PHENOMENOLOGICAL BASES FOR THE ATTRIBUTION OF BALANCE TO SOCIAL STRUCTURE

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ABSTRACT

PHENOMENOLOGICAL BASES FOR THE ATTRIBUTION
OF BALANCE TO SOCIAL STRUCTURE

By

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The objective of this study was to examine how people think about social situations. In particular, the takeoff point of the paper was balance theory which asserts that some patterns of social interaction are harmonious and stable over time while other patterns are clashing and transient. Many studies have attempted to test balance theory in both its original and its revised forms by presenting subjects with tasks such as the triadic completions task in which (1) the subject is told of a group of people o, p, and q; (2) the subject is told how o and p feel about each other and how p and q feel about each other; and (3) the subject is asked to predict how o and q will feel about each other. Astoundingly, none of these studies has ever asked the subjects to report on the processes which they use to derive their predictions.

Thirty-one subjects were asked to report their reasons for making predictions to 33 hypothetical situations and their answers were categorized. The results showed

that subjects did not use either balance theory, revised balance theory, or transitivity of positive affect to explain their answers. Instead, most of them explained their predictions on the basis of inferences about common interests. Most of the subjects ascribed to some version of two principles: (1) one person will like another only if he likes the other person's interests, and (2) two people who like the same things will like each other. Thus the fact that balance theory correctly predicted the response 68% of the time is quite accidental.

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INTRODUCTION

Definitions and Assumptions

The processing of socially relevant information does not ordinarily proceed whimsically or chaotically. Indeed, it has frequently been assumed that the individual possesses a systematic "plan"--a set of general principles called cognitive schemata--which guides this information processing. These schemata provide the structure for the perception, interpretation, and evaluation of social phenomena. It is this structure which allows the individual to understand and predict the nature of interpersonal relations.

This paper considers various schemata that have been proposed for the perceived patterns of affect in groups of three people--the social triad. The affective or sentiment relation is assumed to be dichotomous. Positive and negative affect correspond to the liking and disliking relations respectively--the feelings a person has toward another person or object. This paper will consider only "symmetric" triads, i.e. triads in which each pair of people feel the same toward each other. It is also assumed that each person is either positively or negatively related to the other two people, i.e. no one is indifferent toward another. The following three statements provide an example

of such an interpersonal structure composed of one positive affective relation and two negative affective relations: Person p and Person o like each other; Person o and Person q dislike each other; and Person p and Person q dislike each other.

Since the affective relation is assumed to be dichotomous and without indifference, there are four qualitatively distinct relational patterns, including the previous example. All three relations may be positive, all three relations may be negative, one relation may be positive and the remaining relations negative, or one relation may be negative and the remaining relations positive. These patterns are illustrated in Figure 1 for the cognitive

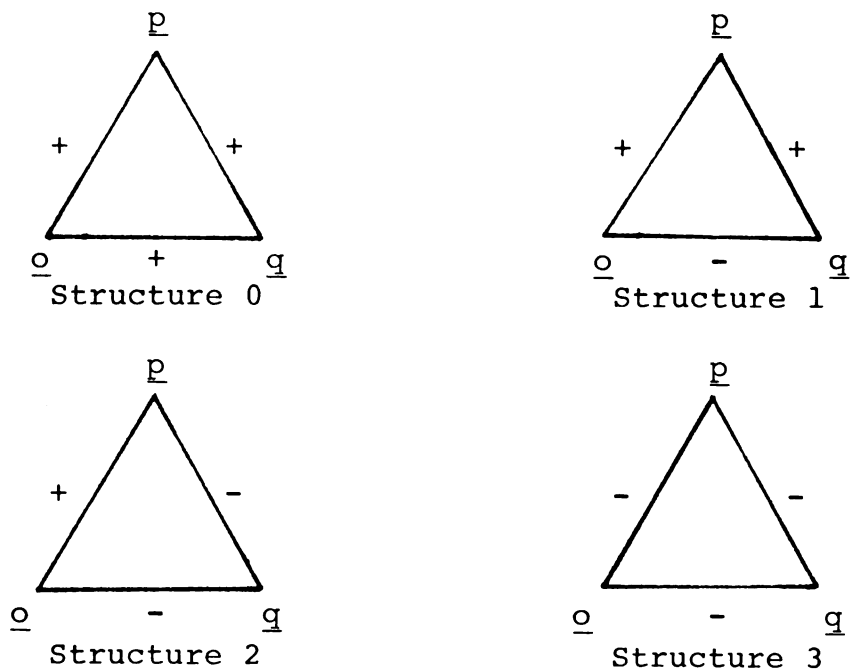


Figure 1: The four connected triadic structures for reciprocated, dichotomous affect. A "+" and "-" represent positive and negative affective relations respectively.

elements p, o, and q. The labels assigned to the four structures in Figure 1 (Structure 0, Structure 1, etc.) correspond to the number of negative affective relations in the structure. These labels are used to reference the structures throughout this paper.

Many papers have now been devoted to the following question: Are all of the structures shown in Figure 1 equally stable? Or are some of the structures likely to produce forces which will change that structure into one of the others? Heider (1944, 1946) originally labeled the structures that he believed to be stable as "balanced". However since that time, "balanced" has come to be identified with Heider's particular theory and other terms have been coined by investigators who have proposed competing theories.

A typical example of the reasoning underlying these formal theories is the following hypothetical social triad. In most families there would be considerable conflict if a man who loves his parents plans to marry someone whom his parents dislike (Structure 1 with o as "parents"). According to Heider's balance theory this conflict would result in a shift to some "balanced" triad such as Structure 0 in which the parents have come to adopt a positive feeling toward their prospective daughter-in-law.

Balance Theory

The first formalization of affective consistency is Fritz Heider's "balance theory" (1944, 1946). The basic

explanatory principle for balance theory as expounded by Heider is the unit relation. Some factors postulated to lead to the formation of social units are similarity, proximity, ownership, familiarity, causality, and liking. For example, if Person p makes or owns Object x, p and x are a unit. If Person p and Person o like each other, p and o tend to be perceived as a social unit by others. Conversely, negative affect is a force opposed to unit formation.

According to Heider, a structure is balanced if each pair of entities which are linked by a unit relation are positively related to each other and are related in a similar way to any other entity in the structure.

In applying Heider's principles to the triads in Figure 1, there must first be an assumption concerning unit relations. The assumption normally made is that positive sentiment implies a unit relation. Given this assumption, Structure 2 is easily shown to be balanced: p and o have the only unit relation in the triad, and they each have a similar view (i.e. negative) toward the other entities (i.e. q). Structure 0 is also balanced: each pair has a unit relation and each member of that pair feels positively toward the third person. Structure 1 is imbalanced: p and o have a unit relation but they disagree in their feelings toward q.

Heider (1946) labeled Structure 3 as imbalanced on the basis of separate considerations (which he later

modified in 1958). "The case with three negative relations does not seem to constitute a good psychological balance, since it is too indetermined" (p. 110).

Cartwright and Harary (1956) developed a version of balance theory to accommodate structures with any number of entities. As a special case of that definition, the rule is obtained for Heider's balance theory for triadic structures in which all sentiments are reciprocated and in which there is no indifference. Thus Cartwright and Harary label Structures 0 and 2 as balanced and they label Structures 1 and 3 as imbalanced.

Balance Theory Reconsidered

All three central figures in the development and popularization of balance theory--Heider, Newcomb, and Davis--eventually expressed dissatisfaction with the original formulation of balance theory. Heider (1958) modified his position of 1946 by saying that the lack of balance in Structure 3 is not as extreme as the imbalance of Structure 1. Newcomb (1968) replaced his 1956 formulation by a new principle called "positive balance theory". Davis (1967) reversed his 1963 endorsement and postulated a new principle which he called "clustering".

In the present context (i.e., symmetric triads without indifference), all three men say the same thing: Structure 3 is <u>not</u> inbalanced, only Structure 1 is inadmissible.

In 1958, Heider noted that Structure 3 has no positive affect and hence no unit relation. Thus there is nothing

in Structure 3 to contradict his balance principle as stated in terms of unit relations. Having noted this, he expressed reservations in labeling it as "imbalanced". On purely logical grounds, that which is not imbalanced must be balanced. And Heider adopted this relabeling of Structure 3, though not without a certain nostalgia for his original position: "If two negative relations are given, balance can be obtained either when the third relation is positive or when it is negative, although there appears to be a preference for the positive alternative" (1958, p. 206).

Davis (1967) noted that balance theory has one "unfortunate" implication: If a group is composed of mutually hostile cliques, then according to balance theory there can be at most two such cliques. Davis traced this implication to Structure 3 which can be viewed as a set of three mutually hostile cliques of size 1. He then proposed his "clustering theory" which labels Structure 3 as admissible.

Another affective consistency perspective concerned with triadic structure is Newcomb's positive balance theory (Newcomb, 1968; Price, Harburg & Newcomb, 1966). Newcomb argues that under certain conditions a person may be indifferent to the attitudes of another person toward a common attitude object (which may be another person). If such indifference, or low engagement exists, the situation is defined by Newcomb to be nonbalanced. A nonbalanced

triadic structure represents a state of neutrality intermediate to Heider's balance and imbalance. A nonbalanced state is characterized by an indifference which is neither pleasant and hormonious nor unpleasant and unstable.

Newcomb does not provide a substantive derivation of what constitutes engagement, though he does indicate that "engagement corresponds, loosely at least to a unit relationship" (Price et al., 1966, p. 268). It is simply stated as a hypothesis that a positive affective interpersonal relation leads to concern about the other person's attitude toward a common attitude object while negative affect implies a lack of interest in the other person's attitude. In order to differentiate his three-category classification scheme of balance and imbalance with engagement, and nonbalance with low engagement, Newcomb (1968) introduces the terms positive balance, nonbalance, and positive imbalance.

Unlike the affective consistency schemata previously discussed, Newcomb's schema requires that the consistency of a triadic structure be evaluated from the perspective of an individual within the structure. For Person p, Structure 0 is positively balanced since two people whom p cares about like each other. Structure 2 is also positively balanced since the one person p cares about, o, also dislikes q. Because the two people p cares about dislike each other, Structure 1 is positively imbalanced. Finally, Structure 3 is nonbalanced since p does not care

about o's attitude toward q or q's attitude toward o. The classification of the four structures remains the same from Person o's and Person q's perspectives, except for Structure 2 which is nonbalanced for Person q who is negatively related to both p and o.

How does the revised balance theory compare to the original? If no sentiment is indifferent, then the difference between the two approaches can be seen most easily at the level of Cartwright and Harary's structure theorem. They proved that a structure is balanced if and only if the entities may be partitioned into (at most) two mutually exclusive subsets such that all of the entities within a subset or "clique" are positively related and all relations between members of different subsets are negative. The revised versions of balance theory also imply clustering with positive relations among group members and negative relations between members of different cliques as a prerequisite for consistency. The difference is that the revised theories do not restrict the number of mutually hostile cliques to two.

The Transitivity of Positive Affect

Davis ultimately became unhappy even with his revised version of balance theory and went on to yet a third structure principle: transitivity of positive affect (Davis & Leinhardt, 1970; Holland & Leinhardt, 1971; Holland & Leinhardt, 1976). Positive affect is transitive in a

group if whenever A likes B and B likes C then A likes C. This principle differs from balance theory in two ways: First, transitivity does NOT predict that sentiments will tend to be reciprocal. In fact, the adherents of transitivity believe that unreciprocated sentiment relations are critical to the study of sociometry since unreciprocated positive regard forms the basis of social status within the group. Second, transitivity also permits three or more negatively related groups.

For purposes of this paper, the critical fact is that for symmetric triads without indifferent sentiments, the only intransitive triad is Structure 1. That is, in the present context, transitivity is equivalent to the other revised balance models. A more detailed discussion is presented in Appendix A.

Evaluation of the Theoretical Perspectives

It is very difficult to evaluate the conceptualizations of affective consistency by reviewing the many diverse empirical studies. The absence of regularity in method across the studies of affective consistency prevents a meaningful comparison of the obtained results.

At the first level of disparity, there are three prominent measures used to assess the "consistency" of a structure. In a triadic completion study (e.g., Morrisette, 1958), the subject is given two of the relations of a triadic structure and is asked to supply the missing relation. In an affective rating study the entire

triad is presented. The subject is asked to rate the pleasantness of the structure (e.g. Price et al., 1966). The dependent variable in a learning of structures study is the number of trials it takes the subject to learn the relations comprising the structure. A trial consists of the presentation of each of the relations in the structure followed by the subject's attempt to recall the relations (e.g. DeSoto, Henley & London, 1968). Those triads which are most often formed by completion, rated the most pleasant, or learned the fastest are expected to be the "balanced" triads.

The problem is that the construct validity of these measures has never been systematically determined. That is, the precise psychological characteristics measured by each dependent variable and the relation between the three dependent variables are not adequately understood. For example, Price et al. (1966) exclusively employ the affective rating method in their study which provided empirical support for positive balance theory. But recently it has been suggested that the triadic completion method and affective rating methods measure different constructs. Fuller (1974) maintains that "a distinction can readily be drawn between the tension induced by the perception of inconsistency or imbalance and the tension induced by the perception of balanced structures which contain unpleasant elements such as negative interpersonal relationships" (p. 804).

A related problem is that even those studies utilizing the same general methodology usually differ in many specific details. For example, the subject may or may not be asked to identify with one of the members of the triad; the relations may or may not be reciprocal; the third element of the triad may be an impersonal entity or another person; if the third entity is impersonal, it may or may not be specified. Again, meaningful comparison is difficult because the theoretical relevance of these variations is not understood.

The Objective of This Study

The lack of comparability in the various empirical studies stems largely from the fact that the investigators in these studies did not query their subjects carefully as to their understanding of the instructions or as to their method of executing the task set them. Thus if a subject answers in a fashion not predicted by balance theory, there is no basis for assessing the reason for the departure.

The present study is intended to fill that gap, i.e. to assess the subjects' phenomenal reports as to why they answered the way they did. Since this study was necessarily exploratory, only one of the types of balance theoretic studies was considered here: the triadic completion task.

THE PHENOMENOLOGY OF THE TRIADIC COMPLETION TASK

The main purpose of this study is the investigation of the phenomenology of triadic structure of interpersonal affect. Of particular interest is the logic of the individual's responses--the language by which he conceptualizes triadic structure. One concern is the ability of the individual to present valid, logically consistent justifications for his responses. If so, then can clusters of explanations be defined such that the explanations in each cluster have similar meanings? If this task can be accomplished, some of the ways in which triadic structure can be conceptualized will be better understood.

In the triadic completion task, the subject is given two of the sentiment relations in a social triad and is asked to predict the third. According to balance theory, the subject should react to two positive relations by completing the triad with a third positive sentiment; he should respond to a positive and a negative sentiment by completing the triad with a second negative relation; and he should respond to two negative sentiments by completing the triad with a positive sentiment. The revised balance theories agree on all but the third case in which the two given sentiments are negative. The revised theories would accept either a positive or a negative (and hence an indifferent) sentiment in completing the triad since either Structure 2 or Structure 3 is admissible.

From the point of view of the revised balance theories, the choice of response categories should be very important. If the subject faced with two negative sentiments is forced to choose only between "like" and "dislike", then he would probably choose "like" and would thus be indistinguishable from a subject governed by balance theory. However if the subject is allowed to choose from a full response range, then according to revised balance theory many of the subjects should react to the openness of choosing either "like" or "dislike" by choosing "indifferent". Therefore this study included triads with both kinds of response options. When the subject was restricted to only two categories, he was also asked to rate his confidence in that response. Subjects also rated their confidence in their 5-point responses.

For purposes of later analysis, the study included triads of mixed sex so as to provide data on the phenomenology of the attribution of jealousy.

Method

Subjects. Participants in the study were 19 females and 12 males from introductory psychology classes at Michigan State University. The students were volunteers who received extra-credit points for their participation.

Materials. The instrument used by the subjects to record their responses was a booklet of 33 pages, one stimulus situation per page. (An example appears in Appendix B.) Each stimulus situation consisted of a

written description of a social triad with only two given symmetric, dichotomous sentiments and a diagrammatic representation of this triad. Except for three triads, the possible responses to fill in the missing, symmetric relation were "dislike very much", "dislike a little", "indifferent", "like a little", and "like very much". The certainty of the response was measured on a 5-point scale anchored by "not at all certain" and "certain". The last question for each triad was a request for the subject to explain his reasons for the completion and certainty responses.

The structures on the first 24 pages represented a factorial combination of two variables. The primary variable was defined by the three incomplete structures defined by the possible pairs of dichotomous, symmetric relations. That is, each incomplete structure consisted of two given positive relations, a given positive relation and a given negative relation, or two given negative relations. The second variable was defined by the eight permutations of sex of stimulus person which was indicated by the use of 18 different unambiguous names of each sex.

Pages 25-27 differed in two ways from the first 24 pages. Although each of these triads represented one of the three possible incomplete structures, the stimulus persons of these triads were referred to as Person A, Person B, etc., i.e. without sex labels. The other difference was the range of possible completion responses. For

these three incomplete triads, the only possible completion responses were "dislike" and "like".

The remaining six triads were a duplicate of the first six triads.

Procedure. Subjects participated in the study in four small groups. As each subject entered the appropriate room, he was handed a written copy of the directions. When the study was scheduled to begin, the experimenter read the directions to the entire group and asked for questions during and after the reading.

Subjects were told that the purpose of the study was to examine their perceptions of the liking and disliking relations among groups of three people. The nature of the triadic completion task, including the composition of the triads in terms of the incomplete structural relations and the sex of stimuli, was explained. Subjects were also told that the name of each stimulus person was not important except to indicate the sex of the person referred to.

The task was untimed. When each subject completed the booklet, he individually turned the booklet in. Each session was complete when the last subject at that session finished. The approximate minimum and maximum completion times across all subjects were 30 and 90 minutes.

Results and Discussion

The data for two sets of triads were analyzed: the three all-male triads with the three-alternative response

range (R3) and the three sexless triads using the two-alternative response range (R2). The data for two subjects in the two-alternative response range were not analyzed because of missing data. These two subjects indicated that they could not meaningfully restrict their responses to just a positive and a negative alternative.

The completion response. In order to fit the data analysis to the traditional balance theory in terms of qualitative states, the 5-point response scales were collapsed to three categories: "like", "indifferent", and "dislike". The relation each triad was completed with was scored as follows. A response of "like a little" or "like very much" was scored as a "+". A "0" represents "indifferent", and a "dislike a little" or "dislike very much" was scored as a "-". For the computation of the mean and standard deviation, a "+", "0", and "-" were numerically scored as a +1, 0, and -1 respectively. The completion responses for both sets of triads appear in Table 1.

A repeated measures analysis of variance was performed for both data sets. For the R3 condition, $F(2,60) = 41.74$, $p \leq .01$. The differences between means were evaluated by the Dunn test. The critical mean differences for three comparisons at $p \leq .05$ and $p \leq .01$ for 60 df are 2.47 and 3.06 respectively. The appropriate transformation of the mean differences for the three possible pairwise comparisons all exceeded 3.06.

Table 1

The Number of Different Completion Responses as a Function of Structure

Response	Male triads, three-alternative response range			Two alternative-response range		
	Given relations			Given relations		
	++	+-	--	++	+-	--
+ (1)	30	1	18	29	7	25
0 (0)	1	15	7	-	-	-
- (-1)	0	15	6	0	22	4
Mean	.97	-.45	.35	1.00	-.52	.72
S.D.	.18	.57	.84	0.00	.85	.70

For the R2 condition, $F(2,60) = 42.26$, $p \leq .01$. Multiple comparisons were again conducted using the Dunn test. In this condition, the transformed mean difference between the completion responses of the two positive relations and the two negative relations was 1.63--a value which does not approach either critical value. The remaining comparisons, however, easily exceeded $p \leq .01$.

At first glance, the data in Table 1 appear to provide almost perfect support for transitivity since not a single subject responded to two given positive sentiments by completing the triad with a negative relation. However transitivity is also assessed by the "+-" triads, since to complete this triad with a positive response is to leave an intransitive triad. In the forced choice R2 condition, 7 out of 29 subjects did just that. In the free response

triads, only 1 subject gave a positive completion, but 15 were neutral.

The "--" triad did not prove as unpredictable as would have been expected by the revised balance theorists. In the forced choice condition, only 4 of 29 subjects completed the triad with a negative sentiment to produce the unbalanced triad with all negative sentiments (which is fewer "inconsistencies" than were observed for the "+-" triads). In the free choice condition, 18 of 31 gave the predicted positive prediction, 7 were neutral, and 6 gave the negative response which produces an unbalanced triad.

Balance theory. Balance theory predicts the subject's response to all three questions, i.e., the entire configuration of the subject's responses. How many subjects answered uniformly in accord with the predictions of balance theory? The answer to this question is given in Table 2.

Table 2

The Number of Subjects Who Responded to the Series of Triads in Accordance with Balance Theory

	Forced choice		
Free choice	Not all balanced	All balanced	Total
All balanced	3	5	8
Not all balanced	6	15	21
Total	9	20	29

In the forced choice condition, 69% of the subjects conformed uniformly to balance theory; but in the free response condition only 28% of the subjects followed balance theory perfectly. In comparing the two response formats, it is clear that allowing neutral responses lead to the subjects expressing much more disagreement with balance theory. This fact is brought out in another way by considering the subjects' response patterns to both response conditions simultaneously. The correlation between the responses which fulfill balance theory in the two conditions is -.09. Only 5 of the 29 subjects followed balance theory in all 6 responses.

It is tempting to try to explain the previous results on the basis of error of measurement in the response. However, balance theory predicts that there will be an unequivocal reaction to each of the three situations and hence no error measurement. Revised balance theory predicts error of measurement only in the "--" situation and cannot handle the error in the other conditions.

The certainty of completion responses. Table 3 presents the mean uncertainty for the basic responses in each of the three completion situations for the 31 subjects who responded to the free choice situation. A repeated measures analysis was performed on the overall means for the three situations, $F(2,60) = 2.09$, $p \leq .13$, which showed no differences between the situations. The further breakdown shown in Table 3 for uncertainty by response, or by

response-situation interaction, similarly showed no significant differences.

Table 3

The Mean Uncertainty of the Completion Responses

Response	Given relations ++	+-	--	Overall mean
+	3.97	2.00	3.78	3.86
0	3.00	3.53	3.71	3.56
-	--	3.67	3.50	3.62
Overall mean	3.94	3.55	3.71	
Overall S.D.	.73	.85	.97	

Finally, the certainty of responses across the three triads for those eight subjects who responded with perfect balance in R3 was compared with the certainty of responses for the remaining subjects. The balance subjects were significantly more certain of their completion responses, $t = -2.48$, $df = 91$, $p \leq .05$. The mean certainty of the completion responses for the eight "balance" subjects was 4.08 versus a mean of 3.58 for the remaining subjects. Although the magnitude of this difference is not large, it is supportive of balance theory. Those subjects who conformed to the balance predictions were more sure of their responses than the subjects who used other configurations of responses.

Phenomenological reports: the "++" situation.

Balance theory predicts that subjects would base their predictions on the harmony or conflict inherent in the pattern of affect in the triad. Yet this is not what the data revealed. Instead the subjects say that they made their decision on the basis of an assessment of the probability that the hypothetical people in the group would have common interests. That is, college age people think of friends in terms of how they spend their leisure time and they appear to conceive of friendship in terms of spending time doing the same thing.

Ninety-six percent of the 30 subjects who completed two positive relations with a positive relation based their argument on the common interests of the three members of the triad. The following argument was abstracted from and is consistent with the explanations of these 28 subjects. (A more detailed version of the common interest explanation to the "++" and also the "+-" and "--" situations appears in Appendix C.)

If p likes o, then p has something in common with o. If o likes q, then o has something in common with q. But if p has things in common with o and o has things in common with q, then p will have something in common with q. Thus the "++" situation should be completed with a positive response.

The crux of this argument is that people interpret the liking relation as transitive, not because positive affect

per se is transitive, but because common interests are transitive. That is, all three members of the group have common interests. This interpretation is supported by the following phrases used by many of the subjects in their explanations: "same interests", "mutual interests", "common interests", "similarities", "all value the same thing", and "birds of a feather flock together".

Phenomenological reports: the "+-" situation. Neither the quantitative nor the verbal responses to the incomplete structure defined by a positive relation and a negative relation exhibited the uniformity of the responses to the two positive relations. Not only are all three quantitative responses used, but there are a variety of explanations underlying the same quantitative response. That is, the cognitions preceding identical behavior patterns differ.

The first response to be analyzed is the balance response--the negative relation. There are two kinds of explanations underlying this response, though they are not necessarily mutually exclusive. Four subjects thought that since o and p like each other, and since p dislikes q, p would discuss only q's "bad points" with o. Person o would then tend to form a negative evaluation of q, regardless of the favorable aspects of q.

The second explanation underlying the balance response is a version of the same inductive explanation used by eight subjects to justify the balance prediction to the

"++" situation. People who like each other have similar interests and people who dislike each other have dissimilar interests. But o likes the things p likes and q dislikes the things p likes. Thus o and q dislike each other.

Two different kinds of explanations provided justification for completing a positive relations and a negative relation with the null relation. Persons p and o could like each other for different reasons than the reasons p and q dislike each other. Thus p and q have no reason for disliking each other.

The second explanation was offered by four subjects who shared a "positivity bias" which countered the tendency toward balance. The argument is that there are competing tendencies: (a) to complete a positive relation and a negative relation with the balance response, and (b) to be motivated toward positive interpersonal affect. The net result of these pressures is a neutral response. A typical example of this argument is the following response, where the three members of the triad are Paul, Pete, and Jeff. "The reasons for Paul and Pete's dislike will influence Jeff, but not enough to necessarily make Jeff dislike Pete."

One subject completed the "+-" structure with a positive response, i.e., in direct opposition to the response predicted by balance theory. This person believed that two people have a tendency to like each other unless presented with contrary evidence. Since the reasons for disliking were considered by this and other subjects to be

more diverse than the reasons for liking, this subject thought that o and q will probably not have a reason to dislike each other. Thus he completed a positive and a negative relation with a positive relation.

Phenomenological reports: the "--" situation. The greatest diversity in quantitative and verbal responses was to the incomplete structure defined by two negative relations. The subjects in this study confirmed the ambiguity of this situation noted by Heider (1958).

There is yet another version of the common interest explanation which forms the premises for the conclusion predicted by balance theory. But some subjects who completed two negative relations with a positive relation used a different reason than the common interest explanation. Two different psychological mechanisms are responsible for the same behavioral response.

The following is a summary of the common interest explanation: Persons o and q have attributes in common which p dislikes and vice versa. That is, o and q like each other for the same reason they dislike p (although some subjects did admit the possibility that o and q could dislike p for different reasons).

The second cluster of explanations underlying the balance response does not invoke common interests per se as a motivating factor for the development of the liking bond. This explanation is based more on the affective processes specified by balance theory instead of the

cognitive emphasis on shared attributes. The primary element uniting o and q is their mutual dislike of p. One subject even suggested that o and q may have dissimilar interests: "When people dislike other people, they stand together because of that dislike, despite their differences toward each other." In this case, the unitizing force based on their mutual dislike for p is stronger than the force opposed to unit formation based on the dissimilar attributes of o and q.

The six subjects who interpreted the disliking relation as transitive provided a reasonable justification for their inferences. These subjects maintained that something was wrong with p since o and q did not like p. But there was also something wrong with o and q since p did not like either of them. That is, o and q did not like each other for the same reason p did not like either of them. All three people had trouble interacting with other people. For example, each member of the triad may be perceived as having "bad" breath by the remaining two members.

Thus, at least in this experimental situation, Heider's (1958) assertion that two negatives may be completed with a positive or a negative is correct. If o and q like each other for the same reason they dislike p, Cartwright and Harary's version of balance is maintained. If there is something offensive about all three individuals which the others cannot reconcile, the grouping schema of DeSoto et al. or the clustering principle of Davis provides an

accurate conceptualization of the situation.

There were two explanations for completing two negative relations with a null relation. The most popular explanation, used by five subjects, may be labeled genuine indifference. These subjects maintained that the existence of mutual dislike does not provide sufficient information for the two people to like or dislike each other.

The remaining subject simultaneously upheld the possibilities that o and q could have something in common or that p, o, and q could all be offensive people. Since this subject saw no way to choose either alternative, they canceled each other out, leaving no general principle as a guide for predicting the missing relation.

Conclusion

In conclusion, the phenomenological analysis of the quantitative responses provided much information that cannot be obtained with the more traditional methods of social psychology. First, reconfirming a point emphasized repeatedly by Asch (1952), it was demonstrated that there is not always a one-to-one correspondence between a response and the psychology underlying this response. That is, different psychological processes may map into the same behavioral response. To limit study to an isolated response ignores the underlying process. This restricted methodology is particularly harmful if the response may be easily interpreted to represent a process which is not only unrepresentative of the actual psychology, but is a

distortion of this underlying psychology (e.g. Asch, 1948). The exclusive study of isolated responses seems justified only when the theory is sufficiently advanced such that the experimenter is reasonably assured that he can account for a single process underlying a given response. It is a rare area in current social psychology where the knowledge exists to draw such an inference.

The interim alternative to the study of isolated responses is the phenomenological method. Indeed this would seem to be the only method for exploratory studies in areas such as social interaction.

This study reconfirms another point Asch (1948, 1952) strongly emphasized; people usually have defendable, reasoned arguments for their responses--regardless of whether or not the response confirms a particular theory. However, under the banner of "scientific exactness", subjects are usually only allowed to express themselves by a simple check in a 5-point scale (or by some equally restricted response). Without the explanation, a response indicating positive transitivity would probably be treated as a mistake. If analysis of variance was used to analyze the set of responses which included this, or any other "deviant" response, it would have been formally treated as error.

This final argument subsumes the previous two assertions. The analysis of explanations added new information to the understanding of the consistency of triadic

structures of interpersonal affect. No recent textbooks in social psychology suggest that balance theory might be explained in terms of shared attributes. Yet these explanations were used by virtually all of the subjects to account for the prediction of the liking relation to complete the "++" situation, and by many of the subjects who completed the other structures with balance responses.

This shared attribute explanation is related to at least one other topic of psychological interest. This explanation resembles Byrne's (e.g. 1961, 1971) similarity and attraction hypothesis which states that attraction is a linear function of similarity. The assertion that two people who have common interests or attributes will like each other is equivalent to Byrne's hypothesis. The major discrepancy between Byrne's hypothesis and Heider's balance theory is that the latter postulates affect to be the basis for the underlying dynamics while Byrne is concerned with more explicit cognitive processes. The pervasiveness of the shared attribute explanation may imply that cognition is more important than affect in the prediction of interpersonal relations. Or, the cognitive explanations the subjects give which support balance theory may be the cognitions which they use to describe a process that, when it actually occurred, was primarily based on affect.

APPENDICES

Appendix A

The Implications of the Transitivity of Positive Affect

This appendix contains the formal proof of the assertions made in the text, i.e. a formal derivation of the labeling of Structures 0-3 generated by transitivity of positive affect. The following notation is used for binary relations: "Rpq" is defined to be "p is related to q by R" (Copi, 1967). Symmetry of R is represented by "Rpq $\Rightarrow$ Rqp", and transitivity is represented by "Rop $\cdot$ Rpq $\Rightarrow$ Roq".

The sentiments in a triadic social structure define two relations: the positive affect relation P and the negative affect relation N. If no one is allowed to be indifferent toward another, then these two relations are completely determined by each other. In symbolic logic, the lack of indifference would be represented by "P $\Leftrightarrow$ $\sim$N" or by "N $\Leftrightarrow$ $\sim$P".

One experimental procedure which has been used to test balance theory is the triadic completion task in which the subject is given some of the sentiments between the people in a triad and is asked to predict others. If there is no indifference, and if sentiments are reciprocated, then only three sentiments must be specified to

characterize the entire structure. The triadic completion task is to predict the third sentiment if two of them are given. If the two sentiments given are both positive, then transitivity immediately applies to the situation and no reasoning is required to conclude that the third sentiment is also positive (from Pop and Ppq one would immediately conclude Poq). What is not obvious is that transitivity also makes a definite prediction if the given sentiments are positive and negative. The following theorem shows that for symmetric triadic structures without indifference, transitivity of positive sentiment implies that if two of the sentiments in the triad are positive and negative, then the third sentiment must be negative. In formal terms this means that under the assumptions $Pxy \Leftrightarrow Pyx$ and $Pxy \Leftrightarrow \sim Nxy$, we have the equivalence of the expressions $(Pxy \cdot Pyz) \Rightarrow Pxz) \Leftrightarrow (Pxy \cdot Nyz \Rightarrow Nyz)$.

Theorem: Completing two positive relations with a positive relation is equivalent to asserting that a positive relation and a negative relation are completed with a negative relation.

$$\left[(Pxy \cdot Pyz) \Rightarrow Pxz\right] \Leftrightarrow \left[(Pyx \cdot Nxz) \Rightarrow Nyz\right]$$

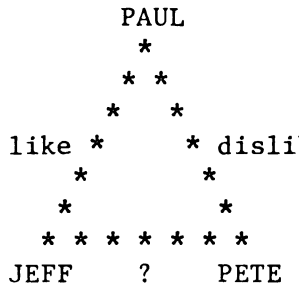
Proof:	$(Pxy \cdot Pyz) \Rightarrow Pxz$	premise
	$\sim(Pxy \cdot Pyz) \vee Pxz$	material implication $(p \Rightarrow q) \Leftrightarrow (\sim p \vee q)$
	$\sim Pxy \vee \sim Pyz \vee Pxz$	De Morgan's theorem $\sim(p \cdot q) \Leftrightarrow \sim p \vee \sim q$

~Pxy V Pxz V ~Pyz	commutation and association
~Pyx V Pxz V ~Pyz	symmetry
~~(~Pyx V Pxz) V ~Pyz	double negation ~~p ⇔ p
~(~~Pyx · ~Pxz) V ~Pyz	De Morgan's theorem
(Pyx · ~Pxz) ⇒ ~Pyz	material implication
(Pyx · Nxz) ⇒ Nyz	substitution

Appendix B

Sample Stimulus Page

Jeff and Paul like each other.
Paul and Pete dislike each other.
How do you think Jeff and Pete will feel toward each other?



Please circle your prediction.

dislike very much	dislike a little	indif-ferent	like a little	like very much

Please indicate how confident you feel about your prediction by placing an X in the appropriate box.

not at all certain _____/___/___/___/___/___/_____ very certain

Please explain the reasons on which you based your decisions.

Appendix C

The Logic of the Shared Interest Explanation

The purpose of this section is to provide a logical formalism for the reasoning which subjects reported using for the triadic completion task, i.e. a formalism for the common interests argument. The basic notation is this: Let there be three people o, p, and q; and let their interests be represented by a, b, and c respectively. If the unit relation is denoted U, then this basic context can be represented by Uoa, Upb, Uqc, or by Figure 2.

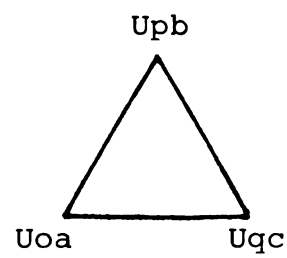


Figure 2: The interests of p, o, and q.

There are two basic laws which form the basis of the subjects' reasoning. The first is the assertion that one person will like another only if he likes that person's interests. In symbolism this becomes a sort of mixed relation transitivity:

$$Lop \bullet Upb \Rightarrow Lob$$

The second law is that if two people share common

interests, then they will like each other:

$$Lox \cdot Lpx \Rightarrow Lop$$

These laws can now be used to derive the triadic completion response. Consider first the "++" situation. To be concrete, let us assume that Lop and Lpq, i.e. let us assume the triad given in Figure 3.

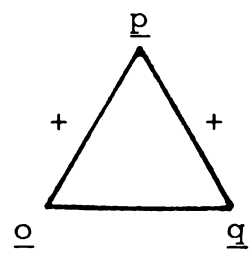


Figure 3: The incomplete structure defined by two positive relations.

Verbally the subject's reasoning goes like this: o likes p and therefore o likes p's interests. q likes p and therefore q likes p's interests. But that means that o and q have common interests and will like each other. Logically stated this is:

$$Lop \cdot Upb \Rightarrow Lob$$

$$Lqp \cdot Upb \Rightarrow Lqb$$

Therefore

$$Lop \cdot Lqp \cdot Upb \Rightarrow Lob \cdot Lqb \Rightarrow Loq$$

Thus the prediction of the positive response to the "++" triadic completion situation follows logically from the premise of the two laws of common interests.

Next consider the "+-" situation. To be concrete, consider the situation shown in Figure 4. Let the dislike

relation be denoted D. Verbally the subjects' reasoning goes like this: q could like o only if q liked o's interests. But p likes o's interests and q dislikes what p likes, and hence q cannot like o's interests. Thus q must dislike o for the same reason that he dislikes p. That is,

$$Dqp \Rightarrow \sim Lqb \Rightarrow \sim Lqa \Rightarrow \sim Loq$$

If the subject is limited to two responses, then $\sim Loq$ would require him to choose Doq. If the response scale allows indifference, however, then the subject is free to choose either indifference or dislike willy nilly.

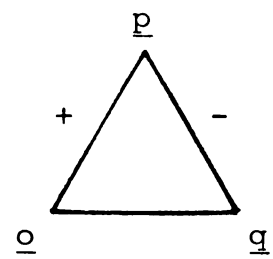


Figure 4: The incomplete structure defined by a positive relation and a negative relation.

The "--" situation is shown in Figure 5. It is different from the other two situations in that the prediction of a third response does not follow logically from the two laws of common interests. Rather it is the case that neither sentiment is inconsistent with those laws. Thus if a subject were doing his reasoning by going through cases and checking them out, then (a) if he first checked out "like", then he would find the "+-" situation

of the previous case which is consistent with the rules of common interests; (b) if he first checked out the negative sentiment, then he would find no problem there either. On the other hand, if the subject is reasoning logically, then there is a fallacious argument to which he might have fallen prey: $Dqp \Rightarrow \sim Uqb$ and $Dop \Rightarrow \sim Uob$ and (erroneously) $\sim Uqb \cdot \sim Uob \Rightarrow Uac \Rightarrow Loq$.

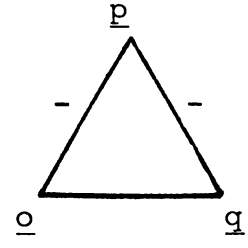


Figure 5: The incomplete structure defined by two negative relations.

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