

POWER AND SATISFACTION IN TASK-ORIENTED GROUPS¹

BY

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1. INTRODUCTION

In quite a number of laboratory experiments on communication structures (networks) one of the two most important dependent variables has been the "morale", or *job-satisfaction*. In most of these studies topological concepts have been used to determine in a quantitative way the communication-structure.

Interpreting Lewin's concept of "shortest path" (intended to be a *dynamic* concept) in a purely positional sense, Bavelas (3)² developed a measure of "*position-centrality*" in the net.

Since the first publication in 1948 elaborate research has been carried out in which researchers were basing themselves more or less on this idea. Leavitt (42) and Smith (4), Shaw (73, 74, 75, 76, 77), Gilchrist (22), Guetzkow (27, 28) and Flament (18) in France, performed laboratory experiments, using the topological *structure* as an independent variable.

In those experiments groups of 3, 4 or 5 subjects³ could interact only by means of written messages. This communication was necessary to solve group-tasks. Each group-member possessed a certain amount of information, and the combination of all of the information was needed to solve the group-problem.

In these groups some of the communication-channels (or links) between the members can be blocked, so that they cannot be used. In this way the experimenter can easily introduce varied structures, in which the positions differ in "centrality". Centrality reflects the extent to which one position is strategically located in relation to other positions in the pattern. The

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³ Subjects were college-students in general.

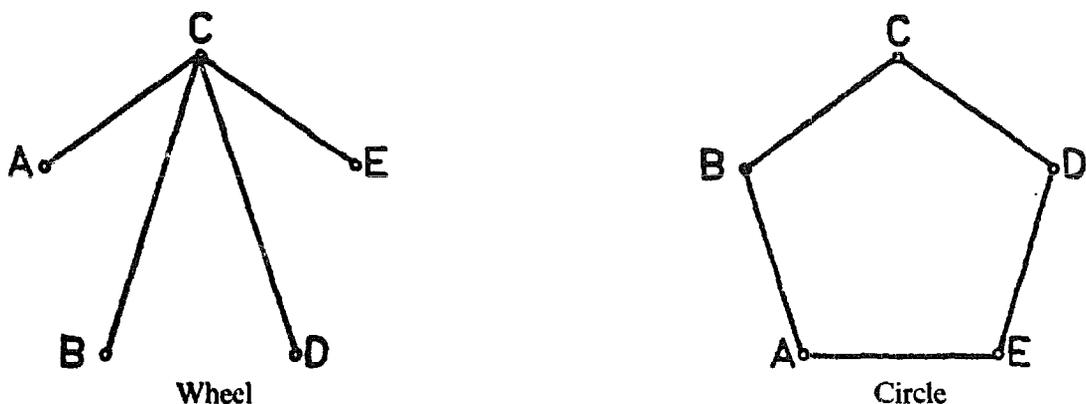
most central position in a network is the position *closest to all other positions*.

Leavitt found that the position-centrality correlates with total activity, accuracy, satisfaction of group-members, emergence of a leader and organization of the group.

In his theory Leavitt submits, that the degree of centrality determines behavior, including the satisfaction of group-members, "*by limiting independence of action*".

Centrality, as a measure of the closeness of all other group-members, is a measure of the "availability of information, which is necessary for the solving of the group's problem".

Let us consider the two "structures", depicted here as Wheel and Circle.



The letters represent persons, the connecting lines represent the channels through which the communication is possible (30). A general finding⁴ is that the most central position in the wheel (C) shows a higher satisfaction than the circle-members and that the "peripheral" wheel-members (A, B, D, E) have the lowest satisfaction. This result is explained by Leavitt in the following way:

"The most central position in the wheel (C) is most likely to get the answer first, but in the circle all positions have an equal opportunity" (42, p. 48). These differences in answer-getting potentials will tend to structure members' perceptions of their own roles in the group. In the wheel a peripheral person (A, B, etc.) is dependent on C for receiving information or the answer. C however is "autonomous and controls the organization".

The position-centrality affects one's perception of one's own dependence or independence (and according to Leavitt, the members' satisfaction is related to this perception).

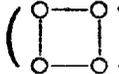
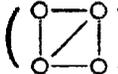
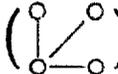
⁴ In the Netherlands, we replicated Leavitt's experiment with 5-position-groups; using the wheel and circle structure. Subjects were students of the University of Amsterdam, in their first year. Ten circle-groups and nine wheel-groups were run. The satisfaction results are similar to Leavitt's (57).

"In our culture, where needs for autonomy, recognition and achievement are strong, one can expect that positions which limit independence of action (peripheral positions) would be unsatisfying". And: "A follower position allows little opportunity for prestige, activity or self-expression". (42, p. 50).

These broad formulations leave uncertainty as to exactly which variables are the primary determinants of the satisfaction in this experimental situation.

Shaw (73) tried to give more content to these general concepts used by Leavitt. His reasoning was: "the greater the centrality of a position, the more information is available in that position. Increasing the amount of information, available to a position, should have the same influence on morale as increasing the centrality.

In order to test this hypothesis, Shaw strongly manipulated the information-availability. He used groups with four positions:

"circle"  "slash"  and wheel .

To three of these four subjects he gave only one information-item, the fourth subject however got five items. This he calls the condition with unequal information-distribution. In the "equal condition" every S starts with 2 information-items. The satisfaction-results are not very clear. Shaw asked each S after the experimental session (a) to indicate on a scale how well he liked his job in the group; (b) how he would compare his position with each of the other positions; (c) how well he thought the group-members co-operated with each other; (d) how he would rate the performance of the group.

It appeared that:

(1) the answers to (a) and (c) did not show a difference between more or less central positions; only question (b) did.

(2) subjects in "more-information-positions" do not differ from subjects in comparable positions in the equal-information-condition in questions (a) and (c); in regard to question (b) there is a difference in two of the three structures.

Thus, four different questions are used as measurements of one variable ("morale"), of which only one (the "importance of position" scale) appears to differentiate here. On itself this result is very weak.

But especially questionable is this "post-hoc" selection—without "rationale"—of one measurement (out of four) as a basis for conclusions, because the "importance" rating is not identical to the job-liking scale (cf.

Guetzkow, 27, pp. 87, 96 seq., and Trow, 88, p. 208). We prefer the job-liking scale as satisfaction-measurement⁵.

No statistical differences are reported for this measurement. This result does not seem to justify the theory that "centrality" has its effect on satisfaction through the availability of information⁶.

Shaw quotes Leavitt's theory of independence, and states that his own study "... offers no evidence against this explanation"⁷.

He then proposes a new theory "that centrality, because of its correlation with *number of channels*, determines the *amount of communication activity* of an individual and hence his enjoyment of the task". An individual enjoys a task, which keeps him occupied, more than he does a task which permits him relatively long periods of inactivity".

Shaw supports his idea with an ad-hoc analysis, showing that Ss with higher centrality spend less time per message than Ss with lower centrality.

However, the same difference exists between Ss with more information and Ss with less information (73, p. 549) and, as we have seen already, the *satisfaction-differences* in *both* these cases are not convincing.

In a theoretical article Shaw follows Leavitt, in supposing that the degree of *independence is essential* (75).

"Independence is used rather broadly to refer to the degree of freedom with which a member of the group may function".

Instead of the centrality index Shaw develops a so-called independence-score, in which he again puts heavy weight on the *number of channels*.

Channel-usage and communication-activity are also reflected in theorizing by researchers in the Massachusetts Institute of Technology. Basing themselves on mathematical telecommunication theories, they suggested a boredom-theory for the satisfaction-phenomena.

But a striking exception in their data is the very low satisfaction of central wheel-members and of circle-members, and the explanation of these phenomena by the writers is in their own opinion "speculative" (49, p. 74; cf. also 10, p. 27 and 16).

⁵ So does Dr. Shaw in recent experiments as he kindly informed us in a personal communication.

⁶ This conclusion is in agreement with Shaw's discussion of his results in 73, pp. 551 and 552 (not with his summary on p. 553).

⁷ Neither there seems to be strong support: the central person in the wheel has to *depend* for 5 information-items on one of the peripheral positions, to whom he may send the 3 other informations or the solution. This dependency-relation differs sufficiently from the dependency relation in the "equal information condition" to result in a satisfaction-difference but this does not show up, as we have seen already.

Very interesting is an experiment, performed by Guetzkow and Simon. They used structures and task-problems as Leavitt did, but laid emphasis on the fact that the groups had to solve also *organizational problems*.

In addition to the trial periods during which Ss could solve the tasks, "intertrial periods" were designed in this experiment. These were meant to allow the subjects an opportunity to solve the organization problem. As a result of this "pressure" from the side of the experimenter, most of the groups developed a specialized division of labor: "Keymen" tended to receive information, form the solutions and then send the answers; "endmen" sent their own information to others and then later received the solution (27, 28).

When differences between those "roles" are more pronounced, a clear satisfaction difference emerges in such a way that the keymen show a higher satisfaction than the endmen (27, p. 74).

Guetzkow asked his subjects, what *meaning* they attached to their "job-liking" ratings; a big proportion (55 %) of all answers he categorized as "task-activity-answers". In the category: "position in the structure", only 3.5 % of the Ss scored. This result seemed very suspect because there appears to exist a large difference in the job liking ratings themselves between the keymen and the endmen in the wheel, being respectively in the central and peripheral "positions in the structure", (27, p. 74). However, a more detailed analysis of Dr. Guetzkow's material⁸ showed, that "task activity" includes responses, as "making of the solution" and "passing of the solution".

The same "meaning"-question for the *importance*-scale shows, that a majority of the subjects defined "importance" on the basis to which the member actually formed the solution to the problem (p. 81). (This is not surprising, because in the introduction of the "importance question" the reaching of solutions is mentioned explicitly!).

It is apparent that these data do not allow for a strict theory on satisfaction. Guetzkow, however, suggests in connection with other findings, a satisfaction-theory. He reports a tendency in his Ss to show a higher job-satisfaction when they perceive everyone in the group as of equal importance, than when they think of themselves as being of less importance, than others in the group. He connects those findings with a theory of Drucker, who writes: "... that the individual must be able to realize through his work in industry that satisfaction which comes from ... that sense of importance, which cannot be produced by propaganda or by

⁸ I am obliged to the kindness of Prof. Guetzkow and Miss A. Bowes to send me their original material for the purpose of analysis.

other psychological means, but can only come from the reality of having importance. This is not a demand for "industrial democracy", if by that is meant a structure of industry in which everybody is equal in rank, income or function. On the contrary it is basically a hierarchical concept in which positions of widely divergent rank, power and income are each seen as equally important to the success of the whole because of the sub-ordination of one man under the other" (27, pp. 98-101).

In our opinion his findings can give but very little support to this theory. They can support the theory only, if we accept the (not confirmed) hypothesis, that the group of Ss who give equal importance ratings to all group-members *differentiate between positions with regard to rank and power*, but nevertheless maintain the opinion that all are of equal importance⁹.

A contrary interpretation, however, seems equally well possible to us.

There is another hypothesis in the early publication, bearing on satisfaction, and similar to the one, suggested by the M.I.T.-researchers, referred to on p. 181.

Boredom hypothesis: The wheel-groups (in which four of the five members are peripherals), seemed to become *bored*.

"Repetition in job situations is claimed to induce feelings of monotony and boredom". A sub-category coding of the jobliking responses shows that 35 % of the task-related responses of wheel-members, all of them occupying peripheral positions, showed boredom with the task. However it is very dangerous in our experience to put much confidence in responses of subjects, where they may perceive that values, connected with their concept of self, are at stake. Their answers can only serve to formulate very tentative hypotheses. And Guetzkow himself gives reasons, why the boredom seems to be only marginal (27, p. 102).

Shaw tested another hypothesis: that satisfaction should be a function of length of time of the experimental session (77).

This hypothesis is related to his theory on the communication-activity, suggested earlier (p. 180). But again there was no support from the experimental results.

2. POWER, SELF-REALIZATION AND SATISFACTION

From this review of a series of communication-experiments it may be seen that the experimental design, since Bavelas' fundamental article in 1948 represented in graphs, *seems* to be ideal as far as isolation and control of the variables is concerned. It is not, however, as can be deduced from the uncertainty of the theoretical results.

Many variables are suggested as significant determinants of satisfaction. Several of these variables are concerned with the *immediate* effects of the

⁹ In more elaborate data the differences, on which the theory had been based, disappeared.

networks. Examples are "availability of information" (as a result of access to information channels), communication-activity (as related to number of channels). Empirical support for theories, stressing the importance of these variables, appears to be weak (see pp. 180-183 this publication).

It is our opinion that in this communication-research too much emphasis is put on the *positional* aspect (cf. Bavelas, p. 1 in this publication), as expressed in channel-usage, access to channels (degree of centrality), and that the *dynamic* aspect has been neglected to a certain degree.

The topological structure, characterized by invariability, determines which behavior is *possible*; dynamic variables, however, determine which behavior will actually happen.

That is to say, we acknowledge that the topological "structure" (centrality) leads, via other variables, to satisfaction. But especially for the prediction of satisfaction in situations different from those used in the reported studies, these other *dynamic intervening variables must be identified*¹⁰.

In this context, the theory of Leavitt (and Shaw) on "independence of action" must be referred to. But "*independence of others*" is a *negative*, vague, construct; it does not determine very precisely, *which* action may lead to satisfaction and what kind of blocked action may lead to dissatisfaction.

Do these writers hypothesize that a tendency exists in Ss in the direction of living (acting) in a sort of social "border"-situation, in which they merely are, as much as possible, independent of each other?

It seems, however, that Ss who show a higher satisfaction can be characterized in a more positive way:

In task-performing groups of the type, studied by Leavitt et al., three task-requirements may be distinguished:

exchange of information: the information-items, needed for the problem-solution, are distributed over all group-members, so they must be sent to others.

making the problem-solution: when all information-items are gathered, the solution can be made.

exchange of problem-solution: all group-members have to know the problem-solution, thus it may be passed around (otherwise, all information must be sent to each group-member).

¹⁰ Cf., for the concept of a dynamic structure: 87, 43, 44, 45, 46, 14, 81, 15, 79 (chs 4 and 6).

These three processes could be clearly identified in our own experiment (see footnote on p. 2), by direct observation during the work-period, or afterwards by analysis of the communication-content. But it is *not possible* in the data of reported experiments *to isolate the three processes qua effects on satisfaction*: The more central persons (or Guetzkow's "keymen"), who show higher satisfaction, send and receive more messages, so they are *more active*. But also the quality of their activity is different: very often they make the *problem solutions* themselves, and they *pass the solutions* to other group-members.

Thus, where the position-centrality varies, variations in all three processes occur ¹¹.

On basis of the foregoing, three constructs are defined:

1. Activity: just being occupied; in the experiments this refers to the amount of communication activity per unit-of-time.
2. Self-realization: having responsibility for the completion of one's task. It may be operationally defined as the making of the problem-solution by the person himself ¹².
3. Power-exertion: a person determines the behavior of another person. In the experiments this occurs when a person sends the problem-solution (or essential information) to another person.

Activity

The (communication-) activity variable is suggested as satisfaction-determinant in theories by Shaw (this publication: pp. 181 and 182), and in the reported boredom-hypotheses ¹³.

It appeared that the experimental evidence was weak and it seems doubtful that the activity variable as such has much influence on satisfaction. The significance of what he is doing is essential for a human individual, not the pure activity as such ¹⁴.

¹¹ This results from the instruction, that all group-members have to know the problem-solutions.

¹² This operational definition of the broad concept: "self-realization" seems justified, as will be discussed later (p. 185-189).

¹³ And f.i. by J. Klein, who suggests that the frequency of action and interaction of the central member of Leavitt's groups leads to task-enjoyment (41, p. 60-71).

¹⁴ The same reasoning applies to the boredom-theories: no activity does not necessarily lead to boredom; it does, if it is measured against a reference-point, against something different.

Some findings of Guetzkow and Simon, although giving a contradictory first impression, give support to this opinion.

On page 182 we saw that a great proportion of the meanings attached by Guetzkow's Ss to their satisfaction-answers, existed of "*task-activity*" responses. But we noticed that this included making-the-solution and passing-the-solution, which is similar to our "self-realization" and "power-variables".

On page 183 we referred to the great proportion of boredom-responses by Guetzkow's peripheral persons in the wheel-structure. But the meaning of those responses is complex. We quote one example (p. 75 in the 1954 publication):

"I got *bored* just sitting and waiting for an answer". Is the small amount of activity, or the dependency, or the not-making of his own answer essential for S?. The effects of the P- and S-variables cannot be isolated in this material.

These writers also put forward a frustration-hypothesis:

"Difficult tasks sometimes induce frustration. The *circle-groups* had little success in solving their task and organizational problems".

The writers themselves give some strong arguments against this hypothesis (27, p. 103) but the interesting point in this context is, that it is just the opposite of the activity-theories. It relates satisfaction, not to engaging in activity, but to the significance of the activity.

Our conclusion is, that the effect of activity-as-such on satisfaction is not made evident. In the following, we therefore concentrate on the self-realization and power variables.

Self-realization

By wording the concept this way, we intentionally relate it to theorizing which is found particularly in clinical-psychological (psychiatric) and industrial social psychological writings, in which responsibility for own work, "finishing one's own piece of work" are thought of as important determinants of job-liking. Fromm uses this concept for "the active expression of the individual's emotional and intellectual potentialities". One of the two fields where individuals may realize themselves, is, according to Fromm, *his work, for which he can feel himself responsible* (21, pp. 225-235)¹⁵.

Karen Horney formulates: ". . . the ultimate driving force in the individual is a wish to grow; to develop whatever faculties he has; to realize given potentialities" (35, pp. 21, 22, 175).

¹⁵ Italics by us.

Horney contrasts the "capability of routine work" to the far more important "capability of creative work".

Snygg and Combs recognize one basic human need: the preservation and enhancement of the phenomenal self (80, p. 58); this need can be satisfied by several techniques, of which mastery over things is a very important one. "It is probable that the breakdown of jobs to more and more minute details in assembly-line production has destroyed for many workers their opportunity for mastery over things possible in the *production of a complete article by one's self*".

We find ideas with a similar content in industrial social psychology; Haire, for instance, inspired by Mc.Gregor, states, that each individual must have "opportunities for growth", . . . "must come to feel that he is something, that he can do something". Very important is . . . "a feeling that one is personally responsible for the accomplishment of certain functions" (29, p. 61, etc.).

If we now try to reach some conclusions, two points are clear: first, the concept of "self-realization" is used in a very broad sense. Rogers, agreeing with Snygg and Combs about this single basic tendency, writes: . . . "this directional force in organic life . . . has not been too well described in testable or operational terms" (cf. also 51, p. 383). Now this is not unexpected; the basic concept of the "self" is not sharply defined either (33, 68). But secondly, we draw a positive conclusion: there is in the above quotations a strong relatedness of self-realization with "job-accomplishment". Completion of a job, creative work, and especially responsibility for own work are emphasized. "Work is certainly one of the more significant things by which he (man) judges himself", writes Hughes (36).

Thus we are justified to define operationally self-realization as own accomplishment of the most important part of the job, the making-of-the-solution, and in doing so, being responsible for the correctness of the solution.

And in our experiment the hypothesis will be tested, that a higher degree of self-realization leads to more satisfaction.

In dynamic terms the hypothesis to test is, that subjects are motivated to accomplish the tasks for themselves. When such a task-dynamical vector exists, dissatisfaction will result, if the making of the problem-solution is denied to them.

But, although this hypothesis will be put to test in our experiment, we do not a priori expect that it will be confirmed. The reason for this "skepsis" is, that by the operational restriction of the concept "self-realization" to the individual task-performance per se, the influence of very important motives, to wit of *social* motives, is excluded.

Earlier we have quoted Hughes, but the quotation was incomplete; he writes: "... *a man's work is one of the things by which he is judged*¹⁶ and certainly one of the more significant things by which he judges himself".

There is no doubt that the self-judgment of an individual is strongly influenced by his perception of *how others judge him*.

Here we have arrived at a crucial point: it is possible that self-realization (as defined here) only leads to satisfaction, when *social* motives are interwoven with it. We have the opinion *that the important human motives are "social", that is to say: related to others*. This has the implication, that the satisfaction of the individual is in general determined to a considerable degree by the reactions of "the others". This opinion is in agreement with Hilgard's hypothesis: ... "the important human motives are interpersonal both in origin and expression. I am inclined that the self as a social product, has full meaning only when expressed in social interaction". (33, p. 399 etc.; cf. also 96.)

Thus according to our opinion self-realization will lead to satisfaction, so far as social motives are involved, for instance when the individual perceives that he is doing things, having importance in the perception of the others.

Strictly speaking the individual does more in *this* case than realizing himself. It is possible, to expand the meaning of the concept self-realization in this "social" direction; we prefer with Ginsberg (23, 24) and Rommetveit (67) "openness" of a concept. But in concrete research it is only senseful to "operationalize" in a strict way.

Now there seems to be contradictory empirical evidence against our opinion, that task-completion gives satisfaction, only in so far as social motives are involved. In some industrial social psychological investigations, satisfaction seems to be related to responsibility for own task-completion (56, 38).

However, clear isolation of the self-realization from *social* variables as "doing-important-things-for-the-total group", prestige, competition, etc., is difficult to make sure in the "real-life" situations in industrial research.

Studies on the work at the assembly line may illustrate the point. Snygg and Combs ascribe the dissatisfaction of assembly line workers to the fact, that they do not produce a complete article by their own. But from the publication of Walker and Guest it is evident, that this conclusion is not solidly based on the reported results of the research. These writers relate

¹⁶ The italics are ours.

“remaining one’s self” with social motives (equality of wages, non-interchangeability etc.) rather than with the repetitiveness of work-on-details (90, p. 161 etc.; also p. 145).

Especially careful one must be in evaluating the results of surveys, based on the opinions of respondents.

According to respondents, job-satisfaction should be determined to a strong degree by independence, self-expression, interesting experience etc. (84, p. 555 and 9, p. 477). As Centers states: “People in our culture desire, most of all, five sorts of gratification; namely independence, self-expression, security, a chance to serve others (social service), and interesting experience. They care, on the whole, much less about power, fame, esteem, leadership and profit.” This seems to us an untenable conclusion, and relevant in this context is that Schaffer has demonstrated that “dominance, recognition and approbation, and socio-economic status are more important than people will admit or, more likely, than they are able to perceive” (70, pp. 12, 17, 18. Cf. also 93, p. 56 and especially 7, pp. 52–57).

Cultural taboo’s have a strong distortive influence in this field and it is extremely difficult to isolate the satisfaction, resulting from the individual’s responsibility for his own task-completion.

The field-investigators are not unconscious of those problems: Morse states: “. . . further, more crucial research . . . is needed before final conclusions can be drawn” (56, pp. 63–65).

And in *more-controlled* studies, two findings are reported which throw a peculiar light on the self-realization theory.

In an experiment in which groups had to solve simple problems and problems, somewhat more complex (Shaw, 74), subjects, working on the more simple tasks showed more satisfaction than those, who performed more complex tasks. Heise and Miller report that in an experiment Ss had to perform tasks, one of which was a stereotypical task (exchange of words).

The writers speak about machine-like behavior, but Ss thought it very interesting (31, pp. 329–331)^{17, 18}.

To conclude the argument: it is doubtful that the self-realization in our experimental design goes together with social motivation; consequently it is doubtful that the hypothesis, that self-realization leads to satisfaction, will hold in this experiment.

¹⁷ In both these experiments tasks were not very difficult with regard to the intelligence level of Ss.

¹⁸ The industrial psychologist Sayles writes about: “. . . “the workers who will have come to *prefer monotony and security* to the anxieties of the learning process” (69, p. 273).

Power exertion

The concept of "power-exertion" implicates a direct "relation" to others: the powerful individual determines the behavior of others.

We hypothesize that this *power-variable is a primary determinant of satisfaction in the reported communication-experiments and in general*. That power-exertion leads to satisfaction, is the core-hypothesis to be tested in our experiment.

Therefore we will first elaborate on the power-concept.

Lewin defines power as the "possibility of inducing forces on another person" and Lippitt et al. use a similar definition. Zander and collaborators refer to the "ability to influence or determine the fate of another person" (46, pp. 40, 335; 48, 37, 94; 19, 20).

While the Lewinian social psychologists emphasize the *potentiality* of power-exertion, Goldhamer and Shils (26) define power as "the extent that a person influences the behavior of others".

The sociologist Parsons relates power to "have access to"; all possession of facilities is possession of power (63, pp. 125, 420). And Bales distinguishes the "structure of property relations" from the "structure of authority" (influence on persons) (2). In these last formulations, reference is made to the foundations of power as "access to resources"¹⁹.

We concentrate on the (potential) power-exertion itself and conceive power as the possibility of power-exertion.

Power-exertion is the determining to a certain extent of the behavior of another.

While there appears to exist a fair amount of agreement in terminology on power, sharp antagonism shows up where power-behavior itself is concerned. In our culture power-exertion is very negatively evaluated in social reality and even in social science. This is made explicit by Fromm: "we think of the wish for power as an expression of an irrational impulse to rule over others. It is a reaction against own feelings of powerlessness, an escape-mechanism". Fromm rejects this mechanism, and opposes to it the "free realization of the self".

But the taboo in connection with power has led to a neglect of this variable in empirical research²⁰, as will be demonstrated for the structure-experiments in our own research. This is a striking fact because prominent writers on human behavior have stressed for a long time already the importance of the power-variable.

¹⁹ It is interesting to notice, that the theory of information-availability (this publication: p. 179 and 180) also refers to "access to resources".

²⁰ An exception must be made for a group of investigators in the Research Center for Group Dynamics in Ann Arbor; attention to their studies is given in the next paragraph (pp. 192-196).

In 1651 Hobbes suggested the existence of: "a restless desire of power after power"²¹. Nietzsche²² built a philosophical system on the "Wille zur Macht".

Sullivan, inspired by Adler, conceives the power-motive as the most fundamental motive (83, pp. 6-8, 120-122): "We seem to be born, however, with something of this power-motive in us. The feeling of ability or power . . . is ordinarily much more important in the human being than are the impulses resulting from a feeling of hunger or thirst". The writer mentions the "biological strivings for power". He uses the power-concept in a broader sense than "power-exertion" is defined on p. 185 but in this context the important point is, that he emphasizes the fundamental significance of "power".

The significance of the power-concept as it appears in these references, is not always adequately reflected in research reports.

The communication processes in the structure-experiments provide some of the groupmembers with an opportunity of controlling the behavior of other persons (53, p. 249). But as we have seen (pp. 2-183) the power-exertion is not conceived as a primary determinant of satisfaction in the communication structure studies: although the experimental evidence is weak, the "activity-theory" is persistent; and an idealistic theory on feelings of equal importance in a situation of inequality qua power-exertion is suggested although several satisfaction findings could be interpreted more easily with a power-theory.

The experimental material of Leavitt, Shaw, Gilchrist and Guetzkow *cannot be conclusive* about the relative importance of the power-variable (P) and self-realization (S). But a detailed analysis shows that significant satisfaction-differences between "positions" exist, where both the P- and S-variables show clear differences (58, pp. 56, 57; 42, 31), and that satisfaction-differences are not significant, where the central person is more a "relayer" than a strong leader (73).

In one experiment (22) appearing satisfaction-differences cannot be explained by the S-variable, because in 72 % of the cases, each "position" solves the problem for himself.

Thus the power-motive may have an effect; the same holds for the self-realization variable. In our experiment the effects of each of these variables will be isolated; thus it will be interesting to compare the more "social" and more "primitive" power-variable against the more "cultural" self-realization with regard to effects on satisfaction.

²¹ 34, p. 64; cf. also p. 51

²² "Die Lust tritt auf, wo Gefühl der Macht"; "das Wesen der Lust ist ein Plusgefühl von Macht". (61, pp. 353, 243; 62, pp. 779, 713).

We expect that (in this experiment) the influence of the power-variable on satisfaction will in any case exceed the effect of the self-realization.

Since for us the power-variable is most relevant, some other hypotheses will now be introduced concerning the power-structure of a group.

3. BEHAVIOR TOWARD MORE OR LESS POWERFUL PERSONS

Under a power-structure in a group, a situation is conceived in which the group-members occupy differential positions in regard to power. Several laboratory experiments and fieldstudies explored various types of behavior as a function of those differences in power:

Field-studies are performed by Whyte (91), Back et al. (1), and Lippitt, Polansky, Redl and Rosen (in boys' and girls' camps, 48); laboratory experiments (on "status") by Thibaut (86) and Kelley (39) and laboratory experiments in a field setting by Pepitone (64) and Hurwitz, Zander and Hymovitch (37)²³.

These studies demonstrate that:

1. powerful persons show a tendency to less frequent interaction (communication) with low-power persons (Whyte, Thibaut);
2. powerful persons show a preference²⁴ for other powerful individuals (Thibaut, Kelley, Hurwitz-Zander);
3. less powerful persons show a tendency to more frequent interaction with the power persons (Back et al.; Thibaut, Hurwitz-Zander²⁵);
4. less powerful persons show more preference for the powerful persons (Lippitt et al.). However under certain conditions (for instance where the possibility of moving upward is excluded), a preference exists for other less powerful individuals (Thibaut; Kelley²⁶);

²³ It will be clear that the greater social power, as studied in these field situations is a much broader concept than our concept power-exertion. Social power (or high status) includes in social reality: influence, prestige, income, privileges, certainties, importance, pleasantness of job, etc. This accumulation of positive valences makes a power-position in social reality very attractive. Cf. 95, pp. 154, 155).

²⁴ Preference was determined by sociometric questions, in which Ss were asked to choose: the group-member with whom they would prefer to continue playing the games (Thibaut); the person which they liked best during the experiment (Kelley); the ones they "like to be with" or "would most like to be" (Lippitt et al.); the ones they would enjoy lunching with on a similar occasion (Hurwitz, Zander).

²⁵ However, in Kelley's sharply designed experiment this tendency does not show up.

²⁶ This tendency is very weak in the reported data.

5. less powerful members show a tendency to perceive the power persons as very friendly toward themselves (Pepitone);
6. less powerful persons show a tendency towards spontaneous imitation, under influence of the power-persons (Lippitt-Redl);
7. less powerful persons exhibit deferential, solicitous behavior, directed to the power-persons.

Theories

Four theories, suggested to explain these data, seem important. The first one concerns *communication-phenomena*

To explain the communication of the "lows" to the "highs" demonstrated in the studies by Back et al., and by Thibaut, Festinger suggested a theory of "substitute locomotion": if real locomotion to a desired position (a high status position) is blocked, upward communication functions as a substitute.

Kelley found in his sharply designed experiment, that low-status persons make more conjectures about the job of the high-status members.

As an explanation for his findings Kelley postulates that task irrelevant communication has the function of being a substitute for real upward locomotion. (Kelley does not report, that "lows" tend to communicate upwards in the hierarchy.)

A second theory has been suggested by Kelley in connection with his results on *sociometric choices*. It appeared, that "highs" who have a chance of moving downward to the low positions, and "lows" *without* possibility of moving upward, show a tendency to choose members of their own sub-group, the "highs", other "highs", the "lows" other "lows".

Kelley suggests a "hostility-theory": the "highs" are threatened by the one's who eventually may replace them in their high status positions, the "lows" perceive the "highs" as the persons who are in the privileged positions, to which for themselves the path is blocked.

In a third theory Lippitt, Redl et al. focussed on the so-called "behavioral contagion", expressed under 183, and they hypothesize that this contagion-behavior has the function of being an attempt at locomotion toward the goal of greater social power, in the following ways:

1. The behavior of the powerful persons is sometimes perceived as representing group standards, as group approved or group desired acts.
2. The power-person is perceived (probably unconsciously) as having the kind of position in the group "I would like to have". So his behavior

is perceived by the others who would like to be "looked up to as he is" as a path to the high positions.

3. A form of magical thinking can occur, in which "acting like him" has the meaning "I become him".

Furthermore they state, that they are, in an analysis of fieldstudy results, not able to determine whether power-persons become liked, or liked individuals become powerful (cf. p. 192, under 4).

The fourth theory, a theory on ego-defensiveness, is not restricted to choice- or communication-phenomena. According to Hurwitz et al., a low status person experiences a feeling of uneasiness in his relations with "highs", because the highs are able to influence or determine his fate, whenever they wish to do so. The behavior towards powerful persons thus has the function of reducing this uneasiness.

Consequently a liking results for the powerful persons, a perceptual distortion of their "approval", a communication-restriction and a directedness of communication toward the power-persons. These feelings of uneasiness and its consequences can be expected, according to the writers, equally well in the case of the power-persons themselves, only somewhat less pronounced. (Cf. also 13, 12, 82).

Discussion

Concerning the direction of communication, we are confronted with the precise theory of the "substitute locomotion". The theory explains nicely Kelley's finding that lows make more guesses about the activity of the highs. But there seems to exist a difference between this situation and the situations in the studies of Back c.s. and Hurwitz c.s. In the latter ones a certain behavior toward the power-persons may bring out *real* gratification of own needs. The substitute-locomotion theory however refers to satisfaction on an irrealty-level, while in the studies of Back and Hurwitz Ss may perceive a real path-to-goal.

Another point in the "substitute-theory" *in this connection* is that it refers exclusively to the directedness of communication of lows to highs. The data show that when communication of the lows is indeed addressed to the highs there is also a directedness of highs toward highs. Here the highs are already in the high position, and we cannot speak of substitute locomotion.

Lippitt a.o. also try only to explain the behavior of less-powerful group-members as "directed to" the power-persons; imitative behavior results from identification, which is explained by strivings towards power-positions.

But from the sociometric data one could conclude, that also the *powerful* members of the group are striving toward the other power-persons. There is support for this conclusion on p. 192, in this publication, under 2.

The theory of "ego-defensiveness" also concentrates upon the behavior of the less-powerful persons, *but applies the same theory to the power-persons themselves.*

However, in the reported sociometric data, the preference of the lows for the highs tends to disappear when the possibility of moving upward seems to be definitely blocked.

How does the defense-theory relate to this situation where we should expect the need for defense to be very urgent?

And how does the theory explain the findings, summarized in points 1 and 2 (p. 192)? Which needs of the "powerfuls" are dependent for their gratification from the "other" powerfuls?

From the viewpoint of our theory on power (pp. 190-192) we suggest an answer on this question: *the need for power-exertion determines the behavior of both less- and more-powerful group-members towards the more-powerful persons*²⁷.

On page 191 we referred to Hobbes "perpetual and restless desire for power after power". Our opinion is that this power-desire does *not only* manifest itself in *purely-rational* means-end-behavior as it is emphasized in some of the reported studies.

But we suppose that a tendency, similar to the one suggested by Lippitt, Redl a.o. to explain the behavior of less powerful persons towards the "more powerfuls", determines also the behavior of power-persons towards the other "powerfuls". Our hypothesis is that *in more powerful persons and in less powerful persons there exists a tendency toward unification (identification) with the powerful and a tendency toward separation from the less-powerful.*

When defining *psychological distance* between two persons as the extent of inequality existing between them, as far as a certain dimension is concerned, we hypothesize

a tendency to reduce the distance between more-powerful group-members and the person himself;

a tendency to increase the distance between less-powerful group-members and the person himself.

This tendency towards "unification" with power-persons can manifest

²⁷ Here the power-exertion is considered in terms of motivational theory (potential energy expenditure); earlier, in the central hypothesis of our theory (p. 11), it was defined in terms of satisfaction (tension-reduction).

itself in preference to play, to communicate, to lunch with them. The goal is power. Forming a psychological unit with the powerfuls leads to a feeling: "I am among them, I belong to them, thus a similar power position, as they have, is proper for me" (cf. 6, pp. 118, 179, 180 and 17 etc.). The tendency toward separation from the less-powerful is understood as "creating a distance":²⁸ the person does not (want to) find back himself in the less powerful.

One point must be emphasized. The tendency to exert power will not manifest itself in all situations: when the distance between the power-persons and the person himself is too great, he will resign from striving for this goal. The preference of less-powerfuls for other less-powerfuls (p. 192 under 4) may be an example. In such cases, the energy may be directed into other directions, for instance solidarity with other powerless group-members^{29, 30}.

This theory on "*power-distance*", in which a unification-tendency is hypothesized to explain the behavior towards power-persons, both of less- and more powerful persons, has resemblance to the theory of Zander and his collaborators.

But explanation of this behavior by ego-defensive tendencies seems us to be incomplete. In the defensiveness-theory the individual acquiesces in the greater power of the other; according to us, however, his behavior is sometimes clearly offensive: striving for more power.

Now Hobbes considered the striving for power to be a reasonable result of the "need for pleasure and security" and this relation between insecurity and power has been often suggested. But this does not seem to be the content of the ego-defense theory, as this theory is more specific.

Our theory on the behavior of individuals in a power-structure will not be tested in full in our experiment, where we restrict ourselves to choice- and perception-processes, thus excluding the communication-processes. In the following the theory will be specified in testable hypotheses.

²⁸ Nietzsche writes about: "Distanzen aufreissen" (61, p. 323; 62, p. 610).

²⁹ In general a pyramid-structure exists in social reality, in which there are far more low positions than high ones; it would be uncomfortable when everyone would be "striving upward" without a reasonable chance to gain satisfaction.

³⁰ In this formulation agreement appears with Festinger's theory on "comparison-processes with regard to opinions and abilities". It may be pointed out, that we hypothesize in the power-processes unidirectionality, as he does for the ability-comparison processes (17).

4. HYPOTHESES AND EXPERIMENTAL DESIGN

Hypotheses

When *power-exertion* is defined as the determining (to a certain extent) of the behavior of another, our core-hypothesis is:

A. To the extent that a person's exertion of power is greater, his satisfaction will increase.

When *self-realization* is defined as having responsibility for the completion of one's own task, the hypothesis is formulated:

B. To the extent that a person's self-realization is greater, his satisfaction will increase.

When we define the *psychological distance* between two persons as the extent of inequality, (psychologically) existing between them as far as a certain dimension is concerned, our "power-distance" theory is in summary: There is a tendency among the individuals to reduce the psychological distance toward the more powerful, if this distance is not too great, and to increase the distance toward the less powerful, this distance being not too small.

The theory is formulated in the following

General hypotheses:

I. In the individuals a tendency exists to reduce the psychological distance toward the more powerful members of the group.

II. The tendency to reduce the psychological distance toward the more powerful increases to the extent that this distance is smaller.

III. In the individuals a tendency exists to increase the psychological distance toward the less powerful members of the group.

IV. The tendency to increase the psychological distance toward the less powerful decreases to the extent that this distance is smaller.

The tendencies, formulated in I and III, have related effects when the individual is in an "in-between-position" (between more and less powerful persons): a move toward more powerful persons is a move away from the less powerful ones.

In our experiment, this situation exists, thus it will often be impossible to isolate the effects of each of the separate tendencies in the resultant effect.

Derived from I and III is the specified hypothesis:

C. In the individuals a tendency exists toward relative preference for the more powerful group-members.

This entails that in sociometric choices the more powerful group-members are preferred over the less-powerful.

Derived from II and IV:

D. To the extent that the distance between the more-powerful and the individuals is smaller, this tendency (toward relative preference for the more-powerful) increases.

We expect the same "distance-increasing" and "distance-decreasing" processes in the field of perception. Derived from I, II, III and IV are:

E. In the individuals a tendency exists to decrease perceptually the difference in relevant qualities between more powerful group-members and themselves, and to increase the difference between themselves and the less-powerful.

With relevant qualities are meant here: qualities, directly related to the occupancy of power positions, for instance abilities, which may give someone a "right to claim" a power position. In this hypothesis it is taken for granted that the individual does not perceive his own qualities to be better than those of the more powerful, or worse than those of less powerful group-members.

F. This tendency (to decrease the perceptual distance between the more-powerful and themselves and to increase the distance between themselves and the less-powerful) increases to the extent that the former decreases and the latter increases.

Experimental design

Groups of four persons were organized with the task to solve problems, as has been used by Leavitt. Each subject of a group of n subjects is given n symbols, out of a possible set of $n + 1$. The task is for the entire group to discover as rapidly as possible the one symbol held in common by all group-members. Each group completed 15 such tasks during the experimental session.

Two variations of the self-realization variable and two of the power-variable were introduced *through the interaction* during the experimental work-session, the combination of these leading to four conditions. In these four conditions, the (communication-)activity of the subjects was held strictly equal. First, the variations will be discussed.

In self-realization I (S_I), the subject does not make the solution himself; in S_{II} , he receives all relevant information and then he solves the problems himself. These variations are manipulated by using *paid participants*, because only then we can assure the complete control which is necessary in our study.

In the S_{II} condition for instance the subject has to receive all relevant "information"; in the S_I condition he has to get the *solution* from somewhere. In our design the subject is receiving this communication from a group-member who has to act according to the plan of the experimenter; this requires a paid participant.

So, in all conditions there was a group-member, who sent the subject all relevant "information", or the solution of the problem.

In the power-variation I (P_I), the subject is to an extreme degree powerless, in power-variation II (P_{II}) he has nearly complete power over two other group-members. That is, in P_{II} two group-members are dependent on him for the receiving of all relevant information, or the problem solution³¹.

In the P_{II} -conditions, two group-members have to be dependent on the subject; this could have been manipulated by the blocking of certain channels; but then this should have been perceived by the subjects as something, introduced by the experimenter, and this impression we wished to avoid. So the subjects worked in an apparently "interconnected" structure, where everyone can communicate with everyone and where the two "dependents" (or in P_I the "peers") are rôle-players too.

Thus the 4-person-groups consist of one subject and three paid-participants.

Yet even this strict control is not sufficient. An essential feature of the design has to be the *control of the activity-variable*.

When activity is defined as the amount of *received* and *sent* messages, the received communication of our Ss can effectively be controlled (if the apparatus is used, described by Leavitt and only written communication is allowed); this is what the others—our rôle-players—send to him. But what he sends out depends in all the reported experiments completely on himself. In our experiment we did not want the subject to send more messages in P_{II} than in P_I . This has led to the use of a specially designed "intercommunicator", a telephonic *send-and-receive-apparatus* (comparable with communication systems, in use on ships). If subject A wants to speak to B he can try to make a connection with B (A informs B about his intention by a light-signal on B's desk; *it depends upon B, if the connection is made*). If there is a connection, A can only speak, B can only listen. If now B wants to send to A (speak to A), he must wait till this connection is broken;

³¹ But, as we have seen, in all groups in all conditions there is a more powerful person in the group than the subject; so in P_{II} -conditions the subject who exerts power over two group-members, is himself dependent on the third member (this last one is always in position-1).

after that he can start trying to contact A again. So at one moment the only possibility is a one-direction-connection; a connection in the opposite direction is possible, but must be tried anew.

Thus the sending activity of the subject is controlled, because only in a certain number of times he succeeds in making a connection (because in a certain number of times the paid participant reacts positively on his trial to make a connection).

During the first problems he "learns", what activities he can perform in the group. For instance in the P_I conditions the subject sends out three messages containing his own "information" and in P_{II} *he succeeds in sending his own information* only once, because later he has to send out another two messages with the solution. In this way, the activity of the subjects is strictly controlled: it is equal in all four conditions, so that *no effect in the dependent variables can be attributed to the activity-variable*.

When we now concentrate again on the P- and S-variables: the manipulation of these variables occurs mainly through manipulating the subjects' own activity. If he receives all relevant information before he has received the problem-solution, he will make his own solution (S_{II}).

When he has the solution himself, and one or more of the others do not have it³², he will send it to them (P_{II}).

It is clear that in this way the experimental variations are not introduced by providing *expectations* for the Ss, but that the variations are realized through their own behavior. This manipulation is supported by some explicit remarks, made by the "introducer" and by the rôle-players during the work-session.

The introducer makes some remarks concerning the S-variable. As has been said already, the solving of a problem in our experiment requires identification of a symbol held in common by all members (this should be not too easy a task for our Ss since in our experiments University-students already make many errors, and our Ss in this experiment had a lower intelligence level). The introducer, demonstrating with four cards the sort of problems, states literally: "And do not make the mistake to think that this is very easy. We have the experience that this is often more difficult than one thinks. If you have four "informations" you can make the solution for yourself . . ." etc. And furthermore he reacts very enthusiastically, when during this demonstration someone gives the solution (this always happens, because it is easy when four cards are held together, to "see" the solution).

³² By a light signal, which is perceivable by the other group-members and by the experimenter, S announces that he has the solution.

In S_{II} , one time S receives the relevant information from "position 1", with the remark: "Here are the data, now you can start solving the problem" and another time with "Here are the data, good luck".

In S_I , the content of those remarks is: "Here I have the solution again, here you are".

The supporting P manipulation occurs only in remarks by the rôle-players: in P_{II} , after S passed the solution to them several times already, one of the "dependents" asks him:

"Do you have the solution already?" and during another problem: "Do you again have the solution for me?"

The other "dependent": "Can I again receive the solution from you?" and "I am completely dependent on you for getting the solution; thanks already". And the person in position-1 to the subject: "Can you may be contact the others?" and "Do the others always get the solution from you?"

This section is concluded with some relevant items about the experimental procedure. The subjects were 80 recruits for the Royal Dutch Navy (20 in each condition). They arrive for one day in a camp, to be selected for the different branches of the Navy. All of them are 19.5–20.5 years old; and have attended so-called U.L.O.-schools. Their intelligence has been determined with the Raven-progressive matrices, and the average corresponds with a Wechsler I.Q. of 102.

The introducer emphasizes, that what Ss are going to do now, has nothing to do with selection. He tells them that the selection procedures are finished (as they are), but that this is a naval research project to explore "how groups co-operate in situations, comparable with those on ships (e.g. where they do not see each other, etc.). So our interest is not, how individual A behaves himself, but how the group co-operates; we are only interested in the group's end-result".

Furthermore they are told, that they are "equals"; that we know from their tests and other data that they have exactly the same abilities which are relevant for this work (although we say to understand that for every single person himself his function which results from the division of labor is extremely important).

Summary of this section: in this experiment two variations of power-exertion (in P_I the subject has little power, in P_{II} he has more power) and two variations of self-realization (in S_I the subject has few possibilities, S_{II} allows for more self-realization) have lead to four experimental conditions.

$P_I S_I$: a small extent of self-realization is combined with a small degree of power-exertion.

$P_I S_{II}$: the subject is responsible for the completion of all his tasks; his power-exertion is restricted.

$P_{II} S_I$: the subject has no possibilities for self-realization in the operationally defined way; but he determines to a great extent the behavior of two other group-members.

$P_{II} S_{II}$: the subject, while being responsible for the completion of all the tasks, also determines the behavior of two other group-members.

In all four conditions the group-member in position-1 is more powerful than the subject.

In de P_{II} -conditions, the occupants of positions 2/3 and 4 are less powerful than the subject; thus the relative distance between the subject and position-1 is smaller in P_{II} - than in P_I -conditions.

5. EXPERIMENTAL RESULTS

Check on the experimental situation

First it will be demonstrated to which degree the realization of the intended experimental situation has succeeded.

5.1 *Activity, "objective" aspect*

Activity is defined as the amount of communication-activity (output and input) per time-unit. Now through the rôle-behavior of the paid participants it is made sure, that in all four conditions the activity was equal.

Time was controlled by our paid participants. Mean durations in minutes of the total work-session were:

$$P_I S_I = 92,08; P_I S_{II} = 94,82; P_{II} S_I = 92,03; P_{II} S_{II} = 93,84.$$

Mean times *per problem* differed for P_I and P_{II} combined = .03 (2 seconds); for S_I and S_{II} combined = .15 (9 seconds).

Those differences are negligible.

5.2 *Activity, "subjective" aspect*

Our S's are asked to rate the performance of their group, on a scale from very bad (= zero) to excellent (= 10).

The data are:

$$P_I S_I = 6,02; P_I S_{II} = 6,43; P_{II} S_I = 6,17; P_{II} S_{II} = 6,42.$$

In analysis of variance no differences appear³³.

To summarize the activity-data; there are no differences in activity between the several conditions; thus, no effect in the dependent variables can be attributed to the activity-variable.

5.3 *The perceived leadership-structure*

Earlier the function of "position 1" has been mentioned as to send all relevant information (in S_{II}) or the solution (S_I) to the subject.

Could this difference eventually lead to different perceptions of "position 1" in S_I and S_{II} ?

Question: "Did your group have a leader?" (If the answer was positive, S is asked to name who it was.)

	First part of the question		Second part of the question	
	No	Yes	Position 1 is chosen	Position 2/3 or 4 is chosen
$P_I S_I$	1	19	18	1
$P_I S_{II}$	0	20	19	1
$P_{II} S_I$	1	19	18	1
$P_{II} S_{II}$	1	19	18	1

In all conditions an identical structure exists, in which position-1 is seen as "the leader".

The reported data demonstrate that the experimental situation is realized according to the intentions³⁴. We proceed now to the dependent variables.

5.4 *Dependent variable: satisfaction*

Because satisfaction was the variable, on which this experiment concentrated, several "measurements" of this variable have been introduced in the design. The essential measurement, applied in our earlier research, was a job-liking rating on a scale from "liked very much" (= 10) to "liked not so much" (= 0). S had to rate all group-members on separate scales,

³³ One method is used, based on the normal distribution: analysis of variance. Other used methods are: for fourfold tables, the usual Chi-square with Fisher's exact method for $f_e < 5$ (40); for $2 \times K$ tables and $K \times L$ tables: the likelihood ratio test of the Independence hypothesis (55); for two-sample tests the Mann Whitney U Test with Hemelrijk's correction for ties (50, 92; 89, 32) and the Sign Test (78).

Results will be stated for a one-tail test since they are testing directional predictions.

³⁴ Ss perceived the experiment (in agreement with the introduction of it by the experimenter) as a study of groups at work, under conditions as they exist on ships (Ss were Navy recruits).

in rank-sequence, first the one who had the most pleasant work etc. In table 1 follow the ratings, subjects give themselves

TABLE 1
Means of subject's own satisfaction-rating:

$P_I S_I$	=	4,89
$P_I S_{II}$	=	5,37
$P_{II} S_I$	=	7,11
$P_{II} S_{II}$	=	6,57

In an "analysis of variance", *only the effect of the power (P-)variable is significant* ($p < .001$); the S-variable has no influence at all, the interaction ($P \times S$) is far from significant.

From the same material we can analyze the *ranks* which Ss give themselves (the "highest" possible rank = 1,0, the lowest 4,0).

TABLE 2
Mean ranks of subject's own satisfactionrating 35)

$\left. \begin{array}{l} * \\ * \end{array} \right\} * \left\} * \left\} * \right\} *$	$P_I S_I$	=	2,95	$P_I \leftrightarrow P_{II} p < .0001$ $S_I \leftrightarrow S_{II}$ no difference
	$P_I S_{II}$	=	2,92	
	$P_{II} S_I$	=	2,30	
	$P_{II} S_{II}$	=	2,00	

This analysis gives the same results, as the one based on the scores themselves: only the P-variable has effect on the satisfaction.

5.5 Observation data: dissatisfaction remarks

During the work-session, one of the rôle-players could "score" psychologically-significant behavior. First, Ss sometimes expressed *direct dissatisfaction* in their remarks, although this was *not encouraged* by the foregoing training (when the messages were formulated rigidly).

Categorized as a dissatisfaction-remark were cases, where either the intonation or the content unmistakably showed dissatisfaction. This dissatisfaction was always expressed in remarks toward position-1, thus it is not only dissatisfaction in general, but aggression, specifically addressed

³⁵ Conditions which are significantly different are connected by a line; *p*-values (results for one-sided test) are designated as follows:

.01	< <i>p</i> < .05	*
.001	< <i>p</i> < .01	**
.0001	< <i>p</i> < .001	***
.00001	< <i>p</i> < .0001	****

Individual conditions are compared with the Mann-Whitney U-test.

against "the leader". Examples: "Here they are again" (in an annoyed tone), "I think it is unfair, but here you are again".

The data follow in table 3.

TABLE 3

	$P_I S_I$	$P_I S_{II}$	$P_{II} S_I$	$P_{II} S_{II}$
number of remarks	7	11	2	3
number of persons	5	5	2	2

(total number of persons in each condition = 20)

If an analysis is made of the (very small) number of persons, who at least one time express dissatisfaction in this way, a difference exists between the combined P_I -conditions and P_{II} -conditions (one tail test: $p = .07$).

When the 0-hypothesis is tested, that chances on dissatisfaction-remarks are equal for each of the four conditions (a test, which is not totally pure, but cannot be fully rejected either) a similar relation holds (P_I versus P_{II} leads to $p = .045$).

Conclusion: ten persons of the 40 in P_I make 18 dissatisfaction-remarks, against four persons in P_{II} , who make five remarks. There seems to be a somewhat stronger tendency in P_I , to express dissatisfaction in this way, than in P_{II} .

5.6 Observation data: obstructive behavior

In all four conditions, it is essential that S sends his information to position-1; in S_I the subject receives after some time the solution from position-1, in S_{II} the subject receives all information. It was hypothesized, that the subject might express dissatisfaction by reluctance to send his own information or by not "calling" position-1.

The tendency to express this behavior is *oppressed* by the experimenter because the time-schedule is endangered by it. On a certain moment position-1 must have available all information. So there was a rule that, if S does not call upon position-1 within two minutes the "introducer" goes to the subjects' room, and his entrance is often sufficient to inspire S to call position-1 (!). If this does not happen, after 20 seconds a combined action of the rôle-player and the introducer starts to bring about the desired behavior of the subjects. Since it is clear that there is in this way a strong pressure on S to limit the time he is "waiting", the frequency of the waiting periods is very significant behavior in itself.

This behavior can result from diffusion, unclarity of the situation, which we can expect in the beginning of the session.

For this reason the data for the period after the third problem were a priori chosen as the more important ones.

TABLE 4
„Obstructive behavior”

total number of	$P_I S_I$	$P_I S_{II}$	$P_{II} S_I$	$P_{II} S_{II}$
„waiting periods”	6	11	2	2
idem after third problem	4	10	2	0
number of persons	6	7	1	2
idem, after third problem	4	6	1	0

When an analysis is made of the number of persons, who at least one time show this behavior (i.e. waiting > 1 minute), S_I and S_{II} do not show a difference; but P_I versus P_{II} gives $.001 < p < .01$.

Again the analysis of the frequency of those “acts” confirms this result. The frequency after the third problem for P_I versus P_{II} is significantly different from a chance-distribution: P_I versus P_{II} gives a p -value: $.01 < p < .05$.

The S-variable has no effect.

Summary

Ten of the 40 subjects in P_I show this behavior (waiting with sending of information to position-1) after the third problem 14 times, against one of the 40 P_{II} -subjects, two times.

(Three Ss waited longer than 2,5 minutes, all of them in P_I).

The conclusion is, that in the P_I -conditions a stronger tendency exists in the Ss to manifest obstructive behavior, although such a manifestation is extremely “difficult” in our experimental situation. This phenomenon is *psychologically* very significant: the results of this direct, non-verbal behavior, which is interpreted as satisfaction-behavior, confirm the results of the other satisfaction-measurements.

5.7 The development of satisfaction

The Ss were asked to draw a line (into a space provided for it), where along the abscissa the problems (1 to 15) are placed, and the ordinate consists of a scale from “less pleasant” (= 1) to very pleasant (= 5). In the introduction of this question an increasing and decreasing curve are demonstrated to S. Thus in general S is asked to give a global impression.

To determine the development of the satisfaction during the experimental session, the average-scores were used of the *first* five problems together and the averages of the *last* five problems, and those two values were compared for each separate subject.

When the second value is higher, there is an increase (+), where it is lower there is a decrease (—), otherwise it is neutral (\pm).

TABLE 5
Decrease versus increase in satisfaction

	+	—	\pm
$P_I S_I$	9	10	1
$P_I S_{II}$	11	7	2
$P_{II} S_I$	15	3	2
$P_{II} S_{II}$	17	2	1

Only $P_{II} S_I$ and $P_{II} S_{II}$ show significant differences between the numbers of increasing and decreasing curves. In both conditions the Sign-Test (see footnote p. 203) leads to $p \leq .01$.

When $P_I S_I$ and $P_I S_{II}$ are combined, there is no difference between the number of subjects with increasing satisfaction (= 20) and those with decreasing satisfaction (= 17). But these figures are for P_{II} respectively 32 and 5 ($p < .01$). Again the S-variable has no effect.

The data of the foregoing analysis result from a *reconstruction* of the development of their satisfaction by the subjects themselves. But also data are available which were collected at different times *during the worksession*. After the third, seventh and eleventh problem the "introducer" walked casually into S' room, asking him: "Well, how are things here"? The intonation of S' response is categorized as + or (non plus) —.

The responses after the third and eleventh problem (corresponding with the earlier analyzed periods of the first five and last five problems) are compared.

For each condition the number of changes (from + to —, from — to +) and the number of non-changes (+ or —) are computed.

With the X^2 method for changes (52, pp. 228–230), only $P_{II} S_{II}$ shows a significant increase in satisfaction during the worksession (one tail test, $.01 < p < .05$). Of the combined conditions, only P_{II} is significant ($p < .02$).

Conclusion

The satisfaction of P_I -subjects does not show a significant increase or decrease during the experimental session. The same holds for S_I - and S_{II} -conditions. But for the subjects in P_{II} a tendency exists to express an *increase in satisfaction* during the session. We emphasize here that *this increasing satisfaction cannot be a function of the activity-variable*, because

the activity does not change anymore in P_{II} than it does in P_I during the session!

5.8 Importance of position

Now some findings will be reported, which are not completely clear. They result from the question: How do you rate the importance of the position of each of the members of your group?

Each member is rated on a separate scale from unimportant (= 0) to important (= 10). The scales are together on one page of the booklet. Ss are not asked to rank the group-members, but this nevertheless occurs implicitly.

This question is introduced as bearing upon "a kind of work-division". Pressure is brought upon S not to rate all members as "alike".

This question was introduced in trial runs, because we intended to use it as independent check on the S-variable.

For that reason we referred, in introducing this question, to "work-division" and put strong pressure on S to differentiate his ratings, which we never did in one of the dependent variable questions (nor for that matter in another question)³⁶.

During the pilot experiments we became sceptical about a check for the *separate* S-variable, but the question was not dropped, because other researchers had made use of it, and new data about the question itself seemed desirable.

TABLE 6
Importance of position, ratings of own position

$P_I S_I$	=	6,00
$P_I S_{II}$	=	6,30
$P_{II} S_I$	=	6,44
$P_{II} S_{II}$	=	7,44

Neither the P-variable, nor the S-variable has a significant effect in an analysis of variance ($.10 < p < .25$).

But they have when we analyze the (implicite) *ranks* which Ss give themselves ("highest" rank = 1,0, lowest = 4,0), as appears from table 7.

Thus here not only the P-, but also the S-variable has effects. These *rank-differences* are a result of the *scores* of the subject himself, *in relation to the scores of positions 2/3 and 4*, but not in relation to position-1 (the leader), as is apparent from the data in table 8.

³⁶ This "importance"rating came in the questionnaire after the satisfaction and sociometric choice questions.

The direct self-ratings of "importance" by the subjects do not show the difference between the P_I - and P_{II} -variables, which we consistently found in the job-satisfaction measurement, in the observed dissatisfaction-remarks, in the "obstructive" behavior and in the measurements concerning the development of satisfaction.

After this negative conclusion, we give her some considerations, which may lead to a positive interpretation.

When we compare $P_{II}S_I$ and $P_{II}S_{II}$, then the subject *knows* in $P_{II}S_{II}$: first, that he makes his own solution; secondly, that positions 2/3 and 4 do not make their own solution, because he *sends* them the solution. In $P_{II}S_I$ the subject knows that positions 2/3 and 4 do not make the solution, neither does he himself, because he receives the solution from position-1, and sends it to the other two. Thus he differs from them in this respect in $P_{II}S_{II}$, not in $P_{II}S_I$. For the conditions $P_I S_I$ and $P_I S_{II}$, the situation is different. Although in $P_I S_{II}$ the subject *knows*, that he makes his own solution, he does not know what the others (2/3 and 4) do.⁴⁰

These data leave the possibility that differences in the importance-measurement between $P_{II}S_I$ and $P_{II}S_{II}$ (and between $P_I S_I$ and $P_I S_{II}$) are based upon subject's perception of his relation to "the others" (i.e. positions 2/3 and 4): in S_{II} he does comparatively "more" than the others, qua making-the-problem-solution. That those differences appear here can be explained by the pressure in this measurement to compare one's own importance with that of other group-members⁴¹. Clues for rating one's self as being more important are furnished by the P_{II} -variation, and by the S_{II} -variation (this last one as a strictly *relative* affair).

When this article was ready for printing, we found some very relevant data. In trial runs for a new experiment, the "importance" question was used, but, by a misunderstanding the interviewers did not put strong pressure on Ss to differentiate their meanings. Five out of eleven Ss gave identical ratings to all persons in their group! (the population was the same as in the now-reported experiment). Thus it is clear that the "prompting" by the interviewer has much influence on the (differentiated) answers of the subjects.

Tentatively we suggest, that the importance-scale indeed is reflecting the P- and S-variations, as was our vague a priori opinion.

Essential in our context is that even where those "relative S-differences" exist (as between $P_{II}S_I$ and $P_{II}S_{II}$), we did not find corresponding satisfaction differences.

5.9 Behavior toward others in the power-structure: Choice-processes

Now to be reported are data on the behavior of our Ss, as directed toward other, more or less powerful group-members: the person on position-

⁴⁰ Although there are some indications not reported here that Ss a number of times *had the opinion*, that 2/3 and 4 do not make the solution themselves.

⁴¹ Not only is pressure exerted by the experimenter in the wording of the introduction to this question, it is also reasonable to expect a culturally determined pressure in the direction of feeling oneself as important as possible.

1, the leader, is in all conditions more powerful than S himself, whereas S is more powerful than "the others" (positions 2/3 and 4) in P_{II} -conditions.

A sociometric question was asked: "With whom of the members of this group would you prefer most to make a ride on a bike? Whom would you prefer least? With whom would you prefer most to go on a camping trip? Whom would you prefer least? With whom would you prefer most to be in one branch? Whom would you prefer least?"

(In each space at least one number has to be filled out: in the pilot study, it appeared that otherwise no rejective response was ever given, so the question, although leading itself worse for analysis, was introduced in this form).

In table 9 the positive (+) and negative (—) choices are given for position 1 (the leader) and "the others" (positions 2/3 and 4).

TABLE 9
Results of sociometric question (last sub-question)

	Choices of position 1		Choices of „others”	
	+	—	+	—
$P_I S_I$	10	6	14	17
$P_I S_{II}$	15	3	9	21
$P_{II} S_I$	16	2	4	20
$P_{II} S_{II}$	16	1	5	20
All conditions	57	12	32	78

In these figures the tendency to make positive choices of position-1 cannot be isolated from the tendency to make negative choices of the others. The choice-process here is clearly "relative": preference for one means less preference (rejection) for another.

Analysis of the data shows, that a far more positive attitude exists toward position-1 than toward the others. The difference between positive and negative choices on position-1 is large and very significant ($.00001 < p < .0001$). Another way of presenting the data is that there are significantly more negative choices of "the others" than positive choices ($.0001 < p < .001$). This finding is in agreement with the data, reported by Lippitt et al. (point 4, p. 192 in this publication).

When conditions are tested against each other, there is a difference (cf. Table 9) in "choices of others" between P_I and P_{II} : in P_I 23 choices are positive, against 38 negative; in P_{II} 9 choices are positive, 40 negative. The difference between P_I and P_{II} is significant ($.01 < p < .02$). The S-variable has no effect.

Again for analysis of those data the choices of position-1 can be used: the number of Ss is determined, who made positive choices of position-1 *exclusively*.

TABLE 10
Number of times that *only* position-1 is positively chosen

$P_I S_I$	7 (total = 20)
$P_I S_{II}$	11 (total = 20)
$P_{II} S_I$	16 (total = 20)
$P_{II} S_{II}$	14 (total = 19)

In P_I 18 subjects of the total of 40 made a positive choice on position-1 exclusively, in P_{II} 30 did (against 9 who did not). In P_{II} the difference is significant ($.01 < p < .02$). The difference between P_I and P_{II} is also significant ($.001 < p < .002$) S_I and S_{II} are not different.

To summarize the results of the choice-process:

1. There exists a strong tendency in the direction of a relative preference for more powerful persons in one's group.
2. This tendency to have relative preference for powerful persons is stronger, when the subjects themselves are in a more powerful position (in P_{II} -conditions).

5.10 Behavior toward others in the power-structure: Perception processes

The intention was to determine how S compared his own abilities with those of the other group-members. Perception of the abilities of the more powerful and less powerful group-members was measured in the following questions:

"Could each of the others have done your work as well? Who could have? Who could have not?" (All three other persons have to be mentioned, but *each may be placed on one of the two spaces*.)

TABLE 11
„Perception of abilities”

	Opinion about position 1		Opinion about others (2/3 and 4)	
	+	—	+	—
$P_I S_I$	18	2	38	2
$P_I S_{II}$	19	1	35	5
$P_{II} S_I$	18	1	31	8
$P_{II} S_{II}$	17	0	28	10
	72	4	132	25

Three analyses will be reported: first it can be stated that far more positive than negative choices are made; both the distribution of positive and negative choices on position-1, and that on others differ significantly from a chance distribution (chances on plus and minus are even), p -values being far lower than .00001.

In the second analysis the two "positive choice" tendencies are compared by determining, whether the general tendency toward position-1 is different from that toward the others (so we test the 72-4 distribution against 132-25: $.01 < p < .02$ with one tail test).

In the third analysis differences between conditions are tested. In the "perception of the others" P_{II} is significantly more negative than P_I ($.01 < p < .02$) and S_I versus S_{II} does not lead to significance.

The perception of position-1 is positive, at least to the degree that there are no differences between conditions in those data. But again a sharper analysis is possible by determining the number of subjects that only make a positive choice on position-1. These data are conceived as indices of a more meaningful "positivity" toward position-1, but it is evident that they are not completely absolute; it is a positivity toward position-1, which is dependent on negativity toward the others.

In $P_I S_I$ this is 0 (of 20), $P_I S_{II} = 1$, (of 20) $P_{II} S_I = 4$ (of 20), and $P_{II} S_{II} = 3$ (of 19). Comparison of P_I and P_{II} leads (with Fisher's exact method) to $p = .027$.

To summarize the results of the perception-processes:

1. When an individual judges the abilities of others in connection with his own work, his perception of the more powerful persons is more positive than his perception of the less powerful persons.
2. This tendency is stronger to the extent that the individual himself is more powerful.

With regard to conclusion 2 holds, that one of the two component-tendencies, the tendency to perceive the less powerful persons more negatively, has been isolated, and separately demonstrated. We may state too, that the positive perception of the more powerful persons is—to a certain degree—demonstrated separately.

Another part (the first part) of this "perception-question" is: "Could you have done the work of the leader as well?" S gave his answer on a scale, from "not so well" (= 0) to "as well" (= 10). The data follow in table 12.

TABLE 12
Perception of own ability for leader's work

F_{IS_I}	=	7,47
$F_{IS_{II}}$	=	8,11
F_{IIS_I}	=	8,50
$F_{IIS_{II}}$	=	7,05

In the analysis of variance, the P-variable has no effect at all; the S-variable and the interaction have p-values in the direction of $p = .10$. It is our opinion, that the question failed to provoke an unbiased comparison of own abilities with those of the leader. In research, now in progress, we are trying out this question in a somewhat modified form.

6. CONCLUSIONS

Power and self-realization

In a number of experimental communication studies, the positional aspects of the group-structure have been emphasized to such a degree, that the dynamic aspect has been neglected too much. Even when more dynamically oriented hypotheses were formulated, they beared upon "potentialities": for instance in the theory on "independence of action" it was suggested that *independence from* the others results in satisfaction. But the question is not answered, *which* action of the subjects is satisfying. In concentrating on the person's "*freedom-to*", we specified this as: freedom to unfold *activity*, freedom to exert *power*, and freedom to have responsibility for *completion of one's own task*.

The earlier theories, in which the pure "*activity*" was put forward as a determinant of satisfaction, were not supported convincingly in a number of tests. Therefore, in our own experiment this variable is not investigated as an independent variable.

Self-realization is operationally defined by us as "having responsibility for the completion of one's own task". In high-pitched theories of clinical psychological and industrial social psychological origin, the importance of this variable has been suggested: production of a complete article by one's self, a feeling that one is personally responsible for the accomplishment of a task, etc.

The empirical support was again small, compared with the theoretical generalizations. Thus it seemed justified, to test in a strict way the hypothesis that completion of one's task, in our experiment the "making-of-the-problem-solution", leads to satisfaction.

The second independent variable in our experiment is the "*exertion of power*". Power-exertion is defined as "the determining to a certain extent of the behavior of another". In our experiment this happens by sending to

two other group-members all relevant data or the problem solution.

It is our opinion that the importance of the power-variable has been strongly underestimated in empirical research: this is for instance illustrated in the idealistic Drucker-theory (pp. 182 and 183) that persons in *different power* positions will have a feeling of *equal importance*.

In a number of studies, referred to in pp. 192-193, the power-exertion is indeed a central variable. In one of these, Lippitt a.o. hypothesize that "achieving and maintaining a position of social power is a positive goal" (for their twelve years old subjects in camps). But the question is: why?

Because implicit in a power-position in that situation are: pleasant activities, privileges, high status, no fear for interference, for "haggling", etc.?

Our intention with this experiment was: to demonstrate that the power-exertion *per se* leads to satisfaction; not only through variables as gain-of-status, more pleasant activity, or other concomitant gains, but in itself.

Our experimental data allow for definite conclusions.

The satisfaction is measured: in a job liking scale; in some measurements, intended to trace the development of satisfaction; in direct observation of negative remarks; and in observation of purely obstructive behavior.

The results are consistent: P_{II} -subjects show more satisfaction than subjects in P_I -conditions.

This is a striking fact, because the subject in the P_{II} -conditions has power over two other group-members, but has a similar power-relation to a "leader" as the two others have toward him. In this sense, he himself is also completely *dependent*, but notwithstanding this dependency, the power-variable has a strong effect on satisfaction.

However, in this experiment no satisfaction-effect of the other independent variable, the self-realization could be demonstrated. This is remarkable, because the "importance" measurement differentiated between the S_I and S_{II} conditions ⁴².

It is noteworthy, that in our experiment a clear difference exists in "availability of information" between S_I and S_{II} conditions. This difference should result, according to Leavitt and Shaw, in a satisfaction-difference, but it fails to do so.

This negative result contradicts the widely spread opinion, found in industrial social psychological and clinical psychological literature about

⁴² There is no reason to believe that the satisfaction differences between P_I and P_{II} could be explained by status-differences; the importance measurement differentiates between P and P_{II} , but also between S_I and S_{II} where we find no satisfaction-differences. This is in agreement with a result of Trow's study where higher satisfaction was not based either on a prior perception of high status.

the motivation of the individual to make a complete article, to avoid routine work, to realize (intellectual) potentialities, to be responsible for the accomplishment of one's own task, etc.

We suggested (on p. 188) that the important human motives are "social" (or, as Hilgard puts it, inter-personal), that is, related to other persons. (The subject perceives his "self", as others perceive him). Consequently the possibility exists, that self-realization leads only to satisfaction, when a strong "social" motivation is interacting with it; for instance when the completion of the job or the responsibility for it are perceived by "others" as important, valuable, etc. (and this perception is perceived by the person himself).

Then self-realization should lead only to satisfaction when its social-relational character is more pronounced than it was in our experiment (where it had, especially in $P_{II}S_{II}$, a clear "relational" quality—cf. p. 210—and where "importance" differences between S_I and S_{II} conditions appeared to exist) (pp. 208, 209).

To explore that "self-realization" variable, and its connection with "social" motivation, further research in controlled situations is needed (cf. 72, 65).

But in any case it is a significant finding in this experiment, that the power-variable, the more "social" variable, but also the more "primitive" variable, (which is illustrated in psychological literature especially in examples taken from child-development and animal psychology)⁴³ has strong effects, whereas the self-realization variable, on which the cultural influence-processes⁴⁴ focus, has no effect.

The power-exertion seems to touch central layers of the personality-structure; *in general*, the power-exertion appears to be a primary determinant of the person's satisfaction.

Besides, the experimental findings demonstrate, that to the extent that the more central persons and the "keymen" in the research, done by Leavitt, Shaw, Guetzkow and Simon, exert more power over others, the power-variable is also a primary determinant of their high satisfaction.

Very recently, Trow published results of a fine experiment (88); he defined *autonomy* as the degree to which a person's position in the information-flow of an organization permits him to determine for himself the organizationally

⁴³ Cf. the satisfaction gained from despotism, as demonstrated in the much publicized behavior of "gallus domesticus" (f.i. 59, pp. 949-951).

⁴⁴ The negative evaluation of power-exertion, which prevails in our culture, is reflected in psychological literature (f.i. 21) and has then *often* a counterpart in a positive evaluation of the so-called self-realization. Both evaluations are objectionable in psychology, where abuse of power is comparable to pathological self-sustaining withdrawal-tendencies.

appropriate level or direction of his own future activity. The difference with Leavitt's experiment is that Trow isolates autonomy ("referring to access to task-relevant information"—88, p. 204), but theoretically he too concentrated upon greater independence, self-sufficiency, as significant determinant of the job-satisfaction. Furthermore, he makes explicit that autonomy is closely related to the concept of "answer-getting potential" used by Leavitt to explain the relationship between centrality and satisfaction. His findings demonstrate that dependency leads to a lower satisfaction than autonomy, while centrality has no influence. But contrary to a second hypothesis, autonomy does not determine perceived status, while centrality apparently does. Trow concludes: "This casts doubt on that part of Leavitt's discussion that seems to imply that satisfaction is based on a prior perception of high status" (88, p. 208).

We have some doubt about another conclusion of the writer, namely that autonomy may be considered as mediating the relationship between centrality and satisfaction, reported in Leavitt's study.

For the resemblance of his experiment to Leavitt's is not very complete. In his definition (see above) Trow mentions the "*organizationally appropriate level*". This refers to the fact, that the *autonomy* of S allows him to make decisions *through which he can avoid a waste of time*; consequently the group can proceed faster. Furthermore the group goal is to finish the task in *as short a time as possible*! So in Trow's experiment, S in the autonomy-conditions co-ordinates his own activity to that of others and, by doing this, *contributes* in an essential way to the movement of his group *to the group-goal*. This "autonomy" then, includes more than mere self-sufficiency, but has a "social"⁴⁵ character: it includes decision-making, which *affects the total group* (cf. 88, p. 208). Now Trow has demonstrated that subjects who make this contribution to the group-performance, show more satisfaction⁴⁶.

In the dependency-conditions S must *wait* for certain information, which he needs for directing his own, ongoing, activity, *or ask for it*. This dependency we call disturbing, because it may be perceived by S as a barrier to the reaching of the group-goal (cf. 88, p. 206) and may be responsible in itself for lower satisfaction.

Thus it does not seem justified by the way, autonomy is realized in the experiment when the writer relates autonomy to Leavitt's "answer-getting-potential", which he defines as the degree to which a person makes his own problem-solutions (88, p. 204) and in which he emphasizes the self-sufficiency.

Furthermore, our experimental data have made evident, that not "making-the-answers" (the S-variable) but sending-out-the-answers (the P-variable) determines satisfaction.

⁴⁵ This concept: "social" has the meaning as discussed on p. 11 in this publication.

⁴⁶ We are not very "satisfied" with the "autonomy"-measurement which S's have to fill out just *before* the session; they rated the statement: "Carrying out the business of life in an independent and self-reliant fashion". Could not result from this a (not intended) heightening of the individual's awareness of certain cultural norms?

Behavior toward others in a power-structure

This behavior is extremely important; often the situation of child and parent in the family-situation is compared with the superior-subordinate relation in the work-situation.

Several studies explored this behavior. Lippitt et al., hypothesizing less rational behavior as identification, restrict themselves to the behavior of the less powerful persons toward the more powerful ones.

The substitute-locomotion theory (Festinger) is also restricted to the behavior of the less powerful persons: certain communication-processes are interpreted as locomotion to the goal on a level of irreality.

In the ego-defensiveness theory (Hurwitz, Zander et al.) also the behavior of the powerful group-members themselves is explained. In this sense their theory agrees with the one, formulated by us.

We consider certain preferences or rejections, certain communication- and perception-phenomena as manifestations of a striving for power. The theory includes behavior of less powerful members toward more powerful ones, and the reverse: a tendency toward identification with the powerful, and a tendency toward separation from the less-powerful.

Using the concept of "psychological distance" we hypothesize: a tendency in the individuals to reduce the psychological distance toward the more powerful group-members, and: a tendency to increase the distance toward the less powerful.

These tendencies could be demonstrated in our experiment in patterns of "preference and rejection", and in "perception of others" (Communication-processes are not investigated).

Also we hypothesized that:

the tendency to reduce the distance toward the more powerful increases, to the extent that this distance is smaller; and that: the tendency to increase the distance toward the less powerful decreases, to the extent that this distance is smaller.

These hypotheses were also confirmed in our experiment.

This result may explain those of Thibaut and Kelley, where no preference for the more powerful persons exists in the less powerful ones. When the distance between the more-powerful persons and the person himself is getting too great, the preference decreases⁴⁷.

Now the difference of our theory on "*power-distance reduction*" with the ego-defensiveness theory may be elucidated. According to the ego-

⁴⁷ This opinion seems to be more related to Festinger's "Comparison theory" than with Kelley's "hostility" theory (p. 193 in this publication).

defensiveness theory subjects are behaving as they do (e.g. show preference for the powerful) to defend themselves against their power and to reduce in this way their own feelings of uneasiness.

But then the expectation should be that the less-powerful the individual is with regard to the powerful, the stronger should be his feeling of uneasiness; and, consequently—according to the ego-defensiveness theory—the stronger the ego-defensive tendencies should manifest themselves in preferences for the powerful.

The reverse is: that the more powerful the individual is with regard to the power-persons, the less urgent is the preference-behavior explained by the ego-defensiveness theory as reducing his uneasiness.

However, as we have seen already, *the factual data do not confirm this expectation, but show the opposite*. This can be nicely explained by our theory. Herein the preferences, expressed by our experimental subjects for the more powerful, are interpreted as manifesting a striving for more power; whereas it is perceived in the ego-defensiveness theory from the viewpoint of the individual's "acquiescence" in being-less-powerful, and adapting one's self to this power-relation.

But if the distance between the person himself and the powerful other is *too* great, the individual renounces of reaching this goal, and then the preference for the more powerful decreases.

In the same way, we interpret the behavior toward the less powerful ones not as acquiescing in the existing power-relation, but as creating distance toward the less powerful.

Our *theory on "power-distance"* shows agreement with the theories on substitute-locomotion, contagious behavior and ego-defensiveness; by means of each of these, certain behavior-phenomena can be explained. But the theories still have a character of "openness", and the specification of the conditions is not finished as yet.

SUMMARY

Satisfaction-Research

Power-exertion and self-realization

A critical survey of a number of studies as to the influence of the communication-structure of the group on the satisfaction of the members shows that too much emphasis has been laid on the positional (topological) aspect. The use of channels, the access to channels, the availability of information, the quantity of information-activity, are examples of variables with the aid of which researchers have tried to explain the differences of satisfaction of the various group-members; they have not succeeded, however.

As a result of this, attention has been directed more and more toward dynamic

variables as possible determinants of satisfaction. But theories, developed in those studies, also appeared to be inadequate in explaining the satisfaction-phenomena.

An experiment has been designed by the author in which the activities of the subjects (Ss) were kept strictly equal in all conditions but in which the exertion of power and the self-realization have been varied.

Exertion of power is the determining (to a certain extent) of the behavior of another.

Self-realization is having responsibility for the completion of one's own task. In this experiment where 4-person-groups have solved certain simple problems, the exertion of power has been operationally defined as the passing on of answers or essential information. The operational definition of self-realization as one's responsibility for making the solution of the problem himself is, to a certain extent, in accordance with the conceptions of a number of authors in clinical psychology and industrial-social psychology.

Hypotheses

- A. To the extent that a person's exertion of power is greater, his satisfaction will increase.
- B. To the extent that a person's self-realization is greater, his satisfaction will increase.

Two variations of the exertion of power (in M_I -conditions S has little power, in M_{II} he has more power) and two variations of self-realization (in S_I : S has few possibilities, S_{II} allows for more self-realization) have lead to four experimental conditions.

Each condition numbered twenty experimental groups, consisting of one S and three "role players" the Ss being Royal Netherlands Navy recruits of an average age of 20, the Wechsler-I.Q. being 102. The task consisted of solving 15 problems of the kind used by Leavitt. Also in other respects the experiment showed some similarity with Leavitt's, but a more rigorous experimental control has been introduced. Verbal communication instead of written has been adopted.

The experimental results show that the power variable has a great influence on satisfaction; self-realization has no influence. The author's opinion is that only then self-realization results in greater satisfaction when strong "social motives" are involved.

Behavior toward more powerful and less powerful persons

A second group of variables tested concerns the behavior toward more powerful and less powerful persons.

The author considers certain phenomena of choice, communication and perception, as manifestations of a tendency toward power. He deduces two tendencies from this pursuit of power; a tendency toward identification with the powerful and one toward separation from the less powerful.

When defining the psychological distance between two persons as the extent of inequality existing between them, as far as a certain dimension is concerned, then the theory can be summarized as follows: There is a tendency among the individuals to reduce the psychological distance toward the more powerful, if this distance

is not too great, and to increase the distance toward the less powerful, this distance being not too small.

This theory on "power distance" is formulated in the following.

General hypotheses:

- I. In the individuals a tendency exists to reduce the psychological distance toward the more powerful members of the group.
- II. The tendency to reduce the psychological distance toward the more powerful increases to the extent that this distance is smaller.
- III. In the individuals a tendency exists to increase the psychological distance toward the less powerful members of the group.
- IV. The tendency to increase the psychological distance toward the less powerful decreases to the extent that this distance is smaller.

The following four hypotheses have been derived from this theory:

- C. In the individuals a tendency exists toward relative preference for the more powerful members of the group.

This entails that in sociometric choices the more powerful group-members are preferred over the less-powerful.

- D. To the extent that the distance between the more-powerful and the individuals is smaller, this tendency (toward relative preference for the more-powerful) increases.
- E. In the individuals a tendency exists to decrease perceptually the difference in relevant qualities between more powerful group-members and themselves, and to increase the difference between themselves and the less-powerful.
- F. This tendency (to decrease the perceptual distance between the more-powerful and themselves and to increase the distance between themselves and the less-powerful) increases to the extent that the former decreases and the latter increases.

The experimental data show that hypotheses C and D have been corroborated in this experiment.

The perception-results show that a tendency does exist toward "creating a distance" between the person himself and less powerful group-members; thus the second part of hypothesis E has been corroborated.

Hypothesis F has been confirmed by the results as far as the "creation of distance" toward the less-powerful is concerned, and supported to a certain extent as regards the behavior toward the more-powerful.

REFERENCES ¹

1. Back, K., Festinger, L., Hymovitch, B., Kelley, H. H., Schachter, S. and Thibaut, J., The methodology of studying rumor transmission. *Hum. Relat.* 1950, 3, 307-312.

¹ Names of journals are abbreviated according to the rules given in: *Psychol. Bull.* 1952, 49, supplement.

2. Bales, R. F., *Interaction process analysis*. Cambridge: Addison-Wesley, 1950.
3. Bavelas, A., A mathematical model for groupstructures. *Appl. Anthropol.* 1948, 7, 16-30.
4. ———, Communication patterns in taskoriented groups. *J. acoust. Soc. Am.* 1950, 22, 725-730. Ock in: 8, 493-506.
5. ———, *Communication patterns in problem-solving groups*. In: Cybernetics, circular causal and feedback mechanisms in biological and social systems. New Jersey: 1952.
6. Blum, G. S., *Psychoanalytic theories of personality*. New York-London: 1953. 219 p.
7. Caplow, Th., *Sociology of work*. Minneapolis: 1954.
8. Cartwright, D. and Zander, A., *Group Dynamics. Research and theory*. New York: 1956, 2nd. ed. 642 pp.
9. Centers, R., *Job satisfaction at various occupational levels*. In: Psychological studies of human development. New York: 1952, 470-478.
10. Cherry, C., *On human communication*. Massachusetts: 1957.
11. Christie, L. S., Luce, R. D. and Macy Jr., J., *Communication and learning in taskoriented groups*. Technical Report No. 231, Cambridge Mass. Research Laboratory of Electronics, Massachusetts. Institute of Technology. May 1952. 250 pp.
12. Cohen, A. R., *Situational structure and individual selfesteem as determinants of threat-oriented reactions to power*. Paper read at the meeting of the American Psychological Association, Ohio, Sept. 1953.
13. ———, Upward communication in experimentally created hierarchies. *Hum. Relat.* 1958, 11, 41-54.
14. Deutsch, M., *Field Theory in Social Psychology*. In: 47, Vol. I, 181-222.
15. Easton, D., Limits of the equilibrium model in social research. *Behavioral Science*, 1956, 1, 96-104.
16. Festinger, L., The relevance of mathematics to controlled experimentation in sociology. *Intern. Social Science Bull. Unesco*, 1954, 6, 622-627.
17. ———, A theory of social comparison processes. *Hum. Relat.* 1954, 7, 117-141.
18. Flament, C., Changements de roles et adaptation à la tâche dans des groupes de travail utilisant divers réseaux de communications. *L'Année Psychol.* 1956, 2, 411-431.
19. French, J. R. P., A formal theory of social power. *Psychol. Rev.* 1955, 63, 181-194.
20. ——— and Raven, B., *The basis of social power*. Ann Arbor: ca. 1957 29 pp.
21. Fromm, E., *The fear of freedom*. London: 1942, 257 pp.
22. Gilchrist, J. C., Shaw, M. E. and Walker, L. C., Some effects of unequal distribution of information in a wheel-group structure. *J. Abn. Soc. Psychol.* 1954, 49, 554-556.
23. Ginsberg, A., Hypothetical constructs and intervening variables. *Psychol. Rev.* 1954, 61, 119-131.
24. ———, Operational definitions and theories. *J. genet. Psychol.* 1955, 52, 223-245.

25. Goldberg, S. C., Influence and leadership as a function of group-structure. *J. Abn. Soc. Psychol.* 1955, 51, 119-122.
26. Goldhamer, H. and Shils, E. A., Types of power and status. *Am. J. Sociol.* 1939, 45, 171-182.
27. Guetzkow, H., *Organizational development and restrictions in communications.* Graduate School of Industrial Administration, Carnegie Institute of Technology, Pittsburgh, January 1954. 108 pp.
28. ——— and Simon, H. A., The impact of certain communication nets upon organization and performance in task-oriented groups. *Management Science* 1955, 1, 233-250.
29. Haire, M., *Psychology in management.* New York: 1956.
30. Harary, F. and Norman, R. Z., *Graph theory as a mathematical model in social science.* Ann Arbor: 1953. 45 pp.
31. Heise, G. A. and Miller, G. A., Problem solving by small groups using various communication nets. *J. Abn. Soc. Psychol.* 1951, 46, 327-335.
32. Hemelrijk, J., Note on Wilcoxon's two-sample test when ties are present. *Annals Mathem. Stat.* 1952, 23, 133-135.
33. Hilgard, E. R., Human motives and the concept of the self. *Am. Psychol.* 1949, 4, 374-382.
34. Hobbes, T., *Leviathan (London 1651).* Oxford: 1946, 468 pp.
35. Horney, K., *Self-analysis.* London: 1942.
36. Hughes, E. Ch., *Work and the self.* In: Rohrer, J. H. and Sheriff, M. (Eds.): *Social psychology at the crossroads.* New York: 1951.
37. Hurwitz, J. I., Zander, A. F. and Hymovitch, B., *Some effects of power on the relations among group-members.* In: 8, 483-492.
38. Katz, D. and Kahn, R. L., *Some recent findings in human-relations research in industry.* In: 85, 650-665.
39. Kelley, H. H., Communication in experimentally created hierarchies. *Hum. Relat.* 1951, 4, 39-56. Ook in: 8, 443-462.
40. Kendall, M. G., *The advanced theory of statistics.* Vol. I, London: 1948.
41. Klein, J., *The study of groups.* London: 1956.
42. Leavitt, H. J., Some effects of certain communication patterns on group performance. *J. Abn. Soc. Psychol.* 1951, 46, 38-50. Ook in: 85, 108-125.
43. Lewin, K., *A dynamic theory of personality.* New York: 1936.
44. ———, *Principles of topological psychology.* New York: 1936.
45. ———, The conceptual representation and the measurement of psychological forces. *Contr. psychol. Theor.* 1938, 1, 4.
46. ———, *Field theory in social science.* Selected theoretical Papers. New York: 1951.
47. Lindzey, G. (Ed.), *Handbook of social psychology.* Vol. 1: Theory and method. Vol. 2: Special fields and applications, Cambridge, Mass.: 1955.
48. Lippitt, R., Polansky, N., Redl, F. and Rosen, S., The dynamics of power. *Hum. Relat.* 1952, 5, 37-64. Ook in: 8, 462-483.
49. Luce, R. D., Macy, Jr. J., Christie, L. S. and Hay, D. H., *Information flow in task oriented groups.* Technical report No. 264, August 1953, Cambridge Mass.

50. Mann, K. B. and Whitney, D. R., On a test of whether one of two random variables is stochastically larger than the other. *Annals Mathem. Stat.* 1947, 18, 50-60.
51. Maslow, A. H., A theory of human motivation. *Psychol. Rev.* 1943, 50, 370-396.
52. McNemar, Q., *Psychological statistics*. New York-London: 1955, 2nd. ed. 408 pp.
53. Miller, G. A., *Language and communication*. New York-London: McGraw Hill, 1951.
54. Mills, C. W., *The power elite*. New York: 1956.
55. Mood, A. M., *Introduction to the theory of statistics*. New York: 1950.
56. Morse, N., *Satisfactions in the white collar job*. Ann Arbor: 1953.
57. Mulder, M., *Groepsstructuur en gedrag*. *Ned. Tsch. Psychol.* 1956, 11, 85-133.
58. ———, *Groepsstructuur, motivatie en prestatie*. C.O.P., Den Haag: 1958, 239 pp.
59. Murchison, C., *The function of social hierarchies in Gallus domesticus*. In: *Handbook in Social Psychology*, Worcester, Mass.: 1935, 947-973.
60. Murphy, G., *Social motivation*. In: 47, Vol. 2, 601-633.
61. Nietzsche, F., *Der Wille zur Macht, 1887*. Leipzig: 1917, 376 pp.
62. Nietzsche Werke, Herausgeg. von Karl Schlechta. München: 1956, Band III.
63. Parsons, T., *The social system*. Glencoe, Ill.: 1951.
64. Pepitone, A., Motivational effects in social perception. *Hum. Relat.* 1950, 3, 57-76.
65. Rasmussen, G. and Zander, A., Group membership and self evaluation. *Hum. Relat.* 1954, 7, 239-252.
66. Rogers, C. R., *Client-centered therapy*. Cambridge, Mass.: 1951.
67. Rommetveit, R., Model construction in psychology: a defense of "surplus-meanings" of psychological concepts. *Acta Psychol.* 1955, 11, 335-345.
68. Sarbin, T. R., *Role Theory*. In: 47, Vol. I, 223-258.
69. Sayles, L. R., Worker values in job evaluation. *J. Person.* 1954, 30, 266-274.
70. Schaffer, R. H., Job satisfaction as related to need satisfaction in work. *Psychol. Monogr.* 1953, 364, 29 pp.
71. Scheidlinger, S., *Psychoanalysis and group behavior*. New York: 1952.
72. Sears, P. S., *Problems in the investigation of achievement and self-esteem motivation*. In: *Nebraska Symposium on motivation*. Ed. Jones, M. R., Lincoln: 1957, 265-339.
73. Shaw, M. E., Some effects of unequal distribution of information upon group performance in various communication nets. *J. Abn. Soc. Psychol.* 1954, 49, 547-553.
74. ———, Some effects of problem complexity upon problem solution efficiency in different communication nets. *J. exp. Psychol.* 1954, 48, 211-217.
75. ———, Group structure and the behavior of individuals in small groups. *J. Psychol.* 1954, 38, 139-149.
76. ———, A comparison of two types of leadership in various communication nets. *J. abn. soc. Psychol.* 1955, 50, 127-134.

77. Shaw, M. E., and Rothschild, G. H., Some effects of prolonged experience in communication nets. *J. Appl. Psychol.* 1956, 40, 281-286.
78. Siegel, S., *Non-parametric statistics for the behavioral sciences*. New York, 1956, 312 pp.
79. Simon, H. A., *Models of Man (social and rational)*. New York, 1957. 287 pp.
80. Snygg, D. and Combs, A. W., *Individual behavior*. New York: 1949.
81. Stevens, S. S., The operational definition of psychological concepts. *Psychol. Rev.*, 1935, 42, 517-527.
82. Stotland, E., *Peer groups and reactions to power figures*. Doct. Diss. Univ. Michigan, 1954. Paper read at the Conference of the A.P.A. New York, Sept. 1954, 9 pp.
83. Sullivan, H. S., *Conceptions of modern psychiatry*. Washington: 1947, 3rd. ed.
84. Super, D. E., Occupational level and job satisfaction. *J. Appl. Psychol.* 1939, 23, 547-565.
85. Swanson, G. E., Newcomb, T. M. and Hartley, E. L., *Readings in social psychology*. New York: 1952, 2nd. ed. 680 pp.
86. Thibaut, J., An experimental study of the cohesiveness of underprivileged groups. *Hum. Relat.* 1950, 3, 251-278. Ook in: 8, 102-121.
87. Tolman, E. C., *Operational behaviorism and current trends in psychology*. In: *Collected papers in psychology*. Los Angeles: 1951, 115-129.
88. Trow, D. B., Autonomy and job satisfaction in task-oriented groups. *J. abn. soc. Psychol.* 1957, 54, 204-210.
89. Vaart, H. R. van der, *Wilcoxon's two sample test*. Report S 32 (M 4) of the Mathematical Centre, Amsterdam. With Auxiliary Table: Report R 132/S 86, 2nd. ed. 1952.
90. Walker, C. R. and Guest, R. H., *The man on the assembly line*. Cambridge, Mass.: 1952.
91. Whyte, W. F., *Street corner society*. Chicago: 1943.
92. Wilcoxon, F., Individual comparisons by ranking methods. *Biometrics*, 1945, 1, 80-83.
93. Wyatt, S. and Marriott, R., *A study of attitudes to factory work*. Medical Research Council. Spec. Reports Series. No. 292. London, 1956.
94. Zander, A. and Cohen, A. R., Attributed social power and group acceptance: a classroom experimental demonstration. *J. abn. soc. Psychol.* 1955, 51, 490-492.
95. ———, Cohen, A. R. and Stotland, E., *Role relations in the mental health professions*. Amsterdam: 1957.
96. Zetterberg, H. L., Compliant actions. *Acta Sociol.* 1957, 2, 179-201.