SOCIOMETRIC CHOICE BEHAVIOR AND INTERPERSONAL PERCEPTION IN TRIAD

MASAO OHASHI

Fukui University

A series of studies were carried out to test Heider’s theory in various interpersonal situations, both real and fictitious. Results obtained were found to differ consistently from what was predicted according to Heider’s theory in some respects. Then a theoretical model which included his theory as its parts was proposed. The configuration composed of positive relations only was defined as the most stable one in the sense that the force to change the relationship among relations contained was minimum in it. Every configuration was postulated to tend toward it through four distinct tendencies: those to positivity, to symmetry, to consonance and to balance. Relationship among them was discussed.

F. Heider (1946) put forward a hypothesis known under the name of “balance theory”. It might be summarized in the following way. Three relations are contained in triad composed of a person p, another person o and an impersonal entity x (henceforth referred to as p-o-x system), about which p is concerned. Here are three relations, i.e., p’s relation toward o, p’s relation toward x and o’s relation toward x as perceived by p. Each relation is distinguished into “unit” and “attitude” as to its type, and into positive and negative as to its sign character (referred to usually as sign). Combination of the three signs forms a “configuration” whose elements are mutually interdependent. “Balanced state” exists in some configurations, and “imbalanced state” in others. When balanced state does not exist forces to change the configuration will arise. Any one of the three signs being changed through action or cognitive reorganization, balance will be secured. X may be replaced by a third person q (p-o-q system) without any modification in the content of the theory.

Many investigators have attempted to verify it and obtained positive conclusions. In addition, several theorists (Newcomb, 1953; Osgood & Tannenbaum, 1955; Abelson & Rosenberg, 1958; Festinger, 1957) proposed somewhat similar theories, some of whom seems to have been influenced by Heider’s view. He himself developed it more precisely and elaborately in his widely read book (Heider, 1958).

Now it would be obvious that there is a good reason to believe that Heider’s theory is very adequate and important. But it is by no means perfect as a fundamental theory and a guiding principle in the psychology of human relations, at least at the present stage. It is still a matter for debate. First, there are not enough evidences to convince us that it has been fully verified. Though some investigators (e.g., Horowitz, Lyons & Perlmutter, 1951; Festinger & Hutte, 1954; Kogan & Tagiuri, 1958) maintain that their predictions derived from it are corroborated, they dealt with part of its aspects only. Conclusions of others (Jordan, 1953; Morrissette, 1958) dealing with larger parts of them are less relevant to real interpersonal
Sociometric Choice and Interpersonal Perception

relations, because they depend on data collected in fictitious situations. Secondly, some investigators (Davol, 1959; Fujino, 1961) offered recently negative conclusions concerning some aspects of it. And thirdly, there are some evidences suggesting its inadequacy. Borrowing and reanalyzing data collected by Jordan (1953), Runkel (1956) showed that the data could be explained better by Newcomb's theory (1953) than by Heider's. Newcomb (1963) himself suggests the same view on that point, too. Cartwright and Harary (1956) pointed out that Heider's theory contains some ambiguities as to the nature of sign character. They succeeded, by use of concepts from the graph theory, in eliminating the difficulties, generalizing the theory and making it applicable to a wider range of empirical situations. Balance as treated by them is not an all-or-nothing concept but a continuous index describing state of the configuration. Harary (1959) asserted later that the tendency toward balance is not an exclusive one but only one of several ones inherent in triad, and suggests a more inclusive model.

Purpose of this paper is to test Heider's theory as applied to interpersonal relations in various situations, both real and fictitious. We confine ourselves to attitude relation contained in the p-o-q system. In the following sections procedures and results obtained in a series of studies will be first described briefly, and then theoretical remarks concerning them will be presented.

STUDY I

Problem

When confined to attitude, three relations contained in the p-o-q system are: p's attitude toward o (henceforth referred to as R1), p's attitude toward q (R2) and o's attitude toward q as perceived by p (R3). Though Heider takes dichotomy on sign character, we will take trichotomy, including neutral attitude (0) in addition to positive (+) and negative (−). It is because we believe that it is not appropriate to neglect (0) which is usually expected to be found more frequently than (+) or (−) in real situations. We assume that (0) is the complement of (+) and has the same, though weaker, property as (+). Heider's theory will be paraphrased in this context as follows. When either none or two of the three signs are (−) and the rest are (+) or (0), balanced state exists. P will attempt to make any triad balanced as possible. So, if all the triads existing in a real group are inquired, balanced ones will be found more than imbalanced ones. Though the three R's should be regarded as mutually interdependent, we try to examine, in this study, how R1 and R2 determine R3. Then, our hypothesis is: Sign of R3 will be determined by combination of signs of R1 and R2 (the "type" of the independent variable) as to produce balanced state. Table 1 indicates signs of R3 to produce balanced, neutral or imbalanced state in a given type of the independent variable.

Procedure

Ss (subjects) in this study were pupils in six classes from fifth to seventh grade. They were, first, given a near-sociometric test in which they were asked to rate each classmate of theirs in a three-point-scale: "Like", "Neutral", and "Dislike". Number of classmates to be rated by Ss in each of the three points was grossly restricted by instruction—about a quarter, a half, and a quarter, respectively. Data concerning R1 and R2 were thus collected. Ss were given, two weeks later, a "relation-perception test" where they were requested to guess a classmate's attitude toward another in a three-point-scale. Like-sexed pairs of pupils (12 male and 12 female, for each class) were contained in the test. Responses

2 Prepared from material more fully reported (Ohashi, 1956 b).
TABLE 1

Signs of R₃ to determine the state of triad in each "type"

<table>
<thead>
<tr>
<th>type</th>
<th>Sign of R₃ which makes the triad balanced</th>
<th>Neutral</th>
<th>Imbalanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>(+ +)</td>
<td>+</td>
<td>0</td>
<td>−</td>
</tr>
<tr>
<td>(+ 0)</td>
<td>+</td>
<td>0</td>
<td>−</td>
</tr>
<tr>
<td>(+ −)</td>
<td>−</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>(0 0)</td>
<td>+</td>
<td>0</td>
<td>−</td>
</tr>
<tr>
<td>(0 −)</td>
<td>−</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>(− −)</td>
<td>+</td>
<td>0</td>
<td>−</td>
</tr>
</tbody>
</table>

Results

First, all the sets of data were divided into three categories according to Table 1. Observed frequencies of balanced and imbalanced configurations were compared with expected frequencies by means of chi-square test of fitness. Chi-squares obtained were highly significant in all the classes; balanced configurations were observed more than theoretically expected. So we might conclude that our hypothesis, and accordingly Heider's theory from which it was derived, were verified in general.

Statistical test, then, was applied on every type. Significant chi-squares were obtained in 32 out of 36 cases. Degree of verifiability of the hypothesis, however, was found to vary with different types; results in some types agreed well with the hypothesis, while those in others did not. Then, we decided to examine more closely how sign of R₃ was determined by R₁ and R₂. The independent variable was, hitherto, combination of the two signs. It was based on the notion that the two R's were equivalent in the role of determining sign of R₃—the basic assumption of Heider's theory. Laying it aside, it would be natural to take permutation of the two signs as the independent variable. We will display type of the new independent variable by use of brackets instead of parentheses.³

Sign of R₃ was compared against the new independent variable. Results of test of fitness (df=2) applied on every type were presented in a summary in Table 2. Double marks indicate significance at <.01, and single marks at <.05. Mark * means that balanced configurations were observed more than expected, while mark x means the reverse. Mark o means neither—significant chi-square was obtained in this case because neutral R₃'s were observed significantly either more, or less, than expected, though ratio of observed frequencies of positive vs negative R₃ was not significantly different from that expected.

It is clear from the table that results are quite different with types. In types [+ +], [+ −], [0 +], and [0 −]—when R₁ is (+) or (0) and R₂ is (+) or (−)—the results agree with the hypothesis very well. When R₁ is (−) and/or R₂ is (0), on the contrary, the results are rather equivocal. In type [− −] the two significant chi-squares were produced by the effect opposing to the hypothesis. The

³ For example, [+] means that sign of R₁ is (+) and that of R₂ is (−), while (+ −) includes both [+] and [− −].
most confused were the results in type $[-+]$. A further analysis was made on the type. Data in each class were divided into four groups; male Ss' data on male pairs, male's on female, female's on male, and female's on female. In 18 out of 24 groups of data, sign of $R_3$ was found to incline toward (+) in comparison with the expected ratio of (+) vs (−). Then, it may be said that sign of $R_3$ in this type tends to be (+) rather than (−), contrary to the hypothesis. Next, types whose $R_2$ is (0) were reanalyzed. In type [0 0], neutral $R_3$'s were observed more than expected in all the groups of data. In types [+ 0] and [− 0] such was the case in 33 out of 48 groups of data. Then it may be concluded that there is a tendency for sign of $R_3$ to become (0) when $R_2$ is (0).

These results together with those described before may be represented in a general form as follows: The sign of $R_3$ tends to coincide with that of $R_4$ irrespective of the sign of $R_1$, though the tendency is less powerful when $R_1$ is (−). We will call it “the revised hypothesis” in the following.

The revised hypothesis was supported in two replication studies where Ss were not well acquainted with one another. In one study, data were collected in class-rooms shortly after the organization of the class. In the other, data were collected in face-to-face groups experimentally organized, whose members had not been acquainted before with one another at all.

**STUDY II**

**Problem**

Results in Study I indicate that $R_2$ is more potent than $R_1$ in determining sign of $R_3$. In other words, p seems to pay more serious attention to q than to o on responding to the relation-perception test. In the test, a list of names of members corresponding to o and q was printed on a sheet of paper. Any member did not appear in the list more than once. The very procedure may be responsible, at least in part, for the results. In this and the next studies it will be examined whether variations of the procedure in that respect cause any difference in results or not.

Purpose of this study is to compare results obtained in two different conditions. In one condition (designated as Situation I) a relation-perception test will be used which is expected to make Ss pay more serious attention to o than in the test used in the previous studies. In another condition (Situation II), a relation-perception test used is expected to make Ss pay more serious attention to q than in the test used before.

**Procedure**

Ss were sixth graders in two classes for each condition. They were given a near-sociometric test where they were asked to rate the same sex classmates in a five-point-scale. They were then directed to select three classmates at random; one they liked, one to whom they were neutral, and one they disliked. After the three members were appointed as o's and the rest as q's in Situation I, and vice versa in Situation II, Ss were given one of the two kinds of relation-perception test and asked to guess o's attitude toward q in terms of a five-point-scale.

**Results**

Responses to the tests were quantified. Score of +2, +1, 0, −1 or −2 was given to each of the five points in the scale. Our revised hypothesis predicts that correlation between scores of $R_2$ and $R_3$ will be positive irrespective of score of $R_1$, though it will be lower when $R_1$ is negative. According to Heider's theory, on the contrary, it is expected to be positive when $R_1$ is positive, but to be negative when $R_1$ is negative. Correlation coefficients were calculated in every situation and for every sexual group of Ss. They ranged from +.152 to +.541, all being statistically significant. And it was observed that

---

4 Fully reported elsewhere (Ohashi, 1958).
the higher the score of $R_1$, the higher the coefficients were in general. These findings agree completely with the revised hypothesis in spite of the variation in procedure introduced, and disagree with Heider’s theory when $R_1$ is negative. Coefficients under the same score of $R_1$ being compared, those in Situation II were significantly higher than those in Situation I in eight out of ten comparisons. Then it will be seen, as we presumed, that the more serious attention Ss pay to $q$ on responding to relation-perception test, the more valid the revised hypothesis appears to be.

We are now convinced that $R_3$ tends to coincide with $R_2$ in such conditions as those. $R_3$ must be dependent in some measure, however, also on objective attitude that $o$ really has toward $q$ (designated as $R_{o3}$), for the latter has some visibility. So it is not clear whether the true determinant of $R_3$ is $R_2$ or $R_{o3}$ when the two $R$’s coincide, even if $R_3$ is found to coincide with $R_2$. That is, the positive correlations found between $R_2$ and $R_3$ may have been produced by the resultant effect of $R_2$ and $R_{o3}$. Is $R_2$ effective enough by itself apart from $R_{o3}$’s effect? In order to answer this question, partial correlation coefficients between scores of $R_2$ and $R_3$ with the effect of $R_{o3}$ eliminated were calculated and shown in Table 3. There are no negative coefficients. Though they are not always high, all of them are significantly different from zero; the question has been affirmed. Inspection of the table will show also that the effects of different scores of $R_1$ and of different situations are much the same as those in the case of simple correlation mentioned above.

**STUDY III**

**Problem**

Two forms of relation-perception test used in Study II were, in spite of minor variations, essentially the same as the original form used in Study I, in that Ss were made to guess $o$’s attitude toward $q$, and in that data concerning $R_3$ thus collected were compared with those concerning $R_1$ and $R_2$ collected beforehand. The revised hypothesis will be tested in the present study by means of a quite different method of data collection.

**Procedure**

Ss were sixth graders in four classes. They were given a near-sociometric test in a three-point-scale. A week later, they were given a new form of relation-perception test in a booklet of some 18 pages, which had been prepared for each individual $S$ on reference to his responses to the near-sociometric test. Names of

---

5 Adapted from the writer’s article (Ohashi, 1962).
Observed frequencies of each subjective type as compared with its expected frequencies

<table>
<thead>
<tr>
<th>1st Group</th>
<th>2nd Group</th>
<th>3rd Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>([R_1, R_2, R_3])</td>
<td>([R_1, R_2, R_3])</td>
<td>([R_1, R_2, R_3])</td>
</tr>
<tr>
<td>([+ + +]) **</td>
<td>([+ 0 0]) **</td>
<td>([+ 0 -]) **</td>
</tr>
<tr>
<td>([0 0 0]) **</td>
<td>([- + +])</td>
<td>([- + 0]) **</td>
</tr>
<tr>
<td>([- + -]) **</td>
<td>([- + +]) *</td>
<td>([- 0 0])</td>
</tr>
<tr>
<td>([- + -]) **</td>
<td>([0 + 0])</td>
<td>([- 0 -]) x</td>
</tr>
<tr>
<td>([+ + -]) x</td>
<td>([+ + 0]) x</td>
<td>([0 0 -]) x</td>
</tr>
<tr>
<td>([+ - +]) x</td>
<td>([+ 0 +]) x</td>
<td>([0 - 0]) x</td>
</tr>
</tbody>
</table>

Two classmates of the same sex as the Ss had been typewritten on each page; one of them was appointed as o, and the other as q. The sign of (+) or (-) was given verbally—“Like” or “Dislike”—as if it represented real attitude of p toward o, of p toward q, and of o toward q. Actually, only some of the signs given were truly the real ones, while the others were not. Ss were asked to correct signs which they thought incorrect, if any, using “Like”, “Neutral” or “Dislike”.

Results

Some of the given signs were corrected, while others were left uncorrected. At any rate, permutation of the three signs Ss approved finally will be designated as “subjective type”. Observed frequencies of each of 27 subjective types were compared with its expected frequencies by means of chi-square test. Results are presented in Table 4. Mark * means that the subjective type was observed more, and mark x less, than expected.

Subjective types may be divided into three groups; 3 types containing any one, 18 containing any two, and 6 containing all of the three kinds of sign. Results were closely related with the groups, as seen in the table. All types belonging to the first group were observed more than expected, while those to the third group were generally less. In the second group, results seem to depend upon whether sign of \(R_2\) and that of \(R_3\) are coincident or not. Generally speaking, types in which they are coincident were observed more, while those in which they are not coincident were observed less, than expected. Only exception is type \([0 0 +]\). Results are more uniform when \(R_1\) is (+) than when it is (−). These findings agree very well with the revised hypothesis in spite of the variations introduced in the method of collecting and analyzing data.

Study IV

Problem

Results obtained in the preceding three studies have shown that the relationship among the three R’s in the p-o-q system can be predicted by the revised hypothesis better than by Heider’s theory. Number of R’s really contained in the system, however, is not three but six. Three R’s to be added are; o’s attitude toward p as perceived by p (\(R_1’\)), q’s attitude toward p as perceived by p (\(R_2’\)), and q’s attitude toward o as perceived by p (\(R_3’\)) (cf. Fig. 1). Heider has never mentioned the three R’s within our knowledge. The reason why he neglects them is not clear. But, it seems to us that the reason is related with the fact that he was interested first in the p-o-x system and later in the p-o-q system. In unit, relation between two

*Condensed from the writer’s article (Ohashi, 1961).
Fig. 1 Six R's contained in the p-o-q system.

entities is not differentiated by its direction. A's relation toward B and B's relation toward A are always identical. In attitude, it is the case in relation between a person and an impersonal entity, so far as its sign character is concerned. In person-to-person attitude relation, however, it is quite another matter. Sign of q's attitude toward o is not always the same as that of o's attitude toward q, though it is occasionally the case. Missing recognizing the essential distinction between the two situations, we suppose, Heider considered that x might be replaced by q without any modification in content of the theory, and generalized it too hastily. It seems to be related with the notion that balance depends not on permutation but on combination of the three signs.

We wish to deal with the relationship among the six R's. In the present study, however, we will analyze that among R₁, R₂, R₃ and R₄ for the sake of simplicity, for it has been already indicated that there is a very powerful tendency for R₁ and R₄ to coincide with R₁' and R₄', respectively (Ohashi, 1956a). Of course, R₃ and R₄ will tend to coincide, too. Powerfulness of the tendency, however, will vary with different relationships between R₁ and R₂. This is our assumption to be certified in this study.

**Procedure**

Ss were sixth graders in two classes. They were given a near-sociometric test in a three-point-scale. They were given the same test a week later. Immediately after that, a relation-perception test in form of a booklet was administered, in which names of pairs of classmates of the same sex as each of Ss were typewritten. Ss were asked to give signs of R₁, R₂, R₃ and R₄ in terms of “Like”, “Neutral” or “Dislike”. However, those of R₁ and R₂ were made to be copied from responses of the second near-sociometric test which had been kept at each S's hand.

**Results**

Combination of signs of R₃ and R₄ will be designated as type (R₃ R₄). Six types are discriminated and they may be grouped into two kinds; even types in which the two signs are the same, and uneven types in which they are not. Even types are predicted to be observed more, while uneven types less, than theoretically expected. The prediction has been corroborated as seen in Table 5 where meaning of marks used is the same as that in Table 4.

Then, all the data were divided into even and uneven by type (R₁ R₂) on the one hand, and by type (R₃ R₄) on the other hand. Contingency tables of 2×2 thus compiled are shown in Table 6. It will be seen that the both types are correlated, the correlation is significant in three out of four groups of Ss. So, it may be concluded that the tendency for signs of R₃ and R₄ to coincide is less powerful when signs of R₁ and R₂ are different than when they are the same.

Will any relationships be found among signs of the four R’s when the both types are uneven? In order to answer the question, Table 7 was constructed. It will be seen that signs of R₁ and R₄ tend to coincide, and so do those of R₂ and R₃. Signs of R₁ and R₃, on the contrary, tend to differ, and so do those of R₂ and R₄.

The findings described above agree
TABLE 5

<table>
<thead>
<tr>
<th>Group of Ss</th>
<th>Even Type</th>
<th>Uneven Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(+ +)</td>
<td>(0 0)</td>
</tr>
<tr>
<td>1-M</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>1-F</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>2-M</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>2-F</td>
<td>**</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 6

Relationship between (R₁ R₂) and (R₃ R₄)

<table>
<thead>
<tr>
<th>Ss' Group</th>
<th>1-M E</th>
<th>1-F E</th>
<th>2-M E</th>
<th>2-F E</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(R₃ R₄)</td>
<td>(R₃ R₄)</td>
<td>(R₃ R₄)</td>
<td>(R₃ R₄)</td>
</tr>
<tr>
<td>E</td>
<td>69 51</td>
<td>63 46</td>
<td>89 56</td>
<td>75 39</td>
</tr>
<tr>
<td>U</td>
<td>78 122</td>
<td>63 102</td>
<td>117 108</td>
<td>71 98</td>
</tr>
</tbody>
</table>

p < .01

E: Even  U: Uneven

TABLE 7

Relationship among the four R's in sets of data which are uneven in both types

<table>
<thead>
<tr>
<th>R₁</th>
<th>+ R₂</th>
<th>0</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+ R₃</td>
<td>+ R₄</td>
<td>- R₃</td>
</tr>
<tr>
<td>+</td>
<td>22</td>
<td>58</td>
<td>45</td>
</tr>
<tr>
<td>0</td>
<td>38</td>
<td>57</td>
<td>57</td>
</tr>
<tr>
<td>-</td>
<td>33</td>
<td>63</td>
<td>24</td>
</tr>
</tbody>
</table>

p < .01

S STUDY V

Problem

We have been hitherto concerned with a derivation from Heider's theory that balanced triads will be observed more than imbalanced ones. This study is concerned completely with the revised hypothesis as well as those in the preceding studies. This reveals further evidence suggesting inadequacy of Heider's theory.

Procedure

Ss were identical with those in Study III. Immediately after they responded to the relation-perception test, they were asked to rate the degree of pleasantness of each triad as they felt in a seven-point-scale.

Results

Responses were quantified, being given score of +3, +2, +1, 0, -1, -2 or -3.

7 Prepared from material more fully reported (Ohashi, 1962).
Mean score of each subjective type was calculated and shown in Table 8. The third column in the table indicates the level of significance of the difference between the mean and the grand mean (= .12, SD = 1.22). Mark * means that the mean is significantly larger, while mark x means that it is smaller, than the grand mean. The largest mean score is found in type [+] [+] [+], which was observed very significantly more than theoretically expected. Mean score in general, however, seems to depend little on the observed frequency of the type compared with the expected frequency (cf. Table 4). For example, mean scores of type [+] [+] [0], [0] [+] [+] and [+] [+] [+] which were observed more than expected are smaller, while that of type [+] [+] [+] which was observed less is larger, than the grand mean.

Instead, the mean score appears to be related with the number of (+) or (−) contained; the more (+), or the less (−), are contained, the higher it seems to be. The supposition has been confirmed by calculating mean score for each sign in every R without reference to signs of other R’s (see Table 9). Difference between mean score of (+) and that of (0), as well as that between (0) and (−), is significant at <.01 for every R.

### Table 8
Mean score of “pleasantness” of each subjective type

<table>
<thead>
<tr>
<th>Subjective Type</th>
<th>M</th>
<th>p</th>
<th>Subjective Type</th>
<th>M</th>
<th>p</th>
<th>Subjective Type</th>
<th>M</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>[+] [+] [+]</td>
<td>1.41</td>
<td>**</td>
<td>[0] [+] [+]</td>
<td>.45</td>
<td>**</td>
<td>[−] [+] [+]</td>
<td>−.18</td>
<td>×</td>
</tr>
<tr>
<td>[+] [+] [+]</td>
<td>.82</td>
<td>**</td>
<td>[0] [+] [+]</td>
<td>.35</td>
<td>*</td>
<td>[−] [+] [+]</td>
<td>−.06</td>
<td>×</td>
</tr>
<tr>
<td>[+] [+] [+]</td>
<td>.45</td>
<td></td>
<td>[0] [+] [+]</td>
<td>−.03</td>
<td></td>
<td>[−] [+] [+]</td>
<td>−.41</td>
<td>×</td>
</tr>
<tr>
<td>[+] [+] [+]</td>
<td>.65</td>
<td>**</td>
<td>[0] [+] [+]</td>
<td>.13</td>
<td></td>
<td>[−] [+] [+]</td>
<td>−.17</td>
<td>×</td>
</tr>
<tr>
<td>[+] [+] [+]</td>
<td>.49</td>
<td>**</td>
<td>[0] [+] [+]</td>
<td>.17</td>
<td></td>
<td>[−] [+] [+]</td>
<td>−.39</td>
<td>×</td>
</tr>
<tr>
<td>[+] [+] [+]</td>
<td>−.12</td>
<td></td>
<td>[0] [+] [+]</td>
<td>−.12</td>
<td></td>
<td>[−] [+] [+]</td>
<td>−.59</td>
<td>×</td>
</tr>
<tr>
<td>[+] [+] [+]</td>
<td>.10</td>
<td></td>
<td>[0] [+] [+]</td>
<td>−.25</td>
<td>×</td>
<td>[−] [+] [+]</td>
<td>−.49</td>
<td>×</td>
</tr>
<tr>
<td>[+] [+] [+]</td>
<td>−.05</td>
<td></td>
<td>[0] [+] [+]</td>
<td>−.02</td>
<td></td>
<td>[−] [+] [+]</td>
<td>−.63</td>
<td>×</td>
</tr>
<tr>
<td>[+] [+] [+]</td>
<td>−.15</td>
<td>×</td>
<td>[0] [+] [+]</td>
<td>−.62</td>
<td>×</td>
<td>[−] [+] [+]</td>
<td>−.69</td>
<td>×</td>
</tr>
</tbody>
</table>

### Table 9
Mean score of pleasantness in each sign of every R

<table>
<thead>
<tr>
<th>Sign</th>
<th>N</th>
<th>R1 M</th>
<th>SD</th>
<th>Sign</th>
<th>N</th>
<th>R1 M</th>
<th>SD</th>
<th>Sign</th>
<th>N</th>
<th>R1 M</th>
<th>SD</th>
<th>Sign</th>
<th>N</th>
<th>R1 M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>1416</td>
<td>.57</td>
<td>1.18</td>
<td>+</td>
<td>1409</td>
<td>.51</td>
<td>1.25</td>
<td>+</td>
<td>1281</td>
<td>.48</td>
<td>1.22</td>
<td>+</td>
<td>1110</td>
<td>.14</td>
<td>1.04</td>
</tr>
<tr>
<td>0</td>
<td>869</td>
<td>.05</td>
<td>1.02</td>
<td>0</td>
<td>896</td>
<td>.08</td>
<td>1.04</td>
<td>0</td>
<td>1102</td>
<td>.34</td>
<td>1.20</td>
<td>0</td>
<td>1026</td>
<td>.34</td>
<td>1.20</td>
</tr>
<tr>
<td>−</td>
<td>1126</td>
<td>.38</td>
<td>1.17</td>
<td>−</td>
<td>1106</td>
<td>−.34</td>
<td>1.19</td>
<td>−</td>
<td>1026</td>
<td>−.34</td>
<td>1.20</td>
<td>−</td>
<td>1026</td>
<td>−.34</td>
<td>1.20</td>
</tr>
</tbody>
</table>

**STUDY VI**

**Problem**

It has been suggested, from the results in the first four studies, that the revised hypothesis is superior to Heider's theory when applied to real interpersonal relations. We will, next, test if it is the case in fictitious situations as well. In this study, how R1 and R2 determine R3 will be analyzed.

**Produce**

Ss were sixty-five under-graduate students. They were asked to guess sign of R3 in each of
nine fictitious situations where signs of $R_1$ and $R_2$ were given verbally. Instruction given in one of them was as follows:

Suppose person A and B are of the same sex and age as you. Assume that you like A and dislike B. Does A like, or dislike, B in such a situation in general? Please choose and check one of the following alternatives which you think most probable.

- A will surely like B.
- A will maybe like B.
- It is indefinite whether A likes or dislikes B.
- A will maybe dislike B.
- A will surely dislike B.

**Results**

Score of $+2$, $+1$, $0$, $-1$, or $-2$ was given to response in each situation. Mean scores obtained are shown in Table 10. The bottom row of the table indicates the level of significance of the difference between the mean score and zero. It will be seen that the results agree with our initial hypothesis derived from Heider's theory (cf. Table 1) better than with the revised hypothesis. But, the mean is negative in type $[- -]$, though not significant, contrary to the initial hypothesis. It may be concluded, then, that sign of $R_3$ in fictitious situations is determined by those of $R_1$ and $R_2$ so as to be in more accordance with Heider's theory than in real situations. The accordance, however, is worse when $R_1$ is $(-)$ than when it is $(+)$ or $(0)$ as the results in real situations.

**STUDY VII**

**Problem and Procedure**

This study, the last in the series, refers to the degree of pleasantness of fictitious triads. Jordan (1953) already reported about similar investigation dealing with the p-o-x system.

Giving sign of $(+)$ or $(-)$ to each $R$ contained, eight three-R-configurations, or ten four-R-configurations, are discriminated. One hundred and fifteen under-graduate students, who served as Ss, were requested to rate the degree of pleasantness of each configuration as they would feel if they were in p's position in a seven-point-scale. O and q were defined as persons of the same sex and age as p. Three-R-configurations were presented first, and then four-R-configurations.

**Results**

Each point in the scale was given one of scores from $-3$ to $+3$. Mean scores of three-R-configurations calculated are shown in Table 11. The meaning of its bottom row is the same as that in Table 10. It will be seen at a glance that the results are considerably different from those in real situations (cf. Table 8). They agree pretty well with Heider's theory; mean scores are generally positive in the configurations considered by him as balanced, and generally negative in those considered as imbalanced. When $R_1$ is $(-)$, however, the results are in less accordance with the theory as before. First, the mean score in $[- - -]$ is significantly positive and that in $[- - +]$ is negative though not significantly, contrary to the theory. Next, absolute value of the mean score in $[- + +]$ is significantly smaller than that in $[+ - +]$, and so is that in $[- + -]$ than that in $[+ - -]$.

Mean scores of four-R-configurations are shown in Table 12. Those in the con-
TABLE 11
Mean scores of pleasantness of three-R-configurations

<table>
<thead>
<tr>
<th>Configurations</th>
<th>[+++]</th>
<th>[++-]</th>
<th>[+-+]</th>
<th>[-++]</th>
<th>[---]</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>2.37</td>
<td>-1.54</td>
<td>-1.21</td>
<td>1.50</td>
<td>-.76</td>
</tr>
<tr>
<td>SD</td>
<td>.87</td>
<td>1.16</td>
<td>1.25</td>
<td>1.18</td>
<td>1.14</td>
</tr>
<tr>
<td>p</td>
<td>**</td>
<td>&lt;&lt;</td>
<td>&lt;&lt;</td>
<td>**</td>
<td>**</td>
</tr>
</tbody>
</table>

TABLE 12
Mean scores of pleasantness of four-R-configurations

<table>
<thead>
<tr>
<th>Configurations</th>
<th>[++++]</th>
<th>[+++-]</th>
<th>[++--]</th>
<th>[+-+-]</th>
<th>[+--+]</th>
<th>[+-++]</th>
<th>[-+++]</th>
<th>[-+-+]</th>
<th>[--++]</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>2.38</td>
<td>-1.19</td>
<td>-2.11</td>
<td>-1.10</td>
<td>-.79</td>
<td>.38</td>
<td>1.28</td>
<td>-.28</td>
<td>-.01</td>
</tr>
<tr>
<td>SD</td>
<td>.89</td>
<td>1.38</td>
<td>1.19</td>
<td>1.62</td>
<td>1.27</td>
<td>1.46</td>
<td>1.40</td>
<td>1.62</td>
<td>.89</td>
</tr>
<tr>
<td>p</td>
<td>**</td>
<td>&lt;&lt;</td>
<td>&lt;&lt;</td>
<td>&lt;&lt;</td>
<td>&lt;&lt;</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
</tr>
</tbody>
</table>

Coincidence of signs of R₃ and R₄ (the last two of the four bracketed) are the same are much similar to those of the three-R-configurations. It can not be explained by the theory, however, that the mean score in [+-+-+] is significantly negative while that in [+--+] is positive. Instead, it is consistent with the results in Study IV, and can be explained well by the revised hypothesis. It has been suggested, then, that discrepancy between the results in real situations and in fictitious ones is less remarkable in four-R- than in three-R-configurations.

DISCUSSION

Theoretical Background of the Revised Hypothesis.

It is clear from the above that the relationship among R's contained in the p-o-q system is not so simple as Heider's theory predicts. The revised hypothesis has proved to be rather superior to Heider's theory so far as real situations are concerned. What it means will be discussed first with reference to other psychological theories.

Coincidence of signs of R₃ and R₄ means that p thinks that o has the same attitude toward q as he-p projects his feeling toward q on o. In other words, it means that p assumes similarity between o's attitude toward q and his own. Heider's theory asserts that p assumes similarity only between o with positive valence for him and himself but negates it—assumes dissimilarity—between o with negative valence and himself. The revised hypothesis, on the other hand, maintains that p assumes similarity between any o and himself, though in less degree in the case of negative o. Fiedler and others (Fiedler, Warrington & Blaisdell, 1952; Davitz, 1955; Smith, 1957; Vroom, 1959, etc.) report that their Ss assume their positive sociometric choices to be more similar to themselves than their negative choices. There seems, however, to be no definite evidence yet that they negate similarity between their negative sociometric choices and themselves, though it is conceivable.

The revised hypothesis is parallel to the notion that p pays more serious attention to q than to o on responding relation-perception test. It being the case, the mechanism then acting on p may be identification rather than projection. One generally wishes, we presume, to be liked by as many persons as possible—even by those he dislikes—, for likability is a desirable personality trait in our culture. If, in addition, it is reasonable to assume that
one usually attempts more or less to identify himself with those he likes, it will be safe to predict that he wishes them to be liked by everybody as well. It may be predicted likewise that one wishes those he dislikes to be disliked by everybody, as he will attempt more or less to discriminate them from himself. One's way of perceiving may be affected by his wish. Thus signs of $R_2$ and $R_3$ will tend to coincide irrespective by of $R_1$.

The tendency, which the revised hypothesis maintains, for $p$ to assume that $q$ is either liked or disliked by everybody depending upon whether $q$ has positive or negative valence for $p$ can be interpreted from another point of view. One will generally attempt to conform to the standard of the group to which he belongs, and he will feel more at ease when he thinks he is conforming. Need for conformity will be satisfied when $p$ perceives that $q$ with positive valence for him is liked, and that $q$ with negative valence is disliked, by every member in the group. He may judge in such cases that his attitude toward $q$, or his opinion on $q$'s likability, is supported by a majority of the group.

**Difference between Heider's Theory and the Revised Hypothesis.**

Essential difference between Heider’s theory and the revised hypothesis is, we recognize, that the former assumes that every $R$ in the configuration is unconditionally symmetric while the latter does not. The assumption, however, has proved to be not always correct. Indeed $R$ tends to be symmetric, but the tendency is restricted by other $R$'s. The powerfulness of the tendency is presumed to depend also on other factors. Suppose that person $A$ has positive sociometric relation toward person $B$. His desire to do something in company with $B$ could be hardly realized unless $B$ has positive attitude toward him as well. So, he will usually expect his choice to be reciprocated by $B$'s choice of him. It will be the case in negative choice as well. If, therefore, sociometric relation between two persons is found to be not symmetric, both will be made to feel unpleasant. In near-sociometric relation, on the other hand, non-symmetry of the relation will not be necessarily unpleasant for one party—person who dislikes, but is liked by, the other—, for his wish to be liked by as many persons as possible is fulfilled in this case. Thus, we can infer that the tendency to symmetry is more powerful in sociometric, than in near-sociometric, relations. Heider’s theory, then, is expected to be more potent over the former than the latter. Kogan and Tagiuri’s investigation (1958) which confirmed Heider’s theory very well may be appreciated along this line. Relations dealt with in it were not near-sociometric but sociometric. $S$s were requested to indicate three crew-members with whom they would like to spend a liberty most and three least, and then to identify the six choices made by each of other members.

Another factor which affects the powerfulness of the tendency is, we infer, the amount of information provided in the situation. The less the amount of information provided, the more readily the symmetricity of the relation may be assured. A person’s real relation toward another is actually much beyond what is represented by its sign. In fictitious situation as dealt with in the present paper, only information provided for $S$s is signs of some $R$'s except the sex and age of $o$ and $q$. The fact that Heider’s theory has proved more potent in fictitious situations than in real ones and more potent in the case of three-R-configurations than in the case of four-R-configurations may be interpreted along this line. Results of other investigators dealing with fictitious situations (e.g., Morrissette, 1958) may be also interpreted along the same line.

**Other Factors Affecting the Validity of the Revised Hypothesis.**

Some factors which will affect the rela-
tive potencies of the revised hypothesis and Heider's theory will be discussed in this section, confining mainly to the case of negative $R_1$, where the contents of both are mutually contradictory.

*Meaning of the Triad for p.* As seen in the preceding sections, relationship among $R$'s is more complex in real situations than in fictitious ones. That is because, we consider, any real triad has particular meaning for $p$ in addition to what is meant by its configuration. Some triads are very important for $p$, he attempts to get along with them very well at any cost, others are less important, still others are of little relevance for him and he is indifferent to them. Further, the group in large which contains the triad as one of its sub-groups may be of various property and significance for him. $p$ may have, therefore, a variety of attitudes in access to the triad. Relationship among $R$'s will depend in some measure on his attitude toward the triad.

Suppose, for instance, that both signs of $R_1$ and $R_2$ are $(-)$. If $o$ and $q$ like each other, the triad will tend to be cleaved in two parts, i.e., the majority composed of $o$ and $q$, and the minority composed of $p$. If $o$ and $q$ dislike each other, it will tend to be cleaved in three parts. G. Simmel points out that the former case is more stable as a state of three-person-group. $p$ will be, however, less confused in the latter because he maintains that enemies who are antagonistic to each other are less troublesome than those who are mutually friendly. Therefore, judging from his personal standpoint, $p$ will prefer the latter to the former. Results obtained have indicated that our $S$s tend to take personal, rather than group-centered, standpoint in both real and fictitious situations, i.e., $[- - +]$ is preferred to $[- - +]$. As $p$ is in the majority side in this case, he will feel more pleasant than in $[- - +]$. The inference was confirmed by empirical data in fictitious situations (cf. Table 11). It was not supported, however, by data in real situations (cf. Table 8), owing to another factor, we presume, which will be discussed later. Further analysis of the data in Table 4 indicates that the configuration $[- + -]$ is readier to be observed than $[- - +]$ ($\chi^2 = 4.40$, $df = 1$, $p < .05$). If sign of $R_3$ is $(-)[- - +]$—the state is not only unstable in Simmel's sense but also unpleasant from $p$'s personal point of view. It is incompatible with the revised hypothesis. But, if sign of $R_1$ is defined as $(-)$ in addition, the state becomes pleasant (cf. Table 12). In real situation the state of $[- + +]$ will be made less unpleasant for $p$ due to his identification with $q$ and satisfaction of need for conformity to group standard as mentioned above, in addition to the readiness to deny the symmetricity of the relation.

It will be clear from the above discussion that Heider's theory stands on the ground near to Simmel's, while the revised hypothesis takes a more personal standpoint. The latter seems to us to be more suitable so far as events in $p$'s life space, instead of behavior of triad as such, is concerned.

*Independent vs Dependent Variable.* In Studies I, II, IV and VI data of $R_3$ were compared with those of $R_1$ and $R_2$, perception was dealt with as the dependent and choice as the independent, variable. Actually, both are dynamically interdependent. The former depends on the latter in some phases of social interaction and vice versa in others. Configuration to be preferred may vary with different $R$'s defined independently.

When sign of $R_1$ is $(-)$ and that of $R_3$ is $(-)$, sign of $R_2$ will tend to be $(-)$, for one can hardly like his enemy's friend. Thus, if $(-)$ and $(-)$ are given independently as signs of $R_1$ and $R_3$, respectively,
the configuration \([- - +]\) is more desirable for \(p\) than \([- + +]\), compatible with Heider's theory. But, when sign of \(R_2\) is dependent and that of \(R_4\) is in turn defined independently as \((-)\), sign of \(R_3\) will tend to be \((-)\) rather than \((+)\), as seen before, being compatible with the revised hypothesis. The configuration \([- - +]\), then, should be regarded as imbalanced in the latter case, while it should be regarded as balanced in the former. It has been suggested from the above discussion that it is in itself inappropriate to deal with the balance concept dichotomously.

**Tendency to Positivity.** Results in Study V have shown that degree of pleasantness of real triad as perceived by \(p\) can be explained neither by Heider's theory nor by the revised hypothesis. They may be explained well if it is assumed for any \(R\) to tend to be positive. Jordan (1953) already noted that triads containing \(p\sim Lo\sim negative\ \(R_1\) in our terms—were rated as being quite unpleasant by his \(Ss\). Remember that he dealt with the \(p-o-x\) system where \(R\) between persons was only \(pRo\). The necessity for assuming the tendency toward positivity was recognized also by a theorist (Harary, 1959). We may be assured, then, that sign of any \(R\) in the \(p-o-q\) system tends to be positive as much as possible.

**Concluding Remarks.**

**Degree of Equilibrium.** Now it would be clear that one should not mention balance or imbalance in a dichotomous way but in terms of continuous degree. Configuration should be regarded as tending to a more stable one. The most stable one to which the rest tend finally, where force to change the configuration is minimum, is defined as having the maximum degree of equilibrium, and the rest as having different degrees smaller than it.

It will be safe to postulate that the most stable configuration is that which is composed of \((+)\)'s only—\([+ + +]\) in three-\(R\)-configuration and \([+ + + +]\) in four-\(R\)-configuration. The concept of the most stable configuration may be applied to other groups than triad. It is, for instance, \([+ +]\) in dyad, which means that \(p\) likes \(o\) and thinks \(o\) likes him.

**Tendencies to Equilibrium.** A configuration will tend to locomote to a more stable one through several paths. We postulate, in the light of findings described above and those reported by other investigators, that there exist four distinct paths. In other words, there are the following four tendencies at work, affecting the configuration in the system.\(^8\) Each tendency is composed of several sub-tendencies.

Tendency \(P\) (Tendency to Positivity)—

Every \(R\) contained in the configuration tends to be positive.\(^8\)

- **T-P-1:** Tendency for sign of \(R_1\) to be positive
- **T-P-2:** Tendency for sign of \(R_2\) to be positive
- **T-P-3:** Tendency for sign of \(R_3\) to be positive
- **T-P-4:** Tendency for sign of \(R_1'\) to be positive
- **T-P-5:** Tendency for sign of \(R_2'\) to be positive
- **T-P-6:** Tendency for sign of \(R_3'\) to be positive

Tendency \(S\) (Tendency to Symmetry)—

Relation between two persons tends to be symmetric.

- **T-S-1:** Tendency for signs of \(R_1\) and \(R_1'\) to coincide
- **T-S-2:** Tendency for signs of \(R_2\) and \(R_2'\) to coincide
- **T-S-3:** Tendency for signs of \(R_3\) and \(R_4\) to coincide

Tendency \(C\) (Tendency to Consonance)—

Any two \(R\)'s toward one and the same person tend to be mutually

\(^8\) Harary (1959) already pointed out that four tendencies, instead of single one, should be assumed. Our model to be described differs from, though considerably similar to, his one in that directionality of \(R\) has been introduced.
consonant.

T-C-1: Tendency for signs of $R_2$ and $R_3$ to coincide
T-C-2: Tendency for signs of $R_1$ and $R_4$ to coincide
T-C-3: Tendency for signs of $R_1'$ and $R_2'$ to coincide

Tendency B (Tendency to Balance)—

Three-R-configuration tends to contain two, rather than one, $(-)'s$.

T-B-1: Tendency for three-R-configuration to be $[+ - -]$
T-B-2: Tendency for three-R-configuration to be $[- + -]$
T-B-3: Tendency for three-R-configuration to be $[- - +]$

Relative powerfulness of sub-tendencies of a tendency may be defined either empirically or logically. In Tendency P, for instance, $T-P-4$ and $T-P-5$ may be regarded as more powerful than $T-P-3$ and $T-P-6$. T-C-3, which has not been shown to exist by our investigation but derived logically, will be least powerful of the three sub-tendencies in Tendency C.

Relationship among the Four Tendencies. It has been suggested from our findings that $T-B-2$ and $T-B-3$ are less powerful than $T-B-1$. It will be related, however, with a variety of relations between Tendency B and others. Sometimes other tendencies co-operate, we postulate, while sometimes compete, with a given tendency. The tendency's force to make the configuration locomote in a certain direction will be reinforced in the former case, while weakened in the latter. In consequence, results to be obtained will be less unequivocal in the latter than in the former. When any two tendencies compete against each other, in which direction the configuration locomotes will depend on their relative potencies. Relative potencies of the four tendencies may be inferred from empirical data. The following are our inferences.

When $R_1$ is $(+)$ and so is $R_2$, all the tendencies operate compatibly with one another so as to make $R_3$ $(+)$. The fact that the results obtained in this case have been most unequivocal will be explained by it. When $R_1$ is $(+)$ and $R_2$ is $(-)$, $R_3$ is to tend to be $(+)$ according to $T-P-3$. According to $T-C-1$ and $T-B-1$, however, it is to tend to be $(-)$. The latter prediction has been fulfilled everywhere, suggesting $T-C-1$ and $T-B-1$ combined more potent than $T-P-3$. When $R_1$ is $(-)$, Tendency C and Tendency B operate in compatibly. The fact that the results in this case have been rather equivocal may be attributed to it. Tendency C seems to be more potent in real, though less potent in fictitious, situation than Tendency B. When sign of $R_1$ is different from that of $R_2$, $T-C-1$ and $T-C-2$ are incompatible with $T-S-3$. The results in Study IV suggest the former is more potent. And Tendency S is presumed to be more potent in sociometric relations than in near-sociometric ones.

In addition, relative potencies of tendencies may be affected in a measure by circumstances in which the system is localized. As mentioned above, $R_3$ generally tends to be $(-)$ when $R_1$ is $(+)$ and $R_2$ is $(-)$. But one of our $S$s in fictitious situation, a college woman, told us that she wished, in such a case, that she liked $q$ as far as possible. Her argument was as follows: "I can not like $q$ at present for some reasons. But I hope that I'll like her in future, for it is unhappy for me to have any disagreeable fellows around me. I expect $o$ to act as middleman between $q$ and me. Therefore, I wish that $o$ will be friendly to $q". Tendency P is more potent than Tendency C and Tendency B combined in this case. It suggests that there is some individual difference in preference of paths toward equilibrium, affecting relative potencies of the four tendencies in a measure.

We are not unwilling to recognize that our theoretical model described above is still defective. Conditions affecting relative powerfulness of sub-tendencies and relative potencies of the four tendencies need to be
inquired further. In addition, other tendencies which have never been mentioned may have to be included. For example, a student told us that she wanted R3 to be (−) when both R1 and R2 are (+). Clearly, a sentiment of jealousy or rivalry might be observed. The model can not cover such a case, no more than Heider’s theory. It has been intended for leaving room for such a case that we have defined the most stable configuration as that in which the force to change the configuration is minimum, instead of naught. Inferior as our model is to Heider’s theory so far as simplicity is concerned, it has some advantages, we believe, one of which is that it may be applied to continuous variate as well as to such discrete variate as used in the present studies.

REFERENCES


JORDAN, N. 1953 Behavioral forces that are a function of attitude and of cognitive organization. *Hum. Relat.*, 6, 273-287.


(Received June 2, 1964)