Return this book on or before the
Latest Date stamped below.

BUREAU OF RESEARCH AND SERVICE
College of Education
University of Illinois
Urbana, Illinois

THE RELATIONSHIP OF INTERPERSONAL PERCEPTION TO EFFECTIVENESS IN BASKETBALL TEAMS

Fred E. Fiedler, Walter Hartmann, and Stanley A. Rudin
College of Education, University of Illinois

Technical Report No. 3

- - - -

SOME EMPIRICAL STUDIES OF THE RELIABILITY OF SOCIAL PERCEPTION SCORES

Stanley A. Rudin, Irving Lazar, Mary E. Ehart and Lee J. Cronbach
College of Education, University of Illinois

Technical Report No. 4

May, 1952

THE RELATIONSHIP OF INTERPERSONAL PERCEPTION TO

EFFECTIVENESS IN BASKETBALL TEAMS

Fred E. Fiedler, Walter Hartmann, and Stanley A. Rudin

College of Education, University of Illinois

Technical Report No. 3

- - - -

SOME EMPIRICAL STUDIES OF THE RELIABILITY OF

SOCIAL PERCEPTION SCORES

Stanley A. Rudin, Irving Lazar, Mary E. Ehart and Lee J. Cronbach

College of Education, University of Illinois

Technical Report No. 4

THE RELATIONSHIP ON INTERPERSONAL PERCEPTION TO
EFFECTIVENESS IN INDUSTRIAL'S TEAM

Fred E. Fiedler, Walter Hartmann, and Stewart A. Rudin
College of Education, University of Illinois

Technical Report No. 1

* * * *

SOME EMPIRICAL STUDIES OF THE INTERPERSONAL
SOCIAL PERCEPTION SCORES

Stanley A. Rudin, Irving Lorge, Maria G. Clark and Carl J. Crutcher,
College of Education, University of Illinois

Technical Report No. 2

May, 1952

THE RELATIONSHIP OF INTERPERSONAL PERCEPTION TO EFFECTIVE-NESS IN BASKETBALL TEAMS[1]

Fred E. Fiedler   Walter Hartmann   Stanley A. Rudin

College of Education, University of Illinois

The Problem

An ever increasing portion of our industrial and military effort is being directed and carried out by teams rather than by single individuals. For this reason, problems of adjustment to the complex demands which team work presents are becoming more and more urgent. The explanation and prediction of group effectiveness is thus of practical importance to those who are charged with assembling and directing teams as well as being of considerable theoretical interest to social psychology.

Depending on the task, factors such as individual ability, visual acuity, height, and many others, will influence team effectiveness to a greater or lesser degree. However, group products are necessarily also a function of fruitful cooperation and team spirit among its members. These psychological factors seem to depend on the ability or willingness of each team member to anticipate the requirements of others, to predict their behavior, as well as to make his own needs known to them.

Previous studies have suggested that most persons' perceptions of others tend to be emotionally charged. Predictions as to what others will do or think

---

are generally inaccurate, because they are distorted not only by real error, but also by the individual's needs (e.g., 6; 10, pp. 65-66). While one person's perception of another individual will determine his attitudes toward and his expectations of him, the perception itself is, in some measure, a product of the perceiver's inner needs. Thus, a member of a group will contribute relatively little to solving the group task if he perceives his relationship to his colleagues to be one in which he attains rewards for behavior which does not primarily contribute to the group task. For example, a member of a basketball team may perceive his teammates as appreciating him for his horseplay or his pleasant manner rather than for his skill as a player. He will then behave in a manner which he perceives to lead to rewards, but which is not primarily designed to contribute to winning games.

The importance of interpersonal perception is also demonstrated in recently published studies on therapeutic relationships (5) and interpersonal relations in a social group (6). These studies presented techniques for measuring interpersonal perception and suggested that certain of these measures, especially the so-called "assumed similarity measures," are correlates of liking and warmth in interpersonal relationships. These measures have been obtained by means of Q-technique descriptions (13) or forced-choice modifications of Q-technique, and will be discussed in greater detail below.

In the present investigation we have gone one step beyond previous studies. We attempt to relate interpersonal perception variables to team effectiveness. We hypothesize that these variables measure dimensions of interpersonal relationships which affect communication and coordination in teamwork, and that these variables will therefore differentiate good from poor teams.

Design of this Investigation

Selection of Groups

Some tasks, such as steering committee work or group research, require intensive personal interaction from team members. Other group tasks, such as

assembly line production or military drill require little or no personal inter-
action. Moreover, interpersonal relationships among team members required by
different tasks vary in quality as well as degree. Some tasks, such as
committee work or group research, demand constant interaction over extended
periods of time; other tasks, such as assembly line production or military
close order drill, require personal interaction only on occasion. A large
group of research workers will require a different type of interpersonal
relationships than that of, say, an ad hoc committee planning an office party.
These considerations led us to conclude that interpersonal perception probably
influences the productivity of groups in some tasks more than in others. Our
understanding is not yet sufficiently advanced to permit prediction of the tasks
in which this influence will be greatest. The major consideration in selection
of subjects was therefore the availability of an adequate sample of small
groups and an acceptable criterion of their effectiveness.

These requirements were met by high school basketball teams. The
squads are composed of from 9 to 18 players. These are chosen by the coach
from a larger pool of interested boys competing for places on the first team.
In the Midwest, where this study was done, interest in, and enthusiasm for
basketball are almost proverbial, and ego-involvement connected with winning
of games and the reality of the situation to players and coaches can be
safely assumed.

Our first sample consisted of 14 teams, totaling 178 subjects (Ss), who
were tested at the beginning of the season before more than two games had
been played.

The Instrument

The tests we used were in the form of forced-choice questionnaires
which permitted various quantitative comparisons between personality descrip-
tions. These questionnaires consisted of 100 descriptive statements grouped

into 20 blocks of five statements each; we attempted to construct the blocks so that statements within each block would be equally acceptable on the average, but descriptive of different personality dimensions.

The items themselves came from a small study on the values and the idiom used by high school boys in describing themselves and others. Three project members individually interviewed twelve male high school seniors for this purpose. Each boy was asked to think about some persons whom he liked and some whom he disliked; some with whom he would like to work and some with whom he would not like to work. The student was then asked to describe the persons of whom he was thinking; he was also asked to give a description of himself. The content of these descriptions was used as the basis for the test statements.

One block of statements is given as an example.

	Most	Least
2. a) I find it easy to understand what others are trying to tell me.		
b) People think I am a hard worker.		
c) I don't mind losing my temper when provoked.		
d) I like people who don't worry about me.		
e) People often look to me for leadership.		

In a self description S would answer these statements by making an X in the left square opposite the statement which S considered most characteristic of himself, and an X in the right square opposite the statement he considered to be least characteristic of himself.

Test Procedure and Instructions

After making appropriate arrangements with coaches and school authorities, two project members went to each of the 14 schools and explained the general purpose of the research to team members and coaches. They stressed that all test responses of Ss would be kept confidential, and that the results would in no way influence the basketball careers of Ss or of their teammates. Although players were urged not to take the test unless they were willing to

cooperate, all team members agreed to participate in the research.

In addition to interpersonal perception tests, two sociometric measures were collected. The work-companion sociometric asked players to name the three team members - not necessarily the best players - "with whom you can cooperate best."* Next, "list the three with whom you can cooperate least well during games."** The friendship sociometric asked S to "list the two persons on your team whom you personally like best", and "the two whom you personally like least well on your team."

The interpersonal perception tests were administered by giving each person four questionnaires containing the same blocks of statements. Players were instructed to (1) "describe yourself," (2) "describe how you would ideally like to be," (3) "predict how the person with whom you can cooperate best will describe himself," and (4) "predict how the person with whom you can co- operate least well will describe himself."

The first questionnaire was to be filled out by marking the one statement in each block which S considered to be <u>most</u> characteristic of himself and the one statement he considered to be <u>least</u> characteristic of himself. The other three questionnaires were to be marked similarly, except as S would ideally like to be; as he predicted his most positive choice; and as he predicted his most negative choice would answer the questionnaire.

Several precautions were used in the administration of the instruments. The order of administration was

      (a) filling out a code sheet with name, school, and other information;

      (b) the self-description questionnaire (s);

      (c) the ideal-self questionnaire (i);

      (d) the work-companion sociometric;

---

    *"positive choices"

    **"negative choices"

(e) the prediction of the positive choice's self description (p);

(f) the prediction of the negative choice's self description (n);

(g) the liking sociometric.

This order served to introduce a break between the first two descriptions, s and i, and the predictions, p and n. The administration of the liking socio-metric at the end was designed to keep work and liking sociometrics as independent as possible. Furthermore, while the pages were identical from questionnaire to questionnaire, the sequence of pages was rotated. As a result, many Ss did not realize that blocks remained the same in all question-naires. Finally, to prevent copying of previous responses, each questionnaire was collected and checked before the next questionnaire was handed out.

The Criterion

Group effectiveness was measured by proportion of league games a team had won as of December 15, 1951. This is approximately when each team had played from 10-12 games. This date permitted analyis of the first sample ear-lier, so that we could collect additional data for the purpose of cross-validation at the end of the season.

In general, small schools are handicapped by having fewer eligible stu-dents who are prospective basketball players. Coaches in small schools also have many more additional teaching duties than do coaches in large schools. However, teams compete in leagues with other neighboring schools of comparable size and the competition within leagues tends to equalize some of the differences which favor large schools.

Interpersonal Perception Scores

In the scoring procedure for conventional tests, scores are obtained by comparing Ss response with the "right" response of a key. The present scores, on the other hand, are obtained by comparing (correlating) the responses on one questionnaire with those on another. This follows the usual correlation-between-persons, or Q-technique rationale (13).

In this investigation we are dealing with two general types of measures, the <u>intra</u>-person scores, which are obtained by correlating two questionnaires of the same person, and the <u>inter</u>-person scores, which are obtained by correlating the questionnaires filled out by two different persons. We shall be particularly interested in the first type, the so-called "assumed similarity measures." These are listed immediately below, followed by the inter-person scores. The tentative interpretations are based in part on evidence from previous studies and will be discussed more extensively in a subsequent section.

Intra-person scores

a. <u>ASp</u> - a measure of assumed similarity obtained by correlating the subject's self-description and his prediction of the self-description of his <u>positive</u> choice. This measure appears to be related to personal warmth and liking for the chosen person. according to previous research. (Cf. 5, 7).

b. <u>ASn</u> - a measure of assumed similarity obtained by correlating the subject's self-description with his prediction of his <u>negative</u> choice. A high ASn score may, on the basis of the interpretation in <u>a</u> above, indicate a feeling of personal closeness and warmth for the <u>negative</u> choice.

c. <u>ASIp</u> - a measure of assumed similarity obtained by correlating the subject's description of his ideal with his prediction for his positive choice's self-description. This measure is presumably related to idealization of a person. (Cf. 5, 7).

d. <u>ASIn</u> - a measure of assumed similarity, obtained by correlating the subject's ideal self-description with his prediction for his negative choice's self-description. On the basis of the suggested interpretation in <u>c</u> above, ASIn would imply a measure of idealization of the negative choice; especially if it is high, it may well measure an unconscious attitude.

e. <u>ASo</u> - a measure obtained by correlating the subject's prediction for his positive choice with his prediction for his negative choice. This measure

is interpreted as "set" to differentiate people into discrete types. (Cf. p. 17ff.)

Some inter-person scores

f. RSp - a measure of real similarity, obtained by correlating the S's self-description with his positive choice's self-description.

g. RSpi - a measure of real similarity, obtained by correlating the S's self-description with his positive choice's ideal self-description.

h. RSni - a measure of real similarity, obtained by correlating the S's self-description with his negative choice's ideal self-description.

i. RSIpi - a measure of real similarity, obtained by correlating the S's ideal self-description with his positive choice's ideal self-description.

j. PAp - a measure of predictive accuracy for the positive choice, obtained by correlating the S's prediction of his positive choice and that individual's actual self-description.

Relation of Perception Measures to Criteria

This investigation sought to determine which, if any, interpersonal perception phenomena are related to group effectiveness. We used basketball teams as subjects and measured group effectiveness in terms of the proportion of games a team had won. We measured interpersonal perception by means of forced choice questionnaires which Ss took with different instructions describing themselves and their ideal, and predicting their positive and negative choices on work-companion sociometrics.

The test of our hypothesis called, therefore, for correlating various interpersonal perception scores with the criterion, namely the proportion of games won. We followed two major procedures. One procedure is based on the assumption that team members of an effective team will, on the average, perceive each other differently from members of ineffective teams. For this reason, we correlated the team median of various perception scores with the criterion. As can be seen from the first column on Tables 1 and 2, correlations between the criterion and median scores are generally near zero, and none

correlate significantly with the criterion.

Our second procedure assumes that certain individuals are most repre-sentative of the group's attitudes, and are perhaps more instrumental than others in the team's effectiveness. We have here used the scores of team members who obtained the greatest number of positive work-companion votes. We have also taken those who received the greatest number of work-companion rejections. These correlations are presented in the second and third columns of Tables 1 and 2. The scores of the team's "most preferred co-worker" correlate with the criterion significantly in the negative direction.

Tables 3 and 4 give the medians and ranges of the Q-correlations used as measures. It is seen from Table 3 that the assumed similarities to the positive choice are all considerably greater than those to the negative choice, which confirms previous findings (6).

Previous studies (5, 6) suggested high ASp and ASIp to be related to warm, empathic interpersonal relationships. We expected to find these relationships - hence also high ASp and ASIp - to be prevalent in effective teams. The present findings are thus in the direction which was not anticipated. They appear to indicate that interpersonal relationships between the most preferred co-operator and his positive choice tend to be relatively distant and emotionally uninvolved. As will be discussed below, this interpretation is supported by the relatively low ASo in most preferred team members of good teams.

In contrast to Assumed Similarity measures, where split-half reli-abilities of .60 and above were found, inter-person measures had extremely low split-half reliabilities (Cf. 12). Significant correlations with the criterion could therefore not be expected, and none were obtained.

The significant correlations in Table 1 are, of course, based on a small sample of teams. In addition, these correlations are the survivors of a considerable number of exploratory measures. Some of these measures are

TABLE 1

CORRELATIONS BETWEEN THE CRITERION AND <u>INTRA</u>-PERSON PERCEP-
TION SCORES IN 14 BASKETBALL TEAMS

Assumed Similarity Measure	C o r r e l a t i o n (rho) b e t w e e n		
	median score in team and criterion	score of most preferred co-worker and criterion	score of most rejected co-worker and criterion
ASp	-.25	-.73 **	-.13
ASn	.12	-.26	.50
ASo	.00	-.78 **	.50
ASIp	-.07	-.62 *	-.24
ASIn	.03	-.18	.20

* P <.05   according to Olds' tables (11).

**P < .01   "   "   "   "

TABLE 2

CORRELATIONS BETWEEN THE CRITERION AND <u>INTER</u>-PERSON PERCEP-

TION SCORES IN 14 BASKETBALL TEAMS

Inter- Person Measure	C o r r e l a t i o n (rho) b e t w e e n		
	median score in team and criterion	score of most preferred co- worker and criterion	score of most rejected co- worker and criterion
RSp	-.31	.13	.00
RSpi	.23	.28	.30
RSIpi	.25	-.16	-.12
RSni	.16	-.16	-.12
PAp	.23	.07	.12

TABLE 3

MEDIANS AND RANGES OF ASSUMED SIMILARITY SCORES*

IN FIRST SAMPLE

Assumed Similarity Measure	Team Medians			Scores of most preferred players			Scores of most rejected players		
	Mdn.	Range		Mdn.	Range		Mdn.	Range	
ASp	.31	.18	.40	.28	-.20	.62	.40	-.18	.65
ASn	.08	.01	.30	.14	-.40	.48	.09	-.05	.25
ASo	.10	-.02	.19	.06	-.42	.48	.10	-.42	.45
ASIp	.30	-.20	.48	.32	-.28	.72	.21	-.12	.75
ASIn	.02	-.12	.18	.07	-.50	.50	.02	-.32	.48

* Expressed in Q correlations

TABLE 4

MEDIANS AND RANGES OF REAL SIMILARITY SCORES*

IN FIRST SAMPLE

Inter-Person Measure	Team Medians			Scores of most preferred players			Scores of most rejected players		
	Mdn.	Range		Mdn.	Range		Mdn.	Range	
RSp	.16	.05	.35	.16	-.10	.45	.13	-.05	.32
RSpi	.18	.02	.28	.20	-.08	.40	.18	-.10	.30
RSIpi	.22	.01	.35	.22	-.10	.45	.19	-.12	.50
RSni	.12	.05	.28	.12	-.15	.40	.12	-.05	.35
PAp	.18	.10	.30	.20	-.08	.32	.22	.02	.40

* Expressed in Q correlations

listed, others were tentatively tried and quickly discarded. A cross-validation of the significant correlations from the first sample, therefore, became essential.

Cross Validation Study

The second study was made solely for the purpose of confirming relation-ships which were significant at the 5% level or below in the first study, i.e. on measures ASp and ASo of the most preferred co-worker.

Since ASp correlated .83 with ASIp (N=70), ideal-self-descriptions were not collected for the second sample. The only other major modifications were in the method of collecting the sample and testing significance. With the assistance of two basketball experts,[2] we selected, toward the end of the season, 9 teams which had had a predominantly winning season and 9 teams which had had a predominantly losing season, and requested their co-operation. These came from the upper and lower third of a roster of over 50 teams. We then tested 7 "good" teams and 5 "poor" teams from which we had gotten permission to test. Since the teams were dichotomously selected, point biserial correlations were here used to estimate the degree of the relationship. The significance of the difference between the scores of "good" and "poor" teams was tested by the usual t- test; inspection of the data revealed that there is no evidence that the conditions for applying a t-test are not met. With these small samples and the not very high reliability of the scores, .62 for ASp, .61 for ASo (12), the probability level must, of course, be interpreted very cautiously.

As can be seen from Table 5, the point biserial correlation between the criterion and ASo is -.58, significant below the 3% level. ASp of the most

---

preferred co-workers is not significant even though the correlation is in the
anticipated direction. We have plotted the measures ASp and ASo of the most
preferred team members from good and poor teams. (See Figure 1) One team,
marked O, is rather unusual since it contained two brothers who chose
each other and were also chosen by almost everyone of their teammates.
Deleting this team raised the correlations for ASp and ASo to $-.34$ and $-.63$,
respectively. While the significance of the findings based on eleven teams
cannot be interpreted, the correlations indicate clearly that further explorations
with ASp are justified. Since AS and ASI behaved similarly in relation to the
criterion and correlate highly, ASIp might also be investigated further as a
possibly promising source for prediction.

Table 6 gives the ranges and medians for this sample. As can be seen,
ASp is consistently greater than ASn.

At the end of the season, we also obtained coaches' judgments on their
players. We asked coaches to name the most valuable and the least valuable
players in their teams and then compared these judgments with the team's
work-companion sociometrics as well as the players' ASp and ASo scores.
These comparisons were made since it seems important to know (a) whether
coaches base their judgments of "valuable" on the same factors on which teams
judge good co-operators, and (b) whether their judgments of "valuable" take
ASp and ASo of players into account.

To answer our first question we obtained the sociometric work-companion
rank of the "most valuable" and the "least valuable" players for each team.
The hypothesis of no relationship can be tested by means of a sign test (4).
In the two samples the sign tests are below the 5% and 1% level respectively,
thus indicating that coaches' judgments of "valuableness" are related to
sociometric choices for work-companions.

Our second question can be answered on the basis of point biserial
correlations between coaches' judgments as to most and least valuable players
and the respective ASp or ASo scores of these players. These correlations

TABLE 5

SECOND STUDY: POINT-BISERIAL CORRELATIONS BETWEEN THE CRITERION

AND ASSUMED SIMILARITY SCORES OF MOST PREFERRED

CO-WORKER

Assumed Similarity Measure	$r_{pt. bis.}$	t	p
ASp	-.20	.53	---
ASo	-.58	2.20	.03

TABLE 6

SECOND STUDY: MEDIANS AND RANGES OF ASSUMED SIMILARITY SCORES OF

MOST PREFERRED CO-WORKER

Assumed Similarity Measure	Good Teams (n=7)			Poor Teams (n=5)		
	Mdn.	Range		Mdn.	Range	
ASp	.32	.00	.55	.42	.15	.48
ASo	.15	-.10	.25	.22	.18	.48

FIGURE 1

ASo AND ASp OF MOST PREFERRED CO-WORKER

PLOTTED AGAINST THE CRITERION IN THE 2nd SAMPLE

ASp			ASo		
Q-Corre-lations	Good Teams	Poor Teams	Q-Corre-lations	Good Teams	Poor Teams
.55	o*		.55		
.50			.50		
.45	x	xx	.45		x
.40	x	x	.40		
.35			.35		x
.30	x	x	.30		
.25			.25	xo*	xx
.20	x		.20	x	x
.15	x	x	.15	x	
.10			.10	x	
.05			.05	x	
.00	x		.00		
-.05			-.05		
-.10			-.10	x	

*Team with two popular brothers, who also chose each other.

are not significant, thus indicating that coaches' judgments do not seem to be related to ASp or ASo. These coaches thus appear either to be unable to recognize attributes related to ASp and ASo, or else they give little weight to them.

Discussion

We have found two interpersonal perception scores which correlated with the criterion in both samples, although only one relation reaches the prescribed significance level both times. The study thus supports the hypothesis that interpersonal perception variables, as here measured, play a part in group effectiveness.

Success in basketball is usually not thought to be primarily determined by psychological variables. Physical co-ordination, athletic endurance, etc., are considered to be at least of equal importance and undoubtedly play a major part in the number of games a team wins. Coaches consider their players' height, speed, and free throwing ability in assembling teams. In addition, such extraneous events as sickness, fouls, referee errors, and adverse playing conditions all contribute to the criterion. Our findings suggest, however, that psychological factors make a substantial contribtuion to team effectiveness. It seems reasonable to expect psychological factors to account for a relatively greater portion of the variance in group activities of primarily psychological character, e.g., groups which have the task of integrating new facts, or which are charged with the development of new plans or processes.

We feel that the present findings primarily serve to emphasize that research on interpersonal perception in task groups is a fruitful area for continued efforts. Our discussion will, therefore, be largely concerned with the implications of these findings to further research.

Let us first examine the measures which yielded significant results.

ASo. This measure was obtained by correlating S's prediction of his positive choice for work-companion with his prediction of his negative choice. It is thus the similarity which S assumes to exist between the person with whom he can, and the one with whom he cannot co-operate. Our data indicate that

the most preferred co-worker in effective teams tends to perceive these two persons as dissimilar. On the other hand, the most preferred co-worker in ineffective teams tends to report greater similarity between his positive and his negative choices. ASo may be described as a tendency not to differentiate people. Low ASo may, therefore, reflect an evaluative, critical attitude toward others, as contrasted to that found in warm, empathic interpersonal relations.

We do not know whether a person would have the same differentiating or non-differentiating attitude in all situations. A person who differentiates highly between his fellow basketball players may or may not differentiate similarly among people in a social relationship or in another task. If the differentiating attitude is generalized, it may be comparable to the "authoritarian character" of Adorno, et al (1). The "authoritarian" seems to perceive others as different from himself on many dimensions. It also appears plausible, however, that the tendency to differentiate good from poor co-operators on a basketball squad reflects the perceiver's attitude toward that particular task. A team member who has low ASo perceives a good co-operator as being quite different from a poor co-operator, even when he is responding in terms of personality characteristics which seem to have very little to do with basketball. This appears more likely to occur when co-operation in basketball is of great emotional significance to the player. A task-oriented person, to whom the winning of basketball games is very important, is seen by this interpretation as more likely to have low ASo, and probably also to be less concerned with having warm, interpersonal relationships with others on his team. We have considered the possibility that low ASo is associated with the "need Achievement" of McClelland and others (9).

ASp. In contrast to ASo, ASp is a measure with which we have had some previous experience. We have found it to correlate positively with reputed therapeutic competence (5) and we have found Ss to have significantly higher

ASp to a fraternity brother who is liked than to one who is disliked (6). As has been mentioned above, ASp is higher than ASn also in the present study. On the basis of these studies, we have interpreted high ASp as indicating a warm, accepting attitude toward another person.

Our data do not permit us to draw definite conclusions regarding the relationship of ASp to group effectiveness. A trend is, however, discernible which indicates that low ASp in preferred co-workers is associated with group effectiveness. Better measures and larger samples will be required to confirm the relation between group effectiveness and this measure. If the relationship between relatively low ASp in preferred co-workers and superior team effectiveness is a non-chance one, it implies that relatively cold, emotionally uninvolved attitudes in key personnel are associated with effective teamwork. The findings regarding ASp and ASo are consistent.

Possibly a person could be both task-and relationship-oriented, but to some degree we see these attitudes as competing and irreconcilable. If we find further evidence that ASp and ASo are associated with warmth and considerateness, but negatively associated with effectiveness in teamwork, much extension and revision of theory about group process will be called for.

The most preferred co-worker. While ASo and ASp in key persons appear to measure relevant factors in team effectiveness, they also point to a phenomenon which may be of more general theoretical importance. It is only the ASo and ASp of the most preferred co-workers which correlate with the criterion. When we correlated the team's median ASo and ASp with the criterion, no significant relationships were found. Nor did we find significant relationships when we correlated ASo and ASp of the second most-preferred co-workers with the criterion. We find it difficult to account for these data in a completely satisfactory manner.

At present we are inclined to take these results as an indication that members of effective teams use a basis different from that of members of

ineffective teams for choosing and rejecting others as co-operators. In light of our interpretations above, this would mean that members of effective teams prefer highly task-oriented persons as co-workers. Members of relatively ineffective teams list as their preferred co-workers the more accepting, relationship-oriented team members. ASo and ASp in the most preferred team worker are thus possibly an indication of the entire team's attitude toward the task, i.e., an index of the team's morale. The most preferred person is representative of the team's attitudes, an interpretation whic is also suggested in Hartmann's study on values (8).

Implications for further research. The present study indicates considerable need for more extensive investigations.

a. We need to confirm the relationship between effectiveness and low ASo and ASp in further task groups essentially similar to those we have studied here.

b. We need to extend our investigations to include groups which are differently organized (e.g., military groups, non-competitive industrial teams), and we need to study groups with different task requirements (e.g., intellectual problem solving, co-ordination of information, etc.)

c. There is need for better measurement techniques. We need to apply and extend recently stated mathematical principles underlying measurement of similarity. We also need to know what traits are most relevant for measuring similarity between persons and for obtaining AS measures.

d. We need to clarify the meaning of the interpersonal perception measures ASo and ASp. Are these indices of general or specific attitudes toward others? To what extent are they determined by the situation, and to what extent are they a function of the test instructions?

e. Eventually, investigations should be concerned with studying the development and change in these attitudes. A study of these processes during the development of the group, as well as during success or failure sequences,

should prove very instructive.

Summary and Conclusions

The present investigation tests the hypothesis that group effectiveness is related to the interpersonal perceptions which members of the group have toward one another.

Interpersonal perceptions were measured by correlating forced choice questionnaires which subjects were instructed to fill out (a) describing themselves, (b) describing their ideal-self, (c) predicting the responses of their preferred co-worker, and (d) predicting the responses of their rejected co-worker.

The first study used 14 high school basketball teams, tested at the beginning of the season. A second sample of 7 "good" and 5 "poor" teams was collected toward the end of the season for the purpose of verifying relations identified in the first study.

The criterion of effectiveness was the proportion of games the teams had won (at midseason in the first sample, two weeks before the end of the season in the second sample). There was no correlation between the criterion and the median of any interpersonal perception measure within a team. Assumed similarity scores of the team's most preferred work-companion correlated -.73 (ASp) and -.78 (ASo) with the criterion in the first sample. In the second sample, correlations of -.20 and -.58 were obtained. The findings thus support the hypothesis.

The interpersonal perception scores of the chosen person are believed to reflect his outlook on other persons and on the task. Low ASp is thought to reflect lack of emotional involvement with teammates; low ASo is thought to reflect task-oriented attitudes. The group which chooses a differentiating person as preferred co-worker is likely to be more concerned with effective task performance, and correspondingly more successful.

As in previous studies, we found that Ss assumed greater similarity

between themselves and their positive, than between themselves and their
negative choices.

This investigation gave no useful information as to the place of real
similarity between persons in group effort because of the low reliability of
such scores on the present instrument.

References

1. Adorno, T. W., Frenkel-Brunswik, Else, Levinson, D. J., and Sanford, R. N. The authoritarian personality. New York: Harper and Brothers, 1950.

2. Cronbach, L. J. Coefficient alpha and the internal structure of tests. Psychometrika, 1951, 16, 297 - 334,

3. Cronbach, L. J., and Gleser, Goldine C. Similarity between persons and related problems of profile analysis. Champaign-Urbana, Illinois: Univ. of Illinois, 1952. (Mimeographed, Technical Report No. 2, Contract N6ori-07135 between the University of Illinois and the Office of Naval Research.)

4. Dixon, W. J., and Mood, A. M. The statistical sign test. J. Amer. statist. Ass., 1946, 41, 557 - 566.

5. Fiedler, F. E. A method of objective quantification of certain countertransference attitudes. J. clin. Psychol., 1951, 7, 101 - 107.

6. Fiedler, F. E., Blaisdell, F. J., and Warrington, W. G. Unconscious attitudes and the dynamics of sociometric choice in a social group. Technical Report No. 1, in preparation.

7. Fiedler, F. E., and Senior, Kate. An exploratory study of unconscious feeling reactions in fifteen patient-therapist pairs. (In press)

8. Hartmann, W. An investigation of the moral values held in an adolescent peer culture. Unpublished Master's paper, The Committee on Human Development, University of Chicago, 1949.

9. McClelland, D. C. Measuring motivation in phantasy: the achievement motive. In Guetzkow, H. (Ed.), Groups, leadership and men; research in human relations. Pittsburgh: Carnegie Press, 1951. Pp. 191 - 205.

10. Murray, H. A., et al. Explorations in personality. New York: Oxford University Press, 1938.

11. Olds, E. G. Distribution of sums of squares of rank differences for small numbers of individuals. Ann. math. Statist., 1938, 9, 133 - 148.

12. Rudin, S. A., Lazar, I. L., Ehart, Mary E., and Cronbach, L. J. Some empirical studies of the reliability of interpersonal perception scores. (Technical Report No. 4 of this project. In preparation).

13. Stephenson, W. A. Statistical approach to typology: the study of trait universes. J. clin. Psychol., 1950, 6, 26 - 38.

CORRECTION AND EXTENSION OF
THE RELATIONSHIP OF INTERPERSONAL PERCEPTION TO
EFFECTIVENESS IN BASKETBALL TEAMS

Fred E. Fiedler, Walter Hartmann, and Stanley A. Rudin
College of Education;University of Illinois

CORRECTION AND EXTENSION OF
THE RELATIONSHIP OF INTERPERSONAL PERCEPTION TO
EFFECTIVENESS IN BASKETBALL TEAMS*

Fred E. Fiedler, Walter Hartmann, and Stanley A. Rudin

An earlier paper described an exploratory and a validation study on high school basketball teams (1). This supplementary report has as its purpose (a) to present further data on the relation of interpersonal perception to effectiveness of basketball teams, and (b) to correct a computational error in the previous report.

The original paper investigated whether certain interpersonal perception measures are related to group effectiveness in the basketball situation. Interpersonal perception was measured by means of Assumed Similarity (AS) scores. These are designed to indicate how similar one person considers himself to be to others, or how similar he considers two other persons to be.

Fourteen high school basketball teams were tested at the beginning of the 1951 season. Two promising relations found in this exploratory study involved the scores ASp, Assumed Similarity to the preferred work-companion, and ASo, Assumed Similarity between the opposites (i.e., between the most and the least preferred work-companions).

When we correlated the median AS scores of team members with the criterion, we found no relation. However, promising correlations were found when we used only the AS scores from the person whom most team members chose as their preferred co-worker.

Since the first study was used to identify hypotheses for testing, we attempted to validate the relations involving ASp and ASo on a second sample of 7 "good" and 5 "poor" teams which were tested toward the end of the season. This second sample was selected on the basis of team standings as of February 18, 1952, and tested in the latter part of February. The good teams were chosen from among the upper third, the poor teams from among the lower third of 50 high school basketball teams in Illinois.

Erratum

Table 1 of Technical Report No. 3 lists the correlation of ASo with the December 15 criterion in the first sample as -.78. This correlation was actually -.53. As will be discussed below, our final conclusions are not materially affected by this error.

Additional Analyses of Basketball Data

Validities Determined for Additional Criterion Dates

In addition to the dates closest to the time of testing, we utilized two additional criterion dates. (See Figure 1.)The first of these was an early criterion date, December 31, 1951, when all teams had played 8-12 games. The second was the end-of-season record, based on the proportion of league games a team had won. Teams play each other in leagues of about 10 schools which are matched for size and which are in the same geographical area. The criterion which is least affected by variables extraeneous to team effectiveness thus appears to be the proportion of league games won over the season.

Table 1 presents the correlations between the most preferred co-workers' ASp and ASo and the three criteria. As reported in Technical Report No. 3, the measure ASp was not consistently related to team effectiveness. All correlations involving ASo are negative, but in the validation sample only one of the correlations (with the criterion close to testing) is significant. The data do indicate consistent negative relation between ASo of the most preferred co-worker and team effectiveness.

12/15
(1st Criterion
Date for 1st
Sample)

End of
Season
(3rd,"League,"
Criterion for
both Samples)

12/31
(2nd Criterion
Date for
Both Samples

2/18
(1st Criterion
Date for 2nd
Sample)

Beginning of
Season

1st Sample
tested early
December 1951
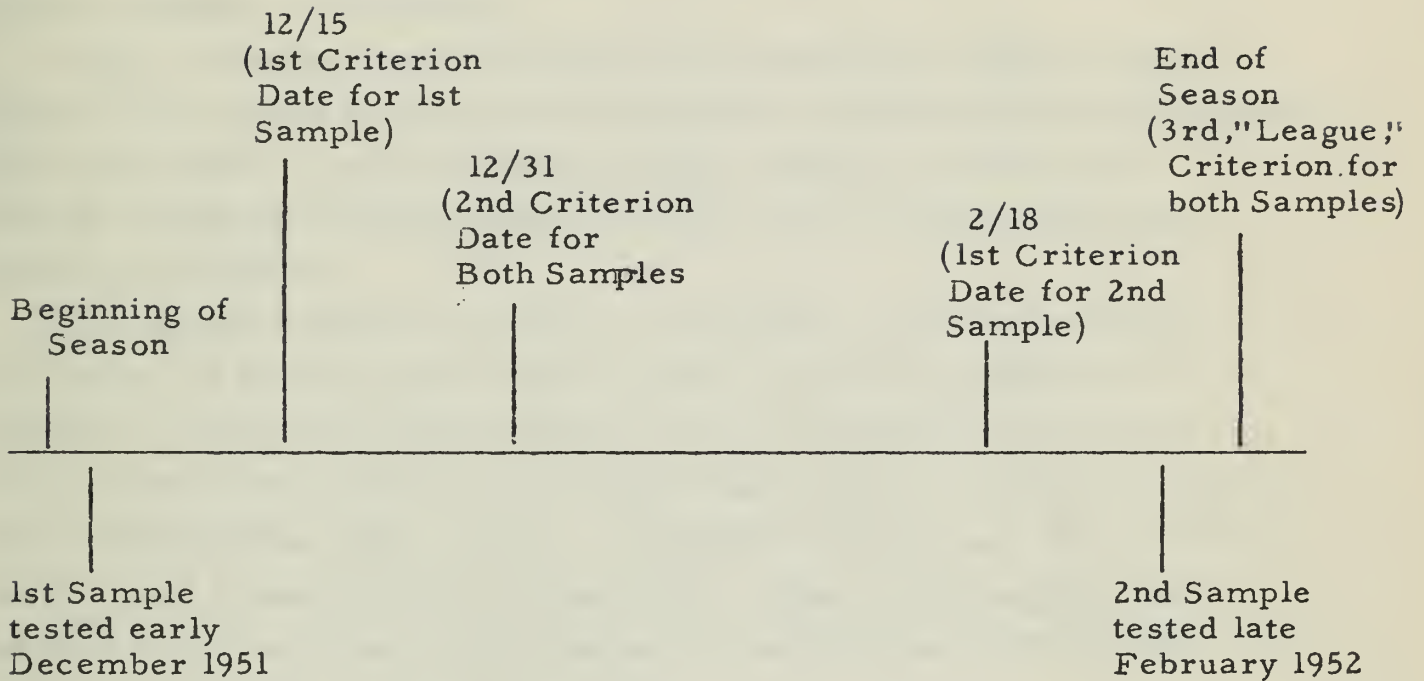
2nd Sample
tested late
February 1952

Figure 1

The Time Relations of Testing Sessions
to Criterion Dates for the Two
Samples

Additional Analyses of ASo Scores

We reported in Technical Report No. 3 that the median ASo score of members of a team was unrelated to the team's effectiveness. We did find a relation with the criterion, however, when we correlated the ASo scores of the most preferred co-worker in a team. This finding raises a number of questions.

If ASo of this key person relates to the criterion, might not other persons' perception scores also be similarly related to group effectiveness? Or, if the choice of a person with low ASo reflects a certain team attitude, would this not also appear in the choice of other relatively preferred persons?

Each person had been assigned a sociometric score by counting the number of times he was chosen as first, second, or third most preferred cooperator (with weights of 3-2-1, respectively.) We now selected the most preferred and second most preferred men in each team, and correlated their ASo scores. Coefficients (rho) were .63 and .27 for the first and second samples respectively. This result suggests that the type of person chosen as preferred co-worker may reflect some aspect of the team's attitude or spirit.

We further hypothesized that the effective team, compared to the less effective team, will be more likely to choose low ASo people. To test this hypothesis we weighted every person's ASo score by his sociometric standing. To estimate a team's general tendency to choose according to high or low ASo of the team members, we computed the teams' "Weighted ASo Score" by the formula

$$\frac{\Sigma\ (St \bullet ASo)}{\Sigma\ St} = \text{Team's Weighted ASo Score}$$

where St = a person's weighted sociometric status

ASo = a person's ASo score.

The rank order correlations of these teams' weighted ASo scores with the final criterion of league games won over the season were -.50 for the first sample, .15 for the second. Neither is significant. Thus, the attempt to increase our prediction of group effectiveness by using more information failed.

TABLE 1

CORRELATIONS BETWEEN <u>AS</u> SCORES OF MOST PREFERRED CO-WORKERS AND CRITERIA AT DIFFERENT POINTS IN THE SEASON

<u>First Sample</u>

N=14	ASp	ASo
Dec. 15*	-.73	-.53
Dec. 31	-.64	-.69
League games, entire season	-.48	-.44

<u>Second Sample</u>

N= 12	ASp	ASo
Dec. 31	.05	-.58
Feb. 18*	-.20**	-.38**
League games, entire season	.14	-.35

* Dates nearest to time of testing

** Point biserial correlations. All other correlations are Rho.

Criterion Reliability

The criterion in this study consisted of the proportion of games a team had won as of a certain date. We originally used December 15 for our first sample, and February 18 for our second sample, since these dates were closest to the time of testing.

In studies of this nature, it is of considerable importance to obtain an estimate of the reliability of the criterion. This was done here by correlating the proportion of games won during the first half of the season with the proportion of games won during the second half of the season. The reliability estimate as of the end of season, corrected by the Spearman-Brown formula, was .62 for the first sample, and .88 for our second sample of teams. These reliability coefficients are based on samples of 14 and 12 teams respectively. (The second group was selected from the extremes of the distribution.) It was desirable to obtain a more stable estimate of reliability. Therefore, we computed the coefficient for the entire population of 50 Central Illinois teams from which all but three teams in our sample had been chosen. This coefficient is .82. The criteria for this study thus possess adequate reliability.

Discussion

We have made a number of additional analyses of the data collected on basketball teams. These provide some further insights into the functioning of effective and relatively ineffective teams.

The original analysis indicated that the interpersonal perception scores of the most preferred co-workers were correlated with team effectiveness. This finding would mean that some element in the entire team's effectiveness is measurable if we test the attitudes of only one of its members.

We had hoped that the use of scores from more than one team member would provide a more reliable predictor or index of team effectiveness. However, neither a median nor a sociometrically weighted ASo score yielded useful results.

Table 1 shows that the correlation of ASo of the preferred co-worker with team standing is higher for standing at the time of testing than at a much later or earlier date. These fluctuations may be due to sampling

errors. It is also possible, however, that the relations become weaker as the interval between testing and the criterion date increases. (Figure 1 diagrams the time relations involved). As time elapses, preference in the team may shift from a person with low ASo to one with higher ASo, and vice versa. Obviously, a longitudinal study of a group would be required to investigate such suggestions.

In light of the data obtained on basketball teams thus far, we reach the following conclusions:

1. The criterion reliability of basketball effectiveness, as here measured, is very high, and recommends the use of these teams for other studies of group effectiveness.

2. ASo of the most preferred team members correlated negatively with basketball team effectiveness in these two samples. While the relations are promising we do not consider them as established by the study of our two samples, since a number of tests were computed even in the validation sample.

3. The relation of ASo with the criterion is less as we use the scores of team members other than the most preferred co-worker. We hypothesize here that the choice of a co-worker with low or high ASo expresses the team's spirit or attitude toward the task.

Reference

1. Fiedler, F. E., Hartmann, W., and Rudin, S.A. The relationship of interpersonal perception to effectiveness in basketball teams. Champaign-Urbana, Illinois. 1952. (Mimeographed. Technical Report No. 3, Contract N6ori-07135 between the University of Illinois and the Office of Naval Research.)