JUDGMENTS OF DISTANCE IN A QUANTIFIED

SOCIAL NORM SITUATION

By

BILL WAYNE GREGORY

Bachelor of Arts

Northwestern State College

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Thesis Approved:

Mark K. MacNeil
Thesis Adviser

Julia L. McHale

William W. Rambo

N. Durham
Dean of the Graduate College

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CHAPTER I

INTRODUCTION

The purpose of this research is to investigate the process of norm

formation and its effects on the perception and judgment of individuals.

Sherif's classic experimental study of social norms (1935), in which he

demonstrated the use of autokinetic movement judgments in the study of

social norm formation is replicated in an alternate judgment situation.

In Sherif's study, it was shown that when an individual faces a

stimulus situation which is unstructured (i.e., ambiguous) he estab-

lishes a norm consisting of a range of judgments (a scale) and a point

within that range peculiar to the individual. Also shown was that when

persons who have developed an individual norm, independently of others,

are put into a situation with others who have also developed an inde-

pendent norm, the norm medians of the individuals tend to converge.

When individuals face the same unstructured judgment situation together

for the first time, the judgment range, and the median within that

range, are more or less unique to the group.

The process of social norm formation in a relatively ambiguous

judgment situation was historically preceded by a series of classroom

demonstrations and experiments beginning about the turn of the century.

These experiments for the most part examined the influence of others

upon the individual in various activities such as motor output, associ-

ation, attention, and imagination.

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Triplett, in 1898, as reported by Hare (1962), conducted an experiment in which children 10 to 12 years of age were given the task of winding in markers attached to lines. Triplett alternated situations testing subjects alone, then in competition. He concluded that the togetherness situation must normally be thought of as producing greater output. Triplett dealt, primarily, with the aspect of competition rather than the effect of others in the situation per se.

Mayer, in 1903, as reported by Burnham (1905), studied the effect of working alone and in the presence of others on both the quantity and quality of school children's homework and classwork. The tasks were memorization, composition, and arithmetic. On the whole, his results indicated better performance when subjects worked in the presence of others.

Meumann, in 1904, found that spontaneous rivalry among 14 year old boys caused an increase in speed and an improvement in the quality of mental work (Burnham, 1905).

Schmidt, in 1904, reported that tasks done at home were generally inferior to classroom work. The majority of the children made more mistakes working alone at home than they did on a similar task in the classroom work (Burnham, 1905).

These classroom experiments led, in time, to further experimental investigation in alone and togetherness conditions in which the effects of others on the behavior of the individual became more apparent.

Walther Moede, in 1914, furthered experimental investigation by writing a pamphlet entitled "Experimental Group Psychology." In this pamphlet, he suggested ways that experimental social units could be constituted for laboratory investigations with appropriate variables

under control so that the effects of togetherness conditions might be sharply defined (Murphy & Murphy, 1931).

Moede's investigations published in 1920 studied judgment in togetherness situations with methods not used before. Two iron balls were allowed to fall, one after the other, upon a piece of iron. Each subject observed and silently recorded the relative intensity of the sounds, in one series alone, and in another series in the presence of one, two, or more subjects. No consistent tendency to superiority or inferiority of judgment appears among the subjects, but some subjects work better, others worse, in the togetherness condition. While noting that competition increased in front of others, Moede did not treat the effect of competition as a culturally relevant factor (Murphy & Murphy, 1931).

Munsterberg, in 1914, showed the influence of individuals on one another in reporting upon physical stimulus judgment situations. Class-room demonstrations involved individual judgments of unstructured stimu-lus complexes such as the number of dots appearing on a card (Murphy & Murphy, 1931).

Munsterberg's and Moede's judgment situations resembled, in a sense, Sherif's (1935) autokinetic situation in which social norm for-mation was experimentally studied for the first time. The physical stimuli being judged were relatively unstructured, i.e., ambiguous. Moede, Munsterberg, and later Sherif left their judgment situations unstructured so that an individual could: (1) respond without being aware of the influence of others; and (2) respond to others' reactions.

Moore, in 1921 (Sherif & Sherif, 1956), demonstrated that under some conditions merely presenting "majority" or "expert" opinion to an

individual could be as effective in producing shifts of opinion to an individual as the influence of others. As is the case in all these early studies, there was no indication that the degree of established social relations among subjects was considered.

F. H. Allport carried out a series of experiments from 1916 to 1919 upon the effect of alone and togetherness situations upon individual's performance in tasks such as vowel cancellations, multiplication, association, and judgment of odors and weights. This study showed the interacting influence of physical and social factors on judgments. Unpleasant odors were judged less unpleasant when subjects were alone and pleasant odors were judged less pleasant when persons judged with others present. The presence of others produced a "leveling effect," i.e., avoidance of extreme judgments in togetherness situations. The leveling effect was also found in judgments of weights (Lindzey, 1954).

In Allport's experiments, an attempt was made to reduce rivalry so that "pure effects" of the togetherness situation could be measured by having all subjects finish at the same time, by prohibiting comparison and discussion of results, and by specifying that the test was not a competition and that no comparison of individual results would be made. Performance by an individual on a given task when in an alone situation was found to be quite different from when he was in a togetherness situation. Allport's experiments make clear that the presence of other individuals is usually a factor, for better or worse, in a person's performance.

A highly important finding resulted when Dashiell (1935) compared two "alone" situations with tasks similar to Allport's. The implication of these experiments was that an individual's knowledge of others

performing the same task at the same .time results, generally, in a difference in performance from a situation in which tasks are undertaken without the knowledge that others are doing the same tasks at the same time. In other words, the physical proximity of others is not the sole determinant of a social effect. There are degrees of aloneness which affect human performance. Findings such as Dashiell's demonstrated that the investigation of human behavior in both alone and togetherness situations necessarily involves factors besides the mere presence of other persons.

While not experimental per se, anthropological studies during the early 1920s supported the experimental findings of the effect of the social context on behavior. The anthropological studies provided evidence of the cultural determination of factors affecting the individual's perception. Representative of such studies are Malinowski's (1927) studies of matrilineal societies of Eastern New Guinea and Mead's (1935) studies of three New Guinea tribes. These studies gave evidence of the cultural determination of the individual's perception and behavior.

With the advent of these studies some American psychologists such as Gardner Murphy began to state that the laws of psychology could not be described until there was an infinitely bigger cultural base from which to work. By the late 1920s, the psychologist had begun to throw in the phrase "in our culture" after every generalization about human conduct, just as he had put quotation marks around the word "instinct" in the earlier 1900s. A new approach encompassing both individual and social factors in understanding behavior was needed. Sherif (1935) brought this new approach to psychology.

In the editor's introduction to Sherif's (1948) <u>Outline</u> <u>of</u> <u>social</u> <u>psychology</u>, Gardner Murphy places Sherif's contribution to social psychology under three headings:

> First he [Sherif] has taught us that social behavior springs largely from the way in which the individual perceives his world; that behavior analysis without an analysis of individual frames of reference, individual habits of social perception, is a study of shadows whose deeper substance is likely to be lost; that the dynamic integrating principles from which coherent social behavior springs are in the first instance principles regarding social perception. What a society does when it molds the individual into membership in the group is first of all to insist upon his learning to see the world in one way rather than another. From the systematic study of social perception-the ways of viewing the world in terms of one's group memberships-follow the behavioral principles and all the other principles with which the analysis of group life is concerned. This much was made clear in Sherif's <u>Psychology</u> <u>of</u> <u>social</u> <u>norms</u>, published over a decade ago [in 1936] . . . .
>
> The role of wants, needs, deprivations, imperious biological demands, was noted in his earlier work, but subordinated to the analysis of perceptual fields . . . .
>
> From this conception of the nature of social perception follows the need to study intensively the role of group membership-class membership . . . in historical and in contemporary social trends; to find how the fact of group membership gives structure to individual points of view, and what the objective characteristics of the resulting group behavior patterns are . . . .
>
> A third principle which was boldly enunciated in <u>The</u> <u>Psychology</u> <u>of</u> <u>social</u> <u>norms</u> . . . was the unity of experimental and of "real life" phenomenon-the fact that a sound psychological analysis will discover in laboratory situations and in life situations the same fundamental dynamics of human life and conduct, because, being human, one cannot <u>ever</u> function without displaying those basic principles from which every sound interpretation proceeds (pp. ix-x).

Sherif's approach was needed to tie together and make sense out of the information obtained from the anthropologists, the findings of the experimenters referred to above, and the data provided from general psychological research.

Sherif's first major contribution was the experimental study of social norm formation. In this study, he introduced the use of the autokinetic situation as a judgment situation in which experimental social norm formation can be observed. Murphy (1949) in discussing the influence of the group upon the individual at the level of his social perception, described research in which Sherif

> . . . used the autokinetic effect-the apparent movement of a point of light in the dark. The effect is governed by factors of previous learning and of present attitude. Placing his experimental subjects in the company of others, he showed that the individual is progressively molded into the group's way of seeing the movement. In other experiments he perceives the rates of tapping, or the degree of excellence of literary passages, as they are defined for him in group participation. Under group conditions of work, the norm and variabilities which had characterized the individual when alone were rapidly forced in a direction determined by others in the group. It is possible after each session to trace the degree to which each individual had given up his own autonomy of judgment in favor of the central tendency of the group as a whole. The curves indicate the convergence, or, as Sherif calls it, the "funnel-shaped relationship" which characterizes indoctrination into group norms (p. 412).

From Sherif's study of the process of social norm formation in 1935 came a series of studies using the autokinetic, or similar, judgment situation. Bovard (1948), using the autokinetic situation, demonstrated that individual subjects could be influenced by experimenter plants in a paired situation to internalize experimental social norms. The internalized social norms persisted for at least 28 days after experimenter influence had been removed. In another experiment using the autokinetic situation, Rohrer, Baron, Hoffman, & Swander (1954) found that experimental social norms once established revealed a high degree of stability even after the lapse of one year.

In the autokinetic situation, MacNeil (1964) found that with successive generations of experimental groups there was an inverse

relationship between continued group conformity to experimental norms and the arbitrariness of those norms.

In the autokinetic situation, Pollis & Montgomery (1966) found significant differences in conformity-compliance among subjects who had previously formed norms as individuals, pairs, and social group members. The findings showed that compliance (a persistence of imposed perception lasting only while social pressure existed), rather than conformity (a more or less permanent persistence of an imposed perception), to norms was greater when individual norms formed in individual (alone) situations than when formed in togetherness situations. Individual norms formed in togetherness situations showed greater compliance (less conformity) than those norms formed in social group situations.

Pollis (1967) using an auditory stimulus judgment situation investigated the question as to what extent individuals would comply with the immediate social influences of others, or conform to his previously established standard, in a novel situation. He found that norms formed during interaction of actual social groups tended to persist more strongly than norms formed in alone situations.

MacNeil (1967), in the autokinetic and shotgun judgment situations, i.e., numerosity estimation of shotgun pellet patterns, found that unrealistic, moderately arbitrary norms could be transmitted to a selected member of a social group through indoctrination by a planted majority of experimenter collaborators. The persistence of the imposed norm when the member later made judgments with the other group members was a joint function of the member's status position and the solidarity of the group.

The autokinetic judgment situation is physically unstructured. The stimulus, a point of light, is presented in a completely dark room. The darkness eliminates the usually available external references by which people judge distance. Thus, due to the ambiguity, the possibility of reasonable alternatives, the autokinetic situation is well suited to the study of social factors involved in norm formation. However, there is a limitation to the autokinetic judgment situation when it is used in studying the effect of social factors in small group norm formation and change. Norms once formed under particular conditions in the autokinetic situation tend to persist. This results in limiting the usefulness of the situation to one particular social factor for any specific group. Other judgment tasks, combined with the autokinetic situation, are needed to provide greater versatility in the study of the effect of the various social factors in small group experimental norm formation.

New judgment tasks which allow for realistic variation in judgments of the situation are essential. Judgment tasks are required which permit judgment variation regarding an attribute by different individuals making judgments at the same time, as well as by an individual making judgments at different times. In other words, additional judgment tasks are needed which are analogous to the autokinetic judgment situation.

CHAPTER II

PROBLEMS AND HYPOTHESES

The problem is to develop an experimental judgment situation

analogous to Sherif's autokinetic situation. Therefore, a judgment

situation must be used in which the degree of ambiguity is such that a

physically identical stimulus may be perceived, and judged, as different

by the same subject on repeated presentations. The judgment situation

must provide a range of quantified judgments of determinable limits and

central tendency. The judgment situation must also allow some diver-

gence in individual judgments among a number of subjects judging the

same stimulus presentation. The ambiguity in the situation must not be

so great, however, as to cause the subjects to feel that the task is so

difficult that they cannot give a reasonably accurate judgment of the

stimulus. It is also desirable that the judgments be given directly in

a quantified form, such as the number of inches of distance between

stimuli.

Judgment situations which have been used to study prototypic exper-

imental social norm formation, in addition to Sherif's (1935) autoki-

netic situation, include: Asch's (1951) comparison of line length (not

quantified); Moede's loudness of ball bounce as reported by Murphy &

Murphy (1931); Munsterberg's numerosity estimations (not quantified as

used) as reported by Murphy & Murphy (1931); MacNeil's (1967) shotgun

shot patterns; Pollis' (1967) tone estimation; Harvey & Consalvi's

(1960) estimates of distance between lights; Schonbar's (1945) estimation of actual movement of light.

The studies of Schonbar (1945) and Harvey & Consalvi (1960) indicate that a range of judgments is obtained even when the physical attribute of the stimulus being judged is relatively structured. Even the same actual movements of stimulus light, or repeated, identical, distances between stimulus lights, are not judged the same by the same subject on different trials. An increase in the ambiguity of the physical stimulus from these cited examples is desirable, however, if the autokinetic judgment situation is to be reasonably duplicated.

MacNeil (Center for Social Psychological Studies, Oklahoma State University), in the process of developing alternative judgment situations for the study of interpersonal interaction in natural groups, has provided a judgment situation which appears to meet the requirements indicated above. The judgment situation developed by MacNeil involves the judgment of stimulus light pairs presented by the Hexagonal-Horizontal-Vertical Apparatus (Hex). This judgment situation utilizes judgments of distance between pairs of lights. Each pair of lights presents an objectively identical physical distance with differences in the angles of the stimulus pair axes contributing to subjects' perceptual differences.

The Hex consists of 13 lights positioned on a board in two overlapping hexagonal patterns around a center light (Figure 1). The apparatus is designed to present five randomized sequence-of-presentation programs, each made up of 24 stimulus-light pairs. Two points of light, i.e., a stimulus pair, are set to appear at the same time for approximately .5 sec. duration. The subject's task is to judge
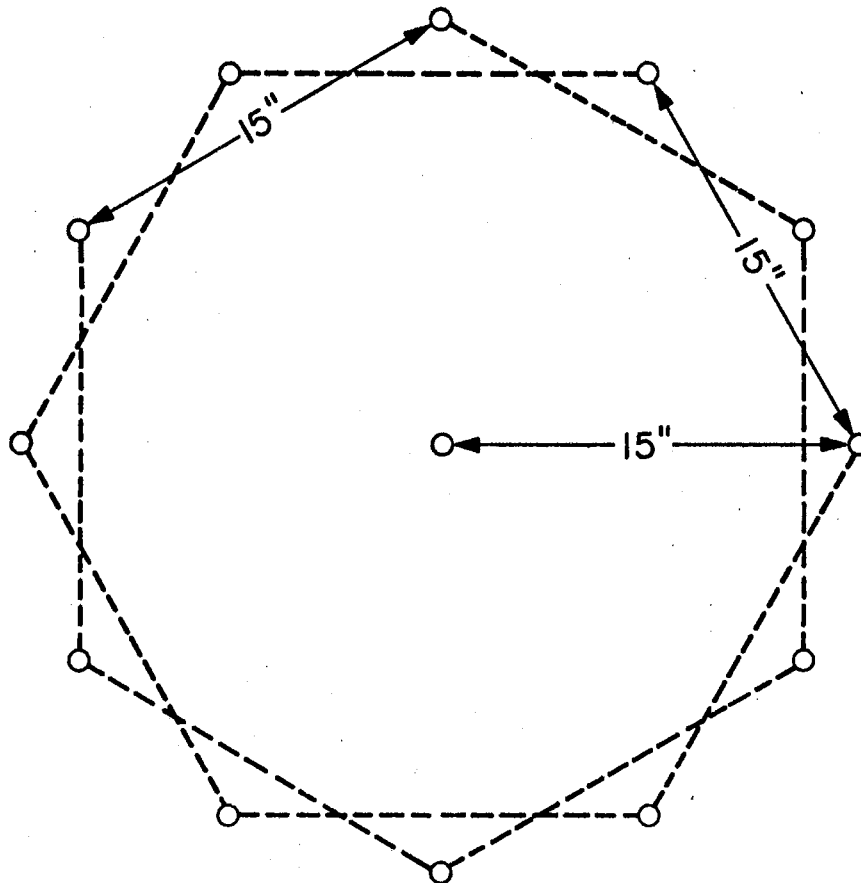
FIG. 1. Position of lights on Hexagonal-Horizontal-Vertical Apparatus. Twenty-four stimulus light pairs with the lights of each pair 15 inches apart (by MacNeil & Gregory, 1969).

the distance between the two points of light. The actual, physical, distance between the points of light remains constant, i.e., 15", but appears, subjectively, to be variable in length according to the axis angle of a particular set of lights.

This judgment situation is based on the classical horizontal-vertical illusion (Kunnapas, 1955, 1959) in which the vertical dimension is seen as perceptually longer than the horizontal dimension when both are physically equal. In studying the horizontal-vertical illusion, Kunnapas found that two factors were involved:

A. The classical overestimation of the vertical line as compared with a horizontal line of equal length.

B. The overestimation of the dividing line, irrespective of whether the direction is vertical or horizontal.

Hypothesizing that the overestimation of the vertical is due to the oval shape of the visual field which is extended in a horizontal direction, Kunnapas compared the normal binocular visual field with different artificial visual fields. It was found that the overestimation of the vertical line is a function, in part at least, of the angular positioning of the vertical-horizontal lines in relation to the visual field. In the judgment situation used in this study, as in the horizontal-vertical illusion, the perception of length (i.e., distance) is a function of the angles of the lines (i.e., stimulus pair axis).

The hexagonal-horizontal-vertical judgment situation is ambiguous to a degree approaching that found in the autokinetic situation. Social norm formation similar to that found in the autokinetic situation will occur. Neither judgment situation, however, is perceived as so difficult that the subject will feel that the task is impossible.

To study norm formation under conditions similar to those employed by Sherif (1935), it is necessary to control for social relations among subjects. If natural norms are to be established free of the confounding effects of status, group solidarity, and related factors, subjects without such established reciprocities must be used.

Hypotheses

In view of the implications for the effect of norm formation shown in the experimental norm formation studies of Sherif (1935), Pollis (1967), MacNeil (1967), and studies carried out with the classical horizontal-vertical illustions (Kunnapas, 1955, 1959), it is predicted that in the hexagonal-horizontal-vertical judgment situation:

Hypothesis I - A naive subject making estimates of distance between two points of light under an alone condition produces a subjective scale and a modal point on that scale and distributes his judgments around that modal point, i.e., forms an individual judgment norm.

Hypothesis II - Naive subjects after establishing their own individual norms under alone conditions persist in maintaining that norm on subsequent occasions in a similar situation under alone conditions.

Hypothesis III - Naive subjects under togetherness conditions making estimates of distance between two points of light establish a common social norm. There is a rapid convergence of individual median values in the course of the interpersonal interaction leading to this common norm.

Hypothesis IV – Naive subjects who have formed individual norms
under alone conditions and subsequently make judgments under
togetherness conditions will exhibit a convergence of their
norm ranges and medians toward a common (social) norm in the
course of judgments made under the togetherness condition.

Hypothesis V – Naive subjects who have formed social norms under
togetherness conditions, prior to participating in judgment
situations under alone conditions, will:

A. Adopt the range and central tendency of the common social
norm as their own in the togetherness condition and

B. Retain the common social norm as their own individual
norm in subsequent alone condition judgment sessions.

CHAPTER III

METHOD

Subjects were 59 male undergraduate and graduate college students,
with ages ranging from 17 to 29. They were obtained from a subject pool
made up of students from psychology and sociology courses who had volun-
teered to participate in a psychology experiment. All subjects were
naive in regard to the autokinetic and similar experimental judgment
situations. Subjects who were asked to return for subsequent sessions
were told at the time they were asked that they would be paid five
dollars each after the series of three experimental sessions were com-
pleted. They were so paid.

To control for the factor of established social relations among
subjects, precautions were taken not to include subjects in the same
sessions who lived in close proximity of each other, e.g., on the same
dormitory floor. Subjects from the same psychology or sociology course
were not included in the same togetherness sessions to further reduce
the possibility of subjects responding on the basis of established
reciprocities. As a further precaution, prior to final scheduling, the
experimenter asked prospective subjects if they knew any subject
scheduled to participate with them.

The experimental room was totally dark when subjects entered and
left for their experimental sessions so as to provide a minimum of phys-
ical structure in the experimental situation. The experimental set-up

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was as depicted in Appendix A. All surfaces were dull black or gray
and no subject gained an accurate idea as to room size or subject to
stimulus distance. Sounds outside the experimental setting were sound
screened by the noise emitted by an air conditioner and the two foot
thick masonry walls of the experiment room.

Experimental Design

The experiment was divided into three experimental procedure
phases: I (Control) Individual norm formation; II (Control) Individual
norm formation and persistence under alone conditions; III A. (Experi-
mental) Norm formation in alone condition followed by togetherness
condition; III B. (Experimental) Norm formation in togetherness condi-
tion followed by alone condition.

There was one judgment session, consisting of 96 judgment trials,
run for each of the 19 subjects under the Alone condition. Four sub-
jects selected at random from the first 19 subjects were then asked to
return for the Retention session in which each selected subject partici-
pated in three additional, Alone, series of judgments of 96 judgments
per series. The Alone-Togetherness condition consisted of four judgment
sessions. A session consisted of each subject (or aggregate of subjects
when appropriate) giving 96 judgments of the distance between stimulus-
light pairs (see Table 1).

Phase I: Individual Norm Formation

In this phase, individual subjects made judgments alone. The pur-
pose of this phase of the experiment was to determine whether or not
subjects established a range and a median within that range peculiar to

TABLE 1

SUBJECT PARTICIPATION IN EXPERIMENTAL
NORM FORMATION

Experimental Phases	Number of Subjects in Conditions	
	Norm Formation Alone	Norm Formation Together
I (Control 1) Individual Norm Formation	19	0
II (Control 2) Individual Norm Formation and Persistence	(4)	(4)
III$_a$ Norm Formation Alone-Together	20	Groups of 2 = 8 Groups of 3 = 12

	Norm Formation Together	Norm Formation Alone
III$_b$ Norm Formation Together-Alone	Groups of 2 = 8 Groups of 3 = 12	20

Total Number of Subjects = 59

Note.--Four subjects participating in norm formation alone and together in Experimental Phase II also participated in Experimental Phase I.

the individual, i.e., which differed more or less from the range and median established by other individuals. Each subject, alone, gave 96 judgments. After the 96 judgments had been given, subjects were given a questionnaire which contained two introspective questions:

(1) Was it difficult to estimate the distance? If yes, give the reason.

(2) Did you try to find some method of your own so that you could make your judgment more accurate? If so, what method did you use?

Phase II: Norm Formation and Persistence Under Alone Conditions

This phase involved four subjects. Each of the four subjects were asked to give 96 judgments per session for three different, Alone, sessions. The three sessions were conducted on different days within a one-week period with at least 24 hours between each session. The four subjects used were selected at random from the 19 subjects used in Phase I. In this phase, all of the instructions given, entrance and seating in the experimental room were exactly the same as in Phase I. The purpose of this phase was to find whether, after an individual's range of judgments (i.e., his individual norm) was established, it persisted on subsequent occasions.

Phase III: Norm Formation Under Alone and Togetherness Conditions

This phase involved the use of eight experimental social units of two subjects each and eight experimental social units of three subjects

each, a total of 40 subjects.

In Phase III A (Alone, then Togetherness), 20 subjects each made 96 judgments alone in the first session. The same subjects then made judgments, as participants in one of eight experimental social units consisting of either two or three subjects each, for three more 96-judgment sessions.

In Phase III B (Togetherness, then Alone), 20 subjects made judgments as participants in one of eight experimental social units consisting of either two or three subjects each, for three 96-judgment sessions. Each subject then made 96 more judgments in the Alone session (see Table 2).

In Phase III, as in Phase I and Phase II, 96 judgments were taken from each subject in each session. The design as stated applies for Alone-Togetherness condition sessions of both two and three subject experimental social units. Subjects in the Togetherness condition sessions were given additional instructions; these were: "Mix up your judgments so that one person does not give his judgment first all of the time." Since the experimenter could not recognize their voices, each subject under the Togetherness condition was asked to give his first name before giving each judgment.

At the end of Phase III, subjects who participated in the Togetherness sessions were given a questionnaire containing three questions. These questions were asked in order to find out whether or not the subjects were aware of their established norm. The questions presented were:

(1) Between what maximum and minimum did the distance vary?

TABLE 2

NORM FORMATION IN ALONE CONDITIONS FOLLOWED BY
TOGETHERNESS CONDITION (EXPERIMENTAL)

Session	I	II	III	IV
	Alone	Togetherness	Togetherness	Togetherness
Subject 1)				
Subject 2)				
Subject 3)				

NORM FORMATION IN TOGETHERNESS CONDITIONS FOLLOWED BY
ALONE CONDITION (EXPERIMENTAL)

Session	I	II	III	IV
	Togetherness	Togetherness	Togetherness	Alone
				Subject 1)
				Subject 2)
				Subject 3)

(2) What was the most frequent distance between these two
points of light?

(3) Do you think you were influenced in your estimates by the
judgments of the other persons in the experiment?

The purpose of this phase of the experiment was to find out what
subjects in a Togetherness condition will do when confronting an un-
structured judgment situation. Will different individuals establish
their own range and norms or will the social unit establish a more or
less common norm peculiar to itself? A further question is: How much
convergence of norms, i.e., ranges, and medians will there be when:
A. the individual first makes judgments (forms an individual norm)
alone and then with others; and B. he faces the situation first with
others (accepts a "group" norm) and then alone?

Apparatus and Experimental Set-up

The experimental setting was a 22' x 29' blacked-out, and sound
deadened room. The experimental room was entered through a light-trap
entrance from an adjoining dark adaptation room in which the general
orientation was given (Appendix A). The light-trap entrance booth was
devised so that subjects could not see clearly any part of the experi-
mental room, nor determine its size or arrangement. The experimental
room was completely dark when subjects (Ss) entered. All surfaces were
painted flat black to eliminate reflections and other clues as to room
size and distance to the stimulus. Neither the exact size of the room
nor the distance of the stimuli from the Ss were determinable by the Ss.

Directly beyond the booth was a subject table 3' wide by 18' long
behind which the subject's chairs were spaced 4' apart from each other

(Appendix A). Ss were guided by the experimenter (E), using a penlight, to their chairs. The Hex stimulus apparatus was located 15' from and centered in front of the seated Ss (Appendix A). The Hex apparatus consisted of a total of 13, 1 mm., lights set in two overlapped 15" diameter hexagonals with one light at the common center. The arrangement allows presentation of a series of two light point stimulus pairs in which each pair of lights were exactly 15" apart from each other in various horizontal-vertical position angles (Figure 1).

The apparatus is programmed to present five different randomized series of the stimulus pairs of light sequences, each series containing 24 stimulus pairs. The series to be used can be selected by a five-position switch enabling random selection of the sequence in which the series are presented. Thus, a total of 120 different stimulus pair sequences were available. Ninety-six of the random stimulus pair sequences were used in each session. Duration of each stimulus pair presentation was one second with a 30-second interval between each presentation. The brightness of the lights was set just above the minimum intensity at which no S had any difficulty in seeing the stimuli. The apparatus presentation of the stimuli was completely automatic once started by E. The E recorded Ss' verbal judgments of distance under a low illumination light shielded by a booth installed directly to the rear of the Hex apparatus (Appendix A).

Procedure

At the time Ss were scheduled for participation in the judgment situation, E greeted them casually and asked their names which he checked off against a list on a clipboard. He then told the Ss to come

with him to the dimly lighted orientation and dark adaptation room.

After the $\underline{S}$s (or $\underline{S}$) were seated, the experimenter told them:

> This is a judgment situation in which we are trying to
> determine how well people judge distance at night. Your task
> will be to judge the distance between two points of light.
> We will enter this other room (experimenter indicates the
> experiment room) and then stop just inside the door. You
> will notice a curtain drawn across the end of the booth.
> After shutting the door I will open this curtain and lead
> each of you to your seat. The reason this is done is because
> the room is completely dark. I will then walk back to my
> machine and turn it on. I will then give you the signal
> (ready) and show you two points of light. A second later
> the light will disappear. Then tell me the distance between
> these two points of light. Try to make your estimates as
> accurate as possible.

The $\underline{E}$ then paused and answered any questions which did not relate to

the judgment situation per se. These instructions remained the same for

all phases of the experiment except for Phase III in which $\underline{S}$s were asked

to give their first name before their judgment and they were told that

they could give their judgments in any order and could change the order

from time to time. After the $\underline{S}$s were seated, $\underline{E}$ by means of a guide

wire, walked to the apparatus booth.

On the way to the apparatus booth, $\underline{E}$ stopped and said:

> There will be one trial run so that you can get used to
> the machine. Tell me when you see two lights. After you
> have seen two lights I will say "ready," then give me judg-
> ments on the next set of lights.

After $\underline{S}$s had given 24 judgments, the apparatus was turned off. $\underline{E}$

then told the $\underline{S}$s (or $\underline{S}$), "Let's take a small break here so that we can

catch our breath." This break lasted one minute. At the end of the

one minute break period, $\underline{E}$ asked, "Are you ready to begin again?"

Following their reply in the affirmative, $\underline{E}$ said "ready," and turned on

the apparatus. A one-minute break, as described, was given at the end

of every 24 judgments.

After each session of 96 judgments, $\underline{E}$ said: "Okay, the experiment is over. Just a minute and I will be with you to help you out." $\underline{E}$ then guided each $\underline{S}$, one by one, into the orientation room. All $\underline{S}$s were then told, "Let's go to my office and pick a time that you can come in again."

$\underline{S}$s who were to return for further sessions were told, "Upon completion of four experiments you will be paid $5.00." (Experimenter had previously explained this when calling $\underline{S}$s to see what time they could participate in the experiment.) At this time, the remark was a reminder and a reassurance. Upon completion of the fourth session, $\underline{S}$s were paid $5.00 each, asked to sign a receipt, and thanked by $\underline{E}$ for their participation.

CHAPTER IV

RESULTS

The data, each subject's verbal estimate of the distance between the lights of each of the stimulus light pairs, were tabulated in frequency tables (Appendices B, C, D, and E). The results given in Appendix B and Appendix C, respectively, show the norm formed by the individual and the retention of that norm in Phase II. The results for two-subject experimental social units are given in Appendix D.

Results for three-subject experimental social units (Appendix E) show essentially the same trend as those for two-subject units. The range, mode, median, mean, Q., P.E.$_{(mdn.)}$, and T. were computed for each subject for each experimental session. The differences in the medians of each possible pair in each session, the reliabilities, i.e., critical ratio: $\frac{D}{P.E.}$ (Guilford, 1936), and tests of significance of mean difference (Edwards, 1960) were computed. For togetherness to alone conditions, the differences between the medians of the last (third session) togetherness session and the alone session (fourth session) were computed (Tables 3-12).

The differences between the medians of subject pairs are small when starting in a togetherness condition and are not significantly different. On the other hand, the differences between the medians of subject pairs starting with the individual session are considerably larger and significantly different in most cases.

The critical evaluation of the results of this experiment may be made by the comparisons of ranges and median values under the conditions stated in the hypotheses:

Hypothesis I   - A naive subject making estimates of distance between two points of light under an alone condition produces subjectively a scale and a central point on that scale and distributes his judgments around that modal point.

Hypothesis II - Naive subjects after establishing an individual norm under alone conditions persist in maintaining that norm on subsequent occasions under alone conditions.

Hypothesis III - Naive subjects under togetherness conditions making estimates of distance between two points of light establish a common norm. There is a rapid convergence of individual median values in the course of the interpersonal interaction leading to this common norm.

Hypothesis IV - Naive subjects who have formed individual norms under alone conditions and subsequently make judgments under togetherness conditions will exhibit a convergence of their norms, ranges, and medians toward a common (social) norm in the course of judgments made under the togetherness condition.

Hypothesis V   - Naive subjects who have formed social norms under togetherness conditions prior to participating in judgment situations under alone conditions, will:

A. Adopt the range and central tendency of the common social norm as their own in the togetherness condition and

B. Retain the common social norm as their own individual norm in subsequent alone condition judgment sessions.

From Table 3, it is evident that subjects in judging distance between two points of light under alone conditions establish a range and a central tendency within that range which is peculiar to the individual. Among the 19 subjects, the shortest individual range is 7 inches, (from 13 inches to 20 inches); the greatest range is 21 inches, (from 3 inches to 24 inches). The minimum median is 6 inches and the maximum is 27 inches.

The subjects' introspective reports give qualitative support to Hypothesis I. The answers given to the question, "Was it difficult to estimate the distance?," show that the subjects feel the lack of reference points. Some of the representative answers are:

(1) "Nothing to relate the distance to because of the total darkness."

(2) "In judging one set, it seemed hard to be sure about the next set."

(3) "It was dark and lights did not stay on long enough."

(4) "Had no concept as to what size the room was."

(5) "Hard to tell how far away from the lights I was."

The answers given to the second question give support to the conclusion that subjects established a subjective basis of comparison. Some of the representative answers are:

(1) "Tried to remember what I said on others about the same length."

(2) "Had the distance in mind before lights came on."

(3) "Tried to determine how much over a foot I thought the distance was."

TABLE 3

QUANTIFIED RESULTS OF INDIVIDUAL
NORM FORMATION (CONTROL)
PHASE I

Subject	Range		Mode	Mdn.	Q.	P.E.$_{(Mdn.)}$[a]
1	(8-18)	10	12	12	.5	.064
2	(4-12)	8	6	6	0	0
3	(5-15)	10	6	8	3.0	.384
4	(18-30)	12	20	25	3.5	.446
5	(15-24)	9	18	18	1.0	.128
6	(10-26)	16	15 & 16	16	2.0	.256
7	(6-14)	8	10	9.5	2.0	.256
8	(10-18)	8	14	14	2.0	.256
9	(15-23)	8	18	18	1.0	.128
10	(6-25)	19	15	15	1.5	.192
11	(10-16)	6	15	15	.5	.064
12	(6-25)	19	14	12	3.0	.384
13	(7-24)	17	13 & 12	13	1.5	.192
14	(3-24)	21	8	8	2.0	.256
15	(18-36)	18	27	27	2.0	.256
16	(6-15)	9	10	10	1.5	.192
17	(12-30)	18	14	14	1.0	.128
18	(6-20)	14	14	14	1.0	.128
19	(13-20)	7	13	14	1.0	.128

a. Critical Ratio of Reliabilities (Guilford, 1936).

(4) "Tried to compare to lengths which were about the same
distance."

(5) "Lights seemed to be on a grid and I tried to judge using
a certain distance between dots on the grid."

Answers similar to the above are given over and over again in the
introspective reports obtained from subjects following their participa-
tion under the alone condition.

The intent of Hypothesis II was to determine if subjects after
establishing a norm under alone conditions persist in maintaining that
norm in subsequent alone condition judgment sessions. The range, mode,
median, mean, Q., P.E.$_{(mdn.)}$, and test of significance for each 96 judg-
ments are given in Table 4. Those results show that once a range and a
modal point within that range (i.e., a norm) are established, there is a
tendency to preserve them in subsequent sessions under the same
conditions.

The task set for the next three hypotheses is to find out if a
prototypic social unit, consisting of two or three people who have not
established a social relationship to each other, will in the present
judgment situation produce social norms comparable to those found in
Sherif's (1935) study. It is necessary to determine if the results
obtained in this study compare with those obtained by Sherif when:

(A) A subject's individual range and mode are formed in an
alone session, and then he is put into the togetherness
condition (for three successive sessions), so that we
may note if his norm (median, mode, and range) converges
toward a common social norm over the course of the to-
getherness condition sessions.

TABLE 4

QUANTIFIED RESULTS OF EXPERIMENTAL INDIVIDUAL
NORM FORMATION AND PERSISTENCE UNDER
ALONE CONDITIONS (CONTROL)
PHASE II

Subject	Range	Mode	Mdn.	Q.	$P.E._{(Mdn.)}$ [a]
One					
Session I	(8-13) 5	12	12	1.00	.128
Session II	(10-16) 6	12	12	1.00	.128
Session III	(9-14) 5	12	12	.50	.064
Eight					
Session I	(12-16) 4	14	14	0	0
Session II	(14-16) 2	14	14	1.00	.128
Session III	(12-16) 4	14	14	1.00	.128
Sixteen					
Session I	(10-18) 8	13	13	.50	.064
Session II	(11-15) 4	13	13	.50	.064
Session III	(12-16) 4	13	14	.50	.064
Nineteen					
Session I	(12-17) 5	14	14	1.00	.128
Session II	(13-16) 3	14	14	.50	.064
Session III	(13-16) 3	14	14	.50	.064

[a]. Critical Ratio of Reliabilities (Guilford, 1936).

(B)   A subject first forms his norm under the togetherness

condition (for three successive sessions on different

days) and then makes judgments under the alone condi-

tion in Session IV on a subsequent day in order that

we may note how closely he adheres to the common norm

established under the togetherness condition.

To give a concise picture, the median values established by each

subject in each successive session are presented graphically (Figures

2-6).

The data presented in Tables 5-14 and Figures 2-6 support

Hypothesis III, Hypothesis IV, and Hypothesis V.   When subjects start

with the alone sessions, the median values established individually

differ from each other.   When on successive sessions they work together,

their medians tend to converge.   This is shown as a "funnel-shaped"

relationship in the graphs.   The graphs shown in Figures 2 and 3, plus

Tables 5, 7, 8, 9, and 10 give graphic and quantitative support to

Hypothesis IV.

When subjects give their initial judgments under the togetherness

condition, there is convergence at once which is maintained in succes-

sive sessions, including the last individual session.   In social units

of two or three persons who start out under togetherness conditions,

there may be a median rise or fall, or a keeping to the same general

level as is seen in cases of units 3 and 4.   However, where there is a

rise, the subjects' medians rise together, and when there is a fall,

they fall together.   Figures 4, 5, and 6 plus Tables 6, 12, 13, and 14

give graphic and quantitative support to Hypothesis V.   The graphs in

TABLE 5

COMPARISON BETWEEN MEDIANS AND MEANS
USING CRITICAL RATIO AND TESTS OF
SIGNIFICANCE OF MEAN DIFFERENCE

UNITS OF TWO SUBJECTS STARTING WITH THE ALONE CONDITION

Session	Mdn. Diff.	P.E.$_{(Mdn.)}$[a]	$\bar{X}$ Diff.	T[b]
First Unit				
I Alone	2	5.41	.2	3.89
II Togetherness	6	13.04	1.7	4.35
III Togetherness	2	4.35	1.4	3.04
IV Togetherness	2	1.54	2.4	1.62
Second Unit				
I Alone	5	25.00	1.8	15.02
II Togetherness	1	5.00	.4	2.61
III Togetherness	1	7.14	.5	3.01
IV Togetherness	1	7.14	.3	1.82
Third Unit				
I Alone	10	55.55	10.1	49.91
II Togetherness	5	25.00	5.9	17.88
III Togetherness	3	16.66	1.9	8.50
IV Togetherness	3	16.66	3.3	9.15
Fourth Unit				
I Alone	6	33.33	6.0	29.92
II Togetherness	1	7.14	.4	2.37
III Togetherness	0	0	.2	.96
IV Togetherness	0	0	.1	.41

Note.--$\bar{X}$ Diff. represents the difference between the means of the medians used as scores.
a. Critical Ratio of Reliabilities (Guilford, 1936).
b. Test of Significance of Mean Difference (Edwards, 1960).

TABLE 6

COMPARISON BETWEEN MEDIANS AND MEANS
USING CRITICAL RATIOS AND TESTS OF
SIGNIFICANCE OF MEAN DIFFERENCE

UNITS OF TWO SUBJECTS STARTING WITH THE TOGETHERNESS CONDITION

Session	Mdn. Diff.	$P.E._{(Mdn.)}$[a]	$\overline{X}$ Diff.	T[b]
First Unit - I Togetherness	2	13.33	3.7	7.03
II Togetherness	1	11.11	1.1	6.50
III Togetherness	1	11.11	1.1	6.09
Self-D S_1 (III-IV)	1	11.11	.1	
S_2 (III-IV)	0	0	.2	
IV Alone	2	22.22	.8	8.62
Second Unit - I Togetherness	0	0	1.0	1.96
II Togetherness	0	0	3.4	3.76
III Togetherness	1	1.37	.1	.42
Self-D S_1 (III-IV)	0	0	.3	1.04
S_2 (III-IV)	.5	3.57	.9	3.33
IV Alone	.5	3.57	1.1	3.78
Third Unit - I Togetherness	0	0	.2	1.33
II Togetherness	0	0	.1	1.00
III Togetherness	0	0	.1	.33
Self-D S_1 (III-IV)	1	11.11	.3	2.00
S_2 (III-IV)	1	11.11	.9	9.00
IV Alone	0	0	.2	1.11
Fourth Unit - I Togetherness	1	5.55	.3	1.00
II Togetherness	1	5.00	.2	.87
III Togetherness	1	4.00	0	0
Self-D S_1 (III-IV)	0	0	1.4	5.18
S_2 (III-IV)	0	0	.1	.84
IV Alone	1	7.69	1.3	5.20

Note.--Self-D (Self-Difference) represents the difference between the medians of the same subjects in the last togetherness condition (Session III) and the alone condition (Session IV).
a. Critical Ratio of Reliabilities (Guilford, 1936).
b. Tests of Significance of Mean Difference (Edwards, 1960).

TABLE 7

DIFFERENCES BETWEEN MEDIANS AND MEANS
USING CRITICAL RATIOS AND TESTS OF
SIGNIFICANCE OF MEAN DIFFERENCE

UNIT OF THREE SUBJECTS STARTING WITH THE ALONE CONDITION

	Mdn. Diff.	$P.E._{(Mdn.)}$[a]	$\bar{X}$ Diff.	T[b]
First Unit				
Session I - Alone				
S_1-S_2 - - - - - - - - - - - - - -3	9.38	5.2	15.75	
S_1-S_3 - - - - - - - - - - - - - -2	7.14	1.3	5.20	
S_2-S_3 - - - - - - - - - - - - - -5	21.73	6.5	21.66	
Session II - Togetherness				
S_1-S_2 - - - - - - - - - - - - - -1	5.55	.7	2.12	
S_1-S_3 - - - - - - - - - - - - - -0	0	.8	1.60	
S_2-S_3 - - - - - - - - - - - - - -1	4.35	1.5	4.48	
Session III - Togetherness				
S_1-S_2 - - - - - - - - - - - - - -1	4.35	1.0	4.54	
S_1-S_3 - - - - - - - - - - - - - -0	0	1.7	5.33	
S_2-S_3 - - - - - - - - - - - - - -1	4.35	.7	5.71	
Session IV - Togetherness				
S_1-S_2 - - - - - - - - - - - - - -0	0	.2	2.00	
S_1-S_3 - - - - - - - - - - - - - -0	0	.4	3.07	
S_2-S_3 - - - - - - - - - - - - - -0	0	.2	1.53	

Note.--S_1-S_2 stands for the difference (D) of the medians of
judgments of subject 1 and subject 2 in the unit.
a. Critical Ratio of Reliabilities (Guilford, 1936).
b. Tests of Significance of Mean Difference (Edwards, 1960).

TABLE 8

DIFFERENCES BETWEEN MEDIANS AND MEANS
USING CRITICAL RATIOS AND TESTS OF
SIGNIFICANCE OF MEAN DIFFERENCE

UNIT OF THREE SUBJECTS STARTING WITH THE ALONE CONDITION

	Mdn. Diff.	$P.E._{(Mdn.)}$[a]	$\bar{X}$ Diff.	T[b]
Second Unit				
Session I - Alone				
S_1-S_2 - - - - - - - - - - - - - - -1	5.55	.8	6.03
S_1-S_3 - - - - - - - - - - - - - -6	33.33	4.4	19.02
S_2-S_3 - - - - - - - - - - - - -5	27.77	3.6	15.12
Session II - Togetherness				
S_1-S_2 - - - - - - - - - - - - - -0	0	.7	5.00
S_1-S_3 - - - - - - - - - - - - - -0	0	1.8	9.00
S_2-S_3 - - - - - - - - - - - - -0	0	1.1	4.78
Session III - Togetherness				
S_1-S_2 - - - - - - - - - - - - - -0	0	1.4	5.83
S_1-S_3 - - - - - - - - - - - - - -0	0	1.9	6.94
S_2-S_3 - - - - - - - - - - - - -0	0	.5	2.77
Session IV - Togetherness				
S_1-S_2 - - - - - - - - - - - - - -0	0	.7	3.42
S_1-S_3 - - - - - - - - - - - - - -0	0	.7	2.97
S_2-S_3 - - - - - - - - - - - - -0	0	0	0

Note.--S_1-S_2 stands for the difference (D) of the medians of
judgments of subject 1 and subject 2 in the unit.
a. Critical Ratio of Reliabilities (Guilford, 1936).
b. Tests of Significance of Mean Difference (Edwards, 1960).

TABLE 9

DIFFERENCES BETWEEN MEDIANS AND MEANS
USING CRITICAL RATIOS AND TESTS OF
SIGNIFICANCE OF MEAN DIFFERENCE

UNIT OF THREE SUBJECTS STARTING WITH THE ALONE CONDITION

	Mdn. Diff.	$P.E._{(Mdn.)}$[a]	$\overline{X}$ Diff.	T[b]
Third Unit				
Session I - Alone				
S_1-S_2 - - - - - - - - - - - - - - -2	5.88		1.2	3.87
S_1-S_3 - - - - - - - - - - - - - - -2	7.14		.2	.64
S_2-S_3 - - - - - - - - - - - - - - -0	0		1.0	2.50
Session II - Togetherness				
S_1-S_2 - - - - - - - - - - - - - - -0	0		.6	6.00
S_1-S_3 - - - - - - - - - - - - - - -2	7.14		1.5	6.25
S_2-S_3 - - - - - - - - - - - - - - -2	5.55		.9	3.75
Session III - Togetherness				
S_1-S_2 - - - - - - - - - - - - - - -0	0		.2	1.00
S_1-S_3 - - - - - - - - - - - - - - -0	0		1.1	.61
S_2-S_3 - - - - - - - - - - - - - - -0	0		.9	.03
Session IV - Togetherness				
S_1-S_2 - - - - - - - - - - - - - - -0	0		1.0	.42
S_1-S_3 - - - - - - - - - - - - - - -0	0		.9	.97
S_2-S_3 - - - - - - - - - - - - - - -0	0		1.9	.39

Note.--S_1-S_2 stands for the difference (D) of the medians of judgments of subject 1 and subject 2 in the unit.

[a] Critical Ratio of Reliabilities (Guilford, 1936).

[b] Tests of Significance of Mean Difference (Edwards, 1960).

TABLE 10

DIFFERENCES BETWEEN MEDIANS AND MEANS
USING CRITICAL RATIOS AND TESTS OF
SIGNIFICANCE OF MEAN DIFFERENCE

UNITS OF THREE SUBJECTS STARTING WITH THE ALONE CONDITION

	Mdn. Diff.	P.E.$_{(Mdn.)}$[a]	$\bar{X}$ Diff.	T[b]
Fourth Unit				
Session I - Alone				
S_1-S_2 - - - - - - - - - - - - - - -2	14.28	2.6	9.64	
S_1-S_3 - - - - - - - - - - - - - - -4	22.22	2.6	13.00	
S_2-S_3 - - - - - - - - - - - - - - -2	11.11	0	0	
Session II - Togetherness				
S_1-S_2 - - - - - - - - - - - - - - -0	0	.3	1.66	
S_1-S_3 - - - - - - - - - - - - - - -0	0	.4	1.66	
S_2-S_3 - - - - - - - - - - - - - - -0	0	.7	2.93	
Session III - Togetherness				
S_1-S_2 - - - - - - - - - - - - - - -0	0	.6	3.00	
S_1-S_3 - - - - - - - - - - - - - - -2	11.11	.5	2.77	
S_2-S_3 - - - - - - - - - - - - - - -2	14.28	1.1	4.78	
Session IV - Togetherness				
S_1-S_2 - - - - - - - - - - - - - - -0	0	1.3	.62	
S_1-S_3 - - - - - - - - - - - - - - -2	11.11	.7	3.54	
S_2-S_3 - - - - - - - - - - - - - - -2	14.28	2.0	10.00	

Note.--S_1-S_2 stands for the difference (D) of the median of judgments of subject 1 and subject 2 in the unit.
a. Critical Ratio of Reliabilities (Guilford, 1936).
b. Tests of Significance of Mean Difference (Edwards, 1960).

TABLE 11

DIFFERENCES BETWEEN MEDIANS AND MEANS
USING CRITICAL RATIOS AND TESTS OF
SIGNIFICANCE OF MEAN DIFFERENCE

UNIT OF THREE SUBJECTS STARTING WITH THE TOGETHERNESS CONDITION

	Mdn. Diff.	$P.E._{(Mdn.)}$[a]	$\bar{X}$ Diff.	T[b]
First Unit				
Session I – Togetherness				
S_1-S_2- - - - - - - - - - - - - -3		6.52	6.5	5.41
S_1-S_3- - - - - - - - - - - - - -3		5.45	8.2	4.37
S_2-S_3- - - - - - - - - - - - - -0		0	1.7	1.63
Session II – Togetherness				
S_1-S_2- - - - - - - - - - - - - -2		7.14	3.9	5.99
S_1-S_2- - - - - - - - - - - - - -0		0	0	0
S_2-S_3- - - - - - - - - - - - - -2		5.55	3.9	5.13
Session III – Togetherness				
S_1-S_2- - - - - - - - - - - - - -2		7.14	4.5	6.81
S_1-S_3- - - - - - - - - - - - - -2		7.14	3.3	4.90
S_2-S_3- - - - - - - - - - - - - -0		0	1.2	1.73
Session III-IV (Self-D)				
S_1 III-S_1 IV - - - - - - - - - - -0		0	1.3	.91
S_2 III-S_2 IV - - - - - - - - - - -0		0	2.0	1.54
S_3 III-S_3 IV - - - - - - - - - - -0		0	.5	.40
Session IV – Alone				
S_1-S_2- - - - - - - - - - - - - -2		8.69	5.2	7.77
S_1-S_3- - - - - - - - - - - - - -2		8.69	1.5	3.14
S_2-S_3- - - - - - - - - - - - - -0		0	3.7	2.56

Note.--S_1-S_2 stands for the difference (D) of the medians of judgments of subject 1 and subject 2 in the togetherness situation. Self-S (Self-Difference) represents the difference between the medians of the same subject in the last togetherness condition (Session III) and the alone condition (Session IV).

a. Critical Ratio of Reliabilities (Guilford, 1936).
b. Test of Significance of Mean Difference (Edwards, 1960).

TABLE 12

DIFFERENCES BETWEEN MEDIANS AND MEANS
USING CRITICAL RATIOS AND TESTS OF
SIGNIFICANCE OF MEAN DIFFERENCE

UNIT OF THREE SUBJECTS STARTING WITH THE TOGETHERNESS CONDITION

	Mdn. Diff.	P.E.$_{(Mdn.)}$[a]	$\bar{X}$ Diff.	T[b]
Second Unit				
Session I - Togetherness				
S_1-S_2 - - - - - - - - - - - - - - -3	8.82	2.0	7.94
S_1-S_3 - - - - - - - - - - - - - -0	0	.3	.13
S_2-S_3 - - - - - - - - - - - - - -3	13.04	1.7	9.70
Session II - Togetherness				
S_1-S_2 - - - - - - - - - - - - - -3	9.37	1.9	7.52
S_1-S_3 - - - - - - - - - - - - -1	3.70	.5	1.78
S_2-S_3 - - - - - - - - - - - - -2	6.25	1.4	5.76
Session III - Togetherness				
S_1-S_2 - - - - - - - - - - - - - -3	9.37	1.9	7.38
S_1-S_3 - - - - - - - - - - - - -1	3.70	.2	2.45
S_2-S_3 - - - - - - - - - - - - -2	6.25	1.7	4.47
Session II-IV (Self-D)				
S_1 III-S_1 IV - - - - - - - - -1.5	5.55	.5	1.71
S_2 III-S_2 IV - - - - - - - - -0	0	.2	1.57
S_3 III-S_3 IV - - - - - - - - -2	7.41	1.0	3.70
Session IV - Alone				
S_1-S_2 - - - - - - - - - - - - -1.5	7.50	1.6	6.37
S_1-S_3 - - - - - - - - - - - - -1.5	5.55	.7	.94
S_2-S_3 - - - - - - - - - - - - -0	0	.9	.61

Note.--S_1-S_2 stands for the difference (D) of the medians of judgments of subject 1 and subject 2 in the togetherness situation. Self-D (Self-Difference) represents the difference between the medians of the same subject in the last togetherness condition (Session III) and the alone condition (Session IV).

a. Critical Ratio of Reliabilities (Guilford, 1936).
b. Test of significance of Mean Difference (Edwards, 1960).

TABLE 13

DIFFERENCES BETWEEN MEDIANS AND MEANS
USING CRITICAL RATIOS AND TESTS OF
SIGNIFICANCE OF MEAN DIFFERENCES

UNIT OF THREE SUBJECTS STARTING WITH THE TOGETHERNESS CONDITION

	Mdn. Diff.	P.E.$_{(Mdn.)}$[a]	$\bar{X}$ Diff.	T[b]
Third Unit				
Session I - Togetherness				
S_1-S_2- - - - - - - - - - - - - -1	7.14	.1		.19
S_1-S_3- - - - - - - - - - - - - -1	7.14	1.2		8.08
S_2-S_3- - - - - - - - - - - - - -0	0	1.3		7.35
Session II - Togetherness				
S_1-S_2- - - - - - - - - - - - - -0	0	0		0
S_1-S_3- - - - - - - - - - - - - -0	0	.2		.32
S_2-S_3- - - - - - - - - - - - - -0	0	.2		.48
Session III - Togetherness				
S_1-S_2- - - - - - - - - - - - - -1	11.11	.5		1.68
S_1-S_3- - - - - - - - - - - - - -1	11.11	.6		1.73
S_2-S_3- - - - - - - - - - - - - -0	0	.1		.95
Session III-IV (Self-D)				
S_1 III-S_1 IV - - - - - - - - - -0	0	.1		.64
S_2 III-S_2 IV - - - - - - - - - -0	0	.1		.59
S_3 III-S_3 IV - - - - - - - - - -0	0	1.5		2.35
Session IV - Alone				
S_1-S_2- - - - - - - - - - - - - -1	11.11	.5		1.01
S_1-S_3- - - - - - - - - - - - - -1	11.11	.8		1.84
S_2-S_3- - - - - - - - - - - - - -0	0	.3		.95

Note.--S_1-S_2 stands for the difference (D) of the medians of judgments of subject 1 and subject 2 in the togetherness situation. Self-D (Self-Difference) represents the difference between the medians of the same subject in the last togetherness condition (Session III) and the alone condition (Session IV).

a. Critical Ratio of Reliabilities (Guilford, 1936).

b. Test of Significance of Mean Difference (Edwards, 1960).

TABLE 14

DIFFERENCES BETWEEN MEDIANS AND MEANS
USING CRITICAL RATIOS AND TESTS OF
SIGNIFICANCE OF MEAN DIFFERENCE

UNIT OF THREE SUBJECTS STARTING WITH THE TOGETHERNESS CONDITION

	Mdn. Diff.	P.E.$_{(Mdn.)}$[a]	$\bar{X}$ Diff.	T[b]
Fourth Unit				
Session I - Togetherness				
S_1-S_2 - - - - - - - - - - - - - - -1		7.14	4.4	9.66
S_1-S_3 - - - - - - - - - - - - - -2		8.69	.1	.63
S_2-S_3 - - - - - - - - - - - - - -1		5.00	4.6	9.75
Session II - Togetherness				
S_1-S_2 - - - - - - - - - - - - - -0		0	.5	1.43
S_1-S_3 - - - - - - - - - - - - - -0		0	.2	1.06
S_2-S_3 - - - - - - - - - - - - - -0		0	.3	.61
Session III - Togetherness				
S_1-S_2 - - - - - - - - - - - - - -1		11.11	.4	.76
S_1-S_3 - - - - - - - - - - - - - -1		7.14	.5	.89
S_2-S_3 - - - - - - - - - - - - - -0		0	.1	.14
Session III-IV (Self-D)				
S_1 III-S_1 IV - - - - - - - - - -0		0	1.7	2.04
S_2 III-S_2 IV - - - - - - - - - -1		7.14	1.2	4.16
S_3 III-S_3 IV - - - - - - - - - -0		0	.5	.92
Session IV - Alone				
S_1-S_2 - - - - - - - - - - - - - -2		14.29	.1	1.16
S_1-S_3 - - - - - - - - - - - - - -1		7.14	.7	2.79
S_2-S_3 - - - - - - - - - - - - - -1		5.55	.6	3.11

Note.--S_1-S_2 stands for the difference (D) of the medians of judgments of subject 1 and subject 2 in the togetherness condition. Self-D (Self-Difference) represents the difference between the medians of the same subject in the last togetherness condition (Session III) and the alone condition (Session IV).
[a.] Critical Ratio of Reliabilities (Guilford, 1936).
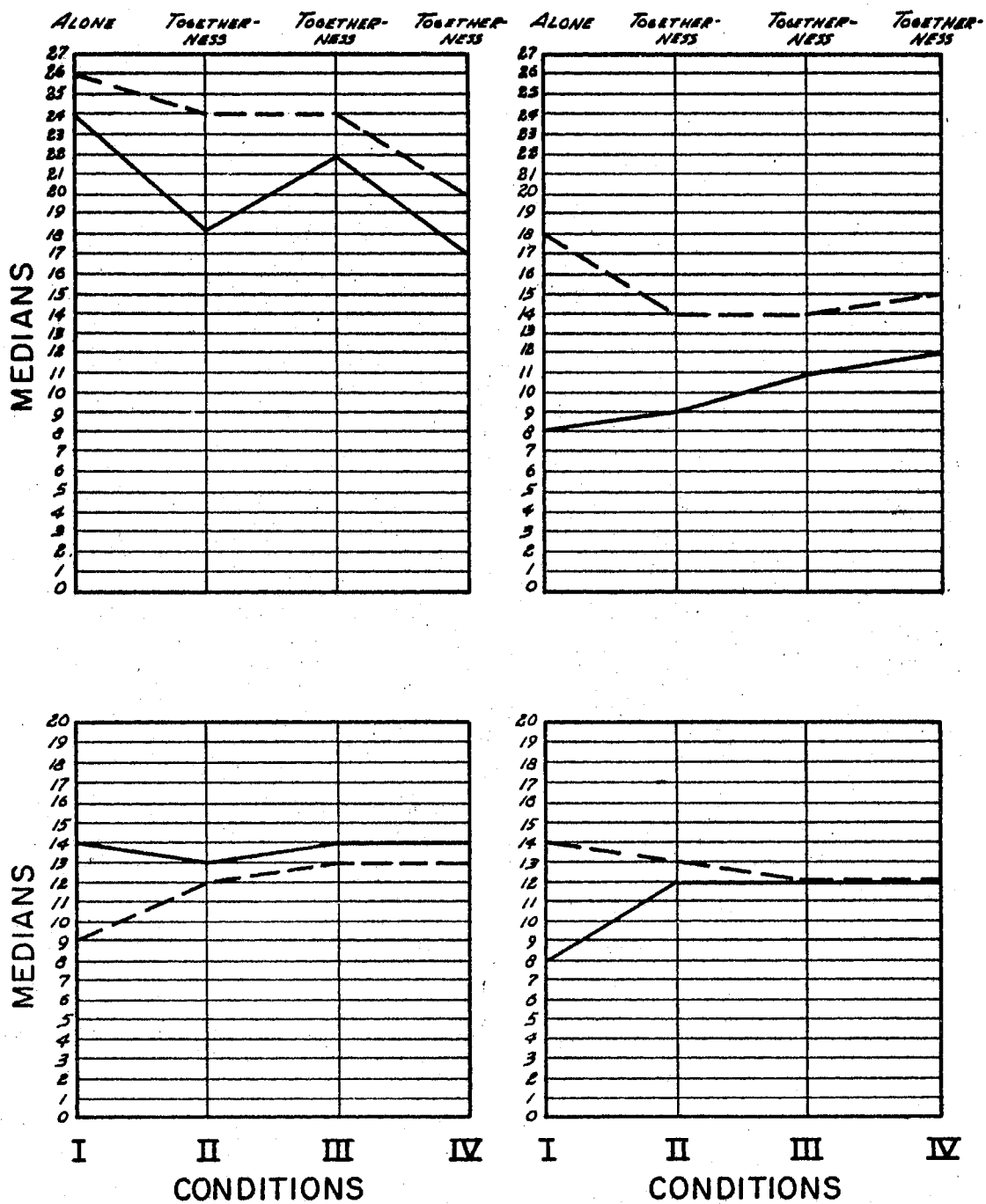[b.] Test of Significance of Mean Difference (Edwards, 1960).

FIG. 2. Medians in alone-togetherness conditions of two subjects starting with alone condition.
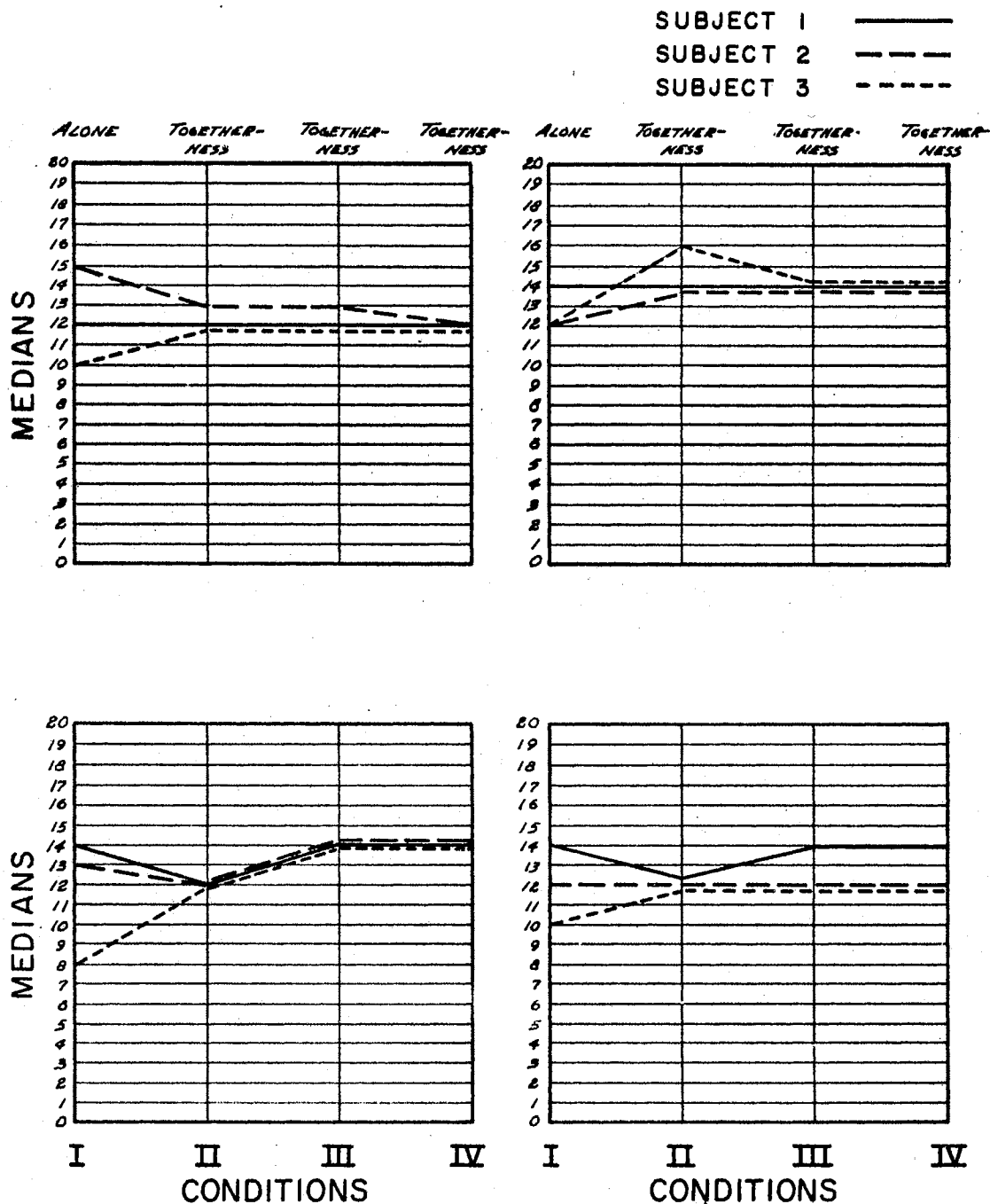
FIG. 3. Medians in alone-togetherness conditions of three subjects starting with alone condition.
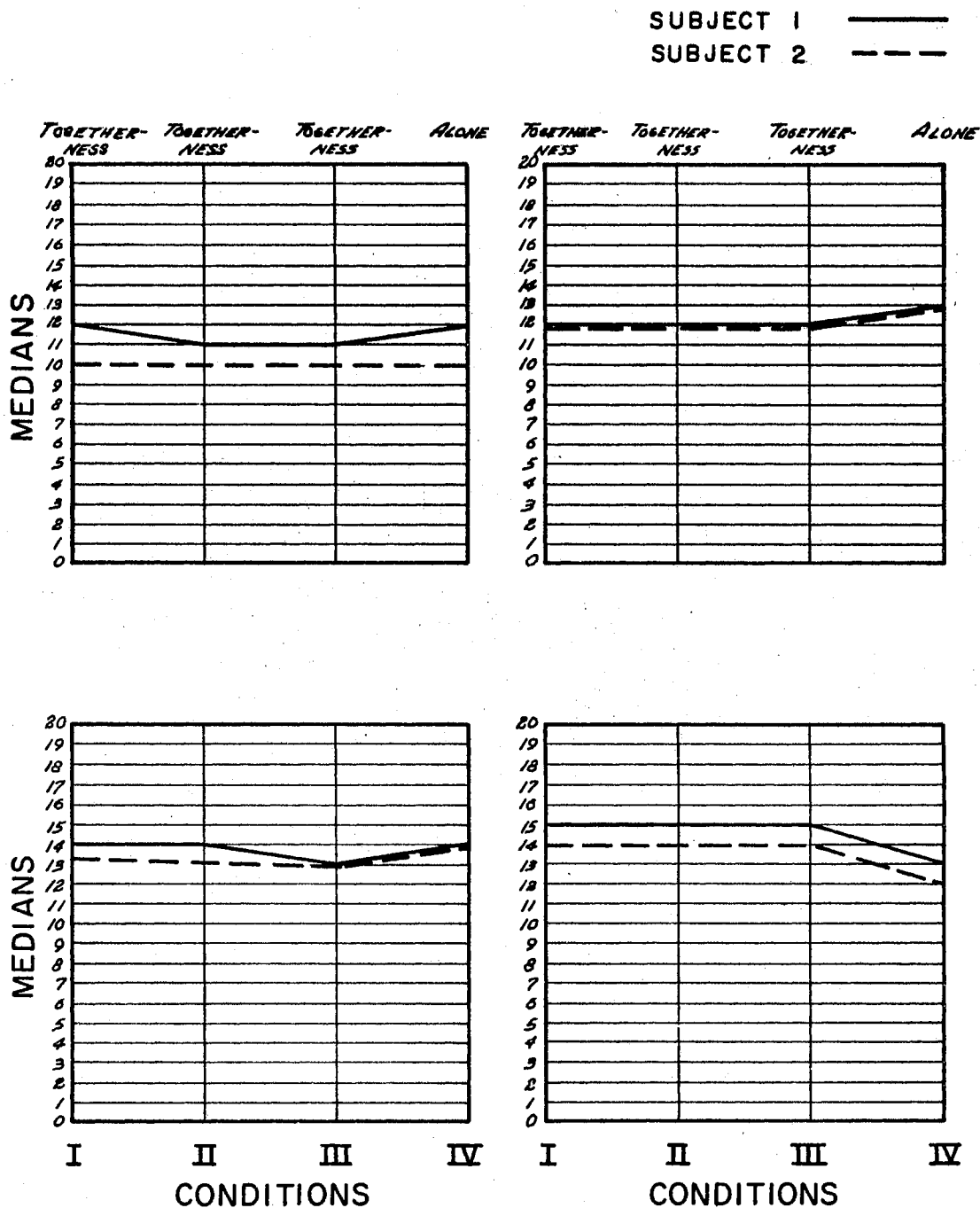
FIG. 4.   Medians in alone-togetherness conditions of two
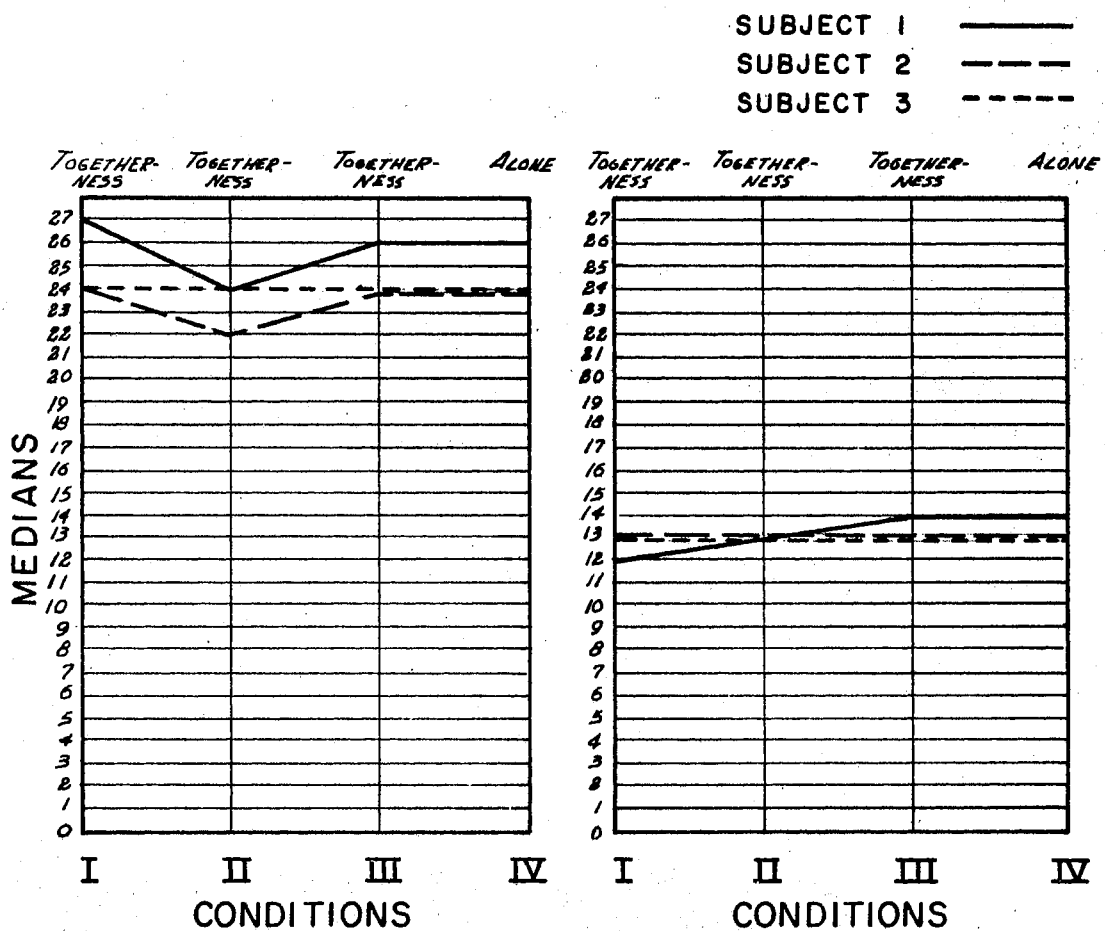subjects starting with togetherness condition.

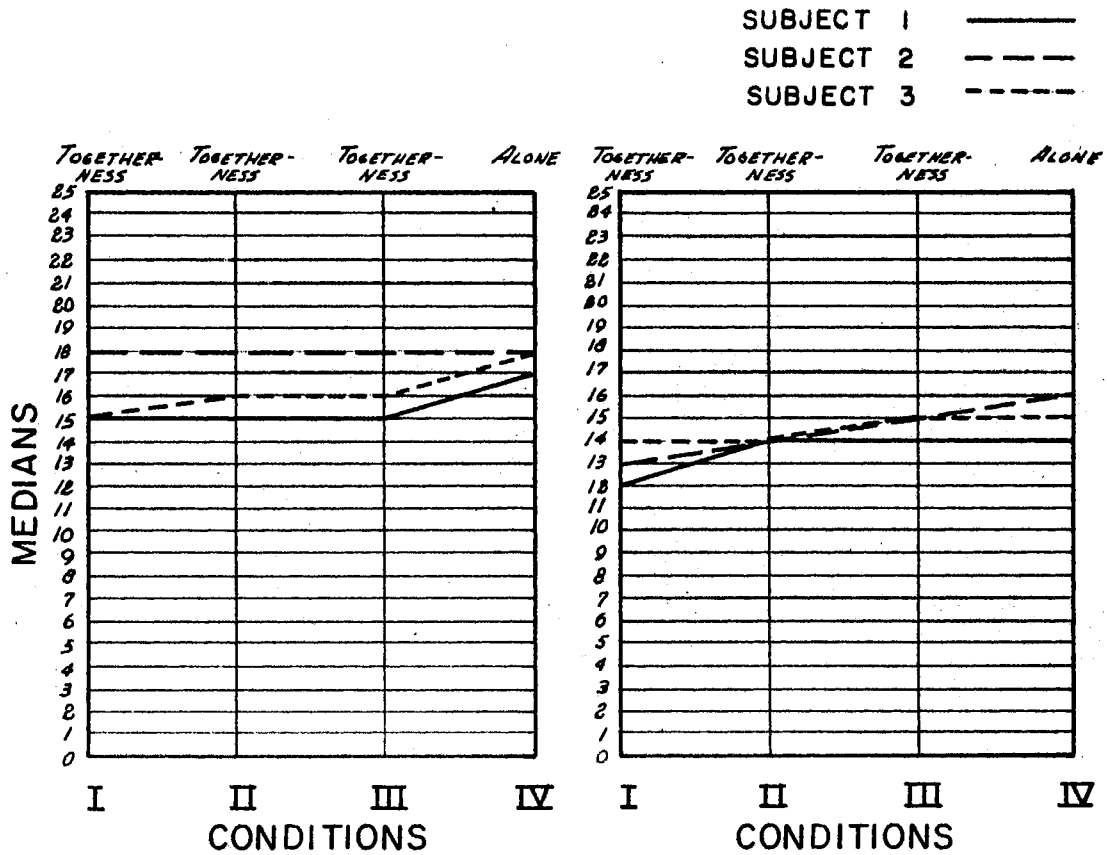FIG. 5. Medians in alone-togetherness conditions of three subjects starting with togetherness condition.

FIG. 6. Medians in alone-togetherness conditions of three subjects starting with togetherness condition.

Figures 3-7 in addition to Tables 5-14 give quantitative support to Hypothesis III.

The answers from the questionnaire given to the alone-togetherness and togetherness-alone subjects corroborate the remarks made by the alone subjects as to the lack of reference points.

To the question, "Do you think you were influenced by the judgments of other persons in the experiment?," Sherif (1935) had 25 percent of his subjects who indicated that they were influenced by others. In this replication, 33 percent of the subjects indicated that they were influenced by others when asked the above question.

CHAPTER V

SUMMARY AND CONCLUSIONS

The formation, persistence, and change of social norms of indi-

viduals in experimental alone-togetherness and togetherness-alone

situations were studied. In the first and second phases of the study,

each subject in an alone situation formed and retained experimental

social norms in a relatively unstructured judgment situation (i.e.,

hexagonal-horizontal-vertical apparatus). In the third phase, subjects

in alone and then togetherness conditions conformed to experimental

social norms formed in the course of interpersonal interaction. Within

the limits of this study, it was determined that an additional judgment

situation has been developed which is reasonably analogous to Sherif's

autokinetic judgment situation.

Subjects initially forming individual norms under alone conditions

persisted in maintaining the initial norm during subsequent alone con-

dition sessions. Subjects who initially formed norms under alone con-

ditions and then participated in togetherness sessions showed a definite

convergence toward a common norm in the latter sessions. Subjects

forming initial norms in togetherness condition sessions, prior to an

alone condition session, showed a tendency to vary only slightly, if

at all, from the initially established experimental social norm. The

results obtained in this study are comparable to those of Sherif (1935).

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The hexagonal-horizontal-vertical judgment situation, in which subjects judged the distance between pairs of simultaneously presented points of light which varied as to their axis angle from trial to trial, was used to investigate experimental norm formation, persistence, and change. Judgments were made by subjects of the distance between two points of light, each pair purportedly different, yet actually the same distance apart from each other. Naive subjects were studied in alone, retention, alone-togetherness, and togetherness-alone conditions.

Effects of formation, persistence, and change were determined by evaluating naive subjects' judgments under particular phases of the experiment. Judgments made by subjects under the alone condition were evaluated against judgments made by the same subject in the retention phase of the experiment. Judgments made by subjects in the alone segment of the alone-togetherness condition were evaluated against judgments made by the same subjects in their subsequent togetherness sessions. Judgments of subjects starting in a togetherness condition session were evaluated against judgments of the same subjects in their subsequent alone condition session.

Discussion of Experimental Results

The relative lack of structure in the judgment situation was demonstrated by the remarks of one of two subjects under alone followed by togetherness conditions. There was a difference of 10 inches between their norm medians at the conclusion of the alone session. After each subject had made three judgments as to the distance between the two points of light in the togetherness condition, the subject with the lower norm said, "Goddam! one of us can't see." After this had happened

the difference dropped to five inches and in the next two togetherness situations dropped to three inches.

The closeness of the medians of individuals in the togetherness sessions gives emphasis to the establishment of a common norm for the experimental social unit. When individuals face a new, unstructured, judgment situation as members of a social unit for the first time, a common norm is established which is peculiar to that unit. Subsequently, when they face the same situation alone they tend to adhere to the median and range, i.e., the norm, established by the social unit. That is to say, individuals who have formed social norms in the course of interpersonal interaction, prior to participating in judgment situations under alone conditions, adopt as their own the range and central tendency of the common social norm. These individuals then retain the common social norm as their own individual norm in subsequent alone condition judgment sessions.

Inspection of the results shows that subject influence was largely a temporal affair. In other words, the effect arose gradually throughout the process of interpersonal interaction which led to a common norm.

Subjects were unaware that the formation, persistence, and change of experimental social norms were being studied. Ostensibly, the study was conducted to see how well people judge distance at night. At no time did a subject question the purported purpose of the experiment, although interest was expressed about the experimental room and apparatus.

The results of this study suggest that an additional judgment task comparable to the classic autokinetic judgment situation has been

developed. This judgment situation has particular relevance for the study of social factors in natural group situations.

Suggested Research

A limiting factor in the present research was that the study was a replication of Sherif's (1935) autokinetic situation. Although the findings of this study indicate that the Hex and autokinetic situation are analogous, research by MacNeil & Pace (1970) does not lend support to this supposition. They provided a sensitive condition under which different judgment situations (e.g., autokinetic situation, shotgun situation, Hex situation, pinball situation) might be compared. One plant, presenting prescribed arbitrary norms, participated with the same three subjects in each situation. They found that the Hex was significantly different from all other situations ($p < .05$). During indoctrination, the subject adopted the arbitrary norm in other situations more readily than in the Hex situation. There are two explanations which seem probable from these results:

(1) The arbitrary norm introduced in the Hex situation was perceived as more arbitrary than the arbitrary norms in the other judgment situations;

(2) The Hex situation has more structure than the other judgment situations.

Further research is needed to determine the validity of these explanations. The Hex situation must be altered so that experimental norm formation judgment situations will be comparable across these situations.
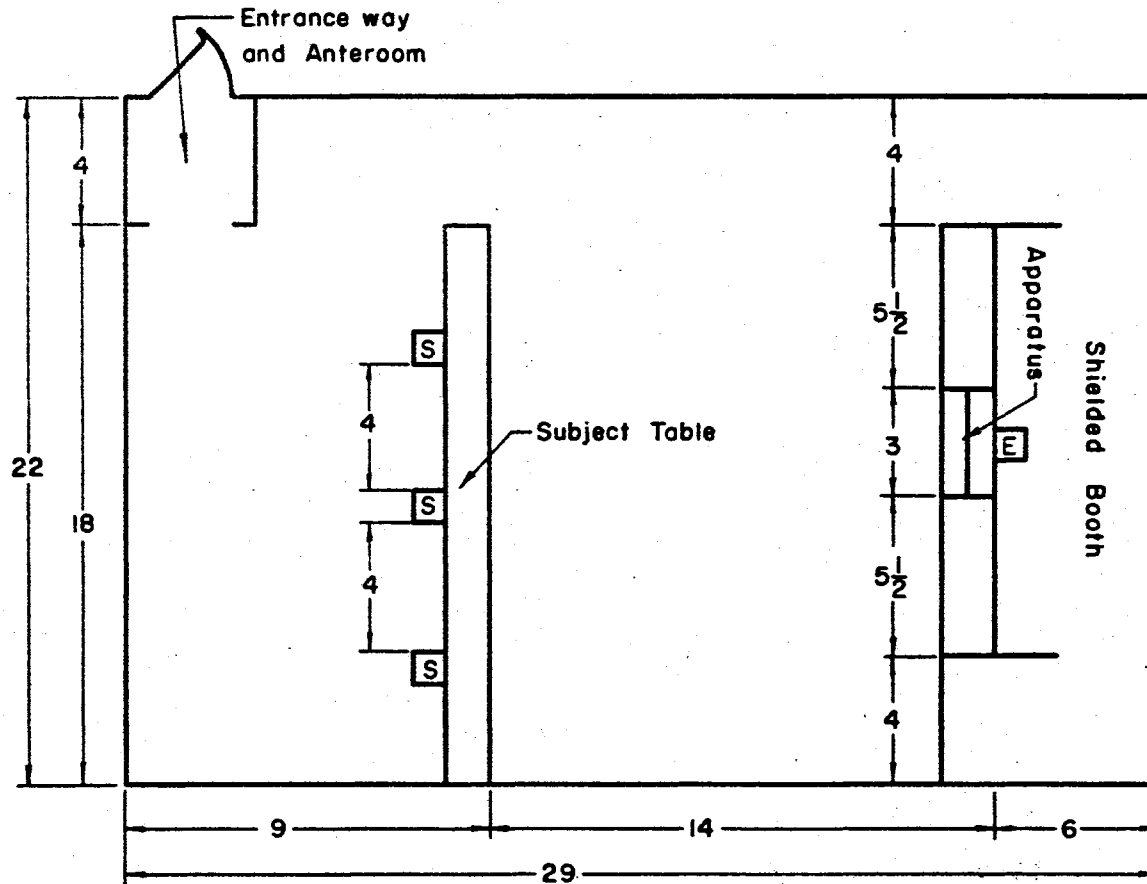
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FLOOR PLAN OF JUDGMENT ROOM

Entrance way
and Anteroom

S

Subject Table

S

S

22

18

4

4

5½

3

5½

4

Apparatus

E

Shielded Booth

9

14

6

29

APPENDIX B

FREQUENCIES OF JUDGMENTS MADE BY SUBJECTS

IN ALONE CONDITIONS

X	Total of Subject Frequency
3	3
4	8
5	23
6	119
7	32
8	142
9	24
10	128
11	23
12	244
13	93
14	241
15	152
16	152
17	29
18	102
19	11
20	85
21	5
22	25
23	5
24	37
25	24
26	20
27	18
28	22
29	2
30	24
31	2
32	4
33	1
34	2
35	
36	1

Total = 1889

APPENDIX C

FREQUENCIES OF JUDGMENTS MADE BY SUBJECTS

DURING NORM FORMATION UNDER ALONE

AND PERSISTENCE CONDITIONS

			Subjects		
X	1	8	16	19	Total
8	2				2
9	4				4
10	56		1		57
11	29		10		39
12	133	16	75	2	226
13	19		110	82	211
14	41	197	61	130	429
15	1		17	57	75
16	3	75	11	17	106
17				3	3
18			1		1
	288	288	288	288	1,152

APPENDIX D

FREQUENCIES OF JUDGMENTS MADE BY TWO SUBJECTS

DURING NORM FORMATION UNDER ALONE AND

TOGETHERNESS CONDITIONS

$\underline{X}$	Alone	Togetherness
5	1	1
6	21	2
7	58	7
8	101	20
9	71	142
10	101	347
11	68	348
12	250	1,387
13	182	726
14	197	654
15	123	333
16	39	100
17	20	11
18	89	205
19	2	
20	31	112
21		2
22	3	
23		
24	75	204
25		
26	29	4
27		
28	29	2
29		
30	19	1
31		
32		
33		
34		
35		
36	6	
	1,536	4,608

APPENDIX E

FREQUENCIES OF JUDGMENTS MADE BY THREE SUBJECTS

DURING NORM FORMATION UNDER ALONE AND

TOGETHERNESS CONDITIONS

X	Alone	Togetherness
2	1	
6	36	
7	8	
8	104	21
9	28	5
10	139	200
11	26	98
12	337	1,600
13	225	661
14	393	1,837
15	229	544
16	185	628
17	78	44
18	150	323
19	4	6
20	75	219
21		1
22	42	116
23		6
24	110	298
25	3	17
26	78	124
27		10
28	43	80
29		3
30	10	18
31		
32		14
33		2
34		2
35		2
36		2
37		1
	2,304	6,902

VITA

Bill Wayne Gregory

Candidate for the Degree of

Master of Science

Thesis: JUDGMENTS OF DISTANCE IN A QUANTIFIED SOCIAL NORM SITUATION

Major Field: Psychology

Biographical:

Personal Data: Born in Enid, Oklahoma, July 27, 1944, the son of
Joe and June Gregory.

Education: Attended elementary school in Enid, Oklahoma; gradu-
ated from Enid High School, Enid, Oklahoma, in May, 1962;
entered Northwestern State College in September, 1962 and
graduated June 1, 1966, receiving a Bachelor of Arts degree,
with a major in Sociology and minor in Psychology and
History; completed requirements for a Master of Science
degree at Oklahoma State University in May, 1972.