This dissertation has been 63–6272
microfilmed exactly as received

KOSLIN, Bertram L., 1930–
PRELIMINARY EXPERIMENTS ON THE PROCESS OF NORM AND ATTITUDE CHANGE DURING COLLECTIVE BEHAVIOR.

The University of Oklahoma, Ph.D., 1963
Social Psychology

University Microfilms, Inc., Ann Arbor, Michigan

Downloaded from SHAREOK. Persistent Handle URL: https://hdl.handle.net/11244/1646

THE UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

PRELIMINARY EXPERIMENTS ON THE PROCESS OF NORM AND ATTITUDE CHANGE DURING COLLECTIVE BEHAVIOR

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

degree of

DOCTOR OF PHILOSOPHY

BY

BERTRAM L. KOSLIN

Norman, Oklahoma

1963

PRELIMINARY EXPERIMENTS ON THE PROCESS OF NORM AND ATTITUDE CHANGE DURING COLLECTIVE BEHAVIOR

APPROVED BY

Muzafer Sherif, Chairman

DISSERTATION COMMITTEE

ACKNOWLEDGMENTS

This dissertation documents my intellectual indebtedness to Muzafer Sherif. Not only have I relied heavily on the published work of Professor Sherif and his students, but also on the ideas he expressed in seminars and conversations. Each time we discussed the problem of collective behavior some idea became clearer, new insights were gained. It is difficult to gauge the productive benefits derived from discussing social problems with a research scientist as involved as Dr. Sherif. If this work extends our knowledge of collective behavior then much of the credit belongs to Professor Sherif.

I must acknowledge that I owe a great deal to Dr. Adamantia Pollis who always reminded me of social actualities whenever I became too abstract. To the members of my committee I owe a word of thanks for their encouragement, patience, and comments. Finally I want to acknowledge my indebtedness to Mr. John Brown and Miss Bonnie Markham, the research assistants who made this work possible.

TABLE OF CONTENTS

	Page
LIST OF TABLES	v
LIST OF FIGURES	vii
Chapter	
I. INTRODUCTION	1
Subordinate Processes of Collective Behavior	5
The Experimental Problem	7
Method	11
II. HYPOTHESES AND EXPERIMENTAL PROCEDURE	34
Procedure	38
III. RESULTS	56
IV. DISCUSSION AND SUMMARY	87
Norms as Emergent Products	101
Summary and Conclusion	114
REFERENCES	119
APPENDIX	123

LIST OF TABLES

Table		Page
1.	Initial "Group" Convergence	57
2.	The Solidarity of Initial "Groups" During the "Group" and Collective Behavior Conditions	63
3.	Variability (Q) of Ss in "Group" ("G"), Collective Behavior (CB) and Final Alone (FA) Conditions	65
4.	Comparison of Ss' Variability During All Experimental Conditions by Position of Initial "Groups"	66
5.	Comparison of Ss' Variability Between Experimental Conditions by Position of Initial "Groups"	67
6.	The Deviation of Ss in the "Group" and Final Alone Conditions from Original "Group" Norms ...	70
7.	The Degree of Convergence During Collective Behavior with Varied Original "Inter-Group" Distance	71
8.	Final Alone Ss Falling Within Range of Collective Behavior as a Function of Original "Inter-Group" Distances	75
9.	Convergence During Collective Behavior for Varied Degrees of Initial "Inter-Group" Concentration	77
10.	Final Alone Ss Within Range of Collective Behavior Norm as a Function of Initial "Group" Concentration	80

Table		Page
11.	Order of Slide Presentation	124
12.	Judgment Experiment Check List	125
13.	Low Position "Groups": "Group" Condition Judgments	129
14.	Intermediate Position "Groups": "Group" Condition Judgments	131
15.	High Position "Groups": "Group" Condition Judgments	133
16.	Original Low Position "Groups": Collective Behavior Condition Judgments	135
17.	Original Intermediate Position "Groups": Collective Behavior Condition Judgments	139
18.	Original High Position "Groups": Collective Behavior Condition Judgments	143
19.	Original Low "Group" Member's Judgments in Final Alone Condition	147
20.	Original Intermediate "Group" Member's Judgments in Final Alone Condition	149
21.	Original High "Group" Member's Judgments in Final Alone Condition	151
22.	Original Low "Group" Member's Median Judgments in All Conditions for All Subjects	153
23.	Original Intermediate "Group" Member's Median Judgments in All Conditions for All Subjects	155
24.	Original High "Group" Member's Median Judgments in All Conditions for All Subjects	157
25.	"Group" and Collective Behavior Norms or Medians	159

LIST OF FIGURES

Figure		Page
1.	Floor plan of experimental rooms	44
2.	Convergence of Ss in "group" condition for experiments A, B, and C	59
3.	Convergence of Ss in "group" condition for experiments B_H and B_L	60
4.	Breakdown of initial "group" solidarity measured by percent increase of $\overline{AD}_{Mdn}$ over "group" conditions during collective behavior	64
5.	Degree of final convergence during collective behavior as a function of original "inter-group" divergence from small to large, A, B, C	72
6.	Degree of final convergence during collective behavior as a function of original "inter-group" concentration. B nonconcentrated; B_H and B_L concentrated	78
7.	Average median judgments for Ss in "group," collective behavior, and final alone conditions, experiment A	82
8.	Average median judgments for Ss in "group," collective behavior, and final alone conditions, experiment B	83
9.	Average median judgments for Ss in "group," collective behavior, and final alone conditions, experiment C	84

Figure | Page

10. Average median judgments for Ss in "group," collective behavior, and final alone conditions, experiment B_H 85

11. Average median judgments for Ss in "group," collective behavior, and final alone conditions, experiment B_L 86

PRELIMINARY EXPERIMENTS ON THE PROCESS OF NORM AND ATTITUDE CHANGE DURING COLLECTIVE BEHAVIOR

CHAPTER I

INTRODUCTION

The purpose of this dissertation is to verify on the psychological level some sociological invariances concerning the processes of collective behavior. The major problem will be the verification of those sociological invariances governing the essential conditions conducive to the emergence of collective behavior. These invariances have been abstracted from a plethora of collective behavior episodes that have occurred in different cultures and in different historical circumstances within the same culture. The essential conditions conducive to collective behavior will determine the specification of the stimulus conditions that must be structured if valid verifying experiments on the psychological level are to be conducted (Sherif, 1936; Sherif and Koslin, 1960).

In the fields of sociology and social psychology, the term collective behavior loosely refers to the emergence of new societal products (i.e., social units, norms and values); the restabilization of weakened social structures, and the reinstitution of older patterns of social norms (Blumer, 1951; Sherif and Sherif, 1956). New, more inclusive social units, regrouped alliances and other changed patterns of inter-group relations, as well as split social units have emerged as the end-products of collective behavior episodes.

Collective behavior phenomena have emerged from stabilized patterns of group (e.g., nation-state) and inter-group relations. The phenomena have also emerged out of situations where focal or motivational issues have arisen for a number of people who share fewer reciprocities than are patterned in well structured intra-group and inter-group relations (Sherif and Sherif, 1956).

Consequently, collective behavior involves the process of socio-cultural change, i.e., the emergence of stable subsequent conditions or end-products from stabilized antecedent conditions. Not all socio-cultural change, however, is the end-product of collective behavior. As a process of socio-cultural transition, collective behavior can be distinguished from other processes of change in terms of the

conditions which are conducive to the rise of the phenomena.

Generally, collective behavior phenomena have occurred following natural or social catastrophies. Times of great social instability are characterized by the frequency of collective behavior episodes. On the basis of the correlation noted between the occurrence of collective behavior and the existence of some crisis condition, sociologists have concluded that when there is some crisis, the matrix of social norms and values becomes weakened. Thus, an unstructured situation is produced in which social "action becomes more problematic than usual" (Turner and Killian, 1957, p. 39). However, not every crisis has led to the emergence of collective behavior. There are, for example, a variety of variables which determine whether panic is likely to occur once some crisis situation has been produced (Brown, 1954). Critical situations are not alone sufficient conditions leading to collective behavior.

It is the reaction of individuals and groups to the event, not the physical or social event in and of itself which produces a critical situation. However, the physical or social event is usually compelling, and catastrophic conditions are perceived rapidly. Individuals, once the disastrous event has occurred, tend to center their interaction

with one another almost exclusively on the necessities of the situation. If there are no difficulties, physical or social, standing in the way, groups or other social units tend to form; norms and values emerge (or the existing ones become stabilized); and collective behavior does not occur. Thus, not all norm and value formation, not every instance of the formation of social units, is the end-product of collective behavior.

If there is some compelling crisis, then interaction among individuals concerning what should be done under certain conditions leads initially toward a disruption of the social order rather than toward immediate stabilization. Interaction may lead toward a disruption of the normative system because for example: (1) the crisis may be so novel that there are no standardized norms in existence; (2) conflict among individuals and groups may lead to the realization (at some level of awareness) that the prevailing norms and values are inappropriate; (3) there may be no solutions immediately available to be applied to the critical situation; (4) old group ties may have to be broken in order to attain motivationally relevant solutions; (5) group formation may not be readily possible due to the opposition of established power groups; and (6) there may be insufficient time. When

there are perceived or imaginary factors blocking the ordinary processes of stabilizing the social order, interaction weakens the normative system and more highly fluid and uncertain social conditions emerge than exist at the impact time of the crisis.

If the degree of structure of stimulus conditions is operationally measured by the number of alternative ways individuals have for arriving at percepts, decisions, etc. (Sherif, 1936), then collective behavior partly involves the process of disrupting the social system, the production of unstructured stimulus conditions. However, collective behavior also involves the process of norm and value change. Therefore, collective behavior can be defined as: the process by which individuals create highly unstructured stimulus conditions while attempting to restabilize the social system under conditions not conducive to the standardization of either new existing or old norms and values.

Subordinate Processes of Collective Behavior

Thus far, by employing a process mode of analysis, the conditions conducive to the rise of collective behavior phenomena have been abstracted from a rich diversity of forms. As Turner and Killian (1957) have pointed out, process or

"life-cycle" analyses provide an overall conceptual framework which enables various sub-topics to be treated as interrelated part-processes. On the one hand, such important subprocesses of collective behavior as: the function of leadership, the changing of membership patterns, the fluctuating power of organized groups, the varying modes of idiosyncratic reactions, the transforming content of interaction (e.g., from religious to socio-political issues) and the like, can be related to the major process--norm and attitude change. On the other hand, economic, political and other socio-cultural factors can be related to the periodicity and interrelationships among collective behavior episodes, as well as to the antecedent and subsequent conditions.

It is worthwhile, however, to attempt to verify on the psychological level, the overall process of collective behavior before any experimental research is undertaken concerning the part-processes. Nevertheless, since it is readily possible, two important subordinate problems of collective behavior will be investigated as follows:

Collective behavior episodes tend to recur in times of great social instability. A variety of explanations for the periodicity of collective behavior during times of great social instability could be given without being exhaustive

or mutually exclusive. One reason (to be stated later as a hypothesis) that collective behavior tends to recur may be due to the difficulties in pluralistic societies of resolving crises because of the divergence of stands among groups. Once a depression sets in, for example, there may be extreme right- to left-wing group plans of action, and therefore it may be difficult to arrive at an emergent line of action that will be binding on all members of a society.

The concentration of established opinion is an important variable affecting the duration of the disruption phase of collective behavior. If fluid conditions exist, as in the after-math of war, for example, and if there is a greater concentration of opinion on the right (adhering to the existing norms) than on the left or vice versa, then the degree of divergence among groups which would ordinarily make convergence difficult, might be quickly swept aside. Thus convergence toward stable end-products during collective behavior episodes might be rapidly achieved.

The Experimental Problem

In order to verify on the psychological level the overall process of collective behavior, it is necessary to structure appropriate stimulus conditions. To accomplish

this task, the following working definition of collective behavior is advanced: Collective behavior is the process by which individuals, the agents of social change, disrupt the social order and produce a highly unstructured situation while being motivated to stabilize norms and values by standardizing either new, existing or old ones. If valid verifying procedures are to be formulated, the following criteria must be met in the design of the experiments.

The production of stable antecedent conditions. As has been pointed out, collective behavior arises from a variety of stable antecedent conditions, i.e., stable group and inter-group relations, and out of social situations where focal issues emerge for a number of people who share, by comparison, few reciprocities. In order to pattern laboratory experiments after the processes of collective behavior, it is necessary to select one set of stable antecedent conditions. In terms of the theoretical issues involved in explaining social change, probably the most important antecedent conditions involve, as in pluralistic societies, established divergent groups interacting to establish the appropriate norms governing all behavior. Therefore, the production of stabilized groups with divergent norms will be selected as the antecedent conditions. (The motivation for

interacting shall be dealt with as a separate criteria below.)

Since one of the variables determining the relative ease of convergence during collective behavior is the degree of original inter-group divergence, and another involves the relative concentration of established group stands, the distance among groups must be subject to manipulation.

Motivation during collective behavior interaction. In collective behavior episodes, individuals and groups are motivated to interact toward the stabilization of the social order. They usually, in pluralistic societies, share some superordinate goal (Sherif and Sherif, 1953), e.g., the preservation of the nation-state. Therefore, even though it is probably not practical to have the groups begin to interact with one another spontaneously if the experiment is to be controlled, a superordinate goal must immediately emerge compelling the almost exclusive interaction over norms once the groups are brought together. However, as in collective behavior episodes involving conflict among groups, the very existence of original group stands makes convergence toward a common norm difficult. Therefore, the motivation toward convergence should conflict with the motives to remain loyal to the original groups and act consistently.

The existential status of norms. Social norms are standardized by individuals acting in concert under conditions where there are a great number of possible alternative ways of behaving and experiencing. Norms are man-made products, nothing more. Therefore, the appropriatness of norms must be left as much as possible to social interaction, and not be determined by the instructions, experimental design, or stimuli at any stage of the experiment.

The individual as the agent of social change. The relationship of the individual to social products, groups and norms, must be measurable to verify the general hypothesis that individuals change norms and are affected by them.

Measurement criteria. Norms and attitudes and the changes in each, as well as the solidarity of the original groups, must be measurable during the antecedent, collective behavior, and subsequent conditions. The degree of structure of the stimulus conditions must be inferrable at all times.

Control variables. All changes in norms and attitudes should be the consequence of social interaction in the laboratory. Change, when and if it occurs, should be the consequence of social interaction and not the result of practice with the stimuli.

Method

Essentially, the methodology first formulated by Muzafer Sherif (1936) for the verification on the psychological level of sociological level generalizations will be extended from the investigation of norm and concomitant attitude formation to the study of norm and attitude change during collective behavior interaction. Since neither experimentally produced norms nor groups have ever before been broken down by any process in a laboratory, the experiments on the overall process of collective behavior that will be formulated and executed should be considered preliminary attempts at verification.

In his pioneer investigation on the psychological level of the process of norm formation, Sherif (1936) employed an unstructured stimulus situation in which subjects (Ss) made judgments (in one variation) alone, together, and alone. Since that time, much research has supported the validity of his experimental approach. The processes by which Ss form norms and attitudes in a laboratory when evaluating physical stimuli in unstructured conditions seem to be related invariantly to norm and attitude formation, functioning, and change in social situations where the objects of evaluation are quite different (Sherif and Hovland, 1961). The generality

of the principles of the formation, functioning, and change of judgmental scales (Johnson, 1955; Volkmann, 1951) seems to apply to norm and attitude formation and change. Therefore, it is assumed that norm and attitude change during collective behavior can be experimentally investigated in the laboratory by employing physical stimuli. However, in order to structure experiments on collective behavior and to justify the operational measures of norms and attitudes, it is necessary to review certain aspects of the literature on the psychology of judgments.

The psychology of judgment. Judgment functions psychologically to evaluate or settle some uncertain state of affairs. The alternatives or choices may either be directly perceived in the environment (i.e., extentionally defined) or they may be intentionally defined and even produced de novo by the judger. In experiments, the response alternatives, or the lack of them, are specified in the instructions. Ss might be asked, for example, to determine by employing x number of categories (defined referentially or intentionally) the relative weight of a series of stimulus objects. They might be required to evaluate a number of statements, as in Sherif's and Hovland's study (1953), according to the number of categories they determined for employing the rank order or

order of merit method. These alternatives, or more precisely, the communication of a judgment, utilizing alternative categories are among the response variables. The other dependent variables in judgmental experiments usually are: S's confidence of judgment, the time required for judgment, and S's difficulty with judgments.

The instructions together with the stimulus material are the principal independent variables. Other independent variables include: the context conditions, i. e., the degree to which judgments are made under impoverished conditions of depth perception, for example, organismic variables (visual acuity, color blindness etc.), and the degree to which Ss are competent judges, that is, how well they understand instructions or can carry out some necessary manipulations.

In classical psychophysical investigations the task is usually so well defined by the appropriate selection of stimulus material, method of judgment, and precise instructions, that competent judges utilize the response categories in the same way. Inter-subject variability is low; consensus and precision are high. The purpose of the classical psychophysical investigations has been to formulate invariant relationships of discriminability for homo sapiens. Since the invariant relationships sought have dealt with man's abilities,

classical psychophysical investigations have attempted, in defining the task, to standardize the judgmental situation so that "extraneous" variables would not affect the results. When determining limens for example, every attempt is made to standardize the relationship conceptually, between the stimulus and response variables. Every effort is made to guarantee that Ss are attending to the same stimuli in the same way while employing response categories with the same meaning. "The judgment process cannot be entirely standardized however, hence some of our best evidence on judgment comes as a by-product from psychophysical experiments and from experiments on affective tone and attitudes" (Johnson, 1955, p. 253).

The extent to which Ss' past experiences, attitudes, motives and other internal factors enter into determining judgments is a function of the degree of conceptual structure the instructions and stimulus conditions afford (Johnson, 1955, pp. 287-300; Sherif and Sherif, 1956, pp. 77-85). If the instructions are well understood, if the dimensions to be judged are referentially precise, then internal factors play a relatively minor role in determining the outcome--a report of judgment. As the stimulus material becomes more heterogenous, e.g., along a scale from perceptual aspects to affective characteristics to judgments of abstract characteristics like the

fictitious dimension "orthosonority" (Coffin, 1941), internal factors play a more weighty role in determining the outcome. In a like manner, whenever the instructions allow for more alternatives, e.g., "determine your own categories," internal factors play a more weighty role in determining judgments (Sherif and Hovland, 1961). The relationship between the degree of structure and the extent to which internal factors influence judgment is inferred from the nature, reaction time, confidence in and difficulty with judgment--the dependent variables. Generally, as the stimulus conditions become more complex, the judgment time increases, the estimated confidence decreases, and the nature of the judgment increasingly indicates that internal factors have been supplied or are operative in arriving at a judgment (Johnson, 1955, pp. 287-300).

Attitude formation in judgmental situations. If "a social attitude is (or is evidenced by) consistency in response to social objects" (Campbell, 1950, p. 31), then under appropriate conditions, individuals form attitudes in psychophysical situations. The establishment of a valuing relationship, positive or negative, toward social objects is another way of expressing that an attitudinal relationship has been formed. Ordinarily, the term attitude refers to the socially

shared, i.e., similar subject-object relationship established by individuals in groups. It is evident that the major reason attitudes are not always socially shared is the individual members of various social units develop idiosyncratic attitudes toward a variety of objects which are limited to their unique experiences. Therefore some attitudes are not social inasmuch as they are not developed with respect to precisely the same socially defined object or even classes of objects.

Attitudes are learned when objects are repeatedly evaluated (Sherif and Sherif, 1956, p. 490). Attitudes apparently develop in real life by some of the methods that are employed in psychophysical investigations, e.g., the method of single stimuli.

The method of single stimuli (also termed the rating, absolute judgment or successive category method) requires Ss to judge one stimulus at a time. The response categories may be prescribed, or the instructions may require that Ss produce them de novo. The method of single stimuli leads to the rapid formation of a subjective scale which organizes the stimuli in a relational way (McGarvey, 1943; Johnson, 1955).

Inferences that absolute scales have been formed are based upon the following findings: Ss isomorphically assign

the various values of stimuli (predetermined by empirical operations related to the method of paired comparison) to response categories, and/or, Ss, in the absence of any changed conditions, employ the same scale (described by the range or category widths and measure of central tendency) in re-tests with the same stimuli; and/or the influence of prior scales is evidenced when new stimulus material is introduced.

The concept of the absolute scale (even though formed by judgments made relative to one another) is applicable to a wide range of phenomena in social life. Judgments concerning the quality of fabrics, the duration of time, the fit of clothes, the wealth of people, the height of men, the artistic value of plays, and the like, are determined by absolute scales which individuals have constructed. In an evaluation of the field, Volkmann (1951) writes: "Perhaps it has been hard enough to make the point that there are some fundamental ways in which the discriminations of pitch, loudness, inclination, area, and brilliance are all alike. In fact, they may be described by the same quantitative regularities. But it is still more important to say that these regularities also apply to the discrimination of nearly any aspect at all." (pp. 285-286). Since the "general principles underlying formation and functioning of all attitudes (social

or nonsocial) are the same" (Sherif and Sherif, 1956, p. 495) it should be possible to produce new attitudes in the laboratory by having Ss repeatedly evaluate physical stimuli.

Anchors and attitude scales. The responses which Ss produce in judging stimulus material reflect not only the establishment of an absolute scale, but the particular valuing of certain salient aspects of that scale sometimes called reference points, or more generally, anchorages.

When Ss judge a graded series of weights, the end-stimuli are the chief anchoring agents. Volkmann, Hunt, and McGourty (1940) held the stimulus range constant and increased the number of stimuli per unit of the stimulus range (i.e., increased their density) and found that Ss' scale categories were unaffected. (The usual measure of anchoring is a demonstrated effect on the response categories, i.e., on category widths and the center of the absolute scale.) The fact that the category widths did not vary with increased stimulus density, but do change when the stimulus range is altered led them to conclude that "category-width depends upon the position of the end-stimuli and not upon any intermediate stimuli. . . the absolute scale seems to resemble a linear chain of categories whose ends are constrained by the two end stimuli" (Volkmann, et al., 1940, p. 282).

The formation of a judgmental scale delimits a particular set of stimuli from everything else, hence, the importance of the end-stimuli. It seems that the establishment of the boundaries of absolute reference scales is a general phenomena (Volkmann, 1951). With reference to attitude scales it is apparent that the object of an attitude is delimited by concepts. Ordinarily, attitudinal stands are thought of as ranging from positive to negative with respect to something which is classed or delimited from everything else. The end-points defining the category, Negro, for example, have an important effect in determining attitudinal scales (Hovland and Sherif, 1951; Sherif and Hovland, 1953). Attitude scales differ when they are, for example, based upon classifying as Negro any person who has "Negro blood" as opposed to a skin color classification. It is evident that the end-stimuli which serve as anchors differ whenever colored people are preferentially classed as either: Mestizos (Negro-white extraction), Zambos (Negro-Indian extraction), Negroes or Indians (Munro, 1950, pp. 70-72).

The objects that can be employed as external or supplied (even by Ss) anchoring agents vary with the degree of structure the experimental conditions afford. Rogers (1941) found that under relatively structured conditions, physical

stimuli beyond the range of stimulus material being judged may, together with any value which falls within the stimulus range, be introduced as an anchor. McGarvey (1943), using verbal statements, reported results which confirmed Rogers' (1941) findings. However, Chapman and Volkmann (1939) have demonstrated that the reported performance of others, knowledge of the chance level of performance and the maximum possible score, S's estimate of his own abilities, were all operative as anchors in determining levels (judgments) of aspiration when Ss had little knowledge of the content of a literacy test. After they had taken the test, their levels of aspiration were not readily shifted by introducing anchors. In other words, when the stimulus conditions were unstructured, a greater variety of anchors could be introduced. When the testing stiuation became more structured, the variety of anchors that could be introduced with effect decreased.

In general as the judgmental situation (i.e., the stimulus conditions) became more unstructured, the more external factors (suggestions, group pressures, etc.), as well as internal factors (attitudes, motives, linguistic factors, etc.), influence responses. These factors can act as anchors determining the development of a judgmental scale.

If the stimulus material is the most unstructured

aspect of the stiuation relative to the entire judgmental situation, "the opinions of other people are very often a significant factor in determining the position and width of scale of judgment. . . . In Sherif's experiments on judgments of the autokinetic effect, the voiced opinions of the other members of the group can be considered as anchoring influences which affected the subjects' scales of judgment" (McGarvey, 1943, p. 26). The emergence of norms in group judgmental situations, then, can be directly related to the anchoring of individual reference scales.

Norm formation. Norms emerge as a consequence of the interaction of individuals in problematic situations where there are many alternative ways of organizing, of behaving and experiencing (Sherif, 1936). Norms refer to group products; groups are social units.

As group products norms cannot be inferred from the behavior of any individual alone, nor by "averaging" the standards of any collection or group of individuals. Individual opinion, for example, does not add up to equal political opinion. "The division of the population into political parties and groups . . . comprises the . . . definition of political opinion, as distinguished from the distribution of individual opinions without regard to organization that

is called public opinion" (Leiserson, 1958, pp. 66-67). The same principle applies everywhere; norms govern the banking system, for example, yet only professional students of money and banking can relate their behavior and experience in banks to the whole norm system. Therefore the operations for inferring norms must be carried out using groups, not individuals, as the units of analysis.

Norm formation, as McGarvey (1943) has indicated, can be treated as a judgmental problem. When individuals make judgments together in unstructured stimulus situations they influence one another and through their verbal interaction, form norms. These norms serve as anchorages for the establishment of individual absolute (attitudinal) scales. This conclusion is supported by the fact that in Sherif's (1935) experiment Ss did not revert to their own original scales after they had participated with others in standardizing the range and median movement of the auto-kinetic light. It is evident that norm and attitude formation takes place concommitantly when Ss make judgments together in unstructured stimulus situations. Norms refer to group products; attitudes to individual products.

Eriksen and Hake (1957) found that neither response attenuation nor stimulus generalization could explain

anchoring. Anchoring is a conceptual matter. In social life, norms, or standardized generalizations, conceptually direct individuals to attend to a certain range of stimuli, and to employ some particular stimuli as standards of evaluation. As has been explicated, they emerge as the end-products of interaction which typically takes place on a conceptual level involving communication with language. Since norms dictate the range of stimulation, i.e., what stimuli are to be evaluated and the standards of evaluation, the attitudes of group members can be expected to be similar. "This is one way in which homogeneity of the culture, when realized in actual stimulation, leads to homogeneity of attitudes" (Tresselt and Volkmann, 1942, p. 288).

Motivation in attitude and norm formation and functioning. Sherif and Sherif (1956) review the evidence garnered from a variety of sources demonstrating that in unstructured situations Ss experience insecurities. In his original autokinetic experiment Sherif (1935) noted that an individual: "feels insecure about his spatial bearing . . . some subjects report that they are not only confused about the location of the point of light; they are even confused about the stability of their own position" (p. 92). Insecurity is situationally aroused in unstructured situations,

and as Sherif's (1937) experiment on the formation of attitudes using autokinetic movement showed, Ss felt disturbed and uneasy especially when no common norm was achieved or maintained. But perhaps the clearest demonstration that maintaining stable anchorages is motivationally important is the Sherif and Harvey (1952) experiment which is summarized as follows:

A number of Ss were required to make judgments of autokinetic movement first alone, and then in pairs--a "group" situation. One third of the Ss were assigned to take either of three ordinally constituted degrees of elimination of stable anchorages. Sherif and Harvey (1952) found:

> (a) The more uncertain the situation, the greater the scale within which judgmental reactions are scattered.
> (b) The more uncertain the situation, the greater the magnitude of norm or standard around which judgments are distributed.
> (c) The more uncertain the situation, the larger the differences between the scales and norms of judgment of different individuals.
> (d) The more uncertain the situation, the greater the tendency, on the whole, toward convergence in group situations. (p. 303)

It is interesting to note that although Ss showed the greatest degree of convergence in that experimental condition where the most anchorages were eliminated, some Ss felt even more insecure in this experimental condition "when

their rather unstable norms from the individual session were assailed or disagreed with by another person" (Sherif and Harvey, 1952, p. 301). Apart from insecurities being created for some Ss by interacting with others in the most anxiety producing experimental conditions, it is warranted to conclude that with the emergence of a group standard situational insecurity, i.e., variability, diminishes.

Walter (1952), in a well conceived experiment, demonstrated that conflicting social anchorages produced an increase in the variability of autokinetic judgments. After establishing a base-line of judgments in the first session, an anchor was introduced prior to the second session via a suggestion that students at a school of previously determined high prestige had found that the light moved x units (either the upper or lower 10th percentile value of S's estimates in the first session). The anchor was incorporated by all Ss reducing the variability of the estimates. Before a third session the opposite anchor was introduced in the same way, and the variability increased greatly. Before a fourth session both anchors were discredited, and the result was another marked increase in the variability of judgments. The control group's variability remained the same throughout. Thus, when stable physical and social anchorages are disrupted the result

is an experienced loss of well being, heightened insecurity, and anxiety. In terms of judgment there is increased variability in choice behavior.

Individuals develop judgmental scales for the discrimination of length, up-down, spacial relations; they develop attitude scales for evaluating the reliability of others, toward norms (including ideal norms), social institutions, groups, as well as for persons along a variety of dimensions. A functional interrelated grouping of these developmentally acquired attitudes into a "sub-system" of an individual's psychological make-up defines the ego (Sherif and Sherif, 1956). Painful tension is experienced when anchorages are disrupted; these states have been referred to by a series of terms: insecurity, anxiety, shame, guilt, aloneness, inadequacy, etc. Maintaining and securing stable anchorages is from all evidence of great motivational importance. It is in varying degrees central to an individual.

Attitude and norm change in psychophysical experiments. Under relatively structured conditions, whenever a well graded series of stimuli are shifted, the absolute scale shifts. Scales move as the range of stimulus material shifts (Hunt and Volkmann, 1937). Shifts in absolute scales organizing fairly well-graded stimuli also occur when anchors are

introduced. Shifts of the absolute scale with anchoring are summarized (except for a more recent contribution) by Guilford (1954) as follows:

1. A scale extends toward an anchor stimulus that is outside the stimulus range. . . .
   a. The farther the anchor stimulus from the stimulus range, the greater the shift.
   b. The more remote the anchor stimulus, the less the increment of shift . . . the shifting effect shows diminishing returns.
   c. The closer the stimulus to the anchor, the greater is its shift on the scale.
   d. The extension of the scale toward the anchor is never complete. An exception to this may be when O is instructed to judge the anchor stimulus along with the others.
   e. One effect of the extension is to broaden the categories.

2. The end of the scale without the anchor remains fixed. Only in rare instances does this end of the scale "pull loose" from its mooring.

3. An anchor may be moved so far from the stimulus range that the shifting of the scale reaches a "breaking point." In this event the limens fall back, but not completely.

4. An imagined stimulus may also serve as an anchor.

5. The anchorage effects are not dependent upon specific instruction to modify scales.

6. Anchors within the stimulus range, when not balanced around a central stimulus value, have effects like those outside the range.

7. Anchorage effects apply to many kinds of judgments. Among those to which they have been found to apply are judgments of lifted weights . . . , slant lines . . . , time intervals . . . , affective

> value of odors . . . and of colors . . . , and judgments of desirability of behaviors and of importance of traits for occupations . . . (pp. 313-314).

Recently, Sherif, Taub and Hovland (1958) have shown that when anchors are introduced in either direction beyond the stimulus range, they are assimilated up to a point and are contrasted from that stimulus value on. As the authors point out, their research modifies previous findings (see 3. above). Essentially, Rogers' (1941) experiment was replicated, but with slight modifications, to test the assimilation-contrast hypothesis. When the introduced anchors were close to the end-points of the previously established absolute scale, they found that judgments were displaced toward the anchor (assimilation). When the introduced anchors were farther away, the judgments were displaced away from (contrasted with) the anchor. They concluded in part that: "On the basis of judgmental relativity we would expect that the range of assimilation would be influenced not only by the absolute distance of the anchor from the extreme stimuli but also by the range of the stimulus series itself" (Sherif, Taub, and Hovland, 1958, p. 154).

Assimilation and contrast effects have also been demonstrated for such heterogeneous stimulus material as autokinetic movement. Whittaker (1958) first had Ss formulate

an absolute scale alone, and then in a subsequent session they made judgments together with a "plant" who distributed his judgments around values which were at various distances from each S's largest initial judgments. The Ss were divided into five groups. In one group each S made judgments with a "plant" whose judgments did not differ from his (control group). In the other groups the "plant" distributed his judgments around a value which was one inch, two, eight, and twelve times (numerically) the largest initial judgment of each S in the alone session. Whittaker found that when the "plant's" judgments were one inch and two "times" greater than the largest value each S had previously given, there were significant shifts toward (i.e., assimilation of) the "plant's" judgments. When the "plant's" judgments were farther away, i.e., eight and twelve "times" greater than the largest value each S had previously given, the Ss shifted away from the "plant." Thus, the introduction of very divergent judgments relative to S's original scale produced a contrast effect.

Toward a valid experimental design for collective behavior. It is now possible to state how the criteria for framing valid experiments on collective behavior can be met. The essential process of collective behavior can be

investigated if it is assumed that the formation of norm and attitude scales in the laboratory embody the essentials of these processes in actual life.

Stable antecedent "group" conditions should be produced by requiring a number of Ss to make judgments aloud (using the method of single stimuli) in an unstructured stimulus situation. If the Ss are required to communicate their evaluation of physical stimuli, then norm and attitude scales should emerge; a small "group" should be stabilized in the course of time.

By producing "groups" with divergent norms, the ease of convergence when the "groups" are brought together is subject to manipulation. If the norms are not too divergent, assimilation should occur; if the norms are highly divergent, contrast should be experienced, convergence should be difficult.

The norms and attitudes produced in the laboratory seem to be valued, i.e., Ss appear from all available evidence to be motivated to find stable anchorages. Therefore, when Ss from different "groups" are confronted with divergent opinions, they should become motivated to regain stable anchorages. In addition, when confronted by conflicting opinion, Ss should become involved with the validity or

"truth" value of the norm that is appropriate for the stimuli being evaluated. Thus, a superordinate goal should emerge.

Considering the fact that Ss volitionally adhere to their "group" norms in the final alone sessions of experiments on norm formation, they should become involved in being loyal to their original "groups" when the "groups" are brought together to interact. Remaining consistent is also an important ego-attitude. Consequently, Ss should experience a conflict of anchorages, in that there are motives toward stabilizing a norm binding for all, and motives for remaining loyal to their original "groups."

If the stimulus material is sufficiently unstructured, there should be a great variety of norms that could emerge. Within limits, it is possible to find a sufficiently unstructured judgment task so that the stimulus material will not determine what norms emerge. Instructions in judgmental situations can require Ss to produce judgments de novo. Therefore, if norms emerge they should be the end-product of give-and-take interaction.

The relationship of the individual to social products can be paralleled in judgmental experiments. Norms are "group" products; attitudes refer to individual psychological

products. Therefore, norms will be measured by disregarding the individual "group" members, whereas attitudes will be measured in terms of the characteristics of individual judgmental latitudes. The relationship of the individual to social products can be measured in terms of the extent to which their attitudes deviate from norms.

The usual measures of norms, attitudes, and variability employed in psychophysical experiments will be employed in analyzing the results. The solidarity of "groups" can be determined in two ways: measuring the extent to which "group" members deviate from their "group" norms and by measuring the degree of similarity among the attitudes of "group" members. The degree of structure of the stimulus conditions is operationally measured by the number of alternative ways of structuring available to Ss. It can be inferred from the usual measures of variability.

Practice in judgmental situations generally leads toward a further stabilization of judgmental scales. Never has any investigator reported that with practice, Ss change their response categories. Never has any researcher found that practice increases the variability of Ss' judgments. These are important control variables, and in the next chapter experimental findings will be cited showing that practice

produces the same results with the stimulus material that shall be employed in these experiments, as with every other judgmental task reported in the literature.

CHAPTER II

HYPOTHESES AND EXPERIMENTAL PROCEDURE

Collective behavior was defined in the previous chapter as: the process by which individuals, the agents of social change, disrupt the social order and produce a highly unstructured situation while being motivated to stabilize norms by standardizing either new, existing or old ones. In order to verify this sociological formulation, the following hypotheses are advanced:

I. The formation of initial "groups"--stable antecedent "group" conditions. If a number of Ss (with similar, i.e., either low, intermediate or high judgment tendencies with respect to the stimuli) are brought together to interact (make judgments), it is predicted that in a fixed period of time (number of trials) they will converge toward a common norm. Their judgmental latitudes (scales) will be more similar than at the outset of the session, i.e., they will form a stabilized small "group." Judgmental latitudes (scales) are

taken as an index of attitudes--characteristic modes of response.

II General hypotheses concerning the collective behavior condition. If a number of small social units (from the "group" condition above) with stabilized, yet different (low, intermediate, and high) norms and therefore attitudes are brought together to interact (make judgments) rapidly for a fixed time interval (number of trials) where they interact almost exclusively over the validity or "truth" value of their conflicting norms and attitudes (collective behavior condition), it is predicted that:

1. A new, emergent collective norm will arise, i.e., a norm binding on all the individuals.

2. In the course of the collective behavior condition a disruption of the norms and therefore attitudes of the initial "group" members will be produced resulting in:

a. disintegration of the initial "groups" as measured by the breakdown of "group" solidarity. Ss will not adhere to their original "group" norms even though it is possible for them to do so.

b. an increase of Ss' variability over its final value in the "group" condition.

III. Final alone condition. If each S is required

to make judgments alone after the collective behavior interaction, it is predicted that:

1. The individuals initially belonging to smaller units will not revert back to their initial "group's" norm, thus revealing a state of continued disorganization of the initial "group's" norm.

2. There will be a stabilization of the pattern of Ss' judgments, i.e., Ss' variability will decrease as compared with its value during collective behavior.

IV. Hypotheses pertaining to some specific problems in collective behavior. Thus far, general hypotheses governing the over-all process of collective behavior have been advanced. However, as was discussed previously, there are a variety of subordinate problems that need investigation. Here, we shall advance hypotheses concerning only two of these problems.

A subordinate, yet exceedingly important problem in analyzing collective behavior is why many collective behavior episodes are necessary before there is a transformation of norms and attitudes. As was pointed out earlier in the previous chapter, this may be due in part to the difficulty of arriving at a binding, collective norm because there is so much divergence among "groups" holding to different standards.

Therefore, the following hypotheses can be advanced:

A. If the distance between the lowest and highest "group" is varied (for the collective behavior condition) while keeping the intermediate "group" always in the middle, and three degrees of "inter-group" divergence (from small to great: A, B and C) are thus constituted, it is predicted that:

1. The less the original divergence among them, the more they will converge toward a collective norm.

2. The smaller the original divergence among initial "groups," the less will be the variability among Ss in the final alone condition. In other words, the more a stable collective norm emerges, the more binding it will be on Ss in the final alone condition as measured by the number of Ss who fall within the range of the collective norm.

Another problem in the field of collective behavior deals with the concentration of opinion or stands of groups on a given issue. Instead of there being an even spread of groups ranging from right to left, it may be that there is a greater concentration of established group opinion on the left than on the right or vice versa. Thus, the following hypotheses can be advanced:

B. If the distance between the lowest and highest

"group" is held constant at approximately the distance of B (indicated in A above), while in one case the intermediate "group" is placed close to the low "group," and in another case near the high "group" thus concentrating the collective behavior interaction in terms of the opinion represented, it is predicted that:

1. When the collective behavior is concentrated, as opposed to when it is not, there will be a greater convergence toward a collective norm.

2. When there is a concentration of opinion in the collective behavior condition, there will be less variability among Ss in the final alone condition. Therefore, once again, the more a stable collective norm emerges, the more binding it will be on Ss in the final alone condition as measured by the number of Ss who fall within the range of collective norm.

Procedure

As was pointed out in the previous chapter, in order to experimentally produce norms and attitudes, an unstructured stimulus situation is required. The visual estimation of number task was chosen for a variety of reasons: (1) Because some Ss under-estimate and others over-estimate the

number of visually presented objects, it is possible not only to produce divergent norms but also contrasting standards of judgment. (2) Because white stimulus objects (dots) can be presented against a dark background, the experiment can be run under light conditions which enable Ss to write their judgments and readily identify "group" members under all conditions where Ss are together. (3) It is possible by varying the stimulus material to produce stimulus conditions of different degrees of structure. (4) Because sufficient research has been carried out on the psychophysical relationships involved in the visual discrimination of number, control variables have been isolated.

In an experiment on the visual discrimination of number (Kaufman, Lord, Reese and Volkmann, 1949) the Ss were required to report the number of dots simultaneously presented to them in fields ranging from 1 to 210 for 1/5 of a second. For stimulus fields greater than 15 dots the actual presented number varied in steps. For example, fields of 89, 103, 118 . . . dots were presented. Each step represents less than one jnd increment. They found that Ss employed one discriminating process for fields up to and including 6 dots, and another process for fields greater than 6 dots. "The first process is defined as operating in the discrimi-

nation of numbers above this point of discontinuity. We call the first discriminatory process subitizing and the second estimating. Under most of the conditions in which we have observed the discrimination of number, the discontinuities have been near the presented number of 6 dots" (Reese, Reese, Volkmann, and Corbin, 1953, p. 70).

For our purposes, the experiments on the effect of practice and suggestion in the visual discrimination of number are particularly important. With mild suggestion (e.g. most people tend to underestimate) shifts from Ss' initial estimates (beyond the 6 dot subitizing range) were more pronounced, the more the number of dots were increased (Reese et al., 1953, pp. 76-77). Practice, i.e., when Ss were given no information whatsoever about the accuracy of their reports in the estimating range (beyond 6 dots) had the following effects: judgment "time and variability decrease, confidence increases, and average accuracy stays about the same" (Reese, et al., 1953, p. 73).

Therefore, as Volkmann and his associates have demonstrated, it is possible to effectively employ suggestion, verbal anchors, in the discrimination of visual number task so long as the stimuli are beyond the subitizing range. It is probably also possible to have for the same stimulus

series, different ranges of judgments anchored by Ss themselves through interaction in the process of norm formation. In the estimation of visual number, practice does not alter the accuracy of Ss' judgments while variability decreases and subjective confidence increases. These are important control variables. Whatever changes occur either in terms of reported number or in the variability of Ss' judgments, can not be attributed to practice effects in the experiments to be reported.

Apparatus and stimulus material. Thirty slides were produced by photographing on 35mm film random distributions of 89, 103 and 118 black disks of 3/8" diameter on a 16" white square (black bordered 3/8" wide). Obvious geometric patterns were broken-up so that judgments of any field of dots within a frame would not be influenced by grouping effects. The slides were arranged in one slide tray by randomizing the slides three at a time. Starting at either end of the tray, an 89, a 103 and a 118 dot slide was presented randomly every three trials. (See Table 11, Appendix).

In order to make the task more reasonable to the Ss and to produce some involvement, the exposure time was set at 2 seconds. Using a tachistoscope, Ss in pretests usually ranged in their judgments from 25 to 250 dots. The range of

their judgmental scale was smaller for Ss giving lower estimates. There was also a tendency for Ss to give judgments by round numbers.

Although Reese et al. (1953) found that "there are not two separate populations of subjects" (p. 83), they gave no explanation for why some Ss judge high; others low. Pretest data (at 2 second exposure) shed some light on why Ss estimate low and high. It seems that the high judgments may be a function of several factors. For example, as a result of neutral instructions, some Ss build up an expectation that the number to be presented will be low, and when a number contrary to their expectations is presented they tend to respond with large estimates. Evidence was also found that some Ss have had previous experience in making estimates of visual number. Due to working in hardware stores, etc., they have come to learn that one tends to underestimate a great array of things. Therefore, these Ss increase their estimates in order to be more correct. In pretests it was also found that at the 2 second exposure, as opposed to faster exposure times (1/5 second and 1 second), all Ss developed a "method" for estimating the number of dots even though they were given no instructions to do so. Projecting on to a screen made from tan colored window shade material

49" by 52" under a variety of surround illumination conditions, i.e., ranging from indoor daylight to neon light in an otherwise darkened room had no effect on reported number. No after images were ever reported.

Since apparent density (Reese, et al. 1953, p. 72) is an important variable influencing Ss reports of visual number, the width of the projected rectangle in which the dots were enclosed was always set at 27 inches. Seating position on either side of the screen and in any of the five rows of a classroom had in pretests no effect on the estimates reported.

In the experiment the same experimental rooms were employed at Hunter and Bard Colleges for all conditions (except the preliminary sessions were run in an adjacent room at Hunter). As indicated in Figure 1, Ss were seated in two rows when making judgments by 4's and 12's and in position A when in the alone condition. Ss were seated in their appropriate positions at random. The chairs not needed for a particular condition were pushed aside. Figure 1 also indicates the position of the three 464-D Sony stero tape recorders (only one of which was set up for the "group" and the alone conditions). A cable running between the two rows of chairs was employed to ostensibly record the Ss from

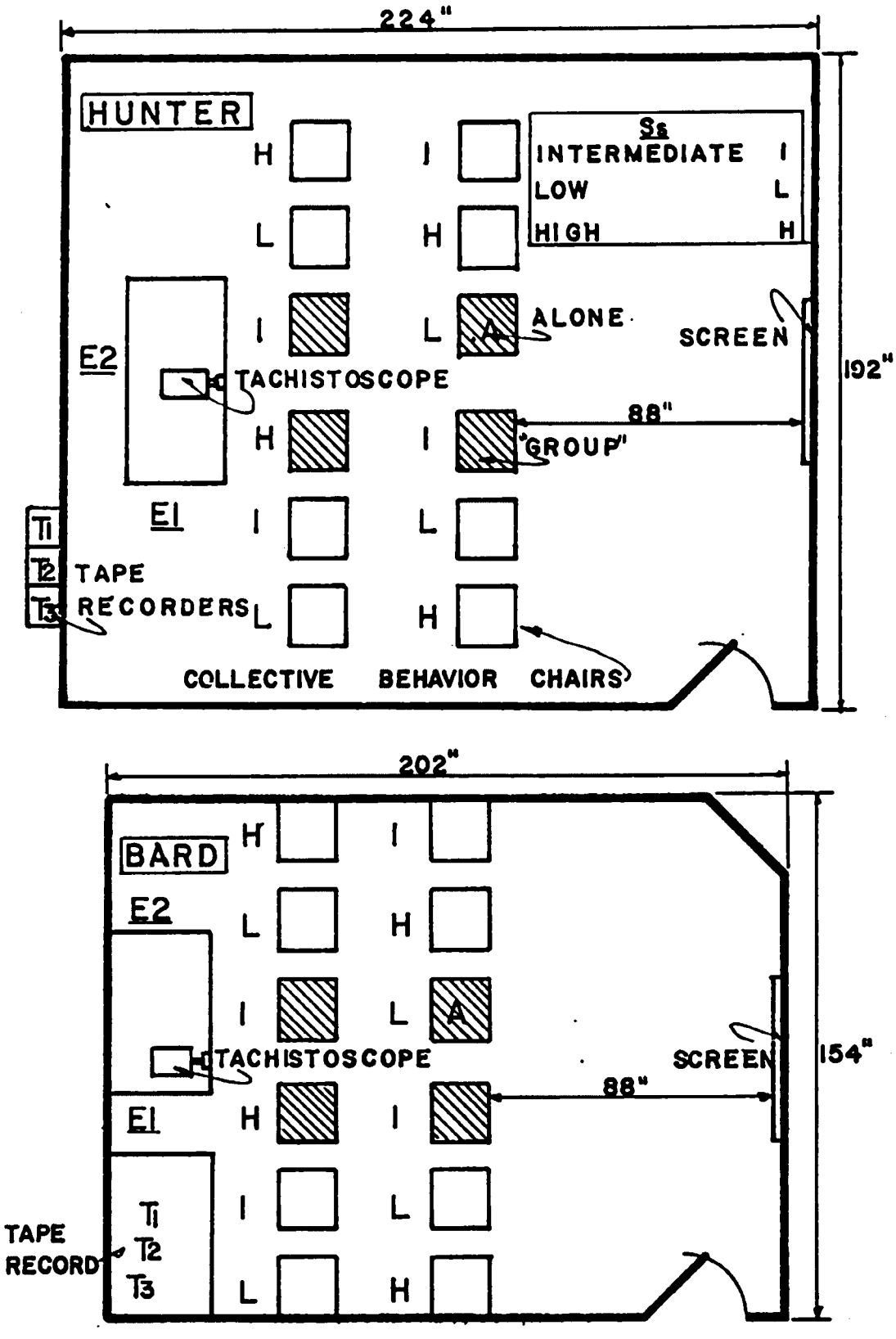

FIGURE 1. FLOOR PLAN OF EXPERIMENTAL ROOMS.

throat microphones. In addition, a phony shutter cable was connected to the myriad of wires on the floor. Thus, the setup was made to look as impressively experimental as possible. To further the involvement of the Ss, a great deal of fuss was made about the fitting and operation of the throat mikes, including checking their recording level and admonishing the S, when necessary, to speak louder.

Subjects. At Hunter College Ss were drawn from the halls, library, and from ten sections of an introductory course in educational psychology. Because the administration at Hunter required it, the Ss were paid at the rate of $2.00 per hour. At Bard, the Ss were taken from the four introductory psychology courses. They were not paid, but they were asked (as were the Hunter Ss) if they would participate after they had worked through the preliminary instructions. At Hunter, the Ss ranged in age from 17 to 42, although most were about 19 years old. The Bard Ss were mostly 19, but the range was from 17-22 years of age. At both schools the students were predominantly from the New York City area. There were 36 women, 24 men and an even number of both sexes in the three Bard experiments, whereas more women than men participated in the two experiments run at Hunter College.

Every effort was made to make sure that the Ss would be relative strangers. At Hunter, people from different course sections were employed in the same experiment with those drawn from the halls, etc. At Bard College, beginning with the first week of school, the experiments were run employing mostly freshmen. It was hoped that the experiment could be completed before well-established relationships developed among any of the Ss.

Instructions. The following preliminary instructions were given to the S alone:

Visual Discrimination Experiment

> The purpose of the session today is to give you an understanding of what will be required of you in the experiment.
>
> I am going to expose a series of slides, projecting a number of solid white dots bordered by a white frame, on to the screen in the front of the room. Part of your task will be to report the total number of solid white dots as rapidly as you can. In order to record your judgment time, I am going to ask you to wear a throat microphone which I shall show you how to use. Since it is somewhat laborious for me to take from the tapes your judgments as well as your decision time, I am going to ask that you keep a written record of your judgments in the space below. If for any reason, you should miss a judgment then leave the space blank for that trial.
>
> The other part of your task will be to report the method you work out for estimating the total number of objects presented. But since in this session you will not have sufficient experience with the stimulus material you will not be asked for your method at this time.

> Before I expose the six trial slides in this session, you should know that the exposure time will appear at first to be a little fast, but after a while (in future sessions) you will find that the time will be more than adequate for you to arrive at your judgments. The exposure speed has been set so that it is impossible to count all the dots. Therefore, you shall have to utilize some judging or estimating process. Even though you will be a little anxious at first, that is, before you have had sufficient experience with the stimulus material, try to make your judgments as accurate as possible.

On the basis of these six preliminary judgments, Ss were scheduled for the next session--the "group" condition. The criteria employed in making such assignments were as follows: Ss were placed together if they made 4 or more judgments below 60 (low "groups"), between 60 and 100 (intermediate "group"), and above 100 (high "group").

In order to guarantee the attendance of the Ss at all sessions, which were at least one week apart in time, each S was required to fill out a post card after he had made a note of the appointment time. This reminder of the appointment arrived one to two days before the next scheduled appointment; in addition, an assistant called each S the evening before the appointment. At Bard, where use was made of the campus mails, Ss were called the day before the appointment; if they still did not show up, they were located by phone at the scheduled time. If an insufficient number of Ss arrived for their appointments, the session was cancelled.

Ss, if they were willing, were rescheduled for the "group" condition when possible, but unfortunately three experiments were lost at Hunter College at the collective behavior stage.

Before the Ss left the experimental room at the end of the preliminary alone session, they were told that in the future they would be making judgments with others for the following reasons: "to speed up the experiment and because psychologists have learned that Ss talk to one another (even when they are instructed not to do so) and it is important to us that if people do influence one another in this situation they do so here where we can statistically control for the possibility." (This procedure was adopted because in pretests it was found that to run any experiment in at least three different colleges in the New York City area, employing a number of Ss, made individuals suspicious that we were interested in "group pressure" or in conformity, etc. Therefore, it was almost impossible to expect to find naive Ss any longer within some colleges.) In addition, the Ss were told that next time they would be required to write "how you expected to make your judgments," i.e., what method they expected to employ before any more slides would be shown.

In the next two conditions, first the "group" and then the collective behavior condition, Ss were given the

following written instructions as soon as they arrived:

Judgment Experiment--The Visual Discrimination of Number

1. In the space below write the method of judgment you expect to employ in today's session together with some evaluative comment.
2. As in previous session(s) judge aloud and in writing the total number of solid white dots within the white rectangular frame. In order that we may evaluate how good your method(s) of judgment are make your estimations as accurate and as rapid as possible. All the time the slide is exposed you are to use for arriving at an estimation. The judgment time is clocked from the time the slide goes off. Therefore as soon as you can, say your judgment after the slide goes off.
Please say your judgment before you write it. Please speak more loudly than you ordinarily would so that we can obtain a reasonably good quality recording with the throat mikes. As you know from previous session(s) you are able to arrive at judgments relatively soon after the slide goes off. Therefore in order to insure maximum attention the slides will be exposed at a fairly rapid rate. Should you for any reason miss a judgment say nothing and leave the space for that trial blank. I shall call off the number of the trial as a signal that the slide is about to be exposed.
3. After you have made the judgments for today's session write the method of judgment you did employ in the space below together with some evaluative comment. How accurate were you? How much confidence do you have in your method? What was the smallest possible and the greatest possible number of solid white dots?

In the collective behavior condition, to compensate for Ss' reactions to the large number of fellow participants, they were given the following written explanation:

Judgment Experiment--The Visual Discrimination of Number

Today, a large number of you have been brought together for the same task--to report by utilizing an estimating process, the total number of solid white dots. The reasons we are following this procedure, that is, of having a large number of people making estimates are as follows:

1. We are pressed for time.
2. People might influence one another, both here and outside of the experimental room and we want to be able to control for this possibility. From experience we know that even if you ask people not to talk with one another about the experiment they sometimes do, and quite frankly we would prefer that you hear others' judgments here in this room rather than possibly gain any information outside of the laboratory. And more importantly we want everyone to hear as close to an equal number of opinions, concerning how many dots are projected. We know from previous experience that the number of people here today represents the upper limit any person has ever talked to concerning the experiment outside of the experimental room.

It will not be necessary to identify you on the tapes this time. But please be sure to write next to your name the channel number which appears on the card. Also please make judgments first aloud and then write them since we are interested in your judgment time. Remember the throat mike only records you, and therefore, it is not necessary that you wait for anyone else before you speak. Although, as you know from the previous session, it is rare for everyone to speak at once, there is nothing wrong with doing so--we shall have clear recordings so long as you speak up so that there is a good recording level.
I shall, as before, call out the number of each trial. This time there will be 120 trials but as you know from the last session, the experiment, with your cooperation, will go rapidly.

At no time were Ss given any previous warning that they would be making judgments with 11 other people. Every

precaution was taken to prevent Ss from knowing that they would participate in such a condition, including the running on the same day of as many collective behavior conditions as possible.

For the first five trials in each session (except the preliminary one), the time between exposures was about four seconds. Thereafter the ready signal was given almost as soon as everyone had made a judgment, about two seconds. The experimental assistant made sure that E called out the correct trial number and exposed the appropriate slide. In addition, the inter-trial pace was gauged. Because of the small amount of time between exposures and the fact that the slides were mounted so that the fields of dots appeared on different parts of the screen at random, Ss by and large were constantly attending to the screen except for the time it took to write their judgments. Rarely was any comment made during the session, and never after the first six trials. Comments were made at the end of each session, however, and these were noted. Thus, by following this procedure, a highly directed interaction process was achieved--the Ss were involved almost exclusively in the judgments of others in relationship to their own estimates.

In the final alone condition, Ss made 60 judgments

(as had been done before in the "group" condition), recording them on sheets of paper, listing each trial number, while they said their judgments out loud. After the final alone judgments were taken, each S was interviewed to find out what he was aware of during the course of the experiment and how he accounted for the changes in his judgments. The interview started with the most general questions: "any reactions to the experiment," "anything you would like to tell me," etc. Then by degrees the questions became more specific. We wanted to be especially sure that all the changes took place because of the experimental conditions and were not due to any outside influences. Finally, S was required to fill out a rather long, detailed questionnaire (see Table 12, Appendix).

Experimental variations. In order to constitute the different degrees of "inter-group" divergence required by the hypotheses, E assigned the available "groups" to the different collective behavior conditions. On the basis of pretests, it was estimated that judgments at about a 100 would contrast with those in the 50 range, although the precise inter-judgmental distances required for contrast to be experienced were not determined. Therefore, by constituting three different degrees of "inter-group" distance from small to large (A, B,

and C) it was hoped that convergence would be difficult in condition C since the low and high group Ss would experience contrast.

The major advantage of this experimental procedure is that whatever happens must be due to social interaction since the stimulus material never changes, nor do the instructions essentially change; Ss can visually locate "group" members, and when in doubt, they can fall back upon their own judgments which are recorded in front of them and therefore change is not favored. Thus, the procedure places the S in social stimulus conditions in collective behavior where ego issues emerge as a consequence of his being involved with the judgments of others in relation to his own on the one hand, while the problem of being consistent emerges on the other.

Apart from the fact that such a procedure is time consuming, its major drawback lies in the fact that it is very difficult to control emergent "group" formations. For this reason, a variety of procedures were tried in pretests in an attempt to anchor the Ss within low, intermediate, and high ranges. All of them were abandoned, all had their faults. A planted S was employed, but for a variety of reasons he sometimes produced negative reactions. In order to

determine whether he was a low or high judger, each S was given preliminary judgment trials. Then he was given a sheet of paper with appropriate judgments impressed upon them. Because, as it turned out, S either wanted to make his own judgments, or because he did not see them, or because he had guilt reactions (this is an established form of cheating), the method was abandoned. A number of methods were tried for introducing false verbal anchors. Such procedures involved E giving appropriate anchors (defined by whether S was a high or low judger on a few preliminary trials) for slides either one jnd higher or lower or both than those to be employed in the experimental conditions in 12 "practice" trials. When only one anchor was thus verbally introduced for either the high or low end, the range of S's judgmental scale varied widely--too widely for our purposes. Only when two anchors were introduced did the Ss have established ranges. This procedure, employing two verbal anchors introduced by E was employed in a "practice" session which was then followed by a "group" condition where Ss who had received the same verbal anchors interacted and further stabilized the prescribed range. When these Ss were next put into a collective behavior condition, few changed their judgments, and there never really was any convergence

toward a collective norm, only a few became disrupted in the whole process, or at least this was the case in two pretests. It seems that it is indeed true that judgment-attitude scales when anchored at both ends by authority (Mausner, 1954) and by verbal dictum, i.e., learned deductively rather than inductively (Hood, 1961) are indeed resistant to change. It shall have to be left to future research to determine whether judgment-attitude scales deductively learned can be broken down in the process of collective behavior interaction. However, nothing would be theoretically gained at this point, i.e., before it has been shown that inductively stabilized "group" norms and judgment-attitude scales can be broken down in the process of stabilizing a new collective behavior product of interaction.

CHAPTER III

RESULTS

Hypothesis I predicted that a stabilized "group" would form during the "group" condition; that Ss judgments would be more similar at the end of the session than at the beginning; that the Ss would converge toward a common norm.

There were a total of 15 "groups" of four Ss employed in the five collective behavior experiments. Following traditional procedures in psychophysics, the median (Mdn) value for each of the three slides--89, 103, 118--was found for the first and last 15 judgments. An average median ($\overline{Mdn}$) was then computed for the first and last 15 judgments in order to represent each S with two measures.

If the Ss converge, if their judgments become more similar in the course of time, then the variance (s_g^2) for these average medians should be less for the last 15 judgments as compared with the first 15 judgments. As is evident in Table 1, the variance for the last 15 judgments is always

Table 1

Initial "Group" Convergence

Collective behavior experiment	Relative position of "group"	Variance (s_g^2) among Ss' judgments		AD_{Mdn}
		first 15	last 15	last 15 judgments
A	L	11.22	6.17	2.5
	I	14.54	11.54	3.3
	H	88.60	1.99	2.1
B	L	64.79	23.47	4.2
	I	217.17	21.09	4.2
	H	1063.24	97.61	8.2
C	L	55.73	13.60	3.6
	I	29.21	13.86	6.7
	H	173.11	10.36	2.9
B_H	L	49.56	25.23	4.2
	I	165.59	40.59	4.7
	H	168.54	89.54	9.6
B_L	L	46.04	32.01	4.8
	I	34.69	11.56	3.1
	H	56.89	29.64	4.9

less than for the first 15 judgments; the results are infinitely significant.

The degree to which Ss share a common norm can be measured by determining their deviation from their respective "group" norms. If a group norm is defined as being, in part, a central standard--a social not individual product--regulating

experience and behavior, then one set of appropriate operations for measuring norms is as follows: Since a norm forms in the process of interaction, find the median for the 89, 103 and 118 dot slides disregarding which of the Ss gave the judgments (for the last 15 judgments) and then take an average of these medians ($\overline{GMdn}$). The deviation of the Ss from their respective norms can be measured by the average deviation from the "group" median ($AD_{\overline{GMdn}}$). As Table 1 shows, these deviations are relatively small, as expected. It is concluded that Ss did converge toward a common norm, as is graphically evident in Figures 2 and 3.

In Figures 2 and 3 the $\overline{Mdn}$ is plotted for the first and last 15 judgments for Ss in each of the 15 "groups." Since the criteria employed in placing Ss into the "group" condition meant that individuals with similar judgmental tendencies were put together, it is evident from the graphs that in some "groups" the Ss converged fairly rapidly from the outset. It should be noted that Ss converged higher or lower in relation to their position during the first 15 judgments. Therefore "groups" converged to stabilize emergent "group" norms. These end-products of "group" interaction cannot be accounted for by averaging the $\overline{Mdn}$ values of the Ss for the first 15 judgments.

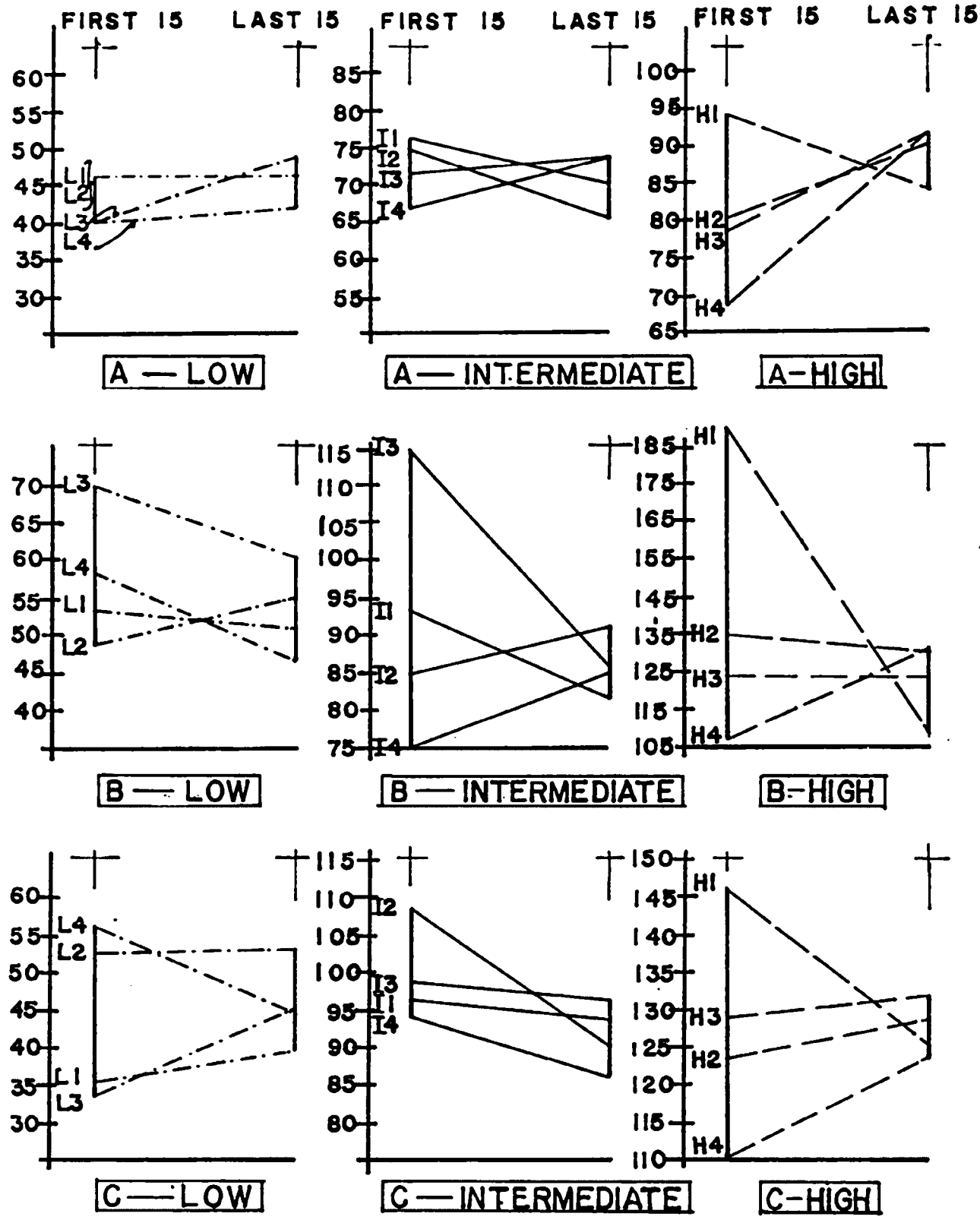

FIGURE 2. CONVERGENCE OF Ss IN "GROUP" CONDITION FOR EXPERIMENTS A, B and C.

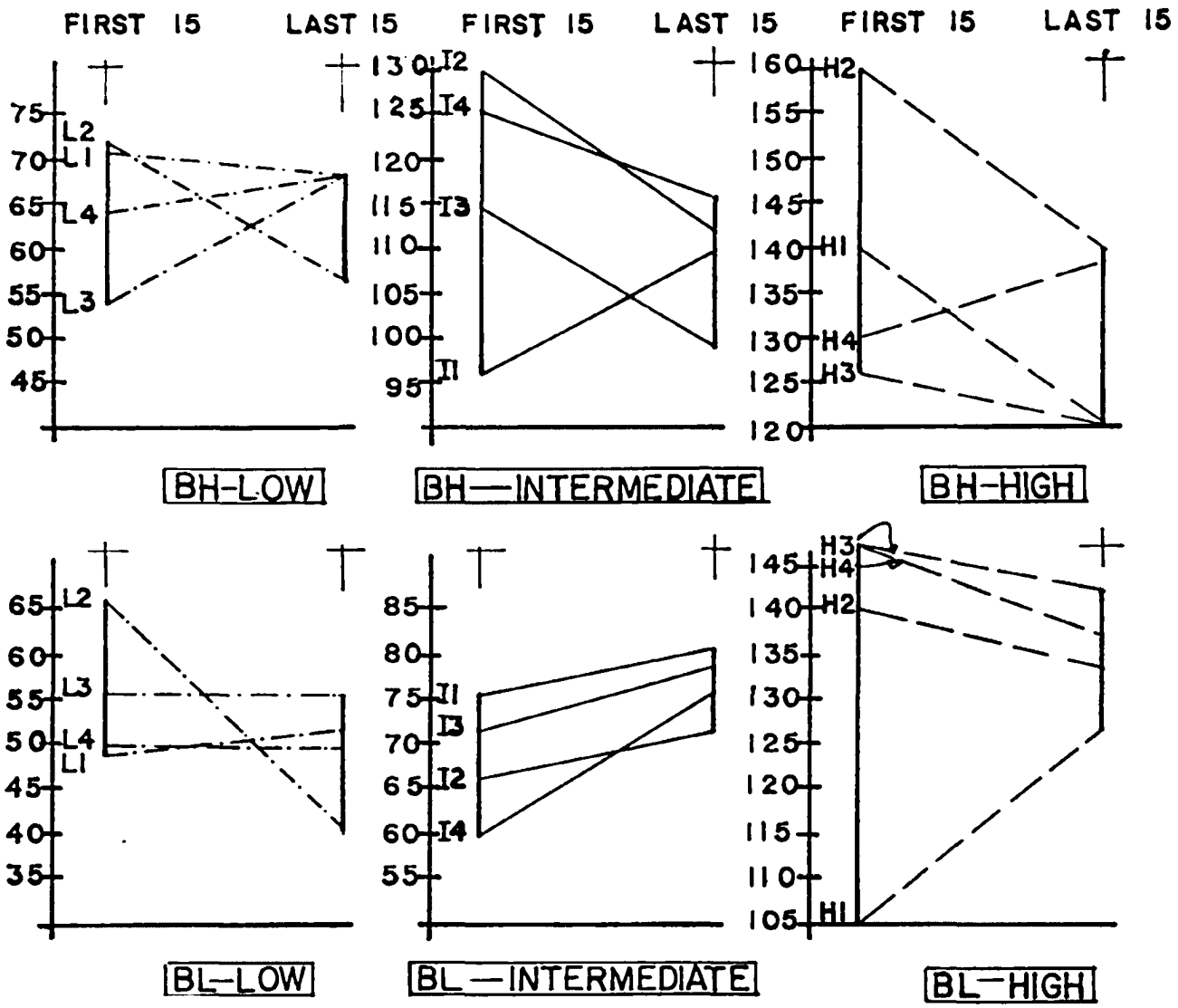

FIGURE 3· CONVERGENCE OF Ss IN "GROUP" CONDITION FOR EXPERIMENT BH and BL.

General hypotheses concerning collective behavior and final conditions. Although hypothesis II-1 will be analyzed last, the other hypotheses will be evaluated so that the most conservative statistical tests can be applied. Therefore, the order in which the hypotheses were advanced will not always be followed.

Hypothesis II-2a predicted a disintegration of the initial "group's" solidarity during the collective behavior interaction. The solidarity of the "groups" can be measured in two ways: by calculating the extent to which they deviate from their original norm and the extent to which "group" members give similar judgments as measured, once again, by the variance. If the "groups" have been disorganized during collective interaction, then Ss should deviate from their respective original "group" norms: their judgments should not be as similar as they were during the final phase of the "group" condition. The crucial comparison for both measures is between the last 15 judgments of the "group" condition (i.e., after stabilization) and the last 60 judgments in the collective behavior condition when a new, collective norm is emerging. (Since the process of convergence is apparently slower during collective behavior than in the "group" condition, i.e., after Ss have participated in the establishment

of a "group" norm, all calculations are based on the last 60 for each S or the second half of the collective behavior judgments rather than for the last 15 as in the "group" condition.)

As Table 2 shows, never was there an exception to this disruption of the original "groups." Both the variance for all the initial "groups" increased, as did the $AD_{\overline{GMdn}}$. Once again, the differences are highly significant. Figure 4 graphically illustrates the extent to which the initial "groups" were disorganized during the collective behavior condition.

Hypothesis II-2b, which predicted that individual variability would increase from its final value in the "group" condition to the collective behavior condition, can be evaluated together with hypothesis III-2: In the alone condition following collective behavior, there will be a stabilization of the pattern of Ss' judgments, i.e., decreased variability. The usual measure of variability in psychophysical experiments, the semi-interquartile range (Q) was calculated for each S in all conditions. Table 3 shows that the variability goes up from the "group" to the collective behavior condition and then it declines in the final alone condition. From the "group" condition to the collective behavior condition, 53 Ss

Table 2

The Solidarity of Initial "Groups" During the "Group" and Collective Behavior Conditions

Collective behavior experiment	Initial position of "group"	s^2_G		$AD_{\overline{GMdn}}$	
		"group"[a]	Collective behavior[b]	"group"	Collective behavior
A	L	6.17	15.78	2.5	20.25
	I	11.54	45.94	3.3	8.13
	H	1.99	72.24	2.1	19.33
B	L	23.47	66.25	4.2	24.35
	I	21.09	108.07	4.2	9.80
	H	97.61	574.49	8.2	20.83
C	L	13.60	205.25	3.6	15.75
	I	13.86	698.36	6.7	29.18
	H	10.36	93.84	2.9	28.68
B_H	L	25.23	203.13	4.2	20.45
	I	40.59	67.68	4.7	13.94
	H	89.54	564.87	9.6	32.28
B_L	L	32.01	456.87	4.8	23.05
	I	11.56	93.32	3.1	8.23
	H	29.64	158.74	4.9	41.70

[a]For last 15 judgments.

[b]For last 60 judgments.

increase their variability, 1 ties, and 6 decrease their variability. From the collective behavior to the final alone condition 46 Ss decrease their variability, 3 tie, and 10 increase their variability. A Friedman two-way analysis of

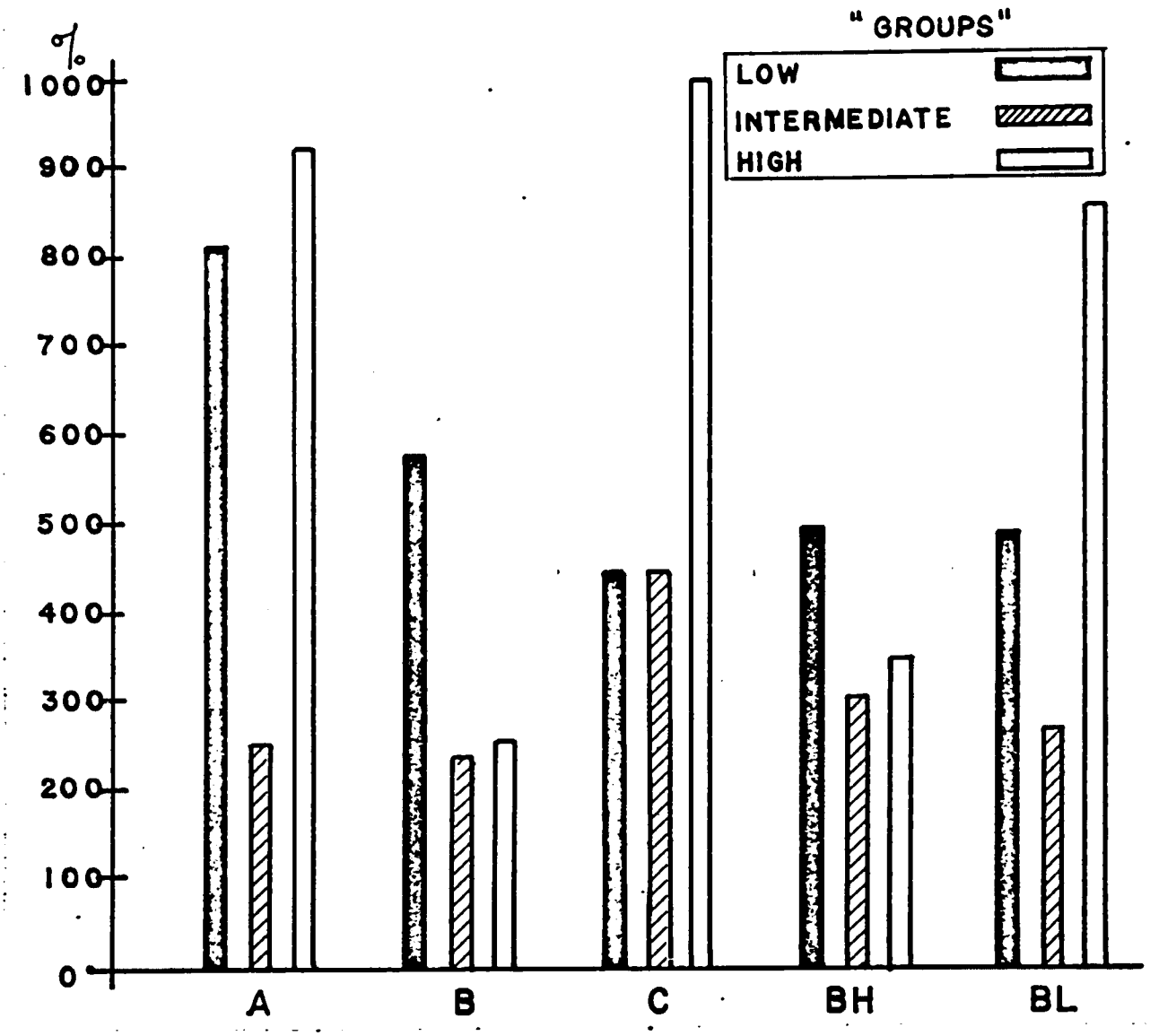

FIGURE 4. BREAKDOWN OF INITIAL "GROUP" SOLIDARITY MEASURED BY PERCENT INCREASE OF Ad $\overline{Mdn}$ OVER "GROUP" CONDITION DURING COLLECTIVE BEHAVIOR.

Table 3

Variability (Q) of Ss in "Group" ("G") Collective Behavior (CB) and Final Alone (FA) Conditions

Collective behavior experiment	Low Ss			Intermediate Ss			High Ss		
	"G"	CB	FA	"G"[a]	CB	FA	"G"[a]	CB	FA
A	3.37	8.75	5.00	2.50	5.00	3.92	6.84	8.25	6.25
	.84	6.83	6.67	4.17	5.84	5.42	2.24	10.42	5.42
	2.50	9.17	10.42	6.84	7.09	6.25	0.00	8.25	7.50
	1.62	6.25	5.42	6.84	8.75	4.09	2.50	6.67	3.34
B	1.62	6.25	9.59	6.67	8.34	9.25	8.24	8.34	2.50
	2.50	8.34	2.50	4.17	7.92	8.34	13.34	21.67	23.34
	.34	5.67	0.00	5.84	8.27	10.00	3.34	10.00	0.00
	2.00	7.50	7.50	5.00	10.84	4.17	7.50	4.17	4.58
C	4.34	8.67	7.50	9.17	9.29	4.59	6.24	8.00	6.67
	4.17	10.67	6.92	5.34	8.75	10.00	6.67	7.92	6.25
	3.00	4.17	1.25	5.00	14.29	5.00	4.17	9.17	6.50
	2.67	11.67	5.00	4.17	4.25	1.15	5.84	8.34	4.17
B_H	5.67	10.00	2.09	14.17	8.34	4.17	2.50	9.17	5.00
	3.50	8.34	8.34	6.67	6.67	7.25	4.17	6.67	5.42
	3.34	10.84	4.59	13.34	5.84	3.63	10.84	5.84	5.42
	5.84	9.59	5.84	9.00	7.38	7.09	9.17	7.25	12.50
B_L	4.17	7.92	2.92	5.00	12.92	2.50	3.34	10.00	9.59[b]
	2.50	7.25	5.50	4.17	6.92	5.84	5.84	8.34	----[b]
	3.34	13.34	5.15	5.84	10.42	6.67	14.75	12.59	9.59
	3.67	6.42	6.92	2.17	5.00	3.34	10.84	9.15	9.15

[a] Q values calculated for the last 15 judgments, i.e. after the final initial "group" stabilization.

[b] S lost due to illness at this stage.

variance (Siegel, 1956), i.e., the variability of the Ss by all the experimental conditions (for the data of Table 3), was calculated and the results, as Table 4 shows, are highly significant.

Table 4

Comparison of Ss' Variability During All Experimental Conditions by Position of Initial "Groups"

"Groups"	χ^2_r	df	p for one-tailed test
L	24.1	2	<.001
I	10.75	2	<.01
H	10.5	2	<.01
Combined	31.69	2	<.001

In order to evaluate the differences in variability of the Ss in the "group" ("G") condition as compared to the collective behavior (CB) condition, and the variability of the Ss during collective behavior to the final alone condition (FA) as well as the differences in variability between the "group" condition from the final alone condition, a series of Wilcoxon matched-pairs signed-rank (Siegel, 1956) tests were calculated. Table 5 summarizes the results.

Table 5

Comparison of Ss' Variability Between Experimental Conditions by Position of Initial "Groups"

Initial "group" position	One-tail Comparisons											
	"G" and CB				CB and FA				"G" and FA			
	T	z	N	p	T	z	N	p	T	z	N	p
L	0		20	<.005	13		18	<.005	24		18	<.005
I	37		20	<.01	37.5		20	<.005		+.34	19	=.3669
H	18		19	<.005	25		18	<.005		-.15	18	=.4404
Combined		-5.53	59	<.00003		-4.89	56	<.00003		-1.18	55	=.1190

There are significant directional differences between the Ss' variability in the "group" and collective behavior conditions, and between the collective behavior and final alone conditions. Therefore, it is concluded that the variability of the Ss increases during collective behavior over its final value in the "group" condition, and that, in the final alone condition, there is a decrease, and thus stabilization, of the Ss' variability as compared with its value during collective interaction.

As Table 5 shows, there is no significant difference for all "groups" combined between the variability of Ss during the final phase of the "group" condition as compared with the final alone condition. Only the low position "groups" show a significant increase in variability during the final alone condition--a finding for which there is no apparent explanation.

Hypothesis III-1 predicted that after the collective behavior condition the Ss would not revert back to their initial "group" norms, and thus there would be a continued disorganization of the initial "groups." In order to measure whether Ss adhere to their respective "group" norms, it is necessary to calculate their deviation in the final alone condition from their respective original "group" norms. If

a comparison is made between their deviation for the final alone condition and the "group" condition, then it is possible to evaluate whether their original "group" norm is binding on the Ss in the final alone condition. As Table 6 shows, there are only 5 Ss who revert back to their respective "group" norms, i.e., for whom the deviation for the final alone condition is less than or equal to their deviation (after stabilization) from their original "group's" norm. Employing the Wilcoxon matched-pairs signed-ranks test (Siegel, 1956), the difference between deviations is, for a one-tailed test, highly significant ($z = 6.15$; $p < .00003$).

Hypotheses pertaining to some particular problems in collective behavior. Hypothesis IV-A-1 predicted that if the distance between the low and high position "groups" is varied, keeping the intermediate "group" in the middle, so that three degrees of "inter-group" divergence (from small to great: A, B and C) are constituted, then the less the original divergence among them, the more they will converge toward a collective norm.

Table 7 shows the degree of convergence among Ss as measured by the variance among Ss (s^2_{CB}) and the average deviation of the collective behavior median ($AD_{CB\overline{Mdn}}$) for the

Table 6

The Deviation of Ss in the "Group" and Final Alone Conditions from Original "Group" Norms

Collective behavior experiment & "G" position	S	"G"[a]	FA	Collective behavior experiment & "G" position	S	"G"[a]	FA
A Low	1	1.7	1.7		1	3.3	29.1
	2	1.7	16.7	C High	2	0.0	25.0
	3	3.3	11.7		3	3.4	12.8
	4	3.3	10.0		4	5.0	28.3
	1	.8	12.1		1	2.5	5.8
A Inter-mediate	2	4.2	10.0	B_H Low	2	9.1	9.2
	3	4.1	10.8		3	2.5	6.7
	4	4.1	14.0		4	2.5	11.7
A High	1	0.0	9.8		1	0.0	36.7
	2	1.7	5.8	B_H Inter-mediate	2	1.7	14.2
	3	3.4	22.5		3	11.7	25.0
	4	3.4	16.6		4	5.3	26.7
	1	2.5	5.8	B_H High	1	11.6	.8
B Low	2	.8	15.8		2	8.4	59.1
	3	5.8	40.8		3	11.6	62.4
	4	7.5	2.5		4	6.7	36.6
	1	3.4	15.0		1	3.2	10.1
B Inter-mediate	2	6.7	1.7	B_L Low	2	8.5	16.2
	3	1.7	35.8		3	6.8	16.2
	4	5.0	17.5		4	.8	18.8
	1	16.6	5.0		1	5.6	6.7
B High	2	7.7	26.7	B_L Inter-mediate	2	3.4	6.7
	3	0.0	23.3		3	3.3	16.7
	4	8.4	21.7		4	0.0	1.7
	1	5.8	13.4		1	7.4	59.0
C Low	2	7.9	17.7	B_L High	2	1.0	S lost
	3	.5	18.5		3	3.3	38.2
	4	.2	1.9		4	8.0	54.0
	1	8.3	3.5				
C Inter-mediate	2	5.0	6.7				
	3	11.7	50.0				
	4	1.7	60.3				

[a]For the final 15 judgments, i.e. after "group" stabilization.

Table 7

The Degree of Convergence During Collective Behavior with Varied Original "Inter-Group" Distance

"Inter-group" distance	Range between high and low position "group" norms after stabilization	s^2_{CB} Last 60 judgments	$AD_{CB\overline{Mdn}}$ Last 60 judgments
A	43.3	58.69	7.15
B	69.1	528.33	16.39
C	83.5	739.36	24.08

variation of original inter-"group" distance, A, B and C. (These measures were calculated using the same operations as specified previously, except that to measure the degree of convergence, the average deviation must be taken from the collective behavior norm; the degree of similarity of Ss judgmental scales must be measured for all 12 Ss in the collective behavior condition.) In terms of both measures, the s^2_{CB} and the $AD_{CB\overline{Mdn}}$, there is more convergence during collective behavior for experiment A, than B, than C as is graphically evident in Figure 5. The $AD_{CB\overline{Mdn}}$ increases in the predicted order ($p = 1/6$). Therefore, on the basis of these two measures, it is concluded that the degree of convergence in collective behavior is a function of the degree of initial "inter-group" divergence. However, convergence does not

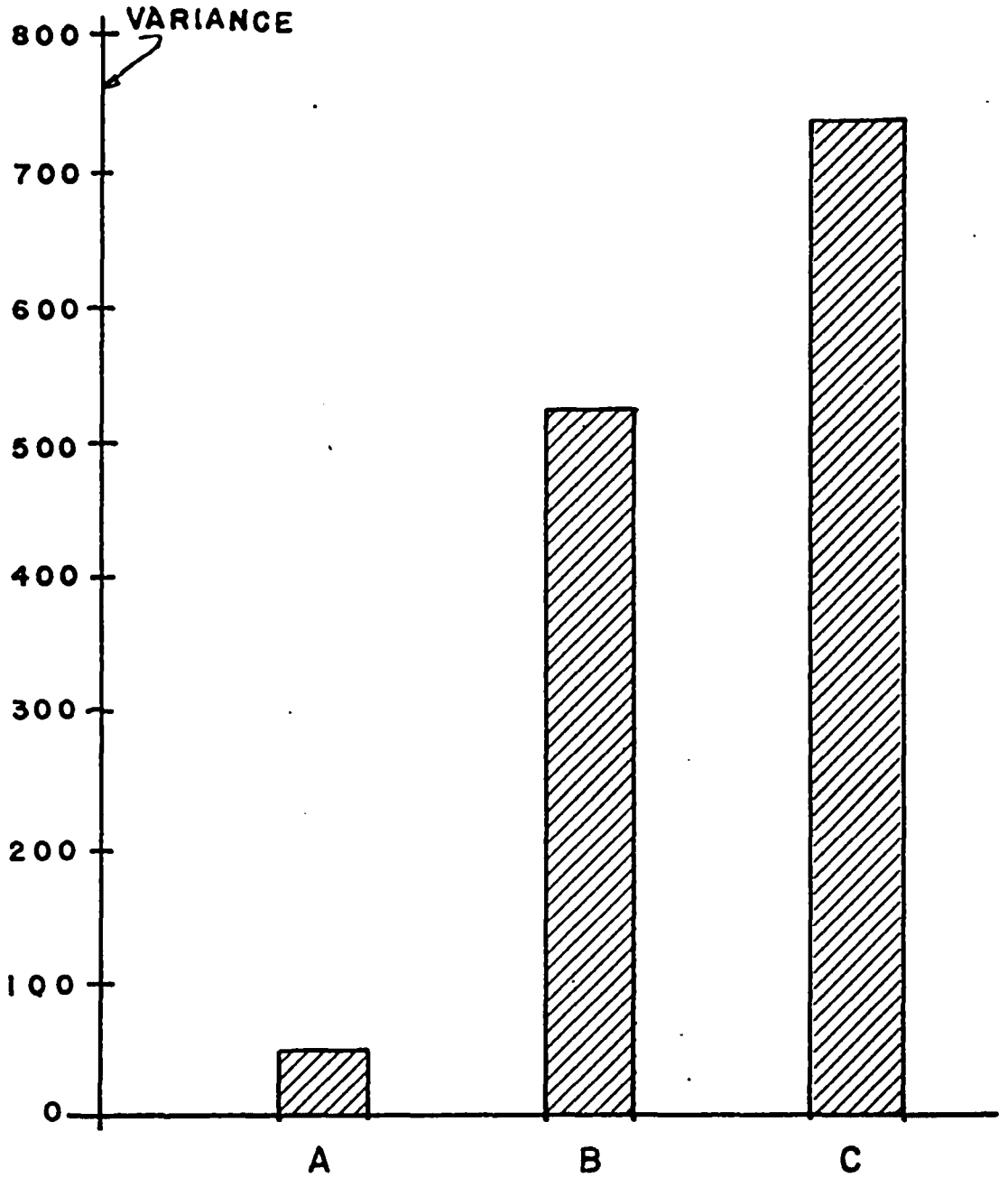

FIGURE 5· DEGREE OF FINAL CONVERGENCE DURING COLLECTIVE BEHAVIOR AS A FUNCTION OF ORIGINAL "INTER-GROUP" DIVERGENCE FROM SMALL TO LARGE, A, B, C.

always take place readily, even in unstructured judgmental situations. Once "groups" have stabilized, once norms and attitudes have been formed, then the distance among conflicting "groups" will determine the degree of convergence in a given period of time. The greater the "inter-group" distance, the less the convergence.

In order to evaluate hypothesis IV A-2, which predicted that the smaller the initial "inter-group" divergence the less will be the variability among the Ss in the final alone condition, the following two procedures can be employed. A chi-square test can be employed to determine if more Ss fall within (as opposed to outside) the range of the collective behavior norm for A, than B, than C in the final alone condition. In addition, the average deviation of the Ss in the final alone condition from the collective behavior norm can be employed as a measure of whether it persists in influencing experience and behavior.

The collective behavior range should be calculated from the standardized values given for the 89 and 118 dot stimulus values since these are the anchors defining the limits of acceptable judgments. The normative range should be calculated for the final phase of the collective behavior interaction, rather than from all the judgments, so that the

fact that convergence took place is brought into the analysis. Ordinarily in psychophysical experiments the range would be calculated from the 25th quartile for the low stimulus value to the 75th quartile for the upper stimulus value. These limits seem too liberal. In order to make the test more conservative of whether Ss in the final alone condition fall within the range of the collective behavior, the range will be calculated from the 35th percentile for the 89 dot slide to the 65th percentile of the 118 dot slide for the last half of the judgments. And then, only if a S's average median value (about two-thirds of his judgments) is within this collective behavior range will he be counted as adhering to the collective behavior norm in the final alone condition.

Table 8 lists the number of Ss whose average median falls within and outside of the range of their repsective collective behavior norms. A likelihood chi-square test (Senders, 1958) was calculated to determine if there are any differences when the "inter-group" distances are varied in terms of the number of Ss who fall within and outside of their respective collective behavior normative ranges, and the results for a one-tail test are significant ($\chi^2 = 9.05$; $df = 2$; $p < .001$). Therefore, there are more Ss who fall

Table 8

Final Alone Ss Within Range of Collective Behavior Norm as a Function of Original "Inter-Group" Distances

Original "inter-group" distance	Collective behavior range	Number of Ss within	Number of Ss outside
A	50 - 90	11	1
B	72.5-110	5	7
C	50 - 95	4	8

within the collective behavior normative range in the final alone condition when the original "inter-group" distance is small.

The average deviation of the Ss in the final alone condition from their respective collective behavior norms for each of the varied original "inter-group" distances (A, B, and C) is sequentially as follows: 11.29, 21.13, and 28.00. That this predicted order would occur by chance alone is one out of six.

Therefore, on the basis of two methods of analysis, it is justified to conclude that the smaller the original divergence among initial "groups," the less the variability among Ss in the final alone condition. The more a stable norm emerges during collective behavior interaction, the more binding it is on the Ss in the subsequent, final alone

condition.

Hypothesis IV-B-1 predicted that if the distance between the low and high "groups" is held constant (approximately at the divergence of B above) and if, in one experiment, the intermediate "group" is placed close to the low "group" (B_L) and in another, it is placed near the high "group," (B_H) then in both of these cases there should be more convergence than when the intermediate "group" is in the middle. This procedure involved, it will be recalled, the varying of the degree of concentration.

Unfortunately, as is evident in Table 9, the ranges between the low and high "groups" are not the same: B(69.1) and B_H(65.8) are close, but B_L(85.5) has a greater range than that of experiment C(83.5) where the inter-group divergence was its greatest. Even though there is no precise knowledge concerning what these distances represent in terms of experienced distance resulting in assimilation-contrast, an average "group" divergence of more than 15 dots between the high and low original "groups" must make convergence all the harder. If a comparison is made, however, between B and B_L rather than C, and more convergence takes place in B_L, then the Ss have actually overcome a greater "inter-group" divergence.

Table 9

Convergence During Collective Behavior for Varied Degrees of Initial "Inter-Group" Concentration

"Inter-group" concentration	Original "group" norms after stabilization			s^2_{CB}	$AD_{CB\overline{Mdn}}$
	High	Inter-mediate	Low	Last 60 judgments	Last 60 judgments
B	123.3	85	54.26	528.33	16.67
B_H	131.6	110	65.8	320.13	15.00
B_L	134	75	48.5	356.08	16.17

In experiment B, the intermediate "group" is 7.16 units closer to the high "group" than it is to the low "group," in B_H, it is 10.6 units closer. Thus the difference between the two experiments is not as great as would have been desirable. In experiment B_L, the intermediate "group" is 32.5 units closer to the low "group" than it is to the high "group," which concentrates the interaction markedly.

Once again, in order to evaluate the hypothesis two measures can be employed: the s^2_{CB} and the $AD_{CB\overline{Mdn}}$ These values are given in Table 9. In Figure 6 it is evident that both the B_H and B_L Ss converge more than those in the B

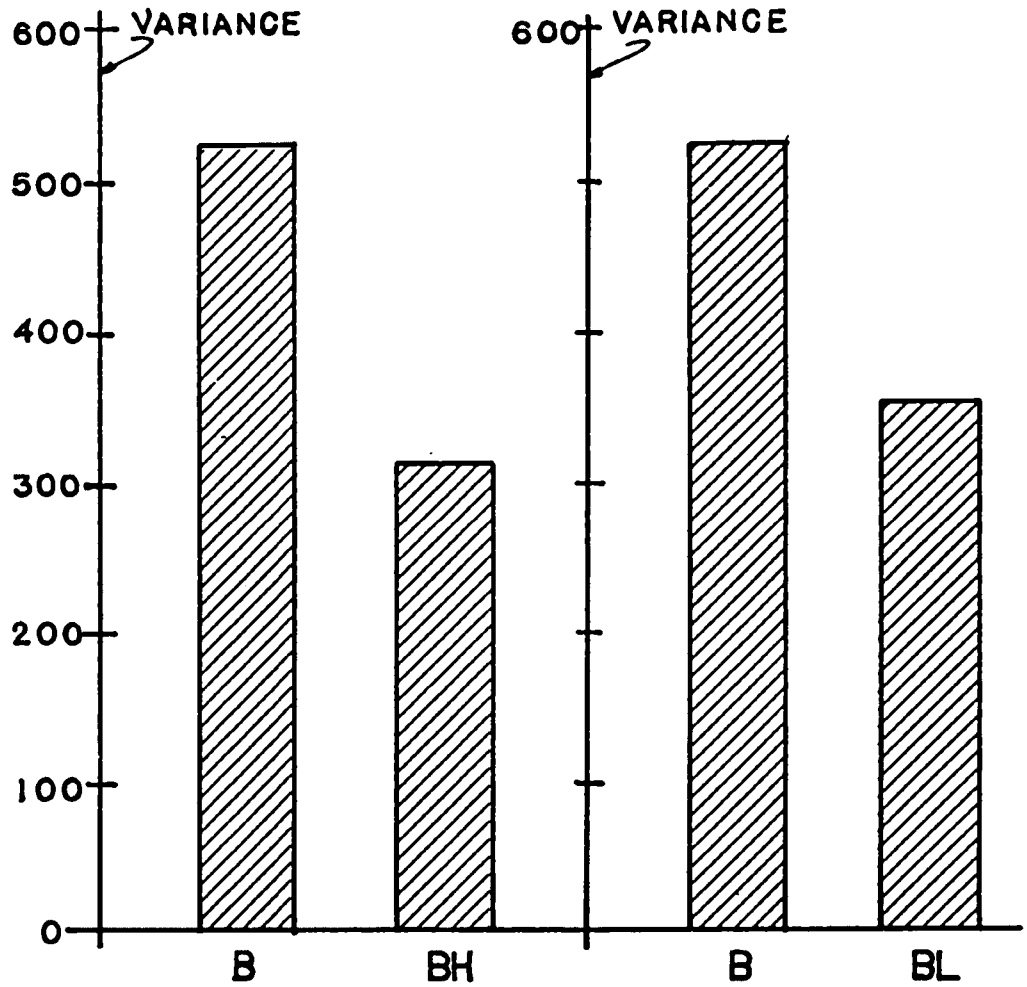

FIGURE 6· DEGREE OF FINAL CONVERGENCE DURING COLLECTIVE BEHAVIOR AS A FUNCTION OF ORIGINAL "INTER-GROUP" CONCENTRATION. B NONCONCENTRATED ; BH AND BL CONCENTRATED.

experiment, i.e., s^2_{CB} is less than in B for both the B_H and B_L experiments. In terms of the $AD_{CB\overline{Mdn}}$, B_H and B_L are both smaller than B. Even though the differences are slight, the probability of twice predicting the correct direction by change alone is $p = .25$. Since these results support the measurement of convergence in terms of the degree of similarity of Ss' judgments, it is concluded that when the collective behavior interaction is concentrated as opposed to when it is not, there is more convergence.

Hypothesis IV B-2 predicted that when there was concentration, as opposed to when there was not, there would be less variability among Ss in the final alone condition as a consequence of the greater degree of convergence. In addition, when there is greater convergence a more binding norm should have arisen resulting in more Ss falling within the range of the collective behavior norm in the final alone conditions.

Table 10 gives the number of Ss falling within and outside of the collective behavior range (as determined by the same criterion established earlier) for the experiments on concentration. Again a likelihood chi-square test (Senders, 1958) was employed to test for the difference between B and B_H and B_L combined. For a one-tail test, the

results are significant ($\chi^2 = 3.493$; df = 1; $p < .05$).

Table 10

Final Alone Ss Within Range of Collective Behavior Norm as a Function of Initial Group Concentration

Dichotomous variable of concentration	Collective behavior range	Number of Ss within	Number of Ss without
Non-concentrated			
B	72.5-110	5	7
Concentrated			
B_H	70 -110	8	4
B_L	55 -100	9	2

The average deviations of the Ss in the final alone condition from the collective behavior norm is less in experiments B_H and B_L than it is in B. The values are as follows: B = 21.13, B_H = 18.13, and B_L = 14.55. Since the probability of the predicted directional outcome is .25, additional support is given to the conclusion that the more the convergence, the more binding is the collective behavior norm on Ss in the final alone condition.

It is now possible to evaluate hypothesis II-1 which predicted that a collective norm would emerge during

collective behavior. From Figures 7, 8, 9, 10, and 11, it is evident that in all experiments there was at least some convergence toward a collective behavior norm. As was predicted, and verified in the previous sections of this chapter, the degree of convergence, the degree to which a stable collective behavior norm was evolved was a function of the original "inter-group" divergence and concentration. The less the original "inter-group" divergence, the more the convergence toward a collective norm. The more a stable collective behavior norm emerges during collective behavior interaction, the more binding it is on Ss in determining experience and behavior in the final alone condition.

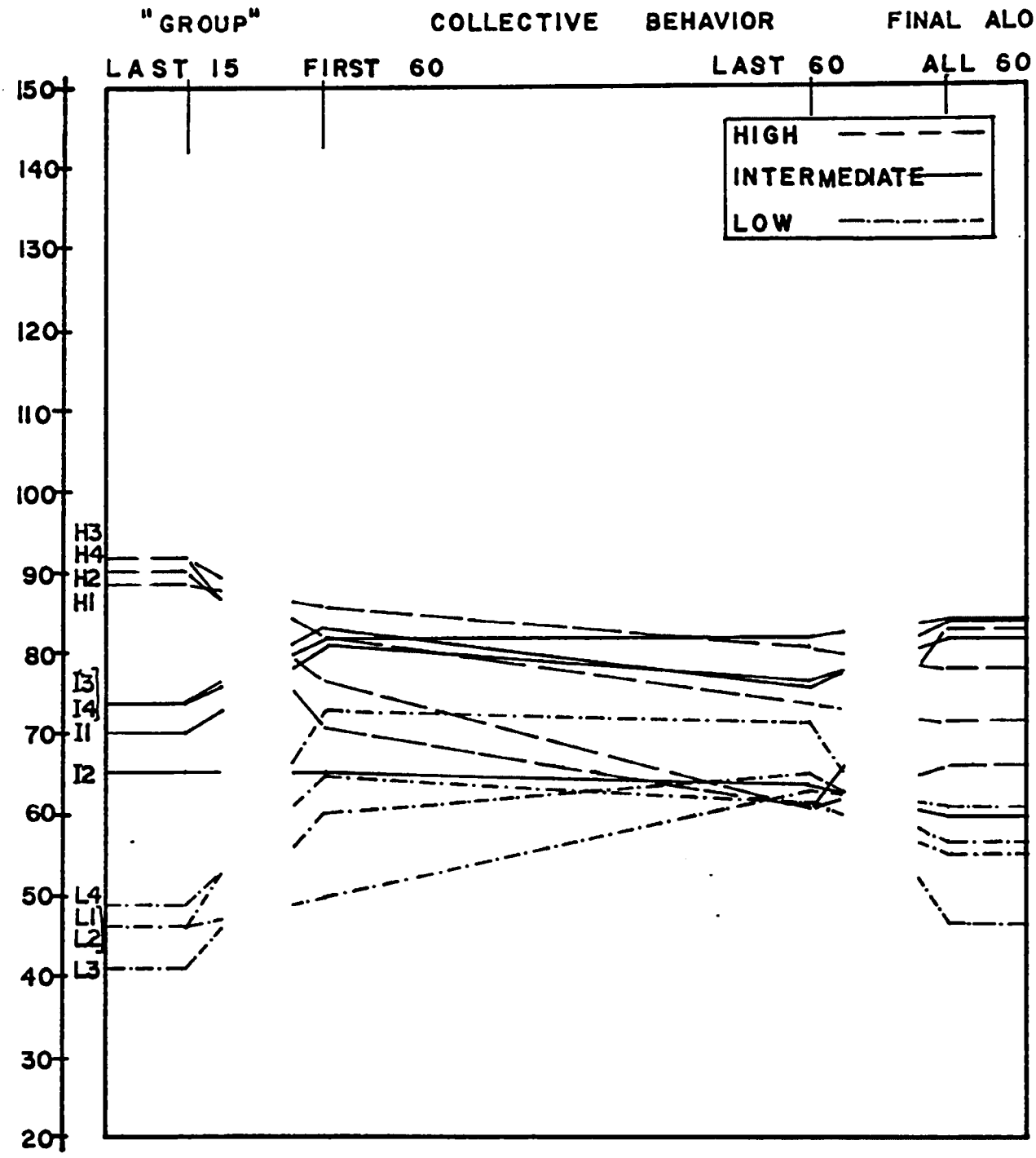

FIGURE 7. AVERAGE MEDIAN JUDGEMENTS FOR Ss IN "GROUP", COLLECTIVE BEHAVIOR, AND FINAL ALONE CONDITIONS. EXPER. A.

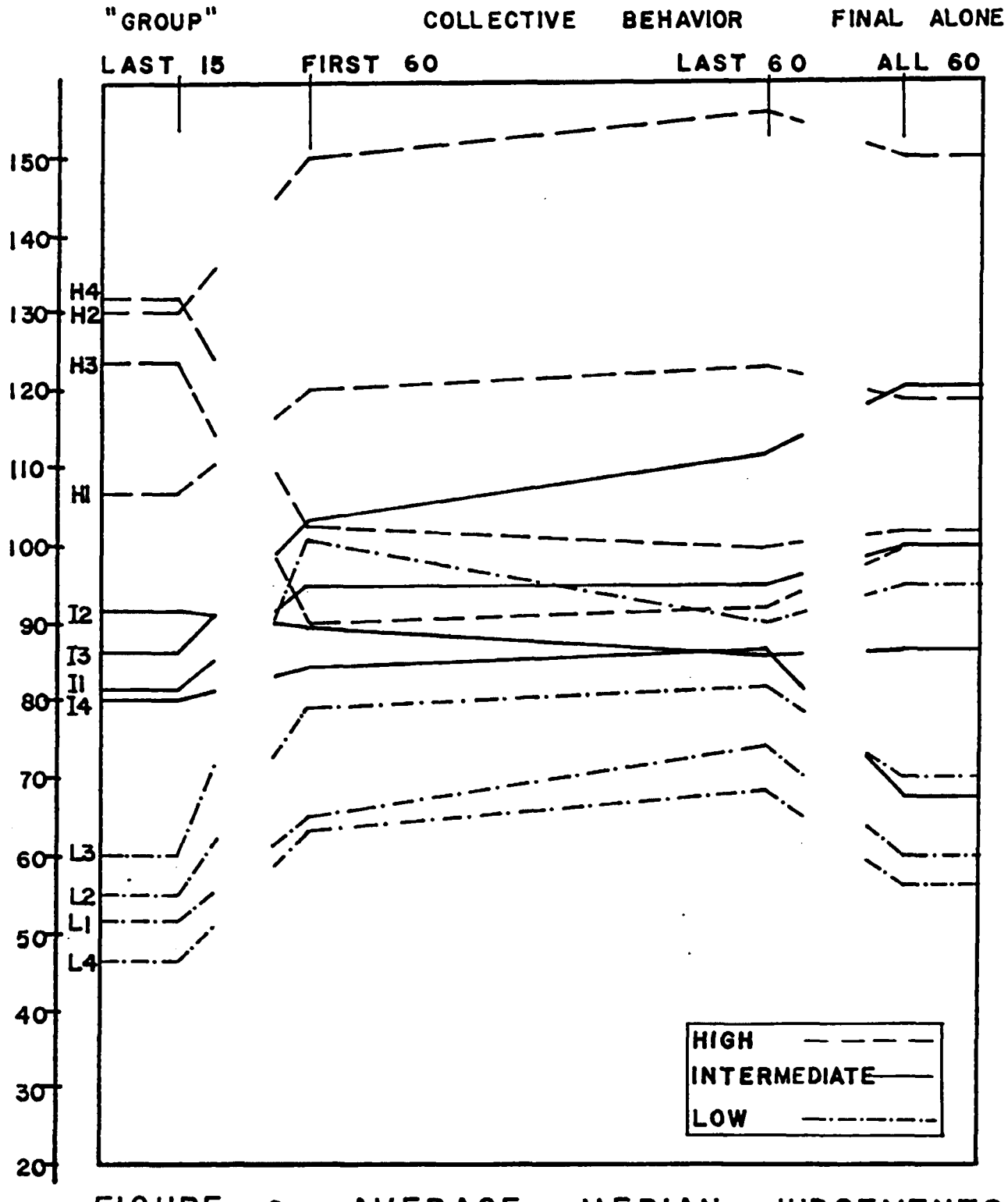

FIGURE 8. AVERAGE MEDIAN JUDGEMENTS FOR Ss IN "GROUP", COLLECTIVE BEHAVIOR, AND FINAL ALONE CONDITIONS. EXPER. B.

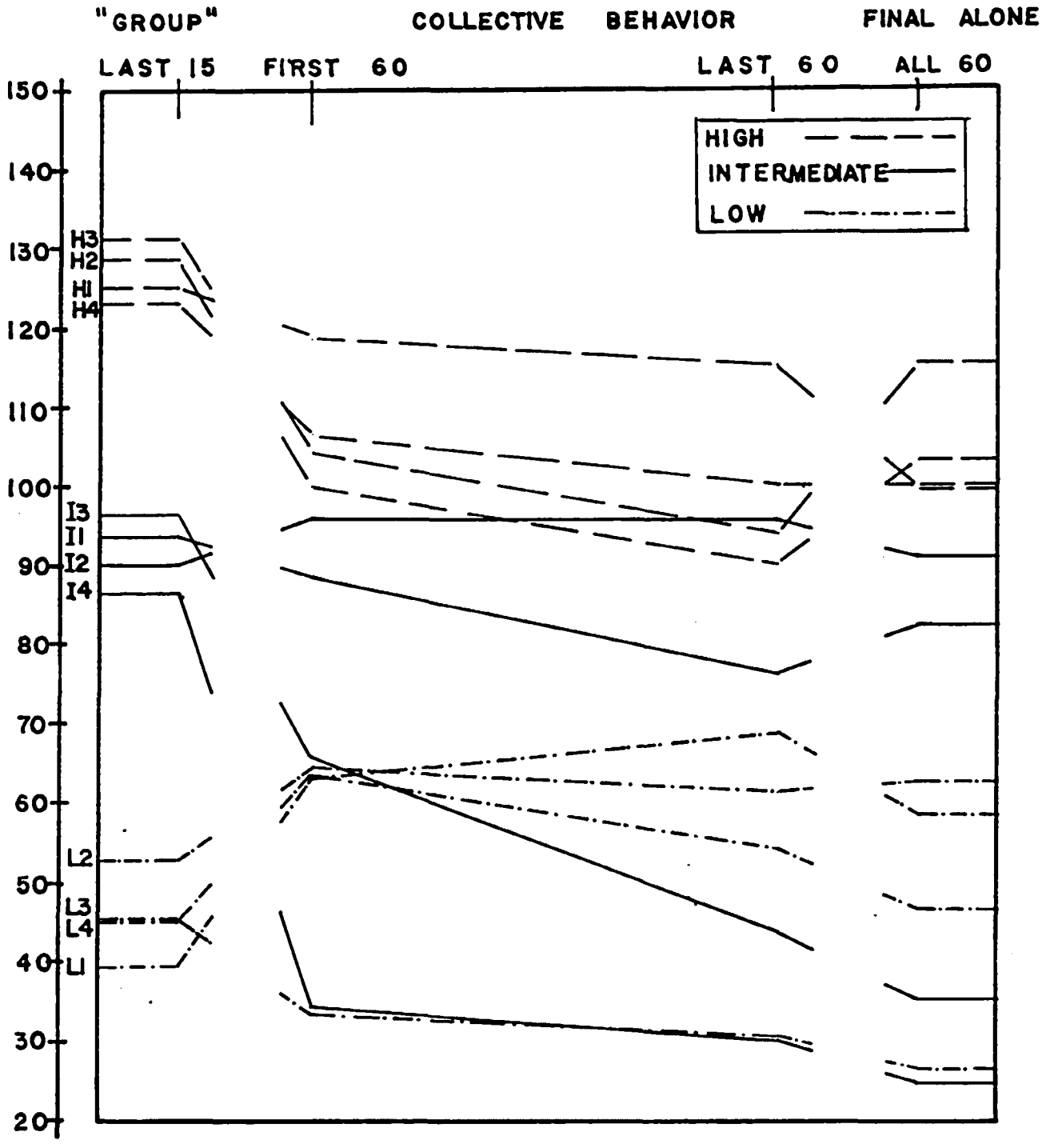

FIGURE 9. AVERAGE MEDIAN JUDGEMENTS FOR Ss IN "GROUP", COLLECTIVE BEHAVIOR, AND FINAL ALONE CONDITIONS. EXPER. C.

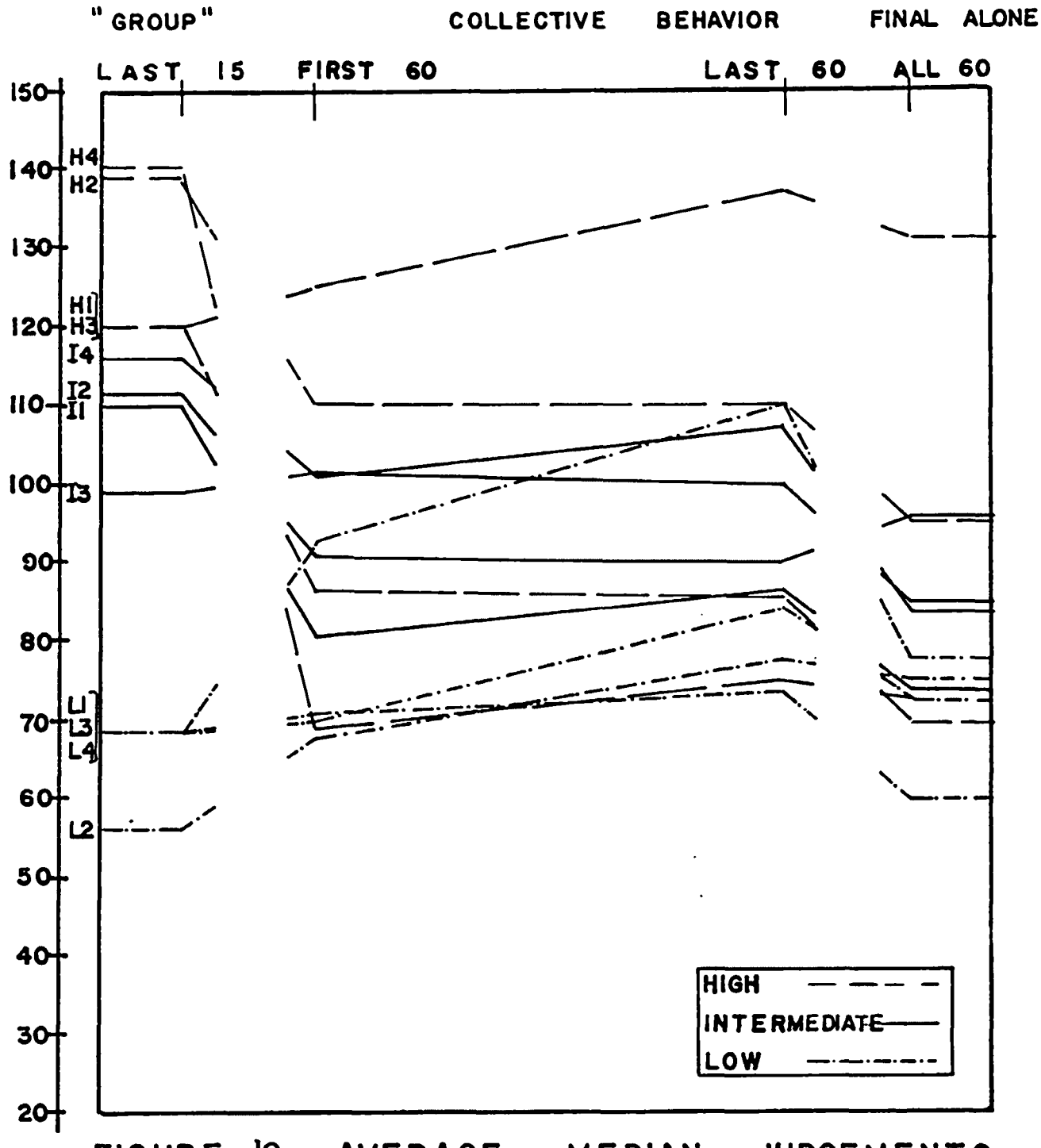

FIGURE 10. AVERAGE MEDIAN JUDGEMENTS FOR Ss IN "GROUP", COLLECTIVE BEHAVIOR, AND FINAL ALONE CONDITIONS EXPER. BH.

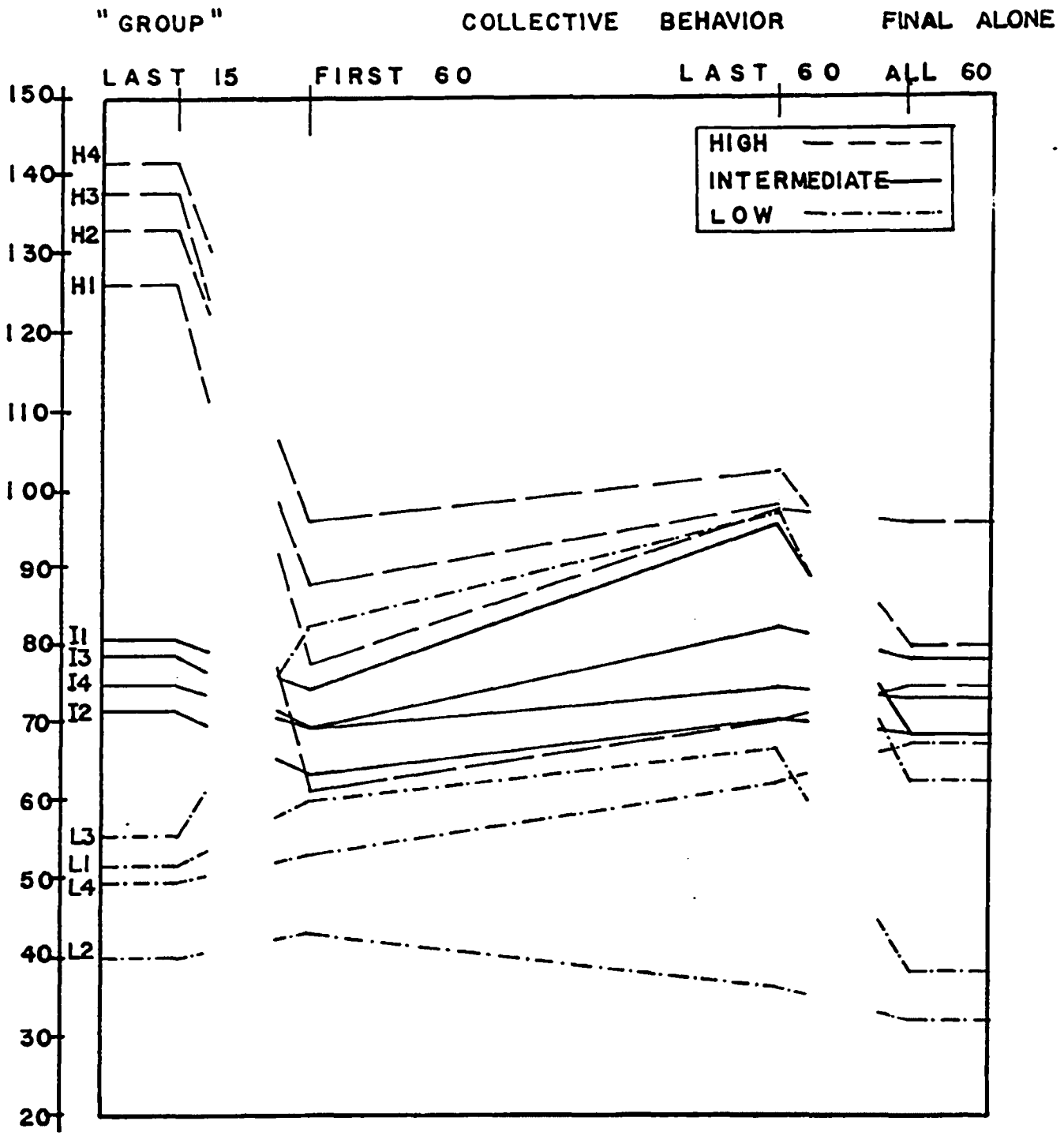

FIGURE 11. AVERAGE MEDIAN JUDGEMENTS FOR Ss IN "GROUP", COLLECTIVE BEHAVIOR, AND FINAL ALONE CONDITIONS. EXPER. BL.

CHAPTER IV

DISCUSSION AND SUMMARY

In the previous chapter, the quantitative results led to an acceptance of the experimental hypotheses. However, in order to more fully evaluate the experiments it is necessary to undertake an analysis of the qualitative data. The experimental findings will then be summarized and interpreted in terms of the processes of collective behavior.

In order to draw final conclusions from the experiments, the following questions must be answered:

1. What accounts for the behavior of the five Ss who reacted idiosyncratically?

2. Are the experiences of the Ss (e.g., reported in the interview and on the questionnaire) consistent with the qualitiative and quantitative observations made on their behavior?

3. Did the Ss experience the stimulus conditions as predicted?

4. Are the norms formed during the experiments emergent as opposed to resultant products?

Idiosyncratic variations. In experiment A, where there was the least degree of original "intergroup" divergence at the outset of the collective behavior condition, one S (L-1) in the final alone session appears to have reverted to the judgmental scale she established during the "group" condition. This reversion took place after she had changed her judgments markedly during the collective behavior condition. In the interview session she spontaneously offered an explanation for her judgments in the final alone situation: 'My concept of 50 dots changed." In other words, she had changed what she meant by fifty dots. In the collective behavior condition she reported that she "saw" more dots and therefore gave higher estimates than in the "group" condition. By the time she had arrived for the final alone condition she realized that she had been influenced by others even though she had "tried to make judgments quickly so as not to be influenced." Not able to accept the fact that she had been influenced, she gave the same estimates in terms of reported number as in the "group" condition, but, as she blurted out, they now represented more dots than the number she "saw" during the "group" condition.

In experiment B_L, one S (L-1) gave lower judgments than ever before in the final alone condition as is evident

in Figure 11. Since she had converged with the others during the collective behavior condition, her final alone judgments represent more than a simple reversion to the "group" condition. On the questionnaire she wrote, "I am anxious to know what significance there is in some people being greatly influenced and others influenced very little." Perhaps this freshman psychology major felt that being "influenced" was a sign of something unhealthy, and consequently she attempted to compensate for her judgments during collective behavior by giving lower judgments in the final alone condition than in the "group" condition.

Some Ss apparently experienced contrast more severely than others during the collective behavior condition. In experiment B, one S (H-2) gave judgments that were higher than those given during the "group" condition; in experiment B_H, another S (H-1) increased her judgments, and finally, in experiment B_L, one S (L-2) gave lower judgments than in the "group" condition. It will be noted that all these Ss were either members of high or low original "groups."

The behavior of the three Ss who deviated in experiments B, B_H, and B_L from the on-going process of converging toward a collective behavior norm might be explained by the original "intergroup" divergence of the B experiments. It

will be recalled that in the B experiments the degree of original "intergroup" divergence was roughly between its minimal value in the A experiment and its maximal value in the C experiment. In experiment A, no persistent contrast was experienced. In the C experiment, the experience of contrast tended to persist the longest, and there was, as predicted, the least convergence toward a collective norm. It will be recalled that the degree of original "intergroup" divergence was manipulated without any precise knowledge of the distance required for Ss to experience contrast. It could be that in the B experiments the threshold for the experiencing of contrast had just about been reached. The degree of original "intergroup" divergence was not so great that all Ss in the high and low "groups" experienced contrast nor so little that none of them experienced contrast. At or around thresholds differential effects must be expected; i.e., some Ss will react one way and some the other way. Other explanations might be offered, but this is the most consistent one since these Ss reported nothing in the interview or on the questionnaires that was particularly distinctive.

Ego-involvement in the experiment. A great number of Ss reported during the interview that they tried not to be influenced. They also reported that they couldn't help being

interested in the judgments of others and their own reactions. Some Ss were very conscious that they were influenced during the collective behavior condition especially, and they were concerned about it. A great number of Ss reported that they tried to make judgments first, in order not to be influenced. Some found that responding first did not diminish the extent to which they were influenced. Some Ss could not understand why there was so much disagreement during the collective behavior condition.

The following observations of the Ss behavior during and after the collective behavior condition are consistent with their reported experiences: One S, in an apparent effort to account for the disagreement in experiment C, stood up at the end of the collective behavior interaction and shouted, "it's an illusion." In the same experiment one S was observed putting his fingers into his ears before he made a judgment. Some Ss in all experiments attempted to fix themselves rigidly in their chairs in an apparent effort to fixate constantly on one part of the screen. During the collective behavior condition, Ss would very often turn to see who was making some judgment. After the collective behavior condition, Ss often exchanged comments about their judgments. Some Ss became so competitively involved in the experiment

that they responded shortly after the slide was exposed even though, in the instructions, they were repeatedly requested to respond only after the slide went off the screen.

Not only were the Ss relatively involved with others, but they were also involved with the "truth" value of their judgments. "Really how many dots are there" was a question that was addressed to E by the overwhelming majority of Ss during the interview. Some Ss reported on the questionnaire (see Table 12) that they were "shocked" by the extreme estimates of others, that they could not help attending to someone calling out "ridiculous numbers." One S reported, "Hearing various judgments made you think you were crazy." Another commented, "Hearing divergent judgments tended to make you more conservative." The fact that convergence was not easy in the C experiment where the degree of original "intergroup" divergence was the greatest is reflected in the comment of one S who reported that too large judgments just couldn't be given because it would make one appear "stupid." On the basis of these reports, it is reasonable to conclude that Ss, on the whole, were ego-involved with others as well as with the "truth" value or validity of their judgments. The degree of involvement varied of course; not every S was involved to the same extent.

The awareness of subjects. Unfortunately, parts of the questionnaire proved to be too complex, and since it was not always possible to make sure that Ss understood the instructions, only those questions which were unambiguous will be analyzed. Specifically, the questions which required Ss to rate on a graphic scale their certainty, for example, and to space their entries so that they indicated their relative degree of certainty in the three experimental conditions will be deleted from the analysis of the qualitative data.

In response to question 9 of the questionnaire, "Do you feel that you were influenced by the estimates of some persons more than others?" 14 Ss responded "yes" for the "group" condition, and 44 Ss responded "no," and 1 did not answer. By contrast, 26 Ss responded "yes" for the collective behavior condition, 32 responded "no" and 1 did not answer. (It will be recalled that one S was lost at the final alone stage of the experiment, so the total therefore is 59.) The responses to question 9 are not indicative of whether Ss felt that they were influenced in general. A S could answer the question in the negative and mean that he was influenced by no one person(s) more than others. It is interesting to note, however, that the number of Ss aware of the fact that some particular person(s) influenced them

almost doubles from the "group" to the collective behavior conditions. Perhaps this increase in awareness is a function of the "contrasting" judgments. When others are so distant, Ss may become more aware of their own position as well as that of others. Thus, they may be in a better position to know if any changes occur once contrast has been experienced than when contrast is not experienced, as would be the case if Ss experienced one another's judgments as reasonable, i.e., if these judgments fell within their latitudes of acceptance.

As part of question 9, Ss were asked to identify who influenced them in the various sessions and to state why they felt that they were more influenced by these persons. A great variety of answers were given. Ss identified a person by name or characteristics. They located the person(s) in the room. It was the person who was the "most confident," who "agreed with them," or who "talked the loudest," or who "answered before they did," whose "reaction time was closest to theirs," or whose judgments were extreme," etc., that had the most impact upon them. The significant finding in these responses is that they indicate that there were no marked seating position effects. Thus, the Ss were not simply attending to their neighbors, but to those who were, for a variety of reasons, salient for them.

Question 11 asked if they felt that they had influenced the estimates of some persons more than others. For the "group" condition, 18 Ss responded "yes," 38 responded "no," and 3 did not know. For the collective behavior condition, 33 responded "yes," 24 responded "no," and 2 did not know. Again, perhaps the reason more Ss felt that they influenced someone in the collective behavior condition than in the "group" condition is due to the fact that with contrast being experienced there is a heightened awareness of the position of others. In terms of the assimilation-contrast theory of attitude organization, it has been suggested that Ss know more what they are opposed to than what they are for. Perhaps, then, being more conscious that one has influenced others than of having been influenced is a function of discriminating what the opposing position is more than one's own position. Nevertheless, the reasons Ss gave for their exerting influence on particular persons were about the same as for being influenced themselves.

In response to question 13, "Were the estimates of some persons more helpful than others?" the following answers were given. For the "group" condition 8 said "yes," 39 "no," 10 did not answer and 2 were in doubt. For the collective behavior condition, 14 said "yes," 38 "no," 6 did not answer,

and 1 was in doubt. Those who found others helpful usually gave the following reasons: "Their judgments were similar to mine," "They corrected my errors," or "They reinforced my guesses." It is therefore reasonable to conclude that most Ss did not find others helpful. There was an increase of the number of Ss who found others helpful, however, from the "group" to collective behavior conditions. Perhaps this increase is due, as most of the Ss report, to the fact that there were some who gave similar judgments and who were therefore important as anchors during the collective behavior condition especially.

From questions 15 ("How many solid dots were presented on the average in each of the sessions?") and 16 ("What was the smallest and largest number of solid dots presented in each of the sessions?") it is possible to determine if the Ss were conscious that they changed their judgments. It is interesting that 40 Ss reported that the average number changed whereas 52 reported that the range changed (on the other hand, 16 Ss reported no change on the average, 3 did not answer, only 6 reported that the range did not change and 1 did not answer the question). It is possible to deduce from anchoring theory that Ss for the end stimuli should be more aware of having changed their judgments as opposed to those in the

middle, for these are the best anchored

In response to question 17, "How do you feel about other persons being with you?" about 1/3 or 17 Ss did not mind or "had no different feeling," whereas the remaining 2/3 or 32 were "distracted," "uncomfortable," "less sure," "confused," etc. A good number of Ss made a distinction between the "group" and collective behavior conditions. For example, "the large groups annoyed me because some answered before the slide was off." There can be little doubt that Ss felt that they had to contend with what others were saying as, for example, "occasionally I was annoyed at other persons being there because even if they didn't affect my numbers, they did distract my attention from the dots to trying to reason why people gave the numbers they did."

In response to question 18, "Do you think you would prefer to make your estimates alone rather than with the other persons?" 34 Ss said "yes," 12 "no" and 13 were indifferent or in doubt. The reason Ss preferred to be alone centered on "not being influenced," "not being distracted," "being more confident," "being more accurate," "being less confused," etc. Most of the Ss who said that they were indifferent reported that: "I wouldn't be influenced," "I liked the competition," I was less self-conscious," etc. Since it

was evident from reading their reported reasons for preferring to make judgments alone rather than with others that the Ss were comparing the collective behavior and final alone conditions, it is legitimate to conclude that the Ss, on the whole, found making judgments with others during the collective behavior condition disruptive.

In response to question 19, "How did you feel in the experimental room during each of the sessions?" the Ss did not differentiate among the sessions. The question was interpreted as referring to the physical surroundings as can be inferred from the following answers: "O.K.," "uncomfortable," "the light was dimmer in the second session," etc. Therefore, the Ss did not find the physical set-up of the laboratory the least bit disturbing. The throat mikes, the tape recorders, the tachistoscope, as well as other aspects of the experimental set-up, had no apparent effects. Hence, whatever the Ss experienced during the experimental conditions must be due to their interaction with one another concerning the evaluational task, estimating the number of visually presented dots.

Methods of estimation. It will be recalled that Ss were required to write the method(s) they expected to employ and the method they did employ for estimating the total

number of solid white dots for the "group" and collective behavior conditions. At the end of the final alone condition, they were asked (question 14 of the questionnaire) for their method of judgment. Every S reported that they had a method they expected to utilize in the "group" condition. Every S reported that they did employ some method in all experimental conditions. Thus, in the unstructured stimulus conditions of the experiment, Ss not only structured the judgments they gave, but also the methods they employed for arriving at judgments. The reported methods referred to the methods for determining the absolute number of dots. Among slides, judgments were made relative to one another. The methods that they employed for determining the absolute number of dots can be subdivided into two types of methods as follows:

1. Global methods which required one to intuit or guess the total number of dots, as for example, "trying to feel the number of dots as one would feel the closeness of people in a subway."
2. Counting and multiplying methods which required any one of a number of operations as in the following examples: count down or across and multiply by a constant; count vertically and

horizontally along the borders of the slide; divide the projected rectangle into k areas, and then count the number of dots within a sample area and multiply by k; pattern the projected image, i.e., group the dots by some constant and then multiply by the estimated total number of such clusters.

Some Ss utilized more than one method in all conditions. Some Ss reported that they changed their methods within a given condition, and some reported that they changed their methods between conditions. However, the number of Ss using any given method during the "group" condition equalled the number of Ss using that method in the collective behavior condition. Therefore, neither the few Ss who switched methods nor the methods themselves can account for the convergence during the collective behavior condition. However, more Ss reported that their judgments reflected the relative numerousness of the slides for the collective behavior than the "group" condition. This increased awareness that the method of single stimuli leads to the formation of a judgmental scale organizing stimuli relative to one another is an illustration, perhaps, of another principle of judgment. When Ss are confronted with a complex task, there is a tendency to attend to

the simplest aspect first (Johnson, 1955). In the collective behavior condition, the Ss were confronted with a wide range of opinion concerning the absolute number of dots presented. Perhaps the first step toward convergence had to be the standardization of the number and distances among the judgmental categories. Once this task was accomplished, then perhaps the Ss thought that the problem of attaching absolute numbers to the judgmental categories could be solved. Even if these steps were followed in the process of convergence, they had to be formulated by the Ss since no suggestions were ever made concerning how the task should be approached.

Norms as Emergent Products

Social as well as individual products can be classified either as emergent or resultant phenomena. It was predicted that emergent end-products would arise as a consequence of the process of norm formation during the "group" and collective behavior conditions. In order to decide whether the end-products of the experiments are best described as resultant or emergent phenomena, it is therefore necessary to define each category. Since what is meant by the term emergent is, generally speaking, non-resultant, the meaning of resultant

phenomena will be explicated. In evaluating the results of the experiments, we shall conclude that the data are emergent products if they can not be classed as resultant phenomena.

In the social sciences there are a variety of theories which postulate that social systems as well as individuals tend toward some sort of equilibrium. The quasi-stationary equilibria theory of Lewin (1951) has influenced, in social psychology, the formulation of a number of particular theories as for example, French's (1956) mathematical model of "group" convergence, and Festinger's (1957) dissonance theory of attitude change.

Generally, those adhering to the Lewinian tradition postulate that when forces are acting on individuals, they tend to engage in various psychological activities which will terminate when the forces have been resolved, i.e., when they counterbalance one another or algebraically sum to zero at some point of equilibrium. The models are apparently based on the resolution of forces theory of classical mechanics. In an explication of three attitude change equilibrium theories Brown (1962) points out, "Human nature abhors incongruity-dissonance-imbalance . . . and continually strives to eliminate it" (p. 75). When imbalance is set up, some psychological activity takes place to reduce it. The resultant

theoretical framework in social psychology can be summarized as follows: Given knowledge of the antecedent forces acting upon persons, one can predict the end-products of the activity thereby initiated in a resultant theoretical framework by ordinary algebraic addition. Equilibrium theorists assume that the "forces" (e.g., group pressures, attractiveness, etc.) are continuous and can therefore be described by continuous mathematical functions.

The most precise formulation of quasi-equilibria theory, as it applies to norm formation, is to be found in French's (1956) mathematical theory of social power. In order to test the predictive value of his theory against the results of the experiments that have been performed, it is necessary to explicate briefly the model as follows.

Social forces are translated into force fields which one or more persons exert on others. The strength of these forces varies with the power of the one or more individuals over one another. The force field is actualized only when there is communication or interaction. Resistance to change is the important counter force. All the forces operate so as to produce resultant changes. The bases of power (arising out of the enduring relationship among individuals) are: attraction power, expert power, reward power, coercive power,

legitimate power, and any and all combinations. French (1956) assumes that the variables can be measured on a ratio scale. There are three postulates involved in the model:

> Postulate 1. For any given discrepancy of opinion between A and B, the strength of the resultant force which an inducer A can exert on an inducee B, in the direction of agreeing with A's opinion, is proportional to the strength of the bases of power of A over B (French, 1956, p. 184).
>
> Postulate 2. The strength of the force which an inducer A exerts on an inducee B, in the direction of agreeing with A's opinion, is proportional to the size of the discrepancy between their opinions (French, 1956, p. 184).
>
> Postulate 3. In one unit, each person who is being influenced will change his opinion until he reaches the equilibrium point where the resultant force (of the forces induced by other members at the beginning of the unit and the resisting force corresponding to his own resistance to change) is equal to zero (French, 1956, p. 184).

In the experiments reported and analyzed in this dissertation, no data were collected concerning the degree of power of one S over another, nor on the resistance of any S to change, etc. Therefore, it is not possible to substitute any data from these experiments into the theorems which French (1956) derives from the postulates. But it is possible to gauge the predictive "power" of his resultant theory in another, more general way. For this reason the definitions of various concepts he employs will not be fully explicated.

It is sufficient, therefore, to note that he applies the mathematical theory of directed graphs, called "diagraphs," to group phenomena. He defines various concepts which enable him to apply "digraph" theory, i.e., complete digraphs, directed paths, and degree of connectedness.

French (1956, pp. 182-190) indicates that his model applies to the experiments conducted under what has been termed the "group" condition in this dissertation. In particular, it appears that we could assume, according to French (1956), that our Ss exert relatively equal power over one another (p. 190). In the language of the theory we have a strongly connected structure which means that there are directed paths in all directions among all possible points. For our "group" condition, "the strongly connected digraph is a cycle, yielding a final common opinion which reflects more equal influence of all members" (French, 1956, p. 188). If this is the case, then a glance at Figures 2 and 3, where the data for 15 "groups" have been plotted for the "group" condition, should be enough to demonstrate that the "point" of final convergence is not always proportional to the size of the discrepancy between the Ss which the model predicts, when, as French (1956) has allowed, the power among Ss is assumed equal (p. 190).

It is possible that the wrong theorem has been applied or that the theorem has been wrongly applied. However, French (1956) does say that there always (or at least he never says otherwise) is a "'funnelling effect', a tendency for the opinions of individuals to converge toward one another, . . ." (p. 189). Never does French (1956) derive a theorem that predicts that Ss will not converge inward toward one another, i.e., that the point of equilibrium will be at a value greater or less than the most extreme value of any S. Indeed, from the postulates it would be impossible to derive such a theorum. From Figures 2 and 3 it is evident that in our experiments there were at least 4 "groups" where the Ss converge at a "point" higher or lower than the most extreme value any S gave on the average for the first 15 judgments.

Festinger's theory of cognitive dissonance (1957) is more difficult to evaluate than French's (1956) theory of social power for two reasons: (1) "The explicit definition of dissonance is not completely precise, and so there is no real guarantee that those who work with the theory will be able to agree about when a situation involves dissonance and when it does not" (Brown, 1962, p. 48). (2) "Dissonance theory offers a variety of techniques for dissonance reduction

or elimination, but, unless many variables other than dissonance are specified, the theory does not predict one particular technique" (Brown, 1962, p. 51). So many alternative ways of reducing dissonance have been formulated that the predictive "power" of the theory has been severely weakened. In a recent article, for example, it has been suggested that Ss have idiosyncratic "'habit family hierarchies'" (Steiner and Rogers, 1963) or a scale of preferential ways they have learned to reduce cognitive dissonance.

Presumably, Festinger (1957) would accept postulate 2 of French's (1956) model, especially since his work (together with colleagues) contributed to its formulation (French, 1956, p. 184). Also, since the Ss reported that they experienced the equivalent of dissonance in the experiments (especially during the collective behavior condition), dissonance theory can be at least crudely evaluated in terms of the experimental results.

Dissonance arises when one item, a belief or attitude or opinion, etc., is opposed by its opposite; i.e., item A is dissonant with another item B when A implies not B (Festinger, 1957). In terms of the language of cognitive dissonance, French's postulate 2 would read as follows: The greater the dissonance the more Ss should converge, everything

else being equal. From Figures 2 and 3 it is evident that in the present research this is not always the case for the "group" condition. Since Festinger's theory is not limited to any particular interaction situation, the results of the collective behavior condition can be utilized in an evaluation of the theory. From Figures 7, 8, and 9, it is evident that the greater the original "intergroup" divergence, the less the convergence during the collective behavior condition. Postulate 2 of French's model (1956) and the theory of cognitive dissonance imply that the more people disagree the more they should converge, which of course means that these theories have reduced the intergroup conflicts which characterize the social world. Contrary to Festinger (1961), people do not always "come to love things for which they have suffered" (p. 11).

Norms are emergent products. In terms of the data the convergence of the Ss toward norms cannot be considered resultant products, they must be classified as emergent products. Not always do the Ss converge toward "new" values. Not all Ss contribute equally to the emergence of norms; i.e., there appears to be no way to "add" together their individual original opinions and arrive at "group" opinion.

The collective behavior condition was purposely

designed to determine whether the end-products could be classified as resultant products. In experiments A, B, and C, the intermediate "group" was placed in the middle. If the hypothesis that convergence leads toward compromise or toward a value which is the algebraic sum of the original position of the Ss, then the intermediate Ss should remain fixed, and convergence should be toward them. As is evident from Figures 7, 8, and 9, the intermediate "group" Ss are always split; i.e., some go up, and some go down during collective behavior. Convergence is not toward them; i.e., they do not remain fixed.

In constituting the greatest degree of original "intergroup" divergence (experiment C) the limits were probably reached in terms of how many dots there could be. For such a task there are limits, a lowest and highest possible number. Therefore, the stimuli are setting bounds on how high and low the judgments can go. In experiment C and in experiment B_L (which had almost the same degree of original "intergroup" divergence as C), there was little possibility that the Ss could have converged at values higher or lower than the original position of either the high or low "groups." In experiment A the low position "group" was at about the lower limit, whereas in experiment B_H the high "group" was

at about the upper limit. Therefore, in these two experiments, the range in which final convergence could reasonably occur was upward from the low "group" in experiment A and in experiment B_H, downward from the high "group." In experiment A the convergence was roughly in the zone between the high-intermediate "groups" and not at a "point" which would represent the resultant product. But the results do not unambiguously favor an emergent classification. In experiment B_H the convergence was in the zone between the intermediate and low "groups" and not quite at the weighted average of all the Ss values. But again, the evidence does not strongly support an emergent position. Experiment B was the only experiment in which Ss could have converged toward values higher or lower than the highest and lowest values given by the low and high "group" Ss. But they converged inward. Thus, in none of the collective behavior experiments was there ever unambiguous convergence toward an emergent collective norm, as was the case for the "group" condition. However, there were only five collective behavior experiments, and if the "group" data are any indication, there is no reason to expect that replicating the experiments would lead to many cases in which the Ss would converge at higher or lower values than they had previously given. Since there

were some "groups" which did unambiguously converge at new values and since a resultant framework can explain neither the results of the "group" condition nor the fact that in none of the collective behavior experiments did convergence take place toward intermediate "group" Ss (i.e., they never remained fixed), it must be concluded that all the experimental end-products fall into the class, emergent phenomena.

The fact that social products, as our experimental findings demonstrate, must be classified as emergent phonomena requires that, in social psychology, an emergent theory must be formulated to account for the data. Since social psychology is in its formative stages (Sherif and Sherif, 1956) it is not possible to write such a theory today. An insufficient number of lawful relationships have been advanced in too few fields of investigation for a theory worthy of the name, to be constructed. Before a genuine theory could be written governing the process of collective behavior or group formation, it is necessary to take into account the degree of ego-involvement of the individuals participating in the process as a critically important variable. Individuals might readily converge in laboratory situations when they have little involvement in the range of autokinetic movement or number of projected dots, etc. However, in

social life, committed individuals who take ego-involved stands do not readily converge toward one another. In actual episodes of collective behavior the elevating or heroic as well as the degrading or leveling effects of social interaction are a matter of historical record. Despite the fact that middle class social scientists abhor violence, it can not be doubted that collective behavior has led to some startling emergent transformations in individual character. Men have turned from bakers into murderous butchers, from aristocrats into seditious vandals who dumped tea into the Boston harbor, for example. The problem, from a programatic point of view, is to be able to predict when collective behavior will lead to elevating or degrading effects. In order to accomplish this aim, it is necessary to analyze social phenomena in terms of the ego-involvement of the participating individuals.

Although the overall process of collective behavior might very well follow the form we have advanced in this dissertation, it is important to take the next step and predict the probability value of a range of emergent products. Not all factors contribute equally to the emergence of social products. Not all participating individuals have the very same ego-attitudes in collective behavior. It may

be that violent agression or passive resistance to oppression may become standardized as the appropriate way of behaving as a consequence of collective interaction. These end-products of collective behavior should be predictable. If the ego-involvement of the participating individuals is taken into account such predictions may be possible. As was stated in the first chapter, part of the difficulty of stabilizing the social order in order to meet crisis conditions stems from finding appropriate lines of resistance when, for example, one also adheres to norms of non-violence. If social psychology is to formulate a genuine predictive theory it should take into account the relative weight of the ego-involvement of the participants in various factors which are patterned during collective behavior.

Essentially this is the program of research Sherif (1936) outlined in his Psychology of Social Norms. Social psychology should not chop the phenomena down so that it fits theory conceived a priori. On the contrary, the fact that social products are emergent phenomena should stimulate the construction of psychological theory that fits the facts even though that theory might have to depart in form from theories in the physical sciences. It is the phenomena that should dictate the theory. But an adequate theory can hardly

be written when the parameters of the phenomena are not known.

Summary and Conclusion

The essential, overall process of collective behavior was abstracted from empirical phenomena and stated as a sociological invariance as follows: Collective behavior is the process by which individuals, the agents of social change, disrupt the social order and produce a highly unstructured situation while being motivated to stabilize norms and values by standardizing either new, existing or old ones. Pluralistic group antecedent conditions were selected for theoretical reasons. In addition two subordinate processes of collective behavior were stated as sociological invariances as follows: The greater the divergence of stands among existing groups, the more difficult it is to arrive at an emergent line of action under collective behavior conditions which will be binding on members of all groups. The greater the concentration of group opinion, holding the degree of intergroup divergence constant, the more readily will collective behavior lead toward the emergence of a norm binding on all individuals.

The problem of the dissertation was to verify on the psychological level the overall sociological process of

collective behavior as well as the two subordinate processes. Criteria were constituted for establishing valid verifying procedures. Once it was shown that valid laboratory experiments could be formulated, ten hypotheses were formulated and tested in five experiments.

The qualitative data demonstrated that the experimental criteria had been met. On the basis of the quantitative, and supporting qualitative data (i.e., the subjects' reports of their experiences and observations) all hypotheses were verified. Therefore, the following conclusions can be drawn:

I. Group condition. When a number of subjects (with similar, i.e., low or intermediate or high judgment tendencies with respect to the stimuli) were brought together to interact (make judgments) they converged, in a fixed period of time, toward a common norm; their judgmental latitudes (scales) were more similar at the end of the session than at the beginning; i.e., they did form a stabilized small "group."

II. Collective behavior condition. When a number of small social units (i.e., small stabilized "groups") with different (low, intermediate, and high) norms, and therefore attitudes, were brought together to interact (make judgments) rapidly for a fixed number of trials where they did interact almost exclusively over the validity or the "truth" value of

their conflicting norms and attitudes, it was found that:

1. A new, emergent collective norm did arise which was binding on all individuals.

2. In the course of the collective behavior condition a disruption of the norms, and therefore attitudes, of the initial "group" members was produced resulting in:

   a. disintegration of the initial "groups" as measured by the breakdown of "group" solidarity. Subjects did not adhere to their original "group" norms even though it was possible for them to do so.

   b. an increase of the subject's variability over its final value in the "group" conditon. Thus the stimulus conditions became more unstructured.

III. Final alone condition.

1. In the subsequent alone condition, individuals initially belonging to smaller units did not revert back to their initial "group's" norm. Thus, the initial "groups" remained disorganized.

2. In the subsequent alone condition following collective behavior, there was a decrease of the subject's variability as compared with its value during collective behavior.

IV. Subordinate collective behavior processes.

A. When the distance between the lowest and highest "group" was varied (for the collective behavior condition) while keeping the intermediate "group" always in the middle, and three degrees of "intergroup" divergence were constituted, it was found that:

1. The less the original divergence among them, the more they converged toward a collective norm.

2. The smaller the original divergence among initial "groups," the less was the variability among subjects in the final alone condition. In other words, the more a stable collective norm emerged, the more binding it was on subjects in the final alone condition as measured by the number of subjects who fell within the range of the collective norm.

b. When the distance between the lowest and highest "group" was held constant at approximately the distance of B (indicated in A above), while in one case the intermediate "group" was placed close to the low "group," and in another case near the high "group," thus concentrating the collective behavior interaction in terms of the opinion represented, it was found that:

1. When the collective behavior was concentrated, as opposed to when it was not, there was a greater convergence toward a collective norm.

2. When there was a concentration of opinion in the collective behavior condition, there was less variability

among subjects in the final alone condition. Therefore, once again, the more a stable collective behavior norm emerged, the more binding it was on the subjects in the final alone condition as measured by the number of subjects who fell within the range of the collective norm. Therefore, the overall process of collective behavior and two subordinate processes were substantiated by psychological findings.

Much in the way of additional research has to be done on collective behavior. If the overall invariant process of collective behavior is valid, then empirical research should substantiate it sociologically. Assuming that empirical research continues to support the overall invariant process of collective behavior, then extensive research on the subordinate processes of collective behavior should be undertaken on the psychological level. All the antecedent conditions should be met in a series of experiments. The relative power of groups should be introduced as a variable. The effect of organized groups attempting to manipulate collective interaction should be varied. The number of trials, number of cycles, and conditions of collective behavior interaction should be varied. The degree of ego-involvement, as was pointed out previously, should be varied. The efficacy of a variety of different strategies for bringing about norm and attitude change should be tested in collective behavior interaction.

REFERENCES

Blumer, H. Collective behavior. In A. M. Lee (Ed.), Principles of sociology. (2nd ed.) New York: Barnes & Noble, 1951. Pp. 167-221.

Brown, R. W. Mass phenomena. In G. Lindzey (Ed.), Handbook of social psychology: special fields and applications. Cambridge, Mass.: Addison-Wesley, 1954, Vol. II. Pp. 833-873.

Brown, R. Models of attitude change. In R. Brown et al., New directions in psychology. New York: Holt, Rinehart and Winston, 1962. Pp. 1-85.

Campbell, D. T. The indirect assessment of social attitudes. Psychol. Bull., 1950, 47, 15-38.

Chapman, D. W., and Volkmann, J. A social determinant of the level of aspiration. J. abnorm. soc. Psychol., 1939, 34, 225-238.

Coffin, T. E. Some conditions of suggestion and suggestibility. Psychol. Monogr., 1941, 53, No. 4.

Eriksen, C. W. and Hake, H. W. Anchor effects in absolute judgments. J. exp. Psychol., 1957, 53, 132-138.

Festinger, L. A theory of cognitive dissonance. New York: Row, Peterson, 1957.

Festinger, L. Psychological effects of insufficient rewards. Amer. Psychol., 1961, 16, 1-11.

French, R. P., Jr. Formal theory of social power. Psychol. Rev., 1956, 63, 181-194.

Guilford, J. P. Psychometric methods. New York: McGraw-Hill, 1954.

Hood, W. R. Rigidity of concept utilization as a function of inductive and deductive derivation. Unpublished doctoral dissertation, Univ. of Oklahoma, 1961.

Hovland, C. I. and Sherif, M. Judgmental phenomena and scales of attitude measurement: item displacement in Thurstone scales. J. abnorm. soc. Psychol., 1952, 47, 822-832.

Hunt, W. A. and Volkmann, J. The anchoring of an affective scale. Amer. J. Psychol., 1937, 49, 88-92.

Johnson, D. The psychology of thought and judgment. New York: Harper, 1955.

Kaufman, E. L., Lord, M. W., Reese, T. M., and Volkmann, J. The discrimination of visual number. Amer. J. Psychol., 1949, 62, 498-525.

Leiserson, A. Parties and politics. New York: Knopf, 1958.

Lewin, K. Field theory in social sciences. New York: Harper, 1951.

Mausner, B. The effect of prior reinforcement on the interaction of observer pairs. J. abnorm. soc. Psychol., 1954, 49, 65-68.

McGarvey, H. R. Anchoring effects in the absolute judgment of verbal materials. Arch. Psychol., N. Y., 1943, 39, No. 261.

Munro, D. G. The Latin American republics: a history. New York: Appleton Century Crofts, 1950.

Reese, E. P., Reese, T. W., Volkmann, J., and Corbin, H. H. (Eds.) Psychophysical research-summary report (1946-1952). Mount Holyoke College, Psychophysical Research Unit, January, 1953 (lithoprint).

Rogers, S. The anchoring of absolute judgments. Arch. Psychol., 1941, 37, No. 261.

Senders, Virginia L. Measurement and statistics. New York: Oxford Univ. Press, 1958.

Sherif, M. A study of some social factors in perception. Arch. Psychol., 1935, No. 187.

Sherif, M. The psychology of social norms. New York: Harper, 1936.

Sherif, M. An experimental approach to the study of attitudes. Sociometry, 1937, 1, 90-98.

Sherif, M., and Harvey, O. J. A study in ego functioning: elimination of stable anchorages in individual and group situations. Sociometry, 1952, 15, 272-305.

Sherif, M., and Hovland, C. I., Judgmental phenomenon and scales of attitude measurement: placement of items with individual choice of number of categories. J. abnorm. soc. Psychol., 1953, 48, 135-141.

Sherif, M. and Hovland, C. I. Social judgment. New Haven: Yale Univ. Press, 1961.

Sherif, M. and Koslin, B. The institutional vs. behavioral controversy in social science with special reference to Political Socence. Unpublished manuscript, Institute of Group Relations, Univ. of Oklahoma, 1960.

Sherif, M. and Sherif, Carolyn W. Groups in harmony and tension. New York: Harper, 1953.

Sherif, M., and Sherif, Carolyn, W. An outline of social psychology. New York: Harper, 1956.

Sherif, M., Taub, D., and Hovland, C. Assimilation and contrast effects of anchoring stimuli on judgments. J. exp. Psychol., 1958, 55, 150-155.

Siegel, S. Nonparametric statistics. New York: McGraw-Hill, 1956.

Steiner, I. D. and Rogers, Evan D. Alternative responses to dissonance. J. abnorm. soc. Psychol., 1963, 66, 128-136.

Tresselt, M. E., and Volkmann, J. The production of uniform opinion by non-social stimulation. J. abnorm. soc. Psychol., 1942, 37, 234-243.

Turner, R. H. and Killian, L. H. Collective behavior. Englewood Cliffs, N. J.: Prentice-Hall, 1957.

Volkmann, J. Anchoring of absolute scales. Psychol. Bull., 1936, 33, 742-743.

Volkmann, J. Scales of judgment and their implications for social psychology. In J. Roher, and M. Sherif (Eds.) Social psychology at the crossroads. New York: Harper, 1951, pp. 273-294.

Volkmann, J., Hunt, W. A., and McGourty, M. Variability of judgment as a function of stimulus-density. Amer. J. Psychol., 1940, 53, 277-284.

Walter, W. A study of the effects of conflicting suggestions upon judgment in the autokinetic situation. Unpublished doctoral dissertation, Univ. of Oklahoma, 1952.

Whittaker, J. O. The effects of experimentally introduced anchorages upon judgments in the autokinetic situation. Unpublished doctoral dissertation, Univ. of Oklahoma, 1958.

APPENDIX

Table 11

Order of Slide Presentation

Trial	Slide	Trial	Slide
1.	118	16.	103
2.	103	17.	89
3.	89	18.	118
4.	103	19.	103
5.	118	20.	118
6.	89	21.	89
7.	103	22.	103
8.	118	23.	89
9.	89	24.	118
10.	118	25.	118
11.	103	26.	103
12.	89	27.	89
13.	103	28.	118
14.	89	29.	103
15.	118	30.	89

[a]For trials 31-60 the order was reversed; trials 61-90 the tray was sent forward again through the projector, and for trials 91-120 the projector was reversed again.

Table 12

Judgment Experiment Check List

Name:_____ Age:_____ Sex: M____F___

Look through the questions on this page and then read the following instructions through before asking any questions concerning the instructions which you should clearly understand.

The questions below pertain to your experiences in the judgment experiment just completed. Following these questions is a series of descriptive phrases arranged in gradations. Use the number 1 for the first session, 2 for the second session, and 3 for the third or today's session. Decide which session you felt the most or least, the next most or least, and the last most or least certain, accurate, etc., depending upon the question. Decide on the distances between each of the sessions and their relative position on the scale. Thus a possible answer to a question would put the sessions in the following order: 3, 1, 2. But the distance between 3 and 1 might be twice as great as that between 1 and 2. Therefore if the line below represented the whole scale the final order might be placed on the scale like this: 3 _____ 1 ____ 2 . You may mark between the phrases if it expresses your feelings more accurately.

1. How certain did you feel about the accuracy of your estimates?

Always very certain	Usually certain	Sometimes certain	Usually uncertain	Always very uncertain

2. Felt most certain about my estimates for the following % of judgments in each session.

In first 20%	In next 20%	In the middle 20%	In next to last 20%	In last 20%

3. Felt least certain about my estimates for the following % of judgments in each session.

In first 20%	In next 20%	In the middle 20%	In next to last 20%	In last 20%

4. How much time did you require to make your judgments?

Rapidly	Moderately fast	Moderately	Moderately slow	Slowly

5. At what % of judgments in each session were your judgments the fastest?

In first 20%	In next 20%	In the middle 20%	In next to last 20%	In last 20%

6. At what % of judgments in each session were your judgments the slowest?

In first 20%	In next 20%	In the middle 20%	In next to last 20%	In last 20%

7. How well did your estimates agree with those of the other persons?

Practically no agreement	Little agreement	Agreed some of the time	Agreed most of the time	Agreed almost all the time

8. Do you feel you were influenced by the estimates of the other persons?

Not influenced	Influenced ¼ the time	Influenced ½ the time	Influenced 3/4 the time	Influenced all time

9. Do you feel you were influenced by the estimates of some persons more than others? Session 1._____Session 2._____ Session 3._____ If so, which one? Session 1._____ Session 2._____ Session 3._____ Why do you feel that you were more influenced by these persons?_____

_____

10. Do you feel you influenced the estimates of the other persons?

_____

Did not influence them	Influenced them ¼ the time	Influenced them ½ the time	Influenced them 3/4 the time	Influenced them all the time

11. Do you feel that you influenced the estimates of some persons more than others? Session 1._____ Session 2._____ Session 3._____ If so, which ones? Session 1_____ Session 2._____Session 3._____ Why do you feel that you influenced these persons more than others?_____

_____

12. How much help were the estimates of others?

_____

Others never were helpful	Others were sometimes a help	Others were usually helpful	Others were rarely helpful	Others always were helpful

13. Were the estimates of some persons more helpful than those of others? Session 1._____ Session 2._____ Session 3._____ If so, whose estimates were the most helpful? Session 1._____ Session 2._____ Session 3._____ Why do you think these were more helpful? _____

_____

14. Did you try to find some method of your own to help you in making your estimates more accurate? If so, explain the method _____

_____

15. How many solid dots were presented on the average? Session 1._____ Session 2._____ Session 3._____

16. What was the smallest and the largest number of solid dots presented? First Session (Smallest)_____
(Largest)_____ Second Session (Smallest)_____
(Largest)_____ Third Session (Smallest)_____
(Largest)_____

17. How did you feel about the other persons being with you?
_____

18. Do you think you would prefer to make your estimates alone rather than with the other persons?_____
Why?_____

19. How did you feel in the experimental room? First time?
_____ Second time? _____
Today? _____

20. How much time was used for the First Session?_____
Second Session? _____ Third Session? _____

21. What did you think of the experiment? _____

Table 13

Low Position "Groups": "Group" Condition Judgments

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		First 15				Second 15			
		89	103	118	$\overline{Mdn}$	89	103	118	$\overline{Mdn}$
A	S 1	40	50	50	46.7	35	40	55	43.3
	S 2	40	45	55	46.7	35	35	55	41.7
	S 3	35	40	45	40.0	30	45	55	43.3
	S 4	30	40	50	40.0	30	40	50	40.0
B	S 1	40	60	60	53.3	40	50	65	51.7
	S 2	40	50	55	48.3	32	55	70	52.3
	S 3	70	70	70	70.0	65	70	70	68.3
	S 4	50	55	70	58.3	40	50	55	48.3
C	S 1	30	40	36	35.3	30	36	35	33.7
	S 2	40	50	67.5	52.5	37.5	55	65	52.5
	S 3	30	35	35.0	33.3	40	35	45	40.0
	S 4	40	60	70.0	56.7	40	45	75	53.3
B_H	S 1	50	81	81.0	70.6	50	60	80	63.3
	S 2	50	65	100.0	71.7	50	65	90	68.3
	S 3	42	60	60.0	54.0	35	50	72	52.3
	S 4	52	62	80.0	64.0	45	60	78	61.0
B_L	S 1	30	50	65	48.3	30	50	60	46.7
	S 2	64	64	68	65.3	25	40	36	33.7
	S 3	45	63	60	56.0	58	68	65	63.7
	S 4	38	50	60	49.3	30	45	58	44.3

Table 13--Continued

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		Third 15				Fourth 15			
		89	103	118	Mdn	89	103	118	Mdn
A	S 1	40	40	55	45.0	40	45	55	46.7
	S 2	35	35	55	41.7	35	50	55	46.7
	S 3	35	40	55	43.3	30	40	55	41.7
	S 4	40	45	55	46.7	40	50	55	48.3
B	S 1	40	50	65	51.7	45	50	60	51.7
	S 2	40	50	65	51.7	40	60	65	55.0
	S 3	60	60	60	60.0	60	60	60	60.0
	S 4	40	45	55	46.7	40	45	55	46.7
C	S 1	30	40	45	38.3	29	48	40	39.0
	S 2	35	40	55	43.3	43	50	65	52.7
	S 3	40	40	50	43.3	48	40	48	45.3
	S 4	40	50	60	50.0	30	45	60	45.0
B_H	S 1	45	63	75	61.0	50	75	80	68.3
	S 2	50	60	80	63.0	45	55	70	56.7
	S 3	45	65	75	61.7	55	65	85	68.3
	S 4	55	65	85	68.3	50	70	85	68.3
B_L	S 1	30	45	65	46.7	35	60	60	51.7
	S 2	24	25	24	24.3	35	49	36	40.00
	S 3	48	53	62	54.3	48	48	70	55.3
	S 4	33.5	43	60	45.5	38	55	55	49.3

Table 14

Intermediate Position "Groups": "Group" Condition Judgments

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		First 15				Second 15			
		89	103	118	Mdn	89	103	118	Mdn
A	S 1	55	85	90	76.7	55	85	85	75
	S 2	65	75	85	75.0	50	65	95	70
	S 3	55	75	85	71.7	65	80	80	75
	S 4	50	70	80	66.7	50	70	85	68.3
B	S 1	70	100	110	93.3	60	85	100	81.7
	S 2	80	80	95	85.0	60	85	110	85.0
	S 3	105	115	125	115.0	90	87.5	100	92.5
	S 4	60	80	85	75.0	50	80	85	71.7
C	S 1	80	100	110	96.5	85	110	120	105.0
	S 2	95	110	120	108.3	75	75	130	93.3
	S 3	75	100	130	98.3	75	95	125	98.3
	S 4	80	102	100	94.0	50	80	90	73.3
B_H	S 1	70	100	120	96.7	70	100	110	93.3
	S 2	110	135	145	130.0	100	110	130	113.3
	S 3	94	120	130	114.7	98	121	140	119.6
	S 4	90	136	150	125.3	72	115	100	95.6
B_L	S 1	77.5	70	80	75.8	55	60	75	66.3
	S 2	60	65	75	66.6	50	70	80	66.7
	S 3	55	75	90	71.6	55	70	70	65.0
	S 4	60	60	60	60.0	70	80	80	76.7

Table 14--Continued

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		Third 15				Fourth 15			
		89	103	118	Mdn	89	103	118	Mdn
A	S 1	55	80	85	73.3	50	75	85	70.0
	S 2	40	55	85	60.0	50	65	80	65.0
	S 3	50	70	90	70.0	60	80	80	73.3
	S 4	55	60	85	66.7	65	60	95	73.3
B	S 1	70	90	100	86.7	60	90	95	81.6
	S 2	85	110	120	105.0	85	90	100	91.7
	S 3	85	80	110	90.0	70	90	100	86.7
	S 4	50	75	90	71.7	65	85	90	80.0
C	S 1	75	100	120	98.3	70	90	120	93.3
	S 2	80	95	120	98.3	80	90	100	90.0
	S 3	75	85	120	93.3	75	95	120	96.7
	S 4	50	80	100	76.7	70	80	110	86.7
B_H	S 1	90	95	120	101.7	80	120	130	110.0
	S 2	105	105	125	116.7	90	120	125	111.7
	S 3	95	100	125	106.6	75	100	120	98.3
	S 4	77	99	143	106.3	86	120	140	115.3
B_L	S 1	60	75	90	75.0	70	80	92	80.6
	S 2	50	70	85	68.3	55	75	85	71.6
	S 3	55	70	90	71.7	65	80	90	78.3
	S 4	60	70	85	71.7	70	70	85	75.0

Table 15

High Position "Groups": "Group" Condition Judgments

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		First 15				Second 15			
		89	103	118	$\overline{Mdn}$	89	103	118	$\overline{Mdn}$
A	S 1	84	100	100	94.7	85	95	105	95
	S 2	80	80	80	80.0	80	90	100	90
	S 3	50	75	80	68.3	80	80	100	86.7
	S 4	80	70	85	78.3	70	80	100	83.3
B	S 1	200	175	205	193.3	190	176	144	170
	S 2	150	105	150	135.0	150	120	180	150
	S 3	110	120	140	123.0	100	120	160	126.7
	S 4	100	95	125	106.7	95	115	110	106.7
C	S 1	130	150	160	146.7	105	130	160	131.7
	S 2	100	120	150	123.3	100	120	125	115.0
	S 3	110	120	155	128.3	110	120	150	126.7
	S 4	100	110	120	110.0	100	120	130	116.7
B_H	S 1	115	140	165	140.0	110	130	170	136.6
	S 2	130	150	200	160.0	125	165	165	151.7
	S 3	80	100	200	126.7	110	115	180	135.0
	S 4	100	130	160	130.0	110	160	180	150.0
B_L	S 1	80	110	125	105.0	85	135	155	125.0
	S 2	100	145	175	140.0	100	129	170	133.0
	S 3	112	150	180	147.3	96	125	125	115.3
	S 4	146	146	150	147.3	130	150	145	141.7

Table 15--Continued

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		Third 15				Fourth 15			
		89	103	118	Mdn	89	103	118	Mdn
A	S 1	75	100	105	91.7	80	90	95	88.3
	S 2	80	90	110	93.3	80	90	100	90.0
	S 3	80	85	110	91.6	80	85	110	91.7
	S 4	75	75	110	86.7	75	90	110	91.7
B	S 1	122.5	107	144	124.5	100	100	120	106.7
	S 2	75	150	150	125.0	90	150	150	130.0
	S 3	100	120	160	126.7	90	120	160	123.3
	S 4	95	110	150	118.3	120	125	150	131.7
C	S 1	110	130	160	133.3	95	125	155	125.0
	S 2	110	130	160	133.3	110	125	150	128.3
	S 3	105	120	160	128.3	110	130	155	131.7
	S 4	100	125	150	125.0	110	120	140	123.3
B_H	S 1	110	125	150	128.3	100	125	135	120.0
	S 2	100	150	180	110.0	120	140	160	140.0
	S 3	90	145	175	136.7	70	125	165	120.0
	S 4	110	150	165	141.7	115	140	160	138.3
B_L	S 1	95	125	150	123.3	100	125	155	126.6
	S 2	112	142	170	141.3	107	140	152	133.0
	S 3	112	128	155	131.7	112	135	175	137.3
	S 4	126	150	136	137.3	126	150	150	142.0

Table 16

Original Low Position "Groups": Collective Behavior Condition Judgments

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		First 15				Second 15			
		89	103	118	$\overline{Mdn}$	89	103	118	$\overline{Mdn}$
A	S 1	85	85	90	86.7	70	70	85	75.0
	S 2	50	50	50	50.0	50	50	60	53.3
	S 3	40	40	60	46.7	65	65	75	68.3
	S 4	65	55	65	61.7	65	65	70	66.7
B	S 1	55	60	75	63.3	55	55	70	60
	S 2	45	75	95	71.7	55	65	100	73.3
	S 3	120	100	100	106.7	105	100	100	101.7
	S 4	50	65	75	63.3	50	60	70	60.0
C	S 1	60	80	48	62.7	80	60	75	71.7
	S 2	55	75	85	71.7	55	45	85	61.7
	S 3	32	28	40	33.3	27	24	38	29.7
	S 4	40	60	75	58.3	40	60	80	60.0
B_H	S 1	55	65	75	65.0	55	55	85	65.0
	S 2	60	85	95	80.0	40	70	105	71.7
	S 3	45	65	85	65.0	45	60	90	65.0
	S 4	80	90	95	88.3	70	85	120	91.7
B_L	S 1	50	65	60	58.3	35	55	80	56.7
	S 2	36	50	49	45.0	24	50	64	46.0
	S 3	63	86	83	77.3	62	68	106	78.7
	S 4	50	60	60	56.7	43	52	63	51.7

Table 16--Continued

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		Third 15				Fourth 15			
		89	103	118	Mdn	89	103	118	Mdn
A	S 1	50	60	95	68.3	55	60	85	66.7
	S 2	40	45	65	53.3	40	50	65	51.7
	S 3	45	60	75	60.0	45	65	80	66.3
	S 4	45	65	75	61.7	45	65	75	60.0
B	S 1	60	65	85	70.0	60	65	75	66.7
	S 2	60	75	100	78.3	80	85	100	88.3
	S 3	105	105	105	105.0	100	98	100	99.3
	S 4	50	65	80	65.0	50	70	85	68.3
C	S 1	60	66	66	64.0	80	40	60	60.0
	S 2	45	45	95	61.7	45	55	75	58.3
	S 3	24	31	45	33.3	33	45	42	40.0
	S 4	50	60	90	66.7	40	60	90	63.3
B_H	S 1	65	70	85	73.3	65	80	85	76.7
	S 2	45	60	95	66.7	65	85	105	85.0
	S 3	55	75	90	73.3	65	80	90	78.3
	S 4	75	100	120	98.3	75	110	120	101.7
B_L	S 1	35	50	85	56.7	40	60	90	63.3
	S 2	24	36	70	43.3	25	35	50	36.7
	S 3	76	73	120	89.7	72	86	93	83.7
	S 4	40	50	62	50.7	50	55	62	55.7

Table 16--Continued

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		Fifth 15				Sixth 15			
		89	103	118	Mdn	89	103	118	Mdn
A	S 1	60	55	95	70.0	60	75	90	75.0
	S 2	55	55	65	58.3	50	60	75	61.7
	S 3	50	65	80	65.0	45	60	85	63.3
	S 4	45	55	70	56.7	45	55	75	58.3
B	S 1	65	75	80	73.3	70	80	85	78.3
	S 2	50	75	100	75.0	70	80	100	83.3
	S 3	100	100	100	100.0	96	100	98	98.0
	S 4	65	60	75	66.7	65	70	80	71.7
C	S 1	80	60	80	73.3	60	45	65	56.7
	S 2	35	55	75	55.0	45	45	80	56.7
	S 3	24	32	38	31.3	19	28	37	28.0
	S 4	60	60	50	56.7	40	60	60	53.3
B_H	S 1	55	65	70	63.3	60	80	75	71.7
	S 2	55	85	90	76.7	60	70	90	73.3
	S 3	65	75	95	78.3	80	90	95	88.3
	S 4	90	105	120	105.0	95	105	125	108.3
B_L	S 1	40	60	70	56.7	53	65	80	66.0
	S 2	30	35	53	39.3	24	32	50	35.3
	S 3	76	98	110	94.7	86	98	115	99.7
	S 4	48	60	70	59.3	50	60	75	61.7

Table 16--Continued

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		Seventh 15				Eighth 15			
		89	103	118	Mdn	89	103	118	Mdn
A	S 1	45	55	90	63.3	55	70	95	73.3
	S 2	55	55	85	65.0	50	60	75	61.7
	S 3	45	50	80	58.3	50	70	85	68.3
	S 4	45	55	65	55.0	45	55	85	61.7
B	S 1	75	80	85	80.0	65	75	85	75.0
	S 2	60	80	100	80.0	70	65	100	78.3
	S 3	90	90	90	90.0	90	90	90	90.0
	S 4	50	60	75	61.7	60	75	80	71.7
C	S 1	60	65	60	61.7	60	65	72	65.7
	S 2	40	60	75	58.3	55	75	85	71.7
	S 3	17	28	34	26.3	24	33	33	30.0
	S 4	40	50	70	53.3	40	70	80	63.3
B_N	S 1	80	80	120	93.3	55	55	80	63.3
	S 2	55	80	95	76.7	75	95	100	90.0
	S 3	75	95	100	90.0	65	85	95	81.7
	S 4	95	110	130	111.7	100	115	135	116.7
B_L	S 1	60	80	90	76.7	45	65	85	65.0
	S 2	29	39	50	39.3	25	36	46	35.7
	S 3	78	88	128	98.0	78	83	98	86.3
	S 4	55	65	78	66.0	58	65	70	64.3

Table 17

Original Intermediate Position "Groups": Collective Behavior Condition Judgments

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		First 15				Second 15			
		89	103	118	$\overline{Mdn}$	89	103	118	$\overline{Mdn}$
A	S 1	70	80	85	78.3	65	75	90	76.7
	S 2	50	60	80	63.3	45	65	85	65.0
	S 3	65	80	90	78.3	70	80	95	81.7
	S 4	60	70	100	76.7	60	75	110	81.7
B	S 1	70	110	125	101.7	50	90	105	81.7
	S 2	85	100	90	91.7	50	90	100	80.0
	S 3	108	120	115	114.3	100	100	107	102.3
	S 4	70	85	110	88.3	70	80	110	86.7
C	S 1	60	75	110	81.7	80	95	105	93.3
	S 2	85	90	110	95.0	90	105	120	105.0
	S 3	45	75	110	76.7	35	45	100	60.0
	S 4	25	35	40	33.3	20	40	40	33.3
B_H	S 1	75	90	110	91.7	45	75	100	73.3
	S 2	100	90	125	105.0	70	90	90	83.3
	S 3	80	110	100	90.0	85	110	115	103.3
	S 4	82	120	120	107.3	90	95	120	101.7
B_L	S 1	55	70	89	71.3	65	73	80	72.7
	S 2	55	65	80	66.7	45	50	90	61.7
	S 3	60	60	90	70.0	50	60	100	70.0
	S 4	60	65	70	65.0	60	70	80	70.0

Table 17--Continued

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		Third 15				Fourth 15			
		89	103	118	Mdn	89	103	118	Mdn
A	S 1	70	80	100	83.3	70	90	95	85.0
	S 2	50	65	80	65.0	55	80	85	73.3
	S 3	75	80	95	83.3	75	80	85	80.0
	S 4	80	80	100	86.7	100	85	100	95.0
B	S 1	85	100	120	101.7	75	110	130	105.0
	S 2	75	90	100	88.3	80	95	100	91.7
	S 3	100	100	110	103.3	90	100	105	98.3
	S 4	60	70	110	80.0	65	75	110	83.3
C	S 1	80	85	120	95.0	65	80	100	81.7
	S 2	70	85	120	91.7	80	90	95	88.3
	S 3	45	55	100	63.3	35	55	75	55.0
	S 4	25	35	45	35.0	25	40	50	38.3
B_H	S 1	45	75	110	76.7	55	85	100	80.0
	S 2	80	85	100	88.3	80	100	95	91.7
	S 3	80	110	110	100.0	95	105	105	101.7
	S 4	69	79	125	91.0	90	105	120	105.0
B_L	S 1	53	73	100	75.3	65	95	104	88.0
	S 2	40	60	80	66.7	50	65	75	63.3
	S 3	45	75	95	71.7	60	70	75	63.3
	S 4	55	70	80	68.3	70	75	75	73.3

Table 17--Continued

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		Fifth 15				Sixth 15			
		89	103	118	$\overline{Mdn}$	89	103	118	$\overline{Mdn}$
A	S 1	75	80	95	83.3	65	75	90	76.7
	S 2	45	70	80	65.0	45	60	75	60.0
	S 3	70	80	95	81.7	70	85	90	81.7
	S 4	70	80	100	83.3	50	70	100	73.3
B	S 1	60	100	110	90.0	95	100	110	101.7
	S 2	75	90	95	86.7	70	85	100	85.0
	S 3	100	105	120	108.3	100	110	120	110.0
	S 4	70	90	110	90.0	80	95	100	91.7
C	S 1	60	75	90	75.0	65	70	80	71.7
	S 2	100	95	100	98.3	85	85	100	90.0
	S 3	35	55	75	55.0	30	40	55	41.7
	S 4	25	30	40	31.7	25	30	35	30.0
B_H	S 1	75	80	100	85.0	60	80	100	80.0
	S 2	70	90	100	86.7	75	90	95	86.7
	S 3	95	100	110	101.7	80	100	110	90.0
	S 4	80	100	110	96.7	100	115	130	115.0
B_L	S 1	85	111	109	101.7	75	95	130	100.0
	S 2	55	65	80	66.7	55	65	65	61.7
	S 3	50	75	100	75.0	70	75	110	85.0
	S 4	65	80	85	76.7	70	75	80	75.0

Table 17--Continued

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		Seventh 15				Eighth 15			
		89	103	118	Mdn	89	103	118	Mdn
A	S 1	65	75	85	75.0	65	75	80	73.3
	S 2	45	60	80	61.7	45	70	75	63.3
	S 3	70	80	100	83.3	60	75	90	75.0
	S 4	55	70	90	71.7	70	90	100	86.7
B	S 1	90	100	110	100.0	75	100	110	95.0
	S 2	70	85	100	85.0	60	95	100	85.0
	S 3	110	115	130	115.0	100	125	130	118.3
	S 4	70	85	110	88.3	70	85	110	88.3
C	S 1	60	80	95	78.3	65	85	95	81.7
	S 2	80	80	120	93.3	85	105	125	105.0
	S 3	20	35	50	35.0	30	45	55	43.3
	S 4	21	23	30	24.7	21	29	35	28.3
B_H	S 1	75	85	110	90.0	60	90	110	86.7
	S 2	80	105	100	95.0	80	95	95	90.0
	S 3	90	100	110	100.0	90	100	120	100.0
	S 4	85	120	120	108.3	90	110	120	106.7
B_L	S 1	65	85	130	93.3	75	110	120	101.7
	S 2	75	65	100	80.0	60	80	100	80.0
	S 3	75	85	110	90.0	60	85	90	78.3
	S 4	70	75	85	76.7	65	75	75	71.7

Table 18

Original High Position "Groups": Collective Behavior Condition Judgments

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		First 15				Second 15			
		89	103	118	Mdn	89	103	118	Mdn
A	S 1	60	80	95	78.3	70	90	100	86.7
	S 2	70	80	90	80.0	60	90	80	76.7
	S 3	50	65	95	70.0	50	80	95	75.0
	S 4	80	65	80	75.0	65	75	75	71.7
B	S 1	100	130	130	120.0	120	120	150	130.0
	S 2	125	150	150	141.7	125	150	120	131.7
	S 3	80	80	100	86.7	60	80	120	86.7
	S 4	90	90	100	93.3	100	100	115	105.0
C	S 1	95	115	140	116.7	85	120	155	120.0
	S 2	90	100	120	103.3	80	100	120	100.0
	S 3	80	100	125	101.7	65	100	130	98.3
	S 4	90	100	110	100.0	100	110	120	110.0
B_H	S 1	95	125	145	121.7	100	120	140	120.0
	S 2	40	70	80	63.3	45	60	85	63.3
	S 3	75	80	145	100.0	60	80	120	86.7
	S 4	80	120	130	110.0	85	120	140	115.0
B_L	S 1	45	65	74	61.7	30	50	110	63.3
	S 2	85	98	103	95.3	60	82	115	85.7
	S 3	55	85	89	76.3	65	73	95	77.7
	S 4	80	120	110	103.3	70	115	100	95.0

Table 18--Continued

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		Third 15				Fourth 15			
		89	103	118	Mdn	89	103	118	Mdn
A	S 1	80	90	95	88.3	75	85	95	85 0
	S 2	60	60	80	66.7	60	80	90	76.7
	S 3	50	70	90	70.0	55	80	80	71.7
	S 4	50	70	95	71.7	55	75	95	75.0
B	S 1	100	120	150	123.3	100	120	150	123.3
	S 2	100	150	200	150.0	120	150	200	156.7
	S 3	70	80	120	90.0	60	80	100	80.0
	S 4	100	100	115	105.0	95	100	110	101.7
C	S 1	83	115	145	114.3	90	120	145	118.3
	S 2	85	95	120	100.0	75	100	115	96.7
	S 3	85	105	125	105.0	95	115	125	111.7
	S 4	100	110	130	113.3	90	100	120	103.3
B_H	S 1	90	130	150	123.3	130	160	165	151.7
	S 2	50	60	85	65.0	60	75	90	75.0
	S 3	60	90	110	86.7	60	75	110	81.7
	S 4	80	110	130	106.7	100	120	120	113.3
B_L	S 1	50	50	85	61.7	60	55	90	68.3
	S 2	73	70	110	84.3	68	90	98	85.3
	S 3	53	73	95	73.7	65	95	116	92.0
	S 4	80	100	110	96.7	90	100	100	96.7

Table 18--Continued

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		Fifth 15				Sixth 15			
		89	103	118	Mdn	89	103	118	Mdn
A	S 1	70	80	105	85.0	65	80	90	78.3
	S 2	45	60	80	61.7	50	70	85	68.3
	S 3	40	60	75	58.3	45	60	65	56.7
	S 4	60	70	70	66.7	55	75	80	70.0
B	S 1	120	120	120	120.0	120	120	150	130.0
	S 2	100	125	150	125.0	100	150	150	133.3
	S 3	60	100	100	73.3	60	100	120	93.3
	S 4	90	105	105	100.0	85	100	110	98.3
C	S 1	95	120	145	120.0	87	125	140	117.3
	S 2	80	90	100	90.0	70	90	110	90.0
	S 3	75	105	120	100.0	75	95	110	93.3
	S 4	60	100	115	91.7	60	90	120	90.0
B_H	S 1	120	150	165	145.0	68	80	90	79.3
	S 2	110	135	165	136.7	50	70	85	68.3
	S 3	115	130	150	131.7	60	70	95	75.0
	S 4	120	140	160	140.0	60	80	85	75.0
B_L	S 1	50	75	75	66.7	45	60	90	65.0
	S 2	65	80	115	86.7	78	100	125	101.0
	S 3	85	110	110	101.7	75	95	130	100.0
	S 4	90	100	110	100.0	95	110	120	108.3

Table 18--Continued

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		Seventh 15				Eighth 15			
		89	103	118	Mdn	89	103	118	Mdn
A	S 1	60	80	95	78.3	65	80	100	81.6
	S 2	50	60	60	56.7	70	70	70	70.0
	S 3	40	60	65	55.0	50	60	70	60.0
	S 4	60	75	100	78.3	60	80	85	75.0
B	S 1	100	120	150	123.3	85	100	120	101.7
	S 2	120	150	200	156.6	120	150	200	156.6
	S 3	80	100	120	100.0	80	100	120	100.0
	S 4	90	100	110	100.0	95	100	115	103.3
C	S 1	80	112	140	110.7	100	123	140	121.0
	S 2	70	95	100	88.3	70	90	110	90.0
	S 3	80	95	105	93.3	70	95	100	88.3
	S 4	80	100	120	100.0	80	110	120	103.3
B_H	S 1	60	85	110	85.0	105	115	125	115.0
	S 2	60	90	120	90.0	100	110	120	110.0
	S 3	45	90	110	81.7	95	110	130	111.7
	S 4	60	75	90	75.0	95	120	130	115.0
B_L	S 1	65	75	95	78.3	55	55	85	65.0
	S 2	80	100	125	101.7	80	110	116	102.0
	S 3	66	85	130	93.7	75	110	125	103.3
	S 4	90	110	115	105.0	70	105	100	91.7

Table 19

Original Low "Group" Member's Judgments in Final Alone Condition

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		First 15				Second 15			
		89	103	118	Mdn	89	103	118	Mdn
A	S 1	40	40	45	41.7	40	45	60	48.3
	S 2	50	60	75	61.7	50	65	80	65.0
	S 3	40	40	65	48.3	35	40	55	43.3
	S 4	45	55	65	55.0	35	50	65	50.0
B	S 1	50	60	65	58.3	50	60	60	56.7
	S 2	40	60	75	58.3	40	80	100	73.3
	S 3	95	90	95	93.3	95	95	95	95.0
	S 4	40	45	60	48.3	40	55	60	48.3
C	S 1	45	45	74	54.7	35	50	70	51.7
	S 2	35	45	50	43.3	45	55	75	58.3
	S 3	18	22	37	25.7	18	28	34	26.7
	S 4	40	50	60	50.0	30	40	60	43.3
B_H	S 1	45	60	70	58.3	50	60	70	60.0
	S 2	40	60	75	58.3	60	75	95	76.7
	S 3	50	70	85	68.3	60	70	90	73.3
	S 4	65	75	100	80.0	65	75	100	80.0
B_L	S 1	35	40	50	41.7	30	35	45	36.7
	S 2	20	30	35	28.3	29	40	49	39.3
	S 3	43	56	73	57.3	44	62	78	61.3
	S 4	50	60	65	58.3	50	65	78	64.3

Table 19--Continued

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		Third 15				Fourth 15			
		89	103	118	Mdn	89	103	118	Mdn
A	S 1	40	45	55	46.7	40	45	65	50.0
	S 2	50	60	75	61.7	55	70	75	66.7
	S 3	45	55	80	60.0	50	75	85	70.0
	S 4	35	55	65	51.7	45	55	65	55.0
B	S 1	55	60	65	60.0	55	60	65	60.0
	S 2	50	80	90	73.3	50	80	95	75.5
	S 3	95	95	95	95.0	95	95	95	95.0
	S 4	50	60	60	56.7	50	60	60	56.7
C	S 1	35	40	70	48.3	40	48	70	52.7
	S 2	45	60	85	63.3	45	75	95	71.7
	S 3	18	24	34	25.3	18	30	32	26.7
	S 4	30	50	60	46.7	40	40	60	46.7
B_H	S 1	55	60	70	61.7	55	65	70	63.3
	S 2	55	80	100	78.3	69	90	95	84.7
	S 3	55	80	90	75.0	60	80	85	75.0
	S 4	60	85	100	81.7	65	75	90	76.7
B_L	S 1	30	35	45	36.7	30	35	40	35.0
	S 2	25	30	50	35.0	20	30	35	28.3
	S 3	50	64	78	64.0	60	64	82	68.7
	S 4	60	65	80	68.3	68	72	80	73.3

Table 20

Original Intermediate "Group" Member's Judgments in Final Alone Condition

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		First 15				Second 15			
		89	103	118	Mdn	89	103	118	Mdn
A	S 1	70	85	90	81.7	65	80	90	78.3
	S 2	40	55	75	56.7	40	60	70	56.7
	S 3	65	75	85	75.0	80	85	95	86.7
	S 4	70	80	90	80.0	65	75	100	80.0
B	S 1	80	100	120	100.0	70	100	120	96.7
	S 2	75	90	100	88.3	70	85	95	83.3
	S 3	90	110	115	105.0	105	130	135	123.3
	S 4	50	70	75	65.0	60	70	75	68.3
C	S 1	55	55	95	68.3	45	65	70	60.0
	S 2	80	105	120	101.7	70	90	90	83.3
	S 3	25	30	50	35.0	25	30	60	38.3
	S 4	20	25	28	24.3	18	22	30	23.3
B_H	S 1	55	80	100	78.3	45	75	90	70.0
	S 2	80	95	100	91.7	75	95	110	93.3
	S 3	70	80	100	83.3	80	90	100	90.0
	S 4	60	90	100	83.3	65	75	110	83.3
B_L	S 1	60	75	75	70.0	60	70	80	70.0
	S 2	60	65	75	66.7	60	60	80	70.0
	S 3	60	85	90	78.3	55	75	90	73.3
	S 4	65	75	75	71.7	60	70	75	68.3

Table 20--Continued

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		Third 15				Fourth 15			
		89	103	118	Mdn	89	103	118	Mdn
A	S 1	70	80	95	81.7	70	90	100	86.7
	S 2	45	55	70	56.7	55	75	85	71.7
	S 3	75	80	95	83.3	80	90	100	90.0
	S 4	60	85	100	81.7	70	90	100	86.7
B	S 1	80	90	130	100.0	85	105	125	105.0
	S 2	60	90	110	86.7	70	85	110	88.3
	S 3	90	125	135	116.7	120	130	135	128.3
	S 4	55	65	75	65.0	55	70	80	68.3
C	S 1	40	45	65	50.0	40	55	65	53.3
	S 2	70	80	100	83.3	75	100	110	95.0
	S 3	25	25	50	33.3	25	30	30	28.3
	S 4	20	25	30	25.0	20	25	28	24.3
B_H	S 1	50	75	90	73.3	55	75	90	73.3
	S 2	90	90	115	98.3	90	100	105	98.3
	S 3	70	80	100	83.3	70	80	100	83.3
	S 4	70	70	90	76.7	65	90	100	85.0
B_L	S 1	55	70	80	70.0	60	70	70	66.7
	S 2	60	65	85	70.0	60	70	90	73.3
	S 3	60	90	100	83.3	70	90	95	85.0
	S 4	60	75	80	71.7	70	75	80	75.0

Table 21

Original High "Group" Member's Judgments in Final Alone Condition

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		First 15				Second 15			
		89	103	118	Mdn	89	103	118	Mdn
A	S 1	60	70	90	73.3	60	75	100	78.3
	S 2	70	80	95	81.7	75	85	90	83.3
	S 3	45	60	90	65.0	50	65	80	65.0
	S 4	55	70	80	68.3	60	70	90	73.3
B	S 1	85	150	150	128.3	85	120	150	118.3
	S 2	120	150	100	123.3	100	150	150	133.3
	S 3	60	100	120	93.3	80	100	120	100.0
	S 4	100	105	105	103.3	90	95	110	98.3
C	S 1	90	105	127	107.3	91	110	127	109.3
	S 2	95	100	110	101.7	95	100	120	105.0
	S 3	85	100	110	98.3	80	105	115	100.0
	S 4	70	110	110	96.7	90	100	110	100.0
B_H	S 1	110	125	140	108.3	110	130	145	128.3
	S 2	65	75	90	76.7	50	75	80	68.3
	S 3	90	50	90	76.7	60	50	85	65.0
	S 4	60	80	100	80.0	60	80	100	80.0
B_L	S 1	65	85	90	80.0	45	75	100	73.3
	S 2	Lost from experiment							
	S 3	65	90	110	88.3	80	100	110	96.7
	S 4	85	110	110	101.7	70	90	90	83.3

Table 21--Continued

Collective behavior experiment and subject (S)		Median per 15 judgments for all slides and subjects							
		Third 15				Fourth 15			
		89	103	118	Mdn	89	103	118	Mdn
A	S 1	45	70	95	70.0	50	80	95	75.0
	S 2	75	85	100	86.7	65	75	100	80.0
	S 3	50	65	80	65.0	45	70	80	65.0
	S 4	50	65	80	65.0	60	75	95	76.7
B	S 1	85	120	150	118.3	85	120	150	118.3
	S 2	100	150	200	150.0	100	120	200	140.0
	S 3	80	100	120	100.0	80	100	120	100.0
	S 4	90	100	115	101.7	95	105	110	103.3
C	S 1	90	112	143	115.0	107	115	138	120.0
	S 2	90	105	110	101.7	95	95	120	103.3
	S 3	85	90	110	95.0	75	100	115	96.7
	S 4	80	100	120	100.0	80	100	120	100.0
B_H	S 1	120	130	155	135.0	120	130	140	130.0
	S 2	60	70	85	71.7	65	70	80	71.7
	S 3	75	45	90	70.0	70	50	85	68.3
	S 4	70	100	130	100.0	90	100	125	105.0
B_L	S 1	70	80	95	81.7	50	80	100	76.7
	S 2	Lost from experiment							
	S 3	70	90	120	93.3	85	120	125	110.0
	S 4	70	70	90	76.7	60	70	80	70.0

Table 22

Original Low "Group" Member's Median Judgments in All Conditions for All Subjects

Collective behavior experiment and subject (S)		"Group"				Final Alone			
		89	All 103	60 118	Mdn	89	All 103	60 118	Mdn
A	S 1	40	42.5	55	48.5	40	45	55	46.7
	S 2	35	45.0	55	45.0	50	60	75	61.7
	S 3	32.5	40.0	55	41.5	45	55	70	56.7
	S 4	35	45	55	41.3	45	55	65	55.0
B	S 1	40	50	62.5	50.8	55	60	65	60.0
	S 2	40	55	65	53.3	90	75	45	70.0
	S 3	62.5	60	63.5	62.0	95	95	95	95.0
	S 4	40	45	55	46.7	60	50	60	56.7
C	S 1	30	40	38	36.0	45	55	74.2	58.2
	S 2	40	50	65	30.0	45	60	82.5	62.5
	S 3	40	40	46.5	42.2	18	27	34	26.3
	S 4	40	50	62.5	50.8	35	45	60	46.7
B_H	S 1	50	67	80.5	65.8	50	60	70	60
	S 2	47.5	60	80	62.5	55	75	95	75
	S 3	45	60	73.5	59.5	57.5	72.5	87.5	72.5
	S 4	50	65	81.0	65.3	62.5	75	95	77.5
B_L	S 1	30	50	60	46.7	30	40	45	38.4
	S 2	35	49	42.5	42.2	20	30	47	32.3
	S 3	48	53.5	67.5	56.3	51	60	77	62.7
	S 4	37.5	50	59.0	48.8	59	65	78	67.3

Table 22--Continued

Collective behavior experiment and subject (S)		Collective Behavior							
		First 60				Second 60			
		89	103	118	Mdn	89	103	118	Mdn
A	S 1	60	75	90	72.5	60	62.5	90	71.8
	S 2	45	60	65	50.0	52.5	60	75	62.5
	S 3	45	60	75	60.0	47.5	62.5	85	65.0
	S 4	55	65	72.5	64.2	45	55	75	61.7
B	S 1	55	65	75	65	67.5	75	85	74.2
	S 2	60	77.5	100	79.2	65	80	100	81.7
	S 3	102.5	100	100	100.8	90	90	90	90.0
	S 4	50	65	75	63.3	65	65	75	68.3
C	S 1	65	60	64.5	63.2	60	60	85	68.3
	S 2	52.5	55	85	64.2	45	57.5	81	61.2
	S 3	28	31.5	41	33.5	23	30	37	30.2
	S 4	40	60	90	63.3	40	60	60	53.3
B_H	S 1	62.5	65	85	70.8	60	77.5	82.5	73.3
	S 2	47.5	80	102.5	67.5	57.5	80	95	77.5
	S 3	52.5	67.5	90	70.0	70	87.5	95	84.2
	S 4	75	92.5	110	92.5	95	110	125	110.0
B_L	S 1	40	60	80	60.0	50	65	85	66.7
	S 2	25	41	64	43.3	25.5	35	50	36.8
	S 3	68	73.5	105	82.2	78	98	115	97.0
	S 4	45	52.5	62	53.2	50	62	75	62.3

Table 23

Original Intermediate "Group" Member's Median Judgments in All Conditions for All Subjects

Collective behavior experiment and subject (S)		"Group"				Final Alone			
		89	All 103	60 118	$\overline{Mdn}$	89	All 103	60 118	$\overline{Mdn}$
A	S 1	55	80	85	70.5	67.6	85	92.5	81.3
	S 2	50	65	85	63.3	42.5	60	75	59.2
	S 3	60	77.5	85	74.2	75	80	95	83.3
	S 4	55	70	80	66.7	67.5	82.5	100	83.2
B	S 1	65	90	100	85	80	100	120	100.0
	S 2	75	87.5	100	88.3	70	90	100	86.7
	S 3	84	90	107.5	93.5	105	125	132.5	120.8
	S 4	50	80	90	73.3	55	70	77.5	67.5
C	S 1	77.5	100	120	99.2	42.5	55	70	82.5
	S 2	80	95	122.5	99.2	75	90	110	91.7
	S 3	75	95	120	96.7	25	30	50	35.0
	S 4	65	80	100	81.7	20	24	30	24.7
B_H	S 1	100	75	120	98.7	55	75	90	73.3
	S 2	102.5	120	130	116.8	85	95	107.5	95.8
	S 3	92	110.5	130	110.8	70	85	100	85.0
	S 4	76	111	142	109.7	65	85	100	83.3
B_L	S 1	60	75	85.5	73.5	60	70	75	68.3
	S 2	55	70	85.0	66.7	60	65	80	68.3
	S 3	55	72.5	90	72.5	60	85	90	78.3
	S 4	65	70	80	71.7	65	75	80	73.3

Table 23--Continued

Collective behavior experiment and subject (S)		Collective Behavior							
		First 60				Second 60			
		89	103	118	Mdn	89	103	118	Mdn
A	S 1	70	80	92.5	80.8	65	75	90	76.7
	S 2	50	65	80	65.0	45	65	80	63.3
	S 3	70	80	95	81.7	70	80	95	81.7
	S 4	70	77.5	100	82.5	60	70	97.5	75.8
B	S 1	70	100	115	95.0	75	100	110	95
	S 2	77.5	90	100	89.2	70	87.5	100	85.8
	S 3	100	100	110	103.3	100	112.5	122.5	111.7
	S 4	62.5	80	110	84.2	70	90	110.0	86.7
C	S 1	76	85	105	88.7	62.5	75	92.5	76.7
	S 2	80	90	120	96.7	87.5	92.5	110.0	96.7
	S 3	40	60	100	66.7	30	45	55	43.3
	S 4	25	37.5	40	34.2	25	30	35	30.0
B_H	S 1	55	82.5	105	80.8	67.5	82.5	110	86.7
	S 2	80	95	97.5	90.8	75	97.5	97.5	90.0
	S 3	85	110	110	101.7	90	100	110	100.0
	S 4	83.5	100	120	101.2	92.5	107.5	120	107.5
B_L	S 1	61.5	73.5	89.5	74.7	75	88.5	125	96.2
	S 2	45	65	80	63.3	60	67.5	85	70.8
	S 3	52.5	65	90	69.2	62.5	80	105	82.5
	S 4	60	70	77.5	69.2	67.5	75	82.5	75.0

Table 24

Original High "Group" Member's Median Judgments in All Conditions for All Subjects

Collective behavior experiment and subject (S)		"Group"				Final Alone			
		89	All 103	60 118	Mdn	89	All 103	60 118	Mdn
A	S 1	80	100	105	95.0	60	72.5	90	78.5
	S 2	80	90	105	91.7	72.5	80	95	82.5
	S 3	80	85	110	91.7	47.5	65	85	65.8
	S 4	75	80	110	88.3	57.5	70	87.5	71.7
B	S 1	150	125	144	136.3	85	120	150	118.3
	S 2	125	150	150	141.7	100	150	200	150.0
	S 3	100	120	160	126.6	80	100	120	100.0
	S 4	100	110	125	111.7	95	100	110	101.6
C	S 1	110	132.5	160	134.2	85	100	112.5	99.2
	S 2	100	125	150	124.2	95	100	115	103.3
	S 3	110	122.5	155	125.8	94	113.5	139	115.5
	S 4	100	120	140	120.0	80	100	120	100.0
B_H	S 1	105	130	152.5	125.8	117	130	145	130.8
	S 2	122.5	150	180	150.8	60	75	82.5	72.5
	S 3	90	130	180	133.3	70	50	87.5	69.2
	S 4	110	135	165	136.7	70	95	120	95.0
B_L	S 1	95	125	152.5	127.5	57.5	80	97.5	75 0
	S 2	112	141	167.5	140.2	Lost from experiment			
	S 3	112	137.5	157.5	136.7	70	97.5	120	95.8
	S 4	128	150	150	142.7	70	80	90	80.0

Table 24--Continued

Collective behavior experiment and subject (S)		Collective Behavior							
		First 60				Second 60			
		89	103	118	$\overline{Mdn}$	89	103	118	$\overline{Mdn}$
A	S 1	70	90	97.5	85.8	65	80	97.5	80.8
	S 2	60	70	90	76.7	50	60	72.5	60.8
	S 3	50	72.5	90	70.8	42.5	60	77.5	61.0
	S 4	62.5	72.5	90	81.7	60	75	85	73.3
B	S 1	100	120	140	120.0	100	120	150	123.3
	S 2	125	150	175	150.0	120	150	200	156.7
	S 3	70	80	120	90.0	70	100	120	96.7
	S 4	97.5	100	110	102.5	90	100	110	100.0
C	S 1	90	120	145	118.3	87	118.5	140	115.2
	S 2	80	100	120	100.0	70	90	110	90.0
	S 3	82.5	105	125	104.2	75	95	110	93.3
	S 4	90	110	120	106.7	80	100	120	100.0
B_H	S 1	100	127.5	147.5	125.0	115	135	160	136.7
	S 2	50	70	85	68.3	60	75	90	75.0
	S 3	60	90	110	86.7	60	87.5	110	85.8
	S 4	82.5	117.5	130	110.0	95	110	125	110.0
B_L	S 1	42.5	58.5	82.5	61.2	50	75	87.5	70.8
	S 2	72	88	103	87.7	79	98	118.5	98.5
	S 3	61.5	75	97	77.8	75	88.5	130	97.8
	S 4	80	100	110	96.7	90	107.5	110	102.5

Table 25

"Group" and Collective Behavior Norms or Medians

Collective behavior experiment		"Group" Condition				Collective behavior condition			
		89	103	118	$\overline{Mdn}$	89	103	118	$\overline{Mdn}$
	L	35	45	55	45.0				
A	I	52.5	70	85	69.2	55	70	80	68.3
	H	75.0	80	110	88.3				
	L	45	57.5	60	54.2				
B	I	70	90.0	95	85.0	80	100	110	96.7
	H	100	120.0	150	123.3				
	L	40	42.5	52	44.8				
C	I	70	85.0	100	85.0	60	75	90	75.0
	H	110	125.0	150	128.3				
	L	50	65.0	82.5	65.8				
B_H	I	83	120.0	130.0	110.0	80	92.5	110	94.2
	H	107.5	137.5	150.0	131.6				
	L	38	50	57.5	48.5				
B_L	I	65	75	85.0	75.0	65	75	95	78.3
	H	107	140	155.0	134.0				