 significant at p <.05

TABLE 2

CORRELATIONS BETWEEN DEPENDENT VARIABLES

FOR HIGH EFFICIENCY—WIDE LEADER CONDITION

	1.	2.	3.	4.	5.	6.
Efficiency of Group . . . . 1.	1.00					
Efficiency of Leader . . . . 2.	.51	1.00				
Satisfaction with Role . . . . 3.	.43	.44	1.00			
Satisfaction with Group Performance . 4.	.40	.48	.24	1.00		
Satisfaction with Leader Performance. 5.	.26	.45	.19	.65	1.00	
Intelligence of Leader . . . . 6.	.10	.21	.13	.45	.45	1.00

r=.26 significant as p < .05

TABLE 3

CORRELATIONS BETWEEN DEPENDENT VARIABLES

FOR LOW EFFICIENCY-NEGRO LEADER CONDITION

	1.	2.	3.	4.	5.	6.
Efficiency of Group . . . . 1.	1.00					
Efficiency of Leader . . . . 2.	.46	1.00				
Satisfaction with Role . . . . 3.	.16	.50	1.00			
Satisfaction with Group Performance . 4.	.05	.18	.41	1.00		
Satisfaction with Leader Performance. 5.	.05	.34	.31	.50	1.00	
Intelligence of Leader . . . . 6.	.00	.31	.32	.54	.69	1.00

r=.26 significant at p <.05

TABLE 4

CORRELATIONS BETWEEN DEPENDENT VARIABLES

FOR HIGH EFFICIENCY-NEGRO LEADER CONDITION

	1.	2.	3.	4.	5.	6.
Efficiency of Group . . . . 1.	1.00					
Efficiency of Leader . . . . 2.	.98	1.00				
Satisfaction with Role . . . . 3.	.38	.36	1.00			
Satisfaction with Group Performance . 4.	.40	.27	.49	1.00		
Satisfaction with Leader Performance. 5.	.31	.12	.35	.79	1.00	
Intelligence of Leader . . . . 6.	-.04	-.02	.06	.29	.45	1.00

r=.26 significant at p < .05

Similarly, the S's satisfaction with his role was not related to ratings of leader intelligence. These low to moderate correlations were found in all treatment conditions except the low-efficiency, Negro-leader group.

It is interesting to note the systematically high correlation between ratings of the leader's intelligence and the S's satisfaction with the leader's performance. Consistent with the previous result, the correlation found in the low-efficiency, Negro-leader treatment is much higher than correlations found in the other treatments. Since the means for the ratings of this group were consistently lower across all dependent variables (see Tables 5 and 6), than were the means for the other groups, it appears that Ss in the low-efficiency, Negro-leader group were associating low intelligence of the leader with poor performance of the leader. The same association did not occur for the low-efficiency, White-leader group. The race of the leader seemed to make a difference only when paired with low efficiency.

The general similarity of the patterns of correlations across all four treatment groups suggests that the variables were related in the same ways regardless of the race or the efficiency condition in effect at the time.

The means for the six dependent variables are presented in Tables 5 and 6. As has been noted the means for

TABLE 5

GROUP MEANS AND STANDARD DEVIATIONS FOR THE RATING SCALE VARIABLES

Group	N	Efficiency of group		Efficiency of leader		Satisfaction with role in group	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
Low-efficiency, White-leader	40	5.60	2.07	6.15	2.54	6.07	2.47
High-efficiency, White-leader	40	8.20	1.70	8.45	1.66	7.15	2.64
Low-efficiency, Negro-leader	40	4.97	2.40	5.70	2.52	4.85	2.66
High-efficiency, Negro-leader	40	7.90	2.02	8.37	2.21	7.37	2.58

TABLE 6

GROUP MEANS AND STANDARD DEVIATION FOR THE RATING SCALE DATA

Group	N	Satisfaction with group performance		Satisfaction with leader's performance		Intelligence of leader	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
Low-efficiency, White-leader	40	6.07	2.70	6.70	2.74	6.77	2.41
High-efficiency, White-leader	40	8.15	1.90	8.37	1.82	9.45	1.30
Low-efficiency Negro-leader	40	5.17	2.33	6.02	2.75	6.32	2.58
High-efficiency Negro-leader	40	8.07	2.15	8.52	2.22	8.55	1.81

the low-efficiency, Negro-leader group are consistently
lower across all variables, however, the means for the
high-efficiency, Negro-leader and White-leader groups are
quite similar to each other.

In order to examine the differences between means
across the four groups, for the race and efficiency variables,
analysis of variance techniques were applied. The results
of the two-factor, fixed model, completely randomized design
are presented in Tables 7 and 8. Because the rating variables
were relatively independent, results of the analysis on each
variable will be discussed separately.

Dependent Variable 1:   Efficiency of Group

Across the four treatment groups, ratings of the ef-
ficiency of the group showed no significant effect due to
the race of the group's leader. This indicates that the
leader's race was either not successfully manipulated, or
that it was not a variable of importance for the sample used
in this experiment. Results of the attitude survey suggest
support for the latter explanation. Failure to support the
Aronson & Golden (1962) study may well be due to the low
level of prejudice in the sample. Discussion of the pre-
judice variable will be deferred until it is used in an
analysis.

The highly significant effect of efficiency on the

TABLE 7

ANALYSIS OF VARIANCE ON DEPENDENT VARIABLES*

Source	DF	Efficiency of the group		Efficiency of the leader		Satisfaction with role in group	
		MS	F	MS	F	MS	F
A (Race)	1	5.26	.93	3.31	.62	10.51	1.53
B (Efficiency)	1	247.51	43.77**	257.56	48.30**	142.51	20.72**
AB	1	1.06	.19	1.81	.34	28.06	4.08**
Within	156	5.65		5.33		6.88	

*All analyses tested at .05 level

** $p < .05$

TABLE 8

ANALYSIS OF VARIANCE ON DEPENDENT VARIABLES*

Source	DF	Satisfaction with group performance		Satisfaction with leader performance		Intelligence of the leader	
		MS	F	MS	F	MS	F
A (Race)	1	4.90	.93	.06	.01	1.22	.27
B (Efficiency)	1	275.62	48.42**	85.56	12.20**	152.10	33.80**
AB	1	3.02	.53	6.01	.85	2.50	.55
Within	156	5.69		7.01		4.50	

*All analyses tested at .05 level
** $p < .05$

dependent variable implies that the ratings of the group's efficiency depended upon the efficiency level in use at the time. The magnitude of this finding may be, in part, due to the fact that the particular communication network used (wheel) lends itself to a manipulation of efficiency. This is true because the network imposes a centralized structure upon the group with one person in the position of leadership and all other group members dependent upon him. Efficiency of the group is therefore greatly affected by the efficiency of the leader. The effectiveness of the manipulation may be lessened in more decentralized networks.

Because the main effect, efficiency, was significant, it was necessary to examine the group means to explain the significance. These means are shown in Tables 5 and 6. The Tukey (a) procedure (Winer, 1962) was applied to all possible pairs of means. Results show that the low-efficiency, White-leader group differed significantly ($p < .05$) from the high-efficiency, White leader group. It was also found that the low-efficiency, White-leader group and the high-efficiency, Negro-leader group were significantly different ($p < .05$). Similar significant differences ($p < .05$) were found when comparing the low-efficiency, Negro-leader group with the high-efficiency, White-leader group and the low-efficiency, Negro-leader group with the high-efficiency,

Negro-leader group.

In all of the significant comparisons, efficiency varied between the groups. None of the comparisons within the same efficiency condition were significant, indicating the negligible effect of the leader race variable.

These significant findings are apparently due to the successful manipulation of the leader's efficiency through the use of the Efficiency Index (see Appendix E). Thus it appears that the Efficiency Index was a valid method for controlling and varying the levels of efficiency.

The interaction between race and efficiency was found to be not significant. This may have been due to Ss not associating the leader's race with the efficiency of the group or to the poor sample of Ss.

Dependent Variable 2: Efficiency of Leader

Analysis of the Ss' ratings of the leader's efficiency showed no significant differences between groups due to the race of the leader. Apparently Ss did not consider race an important element in the leader's ability to efficiently solve the problem. These results parallel the findings for ratings of the group's efficiency and similar reasons for the non significant findings are proposed.

A highly significant efficiency effect was found in the analysis of Ss' ratings of the leader's efficiency.

Means for the ratings differed significantly in accordance with the level of efficiency in operation at the time, suggesting, once again, that the Efficiency Index was successfully controlling the variable.

The Tukey (a) procedure was applied to discover which mean comparisons (see Table 5) in the efficiency factor were significant. It was found again that the low-efficiency, White-leader group differed significantly ($p < .05$) from the high-efficiency, White-leader. Similar results ($p < .05$) were found between the low-efficiency, Negro-leader and the high-efficiency, Negro-leader; between the low-efficiency, White-leader and the high-efficiency, Negro-leader; and between the low-efficiency, Negro-leader and the high-efficiency, White-leader. These were the same groups that differed significantly on the variable discussed previously. Again, efficiency seemed to be the variable affecting the significant differences between groups.

As in the variable, efficiency of the group, there was no significant interaction between the leader's race and the level of efficiency in operation. It is possible that Ss may have been extremely conscious of the race variables and reacted to it by suppressing any evidence of prejudice on their part. However, it appears more likely that the relative lack of prejudiced Ss in the sample may have been the cause of the non significant interaction.

In order to investigate this prejudice variable, a
frequency distribution was created for the attitude survey
scores available for the Ss in the study. Fifteen of the
160 Ss had been absent during the survey and no scores were
available for them. This secondary analysis was completed
with unequal N's.

In order to identify groups differing in prejudice,
Ss with scores at the two extremes of the distribution were
systematically identified beginning with the most extreme
cases and moving toward the middle. Ss were selected un-
til at least 10 "prejudiced" and 10 "non prejudiced" Ss
were identified in each treatment condition. Since the
Ss in each group were not evenly distributed on the at-
titude scale, the number of Ss finally selected as pre-
judiced or non prejudiced varied from 10 to 18 per group.

Due to the narrow range and skewness of the attitude
score distribution, the Ss selected last for the prejudiced
group were only 10 points lower in prejudice scores than
the last Ss selected for the non prejudiced group. The
distribution was bimodal but both modes were at or above
the middle score possible on the attitude scale.

To insure that Ss selected by this process were homo-
geneous with respect to prejudice across all four treatments,
the mean attitude scale scores for each group, separated in-
to prejudiced and non prejudiced Ss, were computed. These

means, presented in Table 9, show that within each of the
groups, prejudiced and non prejudiced, the means are fairly
close.

TABLE 9

GROUP MEANS FOR ATTITUDE SURVEY SCORES

Group		N	Mean
Low-efficiency, White-leader	prejudiced	18	84.22
	non prejudiced	10	111.10
High-efficiency, White-leader	prejudiced	12	84.00
	non prejudiced	10	110.50
Low-efficiency, Negro-leader	prejudiced	17	81.00
	non prejudiced	16	112.37
High-efficiency, Negro-leader	prejudiced	16	86.93
	non prejudiced	11	111.00

Within each treatment t tests were computed on three
of the rating variables to identify any significant differ-
ences between ratings by prejudiced and non prejudiced Ss.
Those measures chosen for this analysis concentrated on
the S's perceptions of the leader and the S's satisfaction
with his own role in the group. Therefore these t tests
were not applied to the dependent variables dealing with
perceptions of the group.

The results of the t tests used to compare ratings

of the efficiency of the leader are presented in Table 10.
Findings reveal that within each treatment condition the
means for the prejudiced Ss were always lower than those
for the non prejudiced Ss but only the low-efficiency,
Negro-leader group showed significance (p <.10).

TABLE 10

MEANS FOR RATINGS OF EFFICIENCY OF LEADER

Group		N	Mean	
Low-efficiency, White-leader	prejudiced	18	6.11	t = .64
	non prejudiced	10	6.80	NS
High-efficiency, White-leader	prejudiced	12	8.17	t = .71
	non prejudiced	10	8.70	NS
Low-efficiency, Negro-leader	prejudiced	17	4.17	t = .71
	non prejudiced	16	5.18	p < .10*
High-efficiency, Negro-leader	prejudiced	16	7.00	t = 1.00
	non prejudiced	11	8.27	NS

*p values for all t tests are one tailed

The marginal significance found in the comparison
between prejudiced and non prejudiced Ss in the low-ef-
ficiency, Negro-leader condition shows that Negro leaders,
were rated lower by the prejudiced Ss than by non prejudiced
Ss. This is in agreement with Aronson and Golden's (1962)
findings that prejudiced children were less influenced by

Negro speakers than by white speakers when both were equally unqualified to speak on the usefulness of arithmetic.

One of the reasons prejudiced and non prejudiced Ss in the high-efficiency, Negro-leader group did not differ significantly in their ratings of leader efficiency may be the inappropriateness of the attitude survey. The scale was chosen for use because it had been successfully used before (Kelley, Ferson & Holtzman, 1958). Although it had been favorably reviewed by Shaw and Wright (1967), it was outdated by 13 years. Furthermore, some of the items seemed more pertinent for use in a Southern locality. It should be noted, also, that most students' scores fell at or above the middle of the scores possible reflecting a tendency toward non prejudice. This led to difficulty in separating Ss into prejudiced and non prejudiced groups. Since scores nearly overlapped, it was felt that a true sample of prejudiced Ss was not really obtained.

Dependent Variable 3: S's Satisfaction with His Role in the Group

Ss' ratings of their satisfaction with their role in the group did not vary significantly across treatments due to the race of the leader, but the effect of efficiency was again significant across groups. There was a significant interaction between race and efficiency level, consequently,

no interpretation of the individual main effects can be
made.

In order to investigate the differences between the
means for the main effects in the significant interaction,
an analysis of variance was employed on the simple effects.
Results show that race of the leader had no impact on the
ratings of S's satisfaction with his role under the high-
efficiency condition. However, in the low-efficiency
condition, race was a significant variable (p < .05). The
efficiency variable had a significant impact on Ss' role
satisfaction in both race conditions (p < .05).

Previous studies which measured S's satisfaction
with his role in the group found a strong connection be-
tween the leader's efficiency and the S's satisfaction
(Leavitt, 1951; Shaw, 1954 (a); Cohen, 1961).

However, the significant interaction between race
and efficiency found in this study indicates that leader
efficiency is not the only source of Ss' satisfaction.
Apparently other variables, relevant or irrelevant, are
also working. As the present study showed, Ss in low-ef-
ficiency conditions were less satisfied with their role in
the group where the group was led by a Negro leader. If
this is true, it may partly substantiate Allport's (1961)
statement that the individual's group behavior is partial-
ly determined by his personality, which lies beyond the

group's control. In this case, prejudice is considered an element of personality. Interestingly though, in the high-efficiency condition, the race of the leader was not important. Means for the high-efficiency groups were essentially the same regardless of the leader's race.

This significant interaction between race and efficiency is clearly in agreement with Aronson and Golden's (1962) findings. Their results showed that race, an irrelevant variable, and credibility, a relevant variable interacted to influence sixth graders in changing their opinions about the usefulness of mathematics in future careers. In all groups, they found the Negro speaker, who was low in credibility, rated lower than the White speaker of equal credibility. Credibility was considered a variable capable of producing effects parallel to the effects of efficiency in this experiment.

The means for the prejudiced and non prejudiced groups on the variable, satisfaction with role in group, are shown in Table 11. This time t tests resulted in a significant difference between prejudiced and non prejudiced Ss only in the high-efficiency, Negro-leader condition.

TABLE 11

MEANS FOR RATINGS OF SATISFACTION WITH ROLE

Group		N	Mean	
Low-efficiency, White-leader	prejudiced	18	5.85	t = .21
	non prejudiced	10	5.60	NS
High-efficiency, White-leader	prejudiced	12	6.50	t = .59
	non prejudiced	10	7.30	NS
Low-efficiency, Negro-leader	prejudiced	17	5.59	t = .79
	non prejudiced	16	4.87	NS
High-efficiency, Negro-leader	prejudiced	15	6.94	t = 2.02
	non prejudiced	11	8.64	$p < .05$

Results of these t tests show that prejudiced Ss in the high-efficiency, Negro-leader condition were less satisfied ($p < .05$) with their role in the group than the non prejudiced Ss under the same condition. Another explanation might follow from the Aronson and Golden's (1962) theory that unprejudiced Ss tend to overcompensate when evaluating Negroes. This is a logical explanation since the mean for the non prejudiced Ss in the high-efficiency, Negro-leader, condition was rather high relative to all other group means.

It is interesting to note that significance was not found when examining the means for the Ss in the low-efficiency, Negro-leader condition. In fact, prejudiced

Ss appeared slightly more satisfied with their role in
the group than non prejudiced Ss when the leader was a
Negro.

As suggested earlier, such a result could be due
to poor differentiation between prejudiced and non pre-
judiced Ss culled from the attitude survey distribution.
Few really prejudiced Ss were available and Ss who are on-
ly marginally prejudiced may be satisfied with their role
in the group and yet have prejudiced feelings when rating
items directly related to the leader.

Dependent Variable 4: Satisfaction with Group Performance

Differences between means for the variable satis-
faction with group performance showed no significance due
to the race of the leader. Again, for reasons already men-
tioned in discussion of the other variables, the race of
the leader did not appear to be an important element.
However, efficiency was highly significant. Ss in the
high-efficiency condition were more satisfied with the
group's performance than were Ss in the low-efficiency con-
dition.

Tukey (a) procedures (Winer, 1962), used to pin-
point the means in the efficiency conditions which were
significantly different (see Table 6), showed that the low-
efficiency, Negro-leader group varied from the high-ef-

ficiency, Negro-leader group (p < .05). Other significant
differences were found where different efficiency levels
were involved: low-efficiency, White-leader groups vs.
high-efficiency, White-leader groups; low-efficiency,
Negro-leader groups vs. High-efficiency, White-leader groups;
and low-efficiency, White-leader groups vs. high-efficien-
cy, Negro-leader groups (p < .05). None of the means with-
in the same efficiency level were significantly differ-
ent.

No significant interaction between race and leader's
efficiency level was found (see Table 8).

The significance for the main effect, efficiency,
suggests that group members relied primarily on the re-
levant performance variables when judging satisfaction with
the group's performance. This was not the case when they
rated satisfaction with their own role in the group. These
results also suggest that the peripheral members in a
wheel network may feel little involvement in the performance
of the group, and their satisfaction with their own role is
not dependent on satisfaction with the performance of their
group.

Dependent Variable 5: Satisfaction with Leader's Performance

The race variable, again, was found to be non signifi-
cant when Ss rated satisfaction with their leader's perform-

ance. Lack of significance here is interesting because
this is a direct evaluation of the leader, and yet the ir-
relevant race characteristic made no difference. This
certainly differs from results obtained in persuasion
studies, but it does support the notion that role perform-
ance can be evaluated independent of race (Secord & Backman,
1964).

Results of the analysis of variance on these ratings
of satisfaction with the leader showed a highly significant
effect from efficiency (see Table 8). As expected, $\underline{S}$s were
more satisfied with the leader's performance under high
efficiency conditions than under low efficiency conditions.

Tukey (a) procedures investigated the efficiency ef-
fect to find which means differed significantly (see Table
6). Again, those means in which the level of efficien-
cy varied (H - E, N vs. L - E, N; H - E, W vs. L - E, W;
H - E, W vs. L - E, N; L - E, W vs. H - E, W) were sig-
nificantly different (p < .05) and in no case did race con-
trol the difference.

It appears that $\underline{S}$s evaluated the leader on the basis
of the group's efficiency. Apparently they could tell
that the leader's inefficiency was operating even though
they had no more efficient experience to compare against.
These data support Kendler's (1968) definition of leader-
ship, as "the process of controlling the behavior of a

group seeking to achieve some goal (p. 575)," and his notion that leadership can be evaluated in terms of how well the group reaches its goal. Not only can leaders be evaluated in this way, but apparently they are. Thus, an efficient leader is one who controls the behavior of his group members in such a way as to assure rapid and accurate problem-solving.

No significant interaction was found between race and level of efficiency. This lack of effect may be due to the overpowering influence of the relevant characteristic, efficiency or to the poor sample of prejudiced Ss.

Results of t tests between the means for the prejudiced and non prejudiced Ss' ratings for satisfaction with the leader's performance show that both groups of Ss in the high-efficiency conditions were equally satisfied with their leader, regardless of his race. In the low-efficiency, Negro-leader condition, however, Ss' ratings differed significantly (p < .01). Table 12 presents these findings. Prejudiced Ss were less satisfied with Negro leaders under low efficiency conditions than were non prejudiced Ss under the same treatment.

TABLE 12

MEANS FOR RATINGS OF SATISFACTION WITH LEADER PERFORMANCE

Group		$\underline{N}$	Mean	
Low-efficiency, White-leader	prejudiced	18	5.94	$\underline{t} = 1.15$
	non prejudiced	10	7.20	NS
High-efficiency, White-leader	prejudiced	12	8.25	$\underline{t} = .06$
	non prejudiced	10	8.20	NS
Low-efficiency, Negro-leader	prejudiced	17	4.58	$\underline{t} = 1.31$
	non prejudiced	16	6.06	$p < .10$
High-efficiency, Negro-leader	prejudiced	16	8.31	$\underline{t} = .31$
	non prejudiced	11	8.54	NS

Dependent Variable 6: Intelligence of the Leader

Ss' ratings of the intelligence of the leader did not vary significantly according to the race of the leader. Again, this is an interesting finding because rating of intelligence is a direct evaluation of the leader, but it does not seem to be affected by race. Explanations given for the insignificant race effect on the other variables would apply here.

As shown in Table 8, the Ss' ratings of the intelligence of their leaders were affected by the efficiency manipulation. Those Ss under low-efficiency conditions rated their leaders significantly lower in intelligence than those Ss under high-efficiency conditions, regardless

of the race of the leader. There was no interaction be-
tween race and leader efficiency.

In effect Ss were admitting that race does not af-
fect the intelligence of the leader but that efficiency is
evidence of intelligence. Means were calculated within
each treatment condition for prejudiced and non prejudiced
Ss. These means are presented in Table 13. None of the
means within conditions differ significantly.

TABLE 13

MEANS FOR RATINGS OF LEADER INTELLIGENCE

Group		N	Means	
Low-efficiency, White-leader	prejudiced	18	6.33	t = 1.07
	non prejudiced	10	7.40	NS
High-efficiency, White-leader	prejudiced	12	8.25	t = .83
	non prejudiced	10	8.70	NS
Low-efficiency, Negro-leader	prejudiced	17	7.05	t = 1.22
	non prejudiced	16	5.87	NS
High-efficiency, Negro-leader	prejudiced	16	9.00	t = 1.31
	non prejudiced	11	8.36	NS

These findings are identical with Aronson and Golden's
(1962) findings that low credibility speakers were rated
equally low in intelligence by both prejudiced and non pre-
judiced Ss and high credibility speakers were rated equally

high in intelligence regardless of race.

Dependent Variable 7:   Number of Calls

In order to test the findings of McGinnies and Alt-
man (1959) which showed that prejudiced Ss tend to restrict
communication with Negroes, means for the number of calls
initiated by Ss to their leader were analysed by t tests
(see Table 14).   The means are in the expected direction
for the Negro leader groups, in that prejudiced Ss initiated
fewer calls to leaders under the Negro conditions regardless
of the efficiency level operating at the time, but none of
the differences are significant.

TABLE 14

MEANS FOR THE NUMBER OF CALLS FROM SUBJECTS TO LEADER

Group		N	Means	
Low-efficiency, White-leader	prejudiced	18	1.72	t = .13
	non prejudiced	10	1.60	NS
High-efficiency, White-leader	prejudiced	12	2.08	t = .87
	non prejudiced	10	3.40	NS
Low-efficiency, Negro-leader	prejudiced	17	1.35	t = .81
	non prejudiced	16	2.00	NS
High-efficiency, Negro-leader	prejudiced	16	1.25	t = 1.24
	non prejudiced	11	2.27	NS

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Since this measure was considered a secondary aspect of the study, and because McGinnies and Altman's (1959) results were only expected to appear in the prejudiced Ss under the Negro-leader condition, no analysis of variance was computed.

Perusal of the means show an unusually large mean number of calls sent by non prejudiced Ss in the high-efficiency, White-leader condition. This effect is not handled by McGinnies and Altman and remains unexplained.

CONCLUSION

Across all six dependent variables measured by the rating scale, efficiency was highly significant. Apparently the Efficiency Index was effective. Future studies therefore could manipulate efficiency as an independent variable. It might also be possible that the Ss placed in leadership positions in centralized networks could be rated for efficiency by analysis of their messages in accordance with the Efficiency Index.

As a result of successful control of efficiency, future studies may find it easier to study other irrelevant leader characteristics such as sex, religion, national origin, stature, appearance, etc. It is hypothesized that some of these variables may also influence Ss' perceptions of their leader and, in turn, influence their interaction in the group. Results of the present study suggest that variables may be effectively studied in communication networks where leader characteristics both relevant and irrelevant can be manipulated.

Research planned along these lines might consider assigning Ss to various treatments based on their attitude scale scores. However, a more sensitive attitude scale is needed in order to secure a better sample of Ss who are really "more prejudiced" and "less prejudiced."

SUMMARY

The irrelevant leader characteristic, race, was manipulated in two conditions of leader efficiency. On all dependent variables, the race of the leader was not found to be significant. Efficiency, as controlled by the Efficiency Index, was found to have a highly significant impact on the six dependent variables measured by rating scales but did not significantly influence the number of calls initiated by Ss to the leader. An interaction between race and efficiency was found to be significant only for ratings by Ss of their satisfaction with their role in the group.

In a small minority of the conditions, prejudiced and non prejudiced Ss gave significantly different ratings on the dependent variables. Results were interpreted in light of the fact that the sample contained very few Ss classified as prejudiced by the attitude measure administered before the study.

Suggestions for future research centered on the use of the Efficiency Index, developed in the present study, for manipulating or evaluating leader efficiency while studying the effect of other relevant and irrelevant characteristics.

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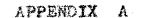Heise, G., & Miller, G. Problem-solving by small groups. Journal of Abnormal Social Psychology, 1961, 46, 327-335.

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APPENDIX A

RATING FORM

POST COMMUNICATION QUESTIONNAIRE

CIRCLE ONE NUMBER EACH   NAME _____

On a ten point scale where 0 means very low and 10 means very high, rate:

a. the efficiency of your group   0 1 2 3 4 5 6 7 8 9 10

b. the efficiency of your leader   0 1 2 3 4 5 6 7 8 9 10

c. your satisfaction with your role in the group   0 1 2 3 4 5 6 7 8 9 10

d. your satisfaction with the group's performance   0 1 2 3 4 5 6 7 8 9 10

e. your satisfaction with your leader's performance   0 1 2 3 4 5 6 7 8 9 10

f. the intelligence of your leader   0 1 2 3 4 5 6 7 8 9 10

APPENDIX B

INSTRUCTIONS

In this experiment, you are a member of a problem-solving group. There are 5 members in your group – a leader and four assistants. You, as an assistant, can communicate with your leader and he can communicate with you by telephone. But you can not communicate with the other assistants. Your communication net looks like this:

The arrows represent the telephone channels connecting you and your leader. You are in position _____.

At any time during this experiment, you can pick up your telephone and attempt to contact your leader. But it is quite possible that your leader's phone line may be busy since the other three assistants have the same prerogative. Don't give up! Keep trying. Remember, this is a group problem and everyone has information essential for reaching a solution.

The problem to be solved deals with a series of 6 symbols. They are:

$$\diamond \quad \square \quad \bigcirc \quad * \quad \triangle \quad +$$

Five of these symbols are systematically assigned to each of you for each trial, so that between the members of your

group there will be only one common symbol on each trial. It is the group's problem to discover this symbol. Naturally, a symbol that you are missing, can't be the correct answer.

All in all, there will be ten different trials. The 5 symbols for each trial are printed on the backs of the numbered cards on the table. The numbers represent the ten trials.

When the signal is given to start the trial, turn the proper card over and begin communicating.

Each time you contact your leader, begin talking by identifying yourself by your letter. For example, "A, this is B". The trial ends when everyone has received and agreed upon the common symbol. A signal will denote the official end of the trial. Your leader will let you know what the start and stop signals are.

Be sure you write your answer next to the proper number on the pad on your table. Remember, this is a group problem and you all must agree on the answer before the trial ends.

After the ten trials are completed, you will be asked to fill out a brief questionnaire. Please remain in your room until the experimenter comes to collect the questionnaire. At that time, you will be given a card crediting you for participating in this experiment. Be sure to give the card to your teaching assistant.

In order to establish a more personal working relationship between the members of the group, you will be given a profile of your leader. Attached to this sheet is a blank profile form for you to complete. This will be collected and given to your leader so that he will have some idea of the people who are his assistants. Please fill it out now. The experimenter will arrive in a moment to collect it from you and give you your leader's profile. At that time she will answer any questions you might have about the experiment.

APPENDIX C

PROFILE FORM

COMMUNICATION MEMBER PROFILE

NAME _____

ADDRESS _____

SOCIAL SECURITY NUMBER _____

TELEPHONE NUMBER _____

SEX _____ COLLEGE GRADE LEVEL _____ RACE _____

PLACE OF BIRTH _____

DATE OF BIRTH _____

COLLEGE ORGANIZATIONS _____

_____

COMMUNITY ORGANIZATIONS _____

_____

INTERESTS, HOBBIES _____

_____

COLLEGE MAJOR _____ MINOR _____

PLANNED FIELD OF EMPLOYMENT _____

APPENDIX D

HIGH EFFICIENCY SCRIPT

Pre-trial Communication

Hi! The signal for starting the trials will be two rings and the signal for ending the trials will be three rings.

(signal)

Trial 1:

1. Check your cards and make sure they're in numerical order.

2. Do you have a $+$?

3. The answer is the $+$, I guess. We were really just plain lucky that time.

(signals)

Trial 2:

1. We must have really been lucky last time. Are you sure you're using card two?

2. Do you have the $\bigcirc$ and the $\triangle$?

3. Do you have the $\square$ and the $\lozenge$?

4. Do you have the $+$ and the $\ast$?

5. The answer is the $\ast$.

(signals)

Trial 3:

1. Do you have the $\bigcirc$, $\triangle$, $\square$?

2. The answer is the $\bigcirc$.

(signals)

Trial 4:

1. This is trial 4, right? Let's try something different; whenever I call you, I'll ask for all the symbols. Then

I'll figure the answer out and call you back. O.K.?
I'll check and see if that's all right with the others
and get back to you.

2. What do you have?

3. The answer is the ◇ . (Someone should correct you and
when he does, you say, "I must have made a mistake. I'll
check and call you back.")

4. I made a mistake. The answer is the ○ . Be sure to
change the answer on your pad.

(signals)

Trial 5:

1. Sorry about that mix-up last time. There are so many
symbols to check. What do you have? (pause a minute as
if checking the symbols)

2. Double check the ◇ .

3. The answer is the ◇ .

(signals)

Trial 6:

1. What do you have? (pause a minute as if checking symbols)

2. It sure is hard to check all of these symbols. Are you
sure you have the ◇ ?

3. The answer is the ◇ .

(signals)

Trial 7:

1. (Call B and C and ask what time it is)

2. What do you have? (pause several minutes as if check-
ing the answers).

3. The answer is the + .

(signals)

Trial 8:

1. (Call D and E and ask what time it is)

2. What do you have? (pause several minutes as if check-
   ing the answers).

3. The answer is the △ .

                    (signals)

Trial 9:

1. Let's try something faster. What don't you have?

2. The answer is □ .

                    (signals)

Trial 10:

1. This is much better for me. What don't you have?

2. The answer is * .

                    (signals)

LOW EFFICIENCY SCRIPT

Pre-trial Communication

Hi! The signal for starting the trials will be two rings and the signal for ending the trials will be three rings.

(signal)

Trial 1:

1. Did you hear the signal? Good.

2. Do you have a + ?

3. Do you have a ○ ?

4. Are you sure you have a ○ ?

5. Are you sure you have a + ?

6. I can't figure this out. Everyone seems to have both the + and the ○ . Can we have two common symbols?

7. The answer is + .

(signals)

Trial 2:

1. O.K. Do you have a ◇ ?

2. Do you have a □ ?

3. Do you have an ✳ ?

4. Here we go again. Do me a favor. Make sure you're using card two.

5. Everyone has both. Let's start again. Wait! Someone's signalling me. I'll get back to you.

6. That other guy is really goofing me up. He keeps thinking we're looking for the missing symbol. Hold on, I may be able to figure this out anyway.

7. If you have an ✳ , that's the answer.

(signals)

Trial 3:

1. I think I straightened that guy out. Now remember, we're looking for the symbol we all have.

2. Do you have a △ ?

3. Do you have a ○ ?

4. Do you have a ◇ ?

5. Do you have a + ?

6. Do you have an ✳ ?

7. Do you have a □ ?

8. O.K. What's going on this time? Are you using card three?

9. Let's try again. Do you have a □ ?

10. Do you have a △ ?

11. Do you have a ○ ?

12. The answer is ○ .

(signals)

Trial 4:

1. This is the fourth trial. Let's try something different. What do you have?

2. Something's wrong. Do you have an ✳ ?

3. Do you have a ◇ ?

4. Do you have a □ ?

5. Do you have a ○ ?

6. The answer must be the ○ .

(signals)

Trial 5:

1. This is the fifth trial, right? Wait, someone's calling me. I'll get back to you.

2. Do you have a □ ?

3. Do you have a ◇ ?

4. Do you have both a □ and a ◇ ?

5. The answer is ◇ .

(signals)

Trial 6:

1. One of the guys has his cards out of order. Have you got the sixth card up?

2. Have you got a + ?

3. Looks like I made a lucky guess this time. Everyone seems to have + , but let's recheck it before I say for sure. You do have the + .

4. The answer is the + .

(signals)

Trial 7:

1. That was a fast trial. Do you think we can do it again? Let's try. Do you have a △ ?

2. Do you have a ○ ?

3. Doesn't look like we're going to do it this time. Any ideas?

4. Let's check what we know so far. You do have ○ and △ don't you?

5. The answer must be the ○ . (Someone should correct you and if he does say, "I better check again.")

6. Sorry, I made a mistake. The symbol must be the △ .

(signals)

Trial 8:

1. Which trial is this? I messed my cards up.

2. Have you got △ , ○ , ✳ ? Are you sure?

3. Have you got □ , + , ◇ ?

4. Are you missing a △ ?

5. Are you missing a ○ ?

6. Are you missing a □ ?

7. The answer is the □ .

(signals)

Trial 9:

1. Let's get this over fast. Are we running out of time? Hold on.

2. Let's try another way. What do you have?

3. Are you sure you have a ◇ ?

4. The answer is ◇ .

(signals)

Trial 10:

1. I think I'm finally getting the idea. What do you have?

2. Check the ✳ .

3. The answer is the ✳ .

(signal)
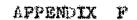
APPENDIX E

EFFICIENCY INDEX

MESSAGES	POINT VALUE

A. Organizational messages   4

B. Noise messages:

   1. Sent by leader   0

   2. Correction of noise messages sent by $\underline{S}$ 4

C. Informational messages:

   1. What don't you have   5

   2. What do you have (when representing all 5 symbols).   5

   3. Do you have (1) symbol, if already accounted for (0) symbols   1

      Do you have (1) symbol, if already accounted for (1) symbol   2

      Do you have (1) symbol, if already accounted for (2) symbols   3

      Do you have (1) symbol, if already accounted for (3) symbols   4

      Do you have (1) symbol, if already accounted for (4) symbols   5

      Do you have (1) symbol, if already accounted for (5) symbols   3

   4. Do you have (2) symbols, if already accounted for (0) symbols   2

      Do you have (2) symbols, if already accounted for (1) symbol   3

      Do you have (2) symbols, if already accounted for (2) symbols   4

      Do you have (2) symbols, if already accounted for (3) symbols   5

Do you have (2) symbols, if already accounted
for (4) symbols   3

Do you have (2) symbols, if already accounted
for (5) symbols   1

5.   Do you have (3) symbols, if already accounted
for (0) symbols   3

Do you have (3) symbols, if already accounted
for (1) symbol   4

Do you have (3) symbols, if already accounted
for (2) symbols   5

Do you have (3) symbols, if already accounted
for (3) symbols   3

Do you have (3) symbols, if already accounted
for (4) symbols   1

Do you have (3) symbols, if already accounted
for (5) symbols   0

6.   Do you have (4) symbols, if already accounted
for (0) symbols   4

Do you have (4) symbols, if already accounted
for (1) symbol   5

Do you have (4) symbols, if already accounted
for (2) symbols   3

Do you have (4) symbols, if already accounted
for (3) symbols   1

Do you have (4) symbols, if already accounted
for (4) symbols   0

Do you have (4) symbols, if already accounted
for (5) symbols   0

7.   A correct answer   5

8.   An incorrect answer   0

APPENDIX F

ATTITUDE SURVEY

PLEASE DO NOT MARK ON THIS PAPER. BLACKEN IN THE APPROPRIATE BLANK ON THE ANSWER SHEET.

This is not an intelligence test nor an information test. There are no "right" or "wrong" answers. The best answer is your HONEST, FRANK opinion. You can be sure that whatever your opinion may be on a certain issue, there are some people who agree and some who disagree. This is what we want to find out: How is public opinion really divided on these socially important topics? The Speech Department, which is conducting this survey, is canvassing the Freshman Class through the psychology 101 discussion groups. We sincerely thank you for your help.

It must be emphasized that the sponsors of this survey do not necessarily agree or disagree with the statements in it. We have tried to cover a great many points of view. We agree with some of the statements and disagree with others. Similarly, you will probably find yourself agreeing strongly with some of the statements, disagreeing just as strongly with others, and being perhaps more neutral about still others.

We ask you to:

a. Read each statement carefully and mark it according to your first reaction. It isn't necessarily going to take a lot of thought.

b. Answer every question.

c. Give your personal point of view. Don't talk about the questions with anyone until you have finished.

d. Be as sincere, accurate and complete as possible.

For every item please blacken the appropriate number on the answer sheet according to the following code:

1. strongly agree

2. agree

3. uncertain or undecided

4. disagree

5. strongly disagree

1. The prospect of interracial marriage is repulsive to me.

2. The Negro will remain ignorant and superstitious despite equal educational opportunities.

3. The fact that there is no racial segregation in certain European countries indicates that desegregation can be made to work here.

4. I would not mind sharing a table with Negroes in a crowded cafeteria.

5. The best way to solve the race problem is to encourage intermarriage so that there will eventually be only one race.

6. I would not object to dancing with a good Negro dancer.

7. I would not hesitate to join a fraternity or sorority which admitted Negroes.

8. If a Negro were elected to a public office, social pressure would prevent his doing a good job.

9. The Negro race will eventually reach the cultural and intellectual level of White people.

10. Negroes living in White neighborhoods lower the standards of cleanliness.

11. The trouble with letting Negroes into White schools is that they would gradually give them a typical atmosphere.

12. If Negroes are allowed to share all public facilities and institutions with White people, they will soon become arrogant and overbearing.

13. I would accept a traffic ticket as graciously from a Negro as from a White police officer.

14. Admitting Negroes to White schools would not work because most Negroes do not have the necessary background to keep up with White students.

15. If one of my best friends married a Negro, I would stop inviting him to my house.

16. Negroes are often dishonest and would increase if admitted to White schools.

17. The Army's desegregation policy is an advance toward inter-racial understanding.

18. I would not object to participating in school athletics with Negroes.

19. One of the reasons for maintaining segregation is that the Negro will be able to find more equal opportunities with his own people.

20. Separate churches for White and Colored people should be maintained since church membership is a matter of individual choice.

21. A Negro Army officer could never do a good job leading White soldiers because they might lack confidence in him.

22. I would not object to sharing a public swimming pool with Negroes.

23. Negroes should be allowed to enter any University they choose.

24. Negroes should be allowed to occupy any seat they can afford at a concert, sports event, or other public program.

25. I would not mind having my children taught by a Negro school teacher.

26. I would consider dating a Negro, providing he or she met all of my other standards.