BEHAVIORAL FORCES THAT ARE A FUNCTION OF ATTITUDES AND COGNITIVE ORGANIZATION

by

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TABLE OF CONTENTS

Chapter 1.

a

The Problem

"A person likes to be with the people he likes" and "a person likes to be with things he likes" are truisms. "A person dislikes to be with things he dislikes" and "a person dislikes to be with people he dislikes" are also truisms. Yet from these truisms we can derive a causal system which, if valid, would greatly aid in our understanding of those aspects of an individual's behavior which are a function of his attitudes and his perception of the social situations wherein he finds himself.

The ideal realization of the above truisms would be a world where the person is with all the things and people he likes and separated from all the things and people he dislikes. Were he omnipotent he would set up such a world.

But the person is not omnipotent. He perforce has relationships with other people who are, to a greater or lesser degree, independent of him and have independent attitudes. In attempting to establish the ideal separation of the liked and the disliked he must include them with their independent systems of likes and dislikes.

Let us call the people whom the person likes - friends, and the people with whom he is associated - associates. If

the person's friends and associates have the same attitudes he has, he will have no problem. They will all be happy with each other, no one will have anything to do with the disliked; the situation will be harmonious. But if a friend or associate likes a thing or activity that the person dislikes a problem will arise. The ideal separation of liked and disliked will become an impossibility. If the person will maintain his relationships with such a friend or associate he will indirectly maintain relationships with disliked entities, yet at the same time the person does not wish to break his relationships with that friend or associate; the situation will be disharmonious.

Let us call the people whom the person dislikes - enemies, and those with whom he has no association - strangers. Now, if the person shares no attitudes with his enemies and with strangers, the situation will be harmonious, the ideal separation will be realizable. Everything the person likes will be disliked by his enemies and by strangers, while everything they like will be disliked by him. If the above will share some attitudes with the person disharmony will result, the ideal separation will be unobtainable. The existence of common attitudes will establish a bond between the person and the enemy or stranger.

The above implies that, in the ideal state, association with another person or thing is tantamount to having a positive attitude towards that person or thing; lack of asso-

ciation with a person or thing is tantamount to having a negative attitude towards that person or thing.

To the extent that in a real life situation a person perceives relationships that correspond structurally to the above schemata, his behavior, all other things being equal, will be predictable on their basis. If the perceived system of relationships will be structurally disharmonious, the person will attempt to establish harmony; if it be perceived as structurally harmonious, he will resist all change.

This paper reports on an experiment performed to test a hypothesis formulated by Heider (4) based on the above considerations. The hypothesis states that a person wants the other people he likes (friends) and those with whom he is associated (associates) to like and/or be associated with the things he likes and/or is associated with, and to dislike and/or be disassocated from the things he dislikes and/or is disassociated from. In other words: friends and associates should like and be associated with the same things and should dislike and be disassociated from the same things. Conversely, a person wants the other people he dislikes (enemies) and those from whom he is disassociated (strangers) to dislike and/or be disassociated from the things he likes and/or is associated with, and to like and/or be associated with the things he dislikes and/or is disassociated from. In other words: enemies and strangers should not like or be associated with the same things, the one liking or being

associated with the things the other dislikes or is dis-associated from.

When a person perceives himself to be in a social situation in which one or both of the above systems of relationships hold, the situation is said to be harmonious for him. If, on the other hand, one or both of the above systems do not hold, i.e., one of his friends or associates dislikes a thing he likes, etc., or if an enemy or stranger likes a thing he likes, etc., the situation is said to be disharmonious for him. When a person perceives himself to be in a disharmonious situation, a state of tension is engendered within him. This tension will be reduced by restructuring the situation to achieve harmony. His behavior will then lead him away from disharmony and towards harmony. It can therefore be said that harmonious situations have a positive valence whereas disharmonious situations have a negative valence.

We will limit the discussion to situations which involve the person, another person, and a thing or activity. If we represent the person by the symbol "p", the other person by the symbol "o", and the thing or activity by the symbol "x", and if we represent the relationship of liking by the symbol "/L", of disliking by the symbol "-L", of being associated with by the symbol "/U", and of being disassociated from by the symbol "-U", we can represent the situations dealt with by the hypothesis in a symbolic notation.

The relationship of friendship then becomes: "p/Lo", of associates: "p/Uo", of enemies: "p-Lo", and of being a stranger: "p-Uo". The person liking a thing becomes: "p/Lx", being associated with a thing: "p/Ux", etc.; the other person liking a thing becomes: "o/Lx", being associated with a thing: "o/Ux", etc. For example: a situation where friends dislike the same thing would be written: p/Lo, p-Lx, o-Lx; a situation where an enemy is associated with a thing liked by the person would be written: p-Lo, p/Lx, o/Ux.

We can subsume the relationships "/L", "-L", "/U", and "-U" under the symbol "R". The following triad would then completely define all possible social situations dealt with by the hypothesis:

pRo, pRx, oRx.

This reads: The person has some relationship with another person, the person has some relationship with a thing, the other person has some relationship with the same thing.*

Inspection will show that if all three "R"s are positive or if any two "R"s are negative the situation will be harmonious. The harmony of the first condition, that of three positive "R"s is self-evident. In regard to the second condition, that of two negative "R"s and one positive "R",

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*Note: Hereafter the symbol "R" when appearing without a sign will refer to both positive and negative relationships, when appearing as "/R" it will refer to "/L" and "/U" only, when appearing as "-R" it will refer to "-L" and "-U" only.

analysis shows that the two members of the pair having the positive relationship are isolated from the third member of the situation by the two negative relationships. For example: p-Lo, p/Ux, o-Lx - the enemy does not like a thing with which "p" is associated - is a harmonious situation.

On the other hand, if but one of the "R"s is negative and the other two "R"s are positive, the situation will be disharmonious. In this case, one member of the pair having a positive relationship will have a positive relationship with the third member, while the second member of the pair will have a negative relationship with the third member. For example: p-Lx, p/Ux, o/Lx - the enemy likes a thing with which "p" is associated - and: p/Lo, p-Lx, o/Lx - "p" dislikes a thing his friend likes - are disharmonious situations.

b

Early Experiments

The present hypothesis is a generalization of an earlier hypothesis concerning phenomenal causality (3). The point made by the earlier hypothesis was that the valence of a thing is often more a function of the valence of the maker of the thing than of its own intrinsic merits. The process can also be reversed. When meeting a newcomer and being told that he is responsible for a cerain event towards which we already have some attitude, our attitude towards the event will greatly influence our attitude towards the newcomer. These are strivings for harmony. He who makes and that which was made are a causal unit. If the elements within a perceived unit have different valences for "p", the situation is disharmonious.

An experiment by Horowitz, Lyons, and Perlmutter (5) specifically tests this early hypothesis. Members of a small discussion group were asked to rate each other in terms of degree of benefit of the individual to the group. They were also asked to rate a series of actions that occurred during the discussion in terms of degree of benefit to the group. Analysis then showed that there was a significant correspondence between an individual's rating of the initiator of the action and his rating of the action.

Using the mean group rating as a standard it was found that those who rated an individual as being more beneficial than the mean rating tended to rate the actions he initiated as being more beneficial than the mean rating; similarly, those who rated an individual as being less beneficial than the mean rating tended to rate the actions he initiated as being less beneficial than the mean rating.

The present writer performed two preliminary experiments before the experiment now reported on (6). In the first experiment close to 100 subjects (all subjects in the following three experiments are members of the standard introductory class psychology students population at the University of Kansas) were presented with ten situations printed on separate sheets of paper. The actual form of presentation of these situations to the subjects was practically the same as the form of presentation of the situations to the subjects in the main experiment to be reported. Because the form will be discussed fully below, its description will be omitted for the present. The subjects were instructed to play the role of "p" and were asked a) if they found themselves in such a situation, would they prefer to let it stand, or change it; b) if they preferred to change it what changes would they make?

Since there were five harmonious situations and five disharmonious situations the general prediction was that

the subjects would let the harmonious situations alone and would change the disharmonious situations so that harmony be established. By and large this prediction was realized. A close analysis of the data showed that there were also other factors affecting the subjects' responses independent of harmony and disharmony. For instance, when indicating the change they would like to make in a situation, the greatest number of subjects changed the relationship of the pair "oRx" while very few of them changed the relationship of the pair "pRo". Some forms of harmonious situations were consistently changed to a different form of harmony. And there was internal evidence in the subjects' verbal comments that some forms of disharmonious situations were definitely preferred to others.

Several sub-hypotheses were formulated that seemed to account for this. On the basis of the general hypothesis and the sub-hypotheses three general predictions could be made: a) that harmonious situations would be preferred to disharmonious situations; b) that certain specific hamonious situations would be preferred to other specific harmonious situations; and c) that certain specific disharmonious situations would be preferred to other specific disharmonious situations. These predictions were tested in another experiment.

In the second experiment 125 subjects were given six sets of four situations each. Again they were instructed to play

the role of "p". They were asked to rate each set of four situations from 1 to 4 in order of preference. The predictions of all but one of the sub-hypotheses were substantiated.

These early experiments had two main faults. The data did not lend themselves to a fine analysis but merely to a crude yes or no validation of the hypotheses. It was felt that each of the sub-hypotheses should be tested directly, independent of the others. The second fault was the arbitrary sample of situations tested. No precautions were taken to determine whether the sample was representative or not. It was felt that a truly representative sample should be chosen for a test. It would be even better were the whole population of possible social situations involving "p", "o", and "x", and the four possible relationships between any pair of these three be submitted to a test.

c

The Final Formulation of the Hypotheses

The present formulation of the hypotheses was reached after the data of the ranking experiment were analyzed. There are four specific hypotheses:

1. Harmonious situations are preferred to disharmonious situations.

2. Positive relationships ("+R") are preferred to negative relationships ("-R).

3. "L" relationships (whether positive or negative) are more potent than "U" relationships (whether positive or negative).

4. The relationship "R" of the first pair "pRo", is more potent than the relationship "R" of the second pair "pRx", and both these relationships are more potent than the relationship "R" of the third pair "oRx".*

The process of rating a situation was deemed to be a twofold one. First the subject responded to the overall aspect of harmony and disharmony. This determined whether

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Note: By potency the enhancement of valence is meant. Operationally we could say that "p" would rate an object of positive valence of high potency as being pleasanter than an object of positive valence of low potency; conversely, "p" would rate a negative valence object of low potency as being pleasanter than a negative valence object of high potency.

the subject found the situation to be pleasant or unpleasant, tension producing or not. The actual degree of pleasnatness and unpleasantness is then determined by the conjunction of the other three hypotheses.

On the basis of hypotheses 2 and 4 we would predict that the harmonious situations where the first pair has the relationship "≠R", i.e., "p≠Ro", would be preferred to the harmonious situations where the first pair has the relationship "-R", i.e., "p-Ro". The same would hold for the disharmonious situations. When the "pRo" component is the same for two situations, then the situation having the component "p≠Rx" will be preferred to the situation having the component "p-Rx". We can summarize the order of preference thus:

1. p≠Ro, p≠Rx.
2. p≠Ro, p-Rx.
3. p-Ro, p≠Rx.
4. p-Ro, p-Rx.

Examination will show that the third component ("oRx") will determine whether the situation is harmonious or disharmonious but will not change the order. If the component "o≠Rx" is added to 1. above we get the most preferred form of the harmonious situations; if the component "o-Rx" is added to 1. we get the most preferred form of the disharmonious situations. If the component "o-Rx" is added to 2. above we get the second preferred form of harmonious

situations; if "o≠Rx" is added, we get the second preferred form of disharmonious situations. The same holds for 3. and 4.

Since, by hypothesis, all harmonious situations are preferred to all disharmonious situations we can formulate eight different forms of positive and negative relationship distributions of decreasing preference. It can be seen that these eight duplicate the order of the four forms given above, first for the harmonious situations and then for the disharmonious situations.

1. p≠Ro, p≠Rx, o≠Rx.
2. p≠Ro, p-Rx, o-Rx.
3. p-Ro, p≠Rx, o-Rx.
4. p-Ro, p-Rx, o≠Rx.
5. p≠Ro, p≠Rx, o-Rx.
6. p≠Ro, p-Rx, o≠Rx.
7. p-Ro, p≠Rx, o≠Rx.
8. p-Ro, p-Rx, o-Rx.

Situations described by form 8. as having three "-R" relationships are considered by Heider to probably be psychologically meaningless. They were specifically excluded from his general hypothesis. They were included in the present experiment for the sake of systematic completeness.

By combining hypotheses 3 and 4 we can construct a series of decreasing potency in a similar manner. A harmonious sit-

uation having the component "p/Lo" will be preferred to a harmonious situation having the component "p/Uo"; conversely, a disharmonious situation having the component "p/Uo" would be preferred to a disharmonious situation having the component "p/Lo", i.e., we would rather have a conflict with an associate than with a friend.

If we take form 1. in the preceding series we can substitute the following "L" and "U" relationships in an order of decreasing valence:

Form 1. p/Ro, p/Rx, o/Rx.

1. p/Lo, p/Lx, o/Lx.
2. p/Lo, p/Lx, o/Ux.
3. p/Lo, p/Ux, o/Lx.
4. p/Uo, p/Lx, o/Lx.
5. p/Lo, p/Ux, o/Ux.
6. p/Uo, p/Lx, o/Ux.
7. p/Uo, p/Ux, o/Lx.
8. p/Uo, p/Ux, o/Ux.

Two comments have to be made about this order of potency. a) there is no apriori way to determine whether situation 4 is more potent than situation 5, i.e., that the "L" relationships of the second and third component together are more potent than the "L" relationship of the first component by itself. The decision is arbitrary. It is based on a subjective feeling of neatness and a feeling that

two "L" relationships somehow define a situation better than does one "L" relationship. b) Situation 8 is again a special case. Heider thinks that three "U" relationships are too tenuous a system to hold a situation together. He therefore also excludes these types of situations from his hypothesis. They were included in the present experiment again for the sake of systematic completeness. This completeness relates specifically to the sub-hypotheses with which Heider did not deal.

This order of potency can be applied to every form of the decreasing preference series in a manner similar to its application to form 1. A total population of sixty-four distinct social situations is therefore derivable.

For every form which defines a harmonious situation, the more potent situation will be preferred to the less potent situation (forms 1 through 4). For every form which defines a disharmonious situation, the less potent situation will be preferred to the more potent situation. Consequently the universe of sixty-four distinct situations can be given a hypothetical rank order of preference. This rank order is shown in table 1. Since the situations are uniquely defined by the order of preference and by the order of potency, they can be represented in an 8x8 table, the abscissa giving the order of preference and the ordinate, the order of potency. Such is table 1. Every cell in this table defines one social

situation. The number within the cell gives the situation's hypothetical valence, or preference rank order.

Table 1.

Universe of Situations and their Hypothetical Valence Ranking								
	1 +/+/+	2 +/--	3 -/+/-	4 --/+	5 +/+/-	6 +/-/+	7 -/+/+	8 ---
1 LLL	1	9	17	25	40	48	56	64
2 LLU	2	10	18	26	39	47	55	63
3 LUL	3	11	19	27	38	46	54	62
4 ULL	4	12	20	28	37	45	53	61
5 LUU	5	13	21	29	36	44	52	60
6 ULU	6	14	22	30	35	43	51	59
7 UUL	7	15	23	31	34	42	50	58
8 UUU	8	16	24	32	33	41	49	57

The specific aim of the experiment was to validate this rank order of preference.

Note on Table 1. The three plusses (+/+/+) in column 1 stand for form 1, p+Ro, p+Rx, o+Rx, of the preference series given on page 11. The one plus and two minuses (+/--) in column 2 stand for form 2, p+Ro, p-Rx, o-Rx, of the same series. This holds for the rest of the columns. The rows represent the decreasing order of potency. A cell is defined by a column and a row. Replacing the first "R" implied in the column by the first relationship given in the row, the second "R" by the second relationship, and the third "R" by the third relationship, we get a unique situation. Hence, it can be seen that the cells 1 through 8 define the eight situations derivable from form 1 that are found on page 12. And so on for the rest of the forms. Since columns 1 through 4 define harmonious situations, the more potent situations with these columns are preferred to the less potent situations; since columns 5 through 8 define disharmonious situations, the less potent situations within these columns are preferred to the more potent situations.

Chapter II

The Experiment

The rationale behind the experiment is simple. Hypothesis 1 says that the social situations with which it deals can be experienced by "p" as being either pleasant or unpleasant, preferred or not preferred, and/or tension creating or non-tension creating. The sub-hypotheses say that this is not a simple all or nothing dichotomy, but a continuum from a hypothetically most pleasant, most preferred, least tension creating situation to a hypothetically least pleasant, least preferred, most tension creating situation. Here, as before, it is necessary to have the subject play the role of "p" and respond in a measurable way. In the earlier experiments the subjects either said how they would change the situation they presented with or ranked various situations in order of preference. These measures were crude, however, and not amenable to internal analysis.

A much simpler method of measurement suggested itself. Since, in terms of the hypothesis, the concepts of tension, preferredness, and pleasantness deal with the same thing, why not have the subjects rate each situation on a scale for degree of pleasantness. To validate the hypothesis the mean order of the ratings would have to approximate the rank order valence of Table 1.

This meant that many subjects would have to rate many situations. It is well known that when many subjects are doing many tasks two important sources of variance are introduced: individual differences and the effect of serial presentation (learning, habituation, practice effect, satiation, etc.). If this variance be unaccounted for it would greatly decrease the sensitivity of possible statistical tests for signigicances of differences. Also, were the design limited to the finding of the mean ratings of the situations only, the statistical proof of differences that are significant would be clumsy. Over two thousand separate T tests would have had to be calculated.

Analysis of variance offers a tailor made design for such a problem, it is the Latin Square. In this design the variance attributable to individual difference and serial presentation can be tested for and, if found to be significant, excluded from the error term, thereby greatly senstizing the statistical tool. It also immediately determines whether the independent variables, in this context generally called treatments, had a significant effect. If the treatment effect is found to be significant, partitioning of the treatment sum of squares enables the testing of the various hypotheses directly. (Partitioning will be discussed more fully below.) The design offers a statistical tool far more sensitive than a battery of T tests and much more labor saving.

The Latin Square has one great drawback for the specific problem of interest here. Like all analysis of variance designs the Latin Square prescribes certain restrictions. In order to estimate the effect of individual differences and of serial presentation each treatment must be given to every subject and has to appear in every position of the serial order. If the number of treatments is small this presents no problem. In the present experiment, however, there are sixty-four treatments. To meet with the restrictions it would therefore be necessary to have sixty-four subjects each rate sixty-four situations.

This is the drawback. To have a subject rate sixty-four situations differing minutely from each other is a long, arduous, and tiring task.

There is a lesser known design called the Lattice Square which achieves the same objectives as the Latin Square without, in the present case, necessitating every subject to rate each of the sixty-four situations. Instead, what is required is a group of seventy-two subjects each rating eight situations. These groups of eight are so arranged that every pair of situations appears in one and only one group. It is this restriction which permits the calculation of the effects of individual difference. A similar restriction enables the calculation of the effects of serial presentation. The design and calculations are given in Cochran and Cox (1), Chapter 12.

The above seventy-two subjects can be divided into nine groups of eight subjects each, each group rating all the sixty four situations once. Such a group of subjects can be represented by an 8x8 block; it is this block, the lattice square, which gives the design its name. The lattice square has eight rows, each row representing a subject, and every row has eight cells, each cell representing a situation that is given to the subject. The cells in the first column of the block are the situations presented first to the subjects, those in the next column are the situations next presented to the subject, etc.

The restrictions of the Lattice Square can now be restated in a more technical language. In order to balance a Lattice Square the blocks have to be replicated until every treatment is paired with every other treatment once, and once only, in a column and in a row. When the number of treatments is sixty-four, nine block replications are required. These nine replications can themselves be replicated as much as desired. In the present experiment they are replicated four times. Hence there are a total of thirty-six block replications each having eight subjects, i.e., two hundred and eighty-eight subjects were necessary for the whole experiment. Each situation was rated thirty-six times.

There was some question whether the sexes would rate the situations equally. By balancing the subjects for sex, significance of sex differences could be tested for. This was

achieved by having all male subjects for two replications of the basic nine blocks and all female subjects for the other two.

If care were to be taken to administer the various block replication as units, the replication sum of squares , if significant, would indicate that the different administrations of the scale had a differential effect on the ratings. In the present experiment this was not controlled too well. There are overlappings in some block replications of two administrations. By and large, however, the block replication sum of squares does represent the effect of different administrations.

The calculation of the treatment sum of squares, the replication sum of squares, and the sex-difference sum of squares is conventional. It is the row and column sum of squares that have to be calculated in a new way.

To summarize: The Lattice Square was found to be a most convenient statistical design for the experiment. By having two hundred and eighty-eight subjects rate randomized samples of eight situations each meeting specific restrictions, it enabled the testing for and control of the variance attributable to a. the situations, b. subject individual difference, c. effects of serial presentation, d. effects of different administrations, and e. sex-differences effect.

The administration of the experiment was by groups. The subjects were given the scales which consisted of ten mimeographed sheets stapled together. The first two sheets were the instructions and the last eight sheets had each a situation and a rating scale. The eight situations in any given scale corresponded to a row in one of the block replications.

The scale was a line eight-nine millimeters long. It had three anchor points: the left marked "best", the mid-point marked "neutral", and the right end marked "worst". The subjects were told they could use any part of the scale in rating the situations.

In scoring the ratings a stright edge graduated in millimeters was placed next to the scale, the left end of the scaled lined up with the number 10 on the straight edge. Then the number corresponding to the subject's mark was read off. The best possible rated situation was scored as 10. The worst possible rated situation was scored as 99. The higher the score the more tension evoking the situation was rated as.

The instructions told the subjects: a. that they were participating in an attempt to establish a method to measure the pleasantness of possible social situations, b. the various terms and elements used in the description of the situations, c, that they were to play the role of "p", and d. how to use the rating scale.

The situations were presented in an abstract form similar to the notational form. The person "p" was replaced by "I", "/L" and "-L" by "like" and "dislike", and "/U" and "-U" by "have some sort of bond or relationship" and "have no sort of bond or relationship". The symbols "o" and "x" were defined and left unchanged. For example: the situation p/Lo, p-Ux, o/Lx was presented to the subject as: I like O, I have no sort of bond or relationship with X, O likes X. (See appendix for a copy of the instructions, the scale, and the complete list of situations as they were presented to the subjects.)

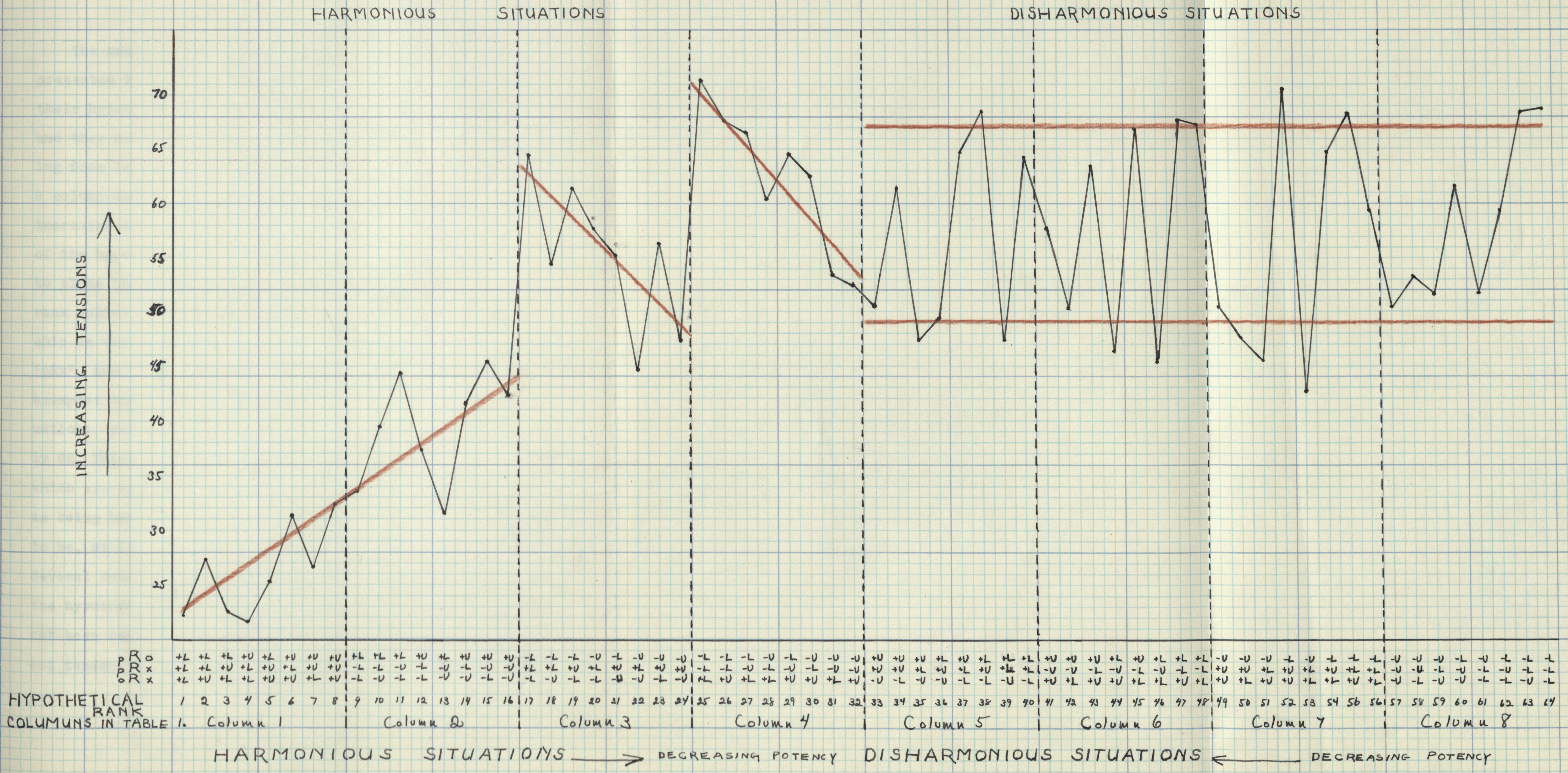
The advisability of this abstract presentation may be questioned. Two reasons determined its use. The subject is told to play the role of "p" and is then told that "p" has some attitude towards an abstract person or thing. If we concretize the person or thing it may often occur that the subject, in real life, may have a different attitude towards the concret object than the attitude prescribed in the situation. If, on the other hand, the subject concretizes the situations for himself, he will most probably consider concrete objects that fit the prescribed attitudes.

The second reason is probably more important. The hypotheses are understood to hold "all other things being equal". It is doubtful whether concretely we can ever find a case where all other things are equal. By having the sub-

ject consider an ideal abstract case we probably approach the condition where "all other things are equal" most closely. This is also the reason why we must be satisfied with a verbal statement of preference rather than a behavioral indication of preference.

TABLE 2

SITUATION MEAN RATINGS AND THEIR GENERAL DIRECTION OF CHANGE



CHAPTER III

Results

The mean ratings of the situations are graphically presented in Table 2. The abscissa gives the situations in their hypothetical ranking, their respective relationships, and they are broken down into the columns of Table 1. Going from left to right the potency of the situations within a column decreases when the situations are harmonious and increases when the situations are disharmonious in terms of the hypothesis. In order to define the situation we have to place the three relationships above the hypothetical rank number into their respective pairs. The first relationship is that of "pRo", the second relationship is that of "pRx", and the third relationship is that of "oRx". For example: the thirtieth situation in rank order is the situation: p-Uo, p-Lx, o/Ux and its mean rating is approximately 62. Those situations rated as less than 55 are those which are basically pleasant, those above 55 are rated as being basically unpleasant. The red lines show what seems to be, at first glance, the general tendency of the curve. Several outstanding features are immediately evident. First the hypothetically expected increasing linear function has not been realized. Instead there are four distinct different tendencies.

Situations 1 to 16, columns 1 and 2, show a linear rise as expected. Situations 17 to 24 and 25 to 32 show a decrease in tension with a decrease in potency, while the situations in column 4 are rated as being more unpleasant on the average than the situations in column three. This rated decrease in tension with decrease in potency is very interesting. We defined potency before in terms of subjective preference saying that the less potent, unpleasant situation will be preferred to the more potent unpleasant situation. We must conclude therefore that the harmonious situations in columns 3 and 4 are experienced by our subjects as tension producing, as being unpleasant. The absolute mean ratings support this conclusion also. Six of the situations in column 4 are rated as being quite unpleasant and four of the situations in column 3 are rated as being unpleasant. If we turn back to table 1 we will find that the distinguishing mark of these situations is the fact that "p" has a negative relationship with "o", (p-Ro).

The disharmonious situations seem to be divided, with some exceptions, into two groups, one rated as being highly unpleasant while the other as slightly pleasant. Checking back to table 2 we find that the situations in columns 5,6, and 7, all have two "/R" relationships and one "-R" relationship. The situations in these three columns are rated as being highly unpleasant when the "-R" relationship is "-L", <u>regardless of the pair involved</u>; and they

are rated as lightly pleasant when the "-R" relationship is "-U", again regardless of the pair. The situations in column 8 all have three "-R" relationships. The pattern here is similar to the previous though not as well defined. Here however the situations which have the pair with the relationship "p-Lo" are rated as being definitely unpleasant while those having the pair with the relationship "p-Uo" are rated as being slightly pleasant.

Table 3 gives the overall analysis of variance.

Table 3

Analysis of Variance				
Component	df	ss	mss	F ratio
1. Replications (Administrations)	35	25,243	721	2.44**
2. Treatments (Situations)	63	427,491	6,786	22.93**
3. Rows (Indiv. Diff.)	252	113,636	451	1.52**
4. Columns (Ser. Present.)	252	76,939	305	1.03
5. Sex	1	1,095	1,095	3.69
6. Error	1,700	502,801	296	
Total	2,303	1,147,205		
** Significant at the 1% level. * Significant at the 5% level.				

The effects of components 1. Group presentation, 2. the Experimental Social Situations, and 3. Individual Differences, are all significant at the 1% level. The effects of components 4. Serial presentations, and 5. Sex Difference, are not significantly different from error.

As was to be expected on the basis of the graph alone, the analysis of variance shows that the situation sum of squares is highly significant. The ratings of these situations cannot be attributed to chance but are a function of the differences among them. The overall analysis of variance does not tell us what they are. Since the curve deviates from the one expected on the basis of the hypotheses, they too cannot serve as an explanation for the results.

We still have to check whether our hypothetical factors as such had any effect, and if they did, was it the predicted effect. A refinement of the method of analysis of variance enables us to do so with relative ease. This refinements is called "partitioning" or the subdivision of the treatment sum of squares.

In the overall analysis of variance we partition the total sum of squares and attribute them to the orthogonal components set up in the design and to experimental error. (In the present experiment the components were the groups, the treatments, the individual subjects, the order of pre-

sentation, and the sex of the subject.) When we say that components are orthogonal to each other we mean that the estimate of the effect of any one of them is independent of the possible effect of any of the other components in the design. In the F test we establish whether the variance attributable to the component is significantly greater than that which could be attributed to experimental error. If this is not the case, we cannot say that the component in question had any effect on the results. (In our experiment this happened to components 4. Serial Presentation and 5. Sex Differences.) The number of degrees of freedom attributable to each component and to the experimental error must add up to the total number of degrees of freedom of the experiment.

In an analogous way we can partition the sum of squares of any component provided that the component has more than one degree of freedom. Mathematical rules (Cochran and Cox, pp. 55 - 64) enable us to establish orthogonal partitions of one or more degrees of freedom. A complete partitioning will account for all the degrees of freedom of the component and the sum of squares of the individual partitions will add up to the total sum of squares attributed to that component. (This is analogous to the overal analysis of variance where the degrees of freedom of the components and of erro add up to the total sum of squares.) An F test will then show if the variance attributable to a partition is

significantly greater than the error variance. A partition is essentially like a Student t test of significance of the various differential effects of the elements making up the component. In fact, as Cochran and Cox show, all the information gained by partitioning can be gotten by individual t tests. The calculations however are generally more laborious.

By means of partitioning the treatment sum of squares we can test directly or indirectly for the effects of the various elements on the ratings of the situations. Because of the rules determining orthogeneity between partitions this is not as simple a matter as the testing of the effects of the general components of the overall analysis of variance. Only one of the hypotheses can be tested in one partition, it is the differential effects of harmony and disharmony. One other can be tested by means of three partitions, the differential effects of "/R" and "-R". A third hypothesis, the differential effects of "L" and "U", needs six partitions to be tested. And the fourth hypothesis, that of differential pair effect, cannot be tested at all directly, but must be inferred indirectly from the above 10 partitions. Table 4 gives these ten partitions. Since each partition is an independent source of variance it can be considered to represent the effect of an independent factor that affects the rating of a situation. Each factor is identified by means of a letter which will also identify the

partition referring to that factor. The first partition will be called partition "A", the second, partition "B", etc.

Let us examine partition "A" more closely. It tests for the significance of the difference of the mean scores of the situations having p/Ro, i.e., the person has a positive relationship with the other person, and p-Ro, i.e., the person has a negative relationship with the other person. The mean score of the "p/Ro" situations is 45.23, the mean score of the "p-Ro" situations is 58.05. This difference is highly significant, above and beyond the 1% level. We conclude therefore that /R is greatly preferred to "-R", when they are the relationship of the pair "p" and "o". Similarly, partition "B" shows that "/R" is again greatly preferred to "-R" when they are the relationship of the pair "p" and "x". The sum of squares of partition "B" is smaller than the sum of squares of partition "A". This indicates that the difference of the means in partition "A" is greater than the difference of the means of partition "B". This is what would be expected if the pair "p" and "x" had a lower potency than the pair "p" and "o"; the direction of the effect is the same in both cases but the magnitude of the effect differs. Partition "C" completes the picture. Again "/R" is preferred to "-R", when they are the relationship of the pair "o" and "x"; but the preference is here so small that the difference is significant only

at the 5% level instead of the 1% level. This too is explainable in terms of differential pair potency. Since all other elements comprising the situations are balanced, i.e., equally represented in both the "/R" and "-R" situations, the significant difference in means must therefore be attributed to the differential effects of "/R" versus "-R". On the average, therefore, "/R" is preferred to "-R".

Table 4

Partitioning of Situation (Treatment) Sum of Squares			
Factor	Factor Ident.	Sum of Squares	Means
p/Ro - p-Rx	A	94,672**	p/Ro: 45.23 p-Ro: 58.05
p/Rx - p-Rx	B	24,898**	p/Rx: 48.63 p-Rx: 54.65
o/Rx - o-Rx	C	1,850*	o/Rx: 50.74 o-Rx: 52.54
p/Lo - p/Uo	D	1,284*	p/Lo: 44.19 p/Uo: 46.27
p/Lx - p/Ux	E	894	p/Lx: 47.75 p/Ux: 49.51
o/Lx - o/Ux	F	2,512**	o/Lx: 49.26 o/Ux: 52.22
p-Lo - p-Ux	G	46,246**	p-Lo: 64.39 p-Uo: 51.71
p-Lx - p-Ux	H	10,380**	p-Lx: 57.65 p-Ux: 51.65
o-Lx - o-Ux	I	13,517**	o-Lx: 55.97 o-Ux: 49.10
Har. - Dis.	J	76,717**	Har.: 45.87 Dis.: 57.41

* Significant at 5% level ** Significant at 1% level
Note: Every partition has 1 degree of freedom.

Partitions "D" through "I" test the hypothesis that the relationship "L" is more potent than the relationship "U". We would now expect that the ratings of the situations having the relationship "L" would indicate less tension than the ratings of the situations having the relationship "U" when these relationships are positive. The means for the situations tested in partitions "D", "E", and "F" show that it is so. Conversely, "U" should indicate less tension than "L" when the relationships are negative. The means for the situations tested in partitions "G", "H", and "I" show that it also is so.

We do not find, however, in these six partitions the differential effects of pair potency as in the first three partitions. We would expect that the sum of the squares of partitions "D" and "G" to be larger than the sum of the squares of partitions "E" and "H", and that both these be larger than the sum of the squares of partitions "F" and "I". But it is not so.

These ten partitions show that, on the average, the best estimate of the effects of the various hypothetical components of the situations conform to the predicted effects. How then are we to explain the deviations from the predicted ranking so obviously demonstrated in Table 2?

Two clues exist as to the direction of further analysis

in order to explain Table 2. The first is in the table itself; it is the difference in the curve when the situations are harmonious and when the situations are disharmonious. The second is the fact that the ten partitions account for only 272,770 of the total sum of squares of 427,491 attributable to the treatments. The latter clue tells us that we have neglected major sources of variance that contributed to the situation sum of squares; the former clue tells us that they are probably the interactions between the factors "A" through "I" (the partitions testing the sub-hypotheses) with the factor "J" (the partition testing the major harmony hypothesis). These interactions, if significant, mean that the effects of factors "A" through "I" vary with harmony and disharmony.

We will therefore add a continuation to Table 4 which gives the interaction partitions of the nine factors "A" through "I" with the harmony factor "J".

Before discussing the continuation of Table 4 let us note that now we account for 395,783 of the situation sum of squares. This is close to 93% of the total accounted for in 19 out of 63 degrees of freedom. Dividing the remainder of the treatment sum of squares, 31,708 by the remaining unaccounted degrees of freedom, 44, we get an average of 720 for each degree of freedom. This average is not significant. We can therefore assume that we have found all the significant

Table 4 (continuation)

Partitioning of Situation (Treatment) Sum of Squares		
Interaction	Sum of Squares	Means
AJ	100,238**	Har. p/Ro: 32.86 p-Ro: 58.88 Dis. p/Ro: 57.60 p-Ro: 57.22
BJ	10,079**	Har. p/Rx: 40.77 p-Rx: 50.97 Dis. p/Rx: 56.49 p-Rx: 58.32
CJ	911	Har. o/Rx: 44.35 o-Rx: 47.39 Dis. o/Rx: ,57.13 o-Rx: 57.69
DJ	993	Har. p/Lo: 30.90 p/Uo: 34.83 Dis. p/Lo: 57.49 p/Uo: 57.70
EJ	436	Har. p/Lx: 40.50 p/Ux: 41.03 Dis. p/Lx: 54.99 p/Ux: 57.99
FJ	63	Har. o/Lx: 43.16 o/Ux: 45.60 Dis. o/Lx: 55.36 o/Ux: 58.82
GJ	4,001**	Har. p-Lo: 63.35 p-Uo: 54.40 Dis. p-Lo: 65.42 p-Uo: 49.02
HJ	5,841**	Har. p-Lx: 51.72 p-Ux: 50.22 Dis. p-Lx: 63.58 p-Ux: 53.08
IJ	451	Har. o-Lx: 50.19 o-Ux: 44.58 Dis. o-Lx: 61.74 o-Ux: 53.64

Table 4 (cont.) SS 123,613
Total SS 395,783

components of the treatment sum of squares. This does not mean that there are no more partitions orthogonal to the above that will be significant. It means that the probability of finding them is small. And if some are found, they would not be too meaningful in terms of our theoretical framework. We therefore do not consider it worth while to seek more.

Examining partition "AJ" we see that it is highly significant. Comparing the means we see that "p/Ro" is greatly preferred to "p-Ro" in harmonious situations, but there seems to be no difference in preference between the two in disharmonious situations.

In other words, when the situations are harmonious, the mere fact of a positive or negative relationship between "p" and "o" is enough to determine that the situations will be rated as being pleasant or being unpleasant. Harmonious situations involving friends and associates are pleasant, harmonious situations involving enemies and strangers are unpleasant. As far as the disharmonious situations are concerned this seems to play no role whatsoever.

The same tendency is exhibited in partition "BJ". Here, however, we have instead of complete equality of the means of "p/Rx" and "p-Rx" a slight preference of the former; this preference is much smaller than the preference of "p/Rx" in the harmonious situation. Partition "CJ" is not signif-

icant statistically, but it too exhibits the same pattern as the above two. We may therefore conclude that the above interactions show that as far as the relationships "/R" and "-R" are concerned, they exhibit a significant effect in determining the ratings when the situations are harmonious; they have a much reduced, if any effect, when the situations are disharmonious.

Partitions "DJ", "EJ", and "FJ" are not statistically significant. Offhand this would mean that the effect of "/L" and of "/U" is the same in harmonious situations as it is in disharmonious situations. If partitions "D", "E", and "F" would have been highly significant, this would have been the proper conclusion to reach. Turning back we see that partition "D" is just significant at the 5% level, partition "E" is not significant, and only partition "F" shows significance at the 1% level. The effects of this comparison ("/L" versus "/U") are therefore quite small and not much differentiated from the effects of random sampling error. We therefore think that it would be also proper to conclude that because of this small initial effect the partitions do not tell us anything as to the effect of interactions of harmony and disharmony with these elements.

Partitions "GJ", "HJ", and "IJ" refer to the difference in the effects of "-L" and "-U". The first two are significant, the third is not. They all however exhibit the same

Pattern. In both harmony and disharmony "-U" is preferred to "-L"; the preference is much greater, however, in disharmony than in harmony. The effect of the comparison "-L" versus "-U" is much greater in disharmony than in harmony.*

The effect of the interaction of harmony and disharmony on pair potency is not immediately discernable in looking at the continuation of Table 4. However, if we take the means of this table and arrange them, as in Table 5, separated for harmony and disharmony, and for elements and pairs, a clear pattern emerges.

When we examine the means in the column "Harmony" we find that, without exception, the predictions of the pair-potency effect have been verified. For all the elements that were hypothetically positive ("≠R", "≠L", and "≠U") the first pair is most preferred, the second pair is less preferred, and the third pair is least preferred; for all the elements that were hypothetically negative ("-R", "-L", and "-U") the third pair is most preferred, the second pair less preferred, and the first pair least preferred.

For the means of the column "disharmony" no such pattern, with the exception of "-L", is to be found. Differential

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*Note: The magnitude of the effect of a comparison can be measured by the difference in means. Giving the difference of the harmonious situations first and the disharmonious second, we have: for "GJ", 8.95 and 16.40; for "HJ", 1.50 and 10.50; and for "IJ", 5.61 and 8.10.

Table 5

Interaction of Pair Effects with Partition J				
Pair	Harmony		Disharmony	
	≠R	-R	≠R	-R
p and o	32.86	58.88	57.60	57.22
p and x	40.77	50.97	56.49	58.32
o and x	44.35	47.39	57.13	57.69
	≠L	≠U	≠L	≠U
p and o	30.90	34.83	57.49	57.70
p and x	40.50	41.03	54.99	57.99
o and x	43.16	45.62	55.36	57.69
	-L	-U	-L	-U
p and o	63.35	54.40	65.42	49.02
p and x	51.72	50.22	63.58	53.08
o and x	50.19	44.58	61.74	53.64

pair potency has no effect. It also seems reasonable to presume that the pattern of the element "-L" in the "Disharmony" column is not due to pair potency effect. This for two reasons. First, the spread between the first and third score is only, in round numbers, 4, whereas the spread between the pairs in the "Harmony" column ranges from 10 to 13. Second, the difference between the first and second pair is approximately equal to the difference between the second and third pair. With the situations in the "Harmony" column, with the exception of

"-U", the difference between the first and second pair is always much larger than the difference between the second and third pair. We would therefore attribute the apparent order of the element "-L" in the "Disharmony" column to chance variation. That being the case we may conclude that the differential pair potency effect is observed only in the harmonious situations and not in the disharmonious situations.

We can summarize the partition results now as follows: Partitions "A" through "J" verify the main hypotheses of harmony versus disharmony and the sub-hypotheses of "/R" versus "-R" and "L" versus "U". Partitions "A" through "C" lend verification to the sub-hypothesis of differential pair potency, but the others do not. The interaction partitions indicate that the differential effect of "/R" vs "-R" and of "/L" vs "-L" is evident in the harmonious situations but is barely evident, if at all, in the disharmonious situations. Table 5 shows that the same holds for the pair potency effect. On the other hand the differential effect of "-L" vs "-U" is much greater in the disharmonious situations than in the harmonious situations.

We are now faced with a dilemma. From a statistical standpoint we have finished our analysis of the results. 93% of the sum of squares attributed to the situations was accounted for in 19 orthogonal partitions all relating to

to the original hypotheses. The hypotheses have been formally verified. The difficulty lies with the main effects, partitions "A" through "J". What is the psychological sense in saying that "/R" is preferred to "-R" when our interactions show that it is true for only 50% of the situations? There is even a more glaring discrepancy in partition "J". In terms of the statistical model we would be justified in saying that harmonious situations are preferred to disharmonious situations. But this is plainly absurd. Table 2 shows that there is a large number of harmonious situations rated as being unpleasant and a large number of disharmonious situations rated as being slightly pleasant. The statistical means used for the tests of significance hide this.

The main effects are but averages of the interaction means, hence all they tell us is that if we treat the 64 situations en bloc, disregarding their internal differences, the main effect would be the best estimate of the factors involved. This is quite a general and crude measurement. The interactions estimate the effects of the elements taking other factors into consideration (in the present instance, harmony vs disharmony). The interactions therefore present a truer picture of the causal nexus than do the main effects. We will henceforth then disregard the means tested in partitions "A" through "J" and prefer those of the interaction partitions as a better resume of the results. These are the means presented in Table 5.

The decision to use the interaction means leaves us without a statistical estimate of the differential effects of harmony and disharmony. Table 2 shows the following: all harmonious situations having the relationship "p/Ro" (friends and associates) are rated as being pleasant while all the disharmonious situations having the relationship "p-Ro" (enemies and strangers) are rated as being unpleasant (this is justified by the fact that the preference of these situations decreases with increase in potency); the disharmonious situations in columns 5, 6, and 7 are rated as mildly pleasant if they have the relationship "-U", but are rated as quite unpleasant if they have the relationship "-L"; and finally the situations in column 8 are rated as mildly pleasant if they have the relationship "p-Uo" and are rated as unpleasant if they have the relationship "p-Lo". Half of the harmonious situations are rated as unpleasant and half of the disharmonious situations are rated as pleasant. Obviously pleasantness and unpleasantness per se are not the main criteria differentiating harmony and disharmony. Unpleasantness is determined by "p-Ro" in harmony and by "-L" and "p-Lo" in disharmony

These conclusions cannot be tested by partitions orthogonal to the partitions in Table 4. This implies that they are not independent of the factors tested there. Table 5, however, does show that for the harmonious situations the mean of the situations having "p/Ro" is 32.86, while the

mean of the situations having "p-R" is 58.88. Partitions "A" and "AJ" show that this is statistically significant. At the same time the means of the situations having "p-Rx" and "o-Rx" are 50.97 and 44.35 respectively, i.e., the latter two means are not rated as being unpleasant. Hence we think that the assertion that "p-Ro" determines the rating of unpleasantness of harmonious situations is justified. (As added confirmation we repeat the fact that preference decreases with decrease in potency for the situations having "p/Ro" while it increases with decrease in potency for the situations having "p-Ro".)

If we now average the means for the means for the situations having "-L" and "-U" in the disharmonious column of Table 5 we get: "-L" is 63.91 (quite unpleasant) while "-U" is 51.91 (mildly pleasant). These means are also derived from significant partitions (with the exception of partition "IJ"). This serves to justify the second statement above, that unpleasantness of disharmonious situations is a function of "-L". (Column 8 is a special case since it has three negative relationships.)

Before summarizing we should note that harmony does influence and enhance the rating of pleasantness nevertheless. The situations rated as being pleasant in harmony (those having "p/Ro") have a much lower mean rating than those rated as being pleasant in disharmony (those having "-U"). This is the reason for the significant difference in means in partition "J".

We can now summarize the results. The effects predicted by the sub-hypotheses were found in the harmonious situations but not in the disharmonious situations. In the latter only "-L" vs "-U" had a measurably significant effect. The other elements had a much smaller, if any, effect in the disharmonious situations than they did in the harmonious situations. On the other hand, "-L" vs "-U" has a much stronger effect in harmony than in disharmony. This difference in the effects of the different elements seems to be the major differentiating characteristic of harmony and disharmony and not pleasantness and unpleasantness. Harmony, however, does enhance pleasantness. The criterion for pleasantness and unpleasantness differs for harmony and disharmony. Harmonious situations are rated as pleasant if "p" is with a friend and/or associate, but they are rated as unpleasant if "p" is with an enemy and/or stranger. Disharmonious situations are rated as pleasant if, excluding the situations with three "-R" relationships, the one "-R" relationship they contain is "-U", but are rated as unpleasant if the "-R" relationship is "-L".

Chapter IV

Discussion

In this experiment we exposed a group of subjects to a group of imaginary social situations and had them respond to the situations. These responses were quantified. The situations were broken down in terms of changing components along various dimensions. Subsequent analysis of the responses showed that, on the average, they changed significantly with changes in the situational components. The specific changes caused by the components were identified; a causal nexus was demonstrated. We still have, however, to discuss the psychological significance of all this.

Let us first turn to the problem of harmony and disharmony. First let it be said that in his formulation of the general hypothesis Heider never discusses harmony and disharmony (he calls them balanced and imbalanced states, by the way) in terms of preference. He does say: "If no balanced state exists, then forces towards this state will arise. ... If a change is not possible, the state of imbalance will produce tension." Disharmony is then a state from which an individual tries to get away, while harmony is the state towards which an individual strives. It seemed therefore legitimate to coordinate these locomotions to expressed feelings of pleasantness and unpleasantness. Does the fact that, at first glance, the data do not seem to verify this mean that Heiders basic

contention is wrong? We do not think so. Let us examine the observed differences between harmony and disharmony.

We can resummarize the conclusions of the previous chapter regarding harmony and disharmony as follows: in the harmonious situations all the sub-parts that go to make up the situation play a noticeable role in determining the rating of the situation; in the disharmonious situations the determining role of one element (sub-part) is greatly enhanced, while the role of the others is greatly diminished, if they have an effect at all.

Gestalt psychology recognizes the difference between a strong and weak gestalt. The accepted definition of the strength of a gestalt is the one formulated by Kohler in his monograph: "Die physischen Gestalten in Ruhe und im stationaren Zustand". This monograph is not translated into English, but it is abstracted in Ellis' "Source Book in Gestalt Psychology" (2). Unfortunately Ellis does not give the definition proper. He summarizes Kohler's discussion of strong and weak gestalten, which in the original is 19 pages long, into the following paragraph:

> "The mathematical treatment of strong and weak Gestalten is discussed. Natural structures are instances of the former. The following is an example of a weak Gestalt ... : a number of conductors, so isolated that there is but a negligible reciprocal influence between them, are connected by fine wires. When a charge is introduced into this system an electric current passes along the wires until there is a uniform potential throughout and hence a static state is reached. Nevertheless the structures assumed by the charge upon each conductor are (almost wholly) the natural

> structures of each. In other words, ... the structural moments of each conductor are in principle dependent upon the conditions of the whole system but in extreme cases their specific articulation is not noticeably influenced by specific events in remote parts of the system; the articulation of such limited events depends instead upon the systemic conditions within each region itself. ... The determining parts of a weak gestalt, (e.g., the several strong Gestalten ...) are finite in number. A weak Gestalt is nevertheless a Gestalt as may be determined by reference to the v. Ehrenfels criteria." (p. 29)

Concerning physiological gestalten we find:

> "As with inorganic physical Gestalten, so here we may distinguish degrees of inner conherence within the system. Thus, although the moments of each minute region are in principle dependent upon the conditions of the entire system, their dependence varies according to a distance function such that the determining influence exerted by topographical conditions in adjacent areas is greater than that of more distant ones. In extreme cases (here as with the Gestalten of physics) the specific articulation of limited regions is no longer noticeably dependent upon specific topographical features of other regions. In these cases although the "total moments" of such areas are mutually dependent, the specific articulations of limited regions develop relative only to the systemic conditions of each region alone. (Compare the distinction between strong and weak Gestalten.) As regards spatial articulation or structure, such limited and internally coherent regions can thus be relatively independent - without impairing the Gestalt coherence of the entire system upon which the Gestalt moments still depend." (p. 37)

Koffka (7, p. 650) summarizes the definition by saying that the strength of a gestalt is a function of the degree of interdependence of its subparts.

The picture of strong and weak gestalten that emerges is the following. Given a gestalt with subparts, a change in one of the subparts will have a greater or lesser effect on the others. To the extent that the change affects the totality, the gestalt is strong, to the extent that it does not, the gestalt is weak. As the gestalt weakens the sub-parts begin

to emerge as gestalten in their own right. The state can be reached where one can deal with the subparts as gestalten proper as well as dealing with them as subparts of a larger weak gestalt.

The dynamics of perception of strong and weak gestalten have yet to be investigated. We assume that a special case of these dynamics would be the following.* Given elements of differential potency, i.e., high and low, in isolation, and combining them to form strong and weak gestalten, the elements of high potency would have a weaker effect on cognition in the strong gestalten than in the weak gestalten, whereas the elements of low potency would have a weaker effect on congnition in weak gestalten than in strong gestalten.

Let us take for example a weak gestalt. The element of highest potency will imediately catch our attention so that we will pay a corresponding lesser attention to the other elements. Changes in the elements of lower potency will have little if any effect upon us. On the other hand, changes in

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*Note: When discussing perception we will be using the term "ptency" in a slightly different sense than up to now. Until now "potency" was used as a measure of effect, the more potent an element was said to be, the greater a predicted effect was anticipated. Now when we say that an element is potent we will mean that it draws our attention - the more potent the element is the more of our attention it draws. Considering attention to be a finite atptitude we may say that if we are confronted with an elemnt of very high potency we will not be able to attend to elements of lesser potency. Examples of this in every day life are fairly common.

the element of high potency will immediately be attended to without any mitigating influence of the others.

In a strong gestalt this would not occur. By definition, the element of high potency cannot monopolize our attention to the exclusion of the other elements. Changes in the low potency elements will then be noticed and responded to while changes in the high potency element will be mitigated by the unchanging elements of lower potency.

In the experiment, the subject was told to imagine himself as being in a social situation; this is equivalent to perceiving himself to be in a social situation. Hence we have a perceptual process where the elements constituting the situations were varied systematically. The effects of the systematic variation of each element was then estimated independently of the effects of the other elements. In a given configuration of elements, all of them had noticeable effect; in another condifuration, disharmony, one of them had a greater effect than in harmony, while the others had a much smaller effect than in harmony, if any. On the basis of the above assumption we may conclude that harmony denotes that the configuration of elements constitutes a strong gestalt, while disharmony denotes that the configuration of elements constitutes a weak gestalt.

The law of pragnanz states that every gestalt tends to

become as "good" as possible. A strong gestalt because of its greater interdependence of its subparts is, in this respect, "better" than a weak gestalt. The choice of emotive non-objective words to describe pragnanz is not fortuitous. It is somewhere here that the objective foundation for values will be found. Harmony is therefore "better" than disharmony.

Since gestalten are not merely and-summations of their constituent elements they are not arbitrary configurations. In order for elements to form a gestalt they must meet with certain criteria which were formulated by Wertheimer in his five laws of gestalt. These laws are empirical; despite Kohler's efforts we doubt that a physical explanation that carries conviction has, as yet, been formulated to justify them. Psychologically they are all characterized by being highly proper and accepted; so much so that generations of perception psychologists did not even dream of investigating the phenomena. That things that are alike are lumped together, or that proximal points are lumped together seems to be truisms. Structures that form gestalten evoke a psychological tone of propriety and goodness* which is lacking in mere and-summation aggregates.

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*Note: Goodness is used here in the sense meant in Chapter 1 of Genesis where the Lord saw that the light was good. In this usage "good" is more a synonym of propriety than of pleasantness. Because of this we will henceforth restrict ourselves to using the term "proper" only.

Harmony is therefore a proper state of affairs. Propriety is not equivalent to pleasantness. Oedipus accepts his lot as being proper, but under no circumstances can it be said that he considers it to be pleasant. We might try to explain conscience in terms of what we consider to be proper conflicting with what we consider to be pleasant, or agreeing with what we consider to be unpleasant. Harmony is proper because all the elements in the situation "fit", because all the forces acting upon "p" are in agreement. The fittedness and agreement is lacking in disharmony.

What then did determine the rating of pleasantness or unpleasantness? In the harmonious situations we saw that those having the relationship "p/Ro" were rated as being pleasant, while those having the relationship "p-Ro" were rated as being unpleasant. But in the disharmonious situations the rating is determined on another basis. For all situations having two "/R" relationships and one "-R" relationship pleasantness or unpleasantness is determined on the basis of the "-R" relationship <u>independent of the pair.</u> If the "-R" relationship is "-L" the situation is rated as being unpleasant, if the "-R" relationship is "-U" the situation is rated as being pleasant. In the situations having three "-R" relationships the determinant of pleasantness is "p-Ro". Here again when "-R" is "-L" the situation is rated as being unpleasant, when "-R" is "-U" the situation is rated as being pleasant.

Underlying our whole discussion there was a tacit assumption that these four relationships are points on a continuum, "/L" and "-L" being the end points while "/U" and "-U" being intermediary points. Now it makes psychological sense to say that the relationship of association implies a positive attitude, i.e., associates tend to be friends; but it does not follow that lack of association implies a negative attitude, i.e., strangers tend to be enemies. Lack of association ("-U") is in this sense undefined. Since strangers might just as well end up being friends as being enemies the relationship does not imply any attitude, i.e., it has a zero attitudinal value.

If this be the case, then the situations having two "/R" relationships and a "-U" relationship are not really disharmonious, they are incomplete. Their completion would tend to "p/Lo" since the other two pairs of the situation have positive relationships. To put it in common sense terms, when we meet a stranger who shares the same likes we do, we would tend to become friends. In the harmonious situations when we have the relationship "p-Uo" the other two relationships are in disagreement since one is positive and the other negative. The completion of the situations would now tend to "p-Lc". Again, in common sense terms, when we meet a stranger who dislikes the things we like, or vice versa, we would not tend to become friends.

Therefore the harmonious situations with the pair "p-Uo" are rated as unpleasant while the disharmonious situations with the same pair are rated as pleasant. The same explanation holds for the situations with three "-R" relationships. The situations with "p-Uo" are rated as being pleasant because of the common dislikes of "p" and "o".

The same holds for the disharmonious situations where the "-U" relationship is that of the other two pairs. Consequently all the disharmonious situations with two "/R" relationships and one "-R" relationship are rated as pleasant when the "-R" relationship is "-U". Table 5 however shows us that the harmonious situations rated as pleasant, those having "p/Ro", have a mean of 32.86, while the disharmonious situations rated as pleasant have an approximate mean of 51.91 ((49.02 / 53.08 / 53.64) ÷ 3). This high difference in rating must be attributed to the joint influence of pleasantness in conjunction with harmony.

This discussion has an important implication. If we decide that (-U) is a "zero" attitude then those situations in the disharmonious side of the graph which have it are really not disharmonious. Hence all the "real" disharmonious situations are actually rated as being unpleasant. This does not vitiate our previous argument concerning strong and weak gestalten. Disharmonious situations are then both unpleasant per se and are also weak gestalten.

To return to our discussion as to the psychological determinants of pleasantness. The positive attitude turns out to be an independent factor. The situation is pleasant when we are with persons we like; it is unpleasant when we are with persons we dislike. This factor is in addition to the factor of disharmony discussed in the previous paragraph.

The third psychological correlate to the factors determining the situations is potency. We believe that, in this case, at least, potency is correlated to interpersonal regions. If the element affects a peripheral interpersonal region it will be of low potency and to the extent that it affects regions that are more central it will gain in potency. This implies that in a given situation "p" and "o" need not be the most potentpair. If a thing refers to regions more central to "p" than "o" does, it will be more potent in determining the forces acting on "p". It is only in an abstract situation that "o" will be more potent. All other things being equal, men are more important than things.

We can now summarize our discussion on the psychological significance of our findings. Firstly, the propriety and fittedness of the perceived structural organization of the elements showed up in the fact that the subjects responded to the harmonious situations as if they were strong gestalten. This was related to Kohler's thesis that value has also

an objective basis in the inherent organizational structure of the perceived world leading to a "good" gestalt. Secondly, two determinants of the rating of pleasantness and unpleasantness were found: positive attitudes to "o" against negative attitudes to "o" and, if we consider "-U" as a zero attitude, disharmonious situations. Thirdly, we equated potency with the interpersonal regions to which an element refers equating degree of potency with degree of centrality. The ratings where therefore determined by the perceived organization of the elements, the attitudes of the perceiver, and the degree of centrality of the elements to the perceiver.

Regarding the hypothesis we have shown that harmonious situations differ strikingly from disharmonious situations; that "real" disharmonious situations are deemed to be unpleasant; that harmonious situations can be either pleasant or unpleasant depending on "pRo"; that positive attitudes are preferred to negative attitudes; that "L" is more potent than "U"; and that "pRo" is more potent than "pRx", and both are more potent than "oRx". (The last conclusion is a general statement which, for individual cases, might not be right.)

SUMMARY

An experiment was performed to test a number of hypotheses developed from a general hypothesis formulated by Heider. The general hypothesis states that harmonious social situations, situations where the elements that bear the same attitude are together and are separated from elements that bear the opposite attitude, are preferred to disharmonious situations, situations where the separation is not achieved.

The specific hypotheses tested were: 1. Harmonious situations will be rated as being more pleasant than disharmonious situations. 2. Positive relations between a person and another person or impersonal entities are deemed to be more pleasant than negative relationships. 3. Relationships of liking or disliking are more potent than relationships of being associated with or of not being associated with. And 4. the relationship between a person and another person is more potent than the relationship between the person and the thing, and both are more potent than than the relationship between the other person and the thing.

The experiment consisted in presenting all possible combinations of the elements dealt with in the above hypotheses to groups of subjects and have them rated for degree of subjective pleasantness. Analysis of the ratings by analysis of variance showed that, by and large, the effects predicted by the hypotheses were realized. There is one major

deviation from the hypothetical expectations. Harmony and disharmony were differentiated by the subjects not on the basis of pleasantness or unpleasantness but were responded to as if they were strong and weak gestalten.

Pleasantness was more a function of attitudes than of harmony proper, though, careful analysis showed, that a strong argument can be made for the effects of harmony and disharmony on the pleasantness, unpleasantness judgements. These effects are as predicted. An arugument was also brought forth saying that the relationship of non-association has a zero attitude value while the relationship of association has a weak positive attitude value.

We then analyzed the ratings as being a function of three major psychological determinants. They are: the objective requirements or propriety of the situations independent of subjective attitudes, the gestalt properties; the attitudes of the subjects; and the degree of centrality of the various components of the situation for the subjects.

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APPENDIX

Example of Instructions and Rating Sheets Given to Subjects

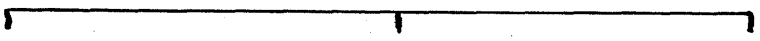
This is an attempt to establish a sensitive scale that discriminates the degree of pleasantness of social situations. You will be given a series of eight situations and will be asked to rate them in terms of pleasantness, or lack of tension, and unpleasantness, or presence of tension. Imagine yourself as being a participant in the situation.

Besides yourself there will be another person (denoted by O) and a thing (denoted by X). The social relationships existing between you and the other person, between you and the thing, and between the other person and the thing will be given. Only four relationships are used: "to like", "to dislike", "to have some sort of bond or relationship with","to have no sort of bond or relationship with".

The "thing" in the situation does not have to be limited to concrete objects. It could also stand for such things as a club, a game, an ideal, a hobby, a particular state of affairs, etc. It must, however, be something that can be shared without conflict by both persons in the situation; there is enough for both of them. If this precaution is not taken a fifth social relationship may unintentionally be introduced - "If I have the thing the other persona cannot have it, and vice versa." - and this is not desirable.

The situations are, of necessity, represented in a somewhat abstract form. There will be three statements in each situation; each statement will refer to a given relationship between two members of the situation. The first statement will always pertain to you and the other person; the second statement will always pertain to you and the "thing"; the third statement will always pertain to the other person and the "thing".

The Scale



The scale is a line with three given points: the two end-points and a mid-point. The first end-point represents the position of the best conceivable, most pleasant social situation in which you can imagine yourself as a participant. The last end-point represents the position of the worst possible, tensest, most conflictful situation in which you can imagine yourself as a participant. The mid-point represents the position of a neutral situation, a situation having no degree of pleasantness or unpleasantness whatsoever.

Two steps should be taken in rating a situation.

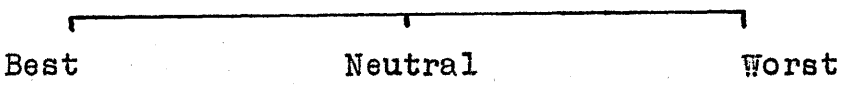
First decide whether the situation will or will not be unpleasant, as far as you are concerned. If you think that you will not experience any tenseness or discomfort in it, its position is obviously to the left of the neutral mid-point and within the half of the scale whose end-point is marked "best". If you think that you will experience some tension or discomfort, regardless of degree, its position is obviously to the right of the neutral mid-point within the half of the scale whose end-point is marked "worst".

After having decided what half of the scale you are going to use, try to determine the degree of pleasantness or tenseness of the situation under consideration. If you feel that the situations is one of great pleasantness where little can be changed for the better, its position is obviously very close to the end-point marked "best". If you feel that the situation is one of great unpleasantness and tenseness, where very little can be changed for the worse, its position is obviously very close to the end-point marked "worst". If you feel that the situation has but slight degrees of pleasantness or unpleasantness its position is obviously close to the neutral point. And if you feel that it is but of an average degree its position is somewhere close to the middle of the half chosen in step 1.

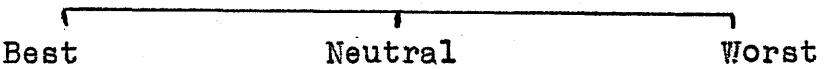
Mark the point whose position in this scale seems most adequately to represent your subjective feeling. Do not hesitate to erase a rating if, for any reason whatsoever, you feel like changing it. Before turning in this paper please check to see that you have <u>one and only one rating on each and every scale.</u>

Turn the page now and try to rate the first situation mentally. Wait until the entire group has finished reading these instructions. They will then be reread aloud and all questions answered pertaining to them. After the question and answer period proceed to rate all the situations given to you.

I like O; I like X, O likes X.



I like O; I like X; O has some sort of bond or relationship with X.



Note: The other situations were presented on separate sheets in an identical format. They will therefore not be reproduced any further.

The other situations as they were presented to the subjects:

I like O; I have some sort of bond or relationship with X; O likes X.

I have some sort of bond or relationship with O; I like X; O likes X.

I like O; I have some sort of bond or relationship with X; O has some sort of bond or relationship with X.

I have some sort of bond or relationship with O; I like X; O has some sort of bond or relationship with X.

I have some sort of bond or relationship with O; I have some sort of bond or relationship with X; O likes X.

I have some sort of bond or relationship with O; I have some sort of bond or relationship with X; O has some sort of bond or relationship with X.

I like O; I dislike X; O dislikes X.

I like O; I dislike X; O has no sort of bond or relationship with X.

I like O; I have no sort of bond or relationship with X; O dislikes X.

I have some sort of bond or relationship with O; I dislike X; O dislikes X.

I like O; I have no sort of bond or relationship with X; O has no sort of bond or relationship with X.

I have some sort of bond or relationship with O; I dislike X; O has no sort of bond or relationship with X.

I have some sort of bond or relationship with O; I have no sort of bond or relationship with X; O dislikes X.

I have some sort of bond or relationship with O; I have no sort of bond or relationship with ^; O has no sort of bond or relationship with X.

I dislike O; I like X; O dislikes X.

I dislike O; I like X; O has no sort of bond or relationship with X.

I dislike O; I have some sort of bond or relationship with X; O dislikes X.

I have no sort of bond or relationship with O; I like X; O dislikes X.

I dislike O; I have some sort of bond or relationship with X; O has no sort of bond or relationship with X.

I have no sort of bond or relationship with O; I like X; O has no sort of bond or relationship with X.

I have no sort of bond or relationship with O; I have some sort of bond or relationship with X; O dislikes X.

I have no sort of bond or relationship with O; I have some sort of bond or relationship with X; O has no sort of bond or relationship with X.

I dislike O; I dislike X; O likes X.

I dislike O; I dislike X; O has some sort of bond or relationship with X.

I dislike O; I have no sort of bond or relationship with X; O likes X.

I have no sort of bond or relationship with O; I dislike X; O likes X.

I dislike O; I have no sort of bond or relationship with X; O has some sort of bond or relationship with X.

I have no sort of bond or relationship with O; I dislike X; O has some sort of bond or relationship with X.

I have no sort of bond or relationship with O; I have no sort of bond or relationship with X; O likes X.

I have no sort of bond or relationship with O; I have no sort of bond or relationship with X; O has some sort of bond or relationship with X.

I like O; I like X; O dislikes X.

I like O; I like X; O has no sort of bond or relationship with X.

I like O; I have some sort of bond or relationship with X; O dislikes X.

I have some sort of bond or relationship with O; I like X; O dislikes X.

I like O; I have some sort of bond or relationship with X; O has no sort of bond or relationship with X.

I have some sort of bond or relationship with O; I like X; O has no sort of bond or relationship with X.

I have some sort of bond or relationship with O; I have some sort of bond or relationship with X; O dislikes X.

I have some sort of bond or relationship with O; I have some sort of bond or relationship with X; O has no sort of bond or relationship with X.

I like O; I dislike X; O likes X.

I like O; I dislike X; O has some sort of bond or relationship with X.

I like O; I have no sort of bond or relationship with X; O likes X.

I have some sort of bond or relationship with O; I dislike X; O likes X.

I like O; I have no sort of bond or relationship with X; O has some sort of bond or relationship with X.

I have some sort of bond or relationship with O; I dislike X; O has some sort of bond or relationship with X.

I have some sort of bond or relationship with O; I have no sort of bond or relationship with X; O likes X.

I have some sort of bond or relationship with O; I have no sort of bond or relationship with X; O has some sort of bond or relationship with X.

I dislike O; I like X; O likes X.

I dislike O; I like X; O has some sort of bond or relationship with X.

I dislike O; I have some sort of bond or relationship with X; O likes X.

I have no sort of bond or relations with O; I like X; O likes X.

I dislike O; I have some sort of bond or relationship with X; O has some sort of bond or relationship with X.

I have no sort of bond or relationship with O; I like X; O has some sort of bond or relationship with X.

I have no sort of bond or relationship with O; I have some sort of bond or relationship with X; O likes X.

I have no sort of bond or relationship with O; I have some

sort of bond or relationship with X; O has some sort of bond or relationship with X.

I dislike O; I dislike X; O dislikes X.

I dislike O; I dislike X; O has no sort of bond or relationship with X.

I dislike O; I have no sort of bond or relationship with X; O dislikes X.

I have no sort of bond or relationship with O; I dislike X; O dislikesX.

I dislike O; I have no sort of bond or relationship with X; O has no sort of bond or relationship with X.

I have no sort of bond or relationship with O; I dislike X O has no sort of bond or relationship with X.

I have no sort of bond or relationship with O; I have no sort of bond or relationship with X; O dislikes X.

I have no sort of bond or relationship with O; I have no sort of bond or relationship with X; O has no sort of bond or relationship with X.