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ABSTRACT

A review of the literature on attribution theory suggests that attributional templates may be similar to balanced structures, in that they are cognitive constructs that have an organizing influence on thought processes and exert a similar organizational influence on the memory for social information. Therefore, the three basic attributional patterns outlined by Kelley may serve to organize memory for incoming effects information. To test this hypothesis, 36 undergraduate students were presented with a series of sentences that defined a 3X3X3 Kelley cube. On each trial, the sentences were precisely consistent with either a person or an entity pattern of effects (pattern variable) and had zero, four, or eight sentences randomly deleted from the "ideal" pattern (missing variable). Memory for the sentences was assessed using a recognition paradigm. The results revealed main effects for the pattern and missing variables. As the number of missing sentences increased, more errors in recognition were committed. The entity pattern produced more errors than did the person pattern. These findings provide evidence that attributional templates exert an organizing influence on memory for social information. (Author/NRB)

# Attributional Constructs: Their Role in The Organization of Social Information in Memory

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## Abstract

It was suggested that the three basic attributional patterns outlined by Kelley serve to organize memory for incoming effects information. Utilizing a 6 x 6 Greco-Latin square design, 36 subjects were presented with a series of sentences that defined a 3 x 3 x 3 Kelley cube. On each trial, the sentences were precisely consistent with either a person or an entity pattern of effects (pattern variable) and had zero, four or eight sentences randomly deleted from the "ideal" pattern (missing variable). Memory for the sentences was assessed using a recognition paradigm. Main effects were observed for the pattern and missing variables. As the number of missing sentences increased, more errors in recognition were committed. The entity pattern produced more errors than the person pattern.

Attributional Constructs: Their Role in The Organization of Social Information in Memory

Attribution theory has undergone subtantial growth and diversification since the seminal writing of Heider in his book, The Psychology of Interpersonal Relations (1958). Various explications of attribution processes have been developed in an attempt to understand diverse phenomena ranging from initimate relations (Harvey Wells, & Alvarez, 1978) to crime and the criminal justice system (Carroll & Wiener, 1982). Despite its broad application by psychologists, relatively little basic research has been conducted on the processes underlying causal attribution (Kelley & Michela, 1980).

Perhaps the best developed and most influential theory of attribution has been presented by Kelley (1967, 1972, 1973). The theory was given substantial empirical support in an early experiment by McArthur (1972), who demonstrated that person, entity and circumstance attributions were made with a high degree of frequency under the conditions predicted by the theory. For example, 85% of the subjects made person attributions under conditions of low distinctiveness, high consistency, and low consensus.

Orvis, Cunningham, and Kelley (1975) extended these results by proposing that attributional templates may facilitate the interpretation of single events when the more complete set of effects is unavailable. Orvis et al. developed a series of 26 different information conditions that represented every possible combination of complete and partial covariance information. The results of this study lent clear support to the conception that people process incoming social information through person, entity and circumstance templates. That is, whenever a person, entity or circumstance attribution is implied by covariation information that is consistent with one of the templates, there is a high probability that such an attribution will be made despite missing or even inconsistent information.

However, note that Orvis et al. (1975) demonstrated the functioning of attributional templates when information about the covariation between effects and each dimension of the Kelley cube had already been specifically provided. That is, the basic effects themselves were not presented to the subjects; rather, a clear and direct summary statement was provided concerning the relationship between the effects (e.g., thoughts, feelings or behaviors being observed) and each dimension of the Kelley cube. For example, consensus information was presented in the form "almost everyone compliments Barry's work" rather than providing separate instances from which the level of consensus could be inferred.

It is plausible to believe that causal templates exert their influence at the more basic level of the organization of social information in memory. Specifically, the attributional templates might influence memory for the effects themselves from which the covariation information is presumably extracted. This idea has not been directly addressed within attribution theory; however, some suggestive evidence and a basic methodology for studying this notion are provided by several studies derived from balance theory that have examined memory for balanced and imbalanced social structures.

Gestalt theories have long suggested that multifacted structures are stored in memory as a unitary whole. Balance theory (Heider, 1944, 1958) predicts that triadic relationships between two people and an object will be perceived as balanced or imbalanced. The perceiver should tend to misperceive, have more difficulty learning and incorrectly recall imbalanced triads relative to balanced ones. A number of studies have provided evidence for this effect using such diverse paradigms as paired associates learning (Zajonc & Burnstein, 1965a, 1965b), conceptual rule learning (Cottrell, 1975), recall (Picek, Sherman, & Shiffrin, 1975), discriminant learning (Thompson, 1980), recognition tasks (Delia & Crockett, 1973) and reaction time (Sentis & Burnstein, 1979). In brief, this research has shown that balanced structures tend to be remembered better and recognized faster than imbalanced structures. Furthermore, subjects appear to fill in missing information so that it is consistent with a balanced structure (see Crockett, 1982 for a review).

The previous research on balanced structures suggests several paradigms useful in studying memory processes. Given the stimulus materials needed to study the effects of attributional constructs on memory, it would appear wise to consider use of the simple recognition memory paradigm. This paradigm has been used to study the organizational processes in the memory for sentences (Bransford & Franks, 1971; Reder, 1982) and the retrieval of words from memory

(Klatzky, 1980). Findings from these applications suggest that the recognition paradigm is a useful and efficient technique for investigating the organizational influence of attributional constructs on memory.

The synthesis of the evidence which has been presented would suggest that attributional templates may be similar to balanced structures, in that they are cognitive constructs that have an organizing influence on thought processes (Kelley, 1972) and exert a similar organizational influence on the memory for social information. Therefore attributional templates may serve to organize the basic effects in memory. It was expected that subjects would make significantly more errors in recognition as the number of items missing from an "ideal" attribution pattern increased.

## Method

### Subjects

Thirty-six male and female Introductory Psychology students participated as subjects. Subjects received credit in partial fulfillment of a class requirement. Participants were run on an individual basis.

### Design

A 2 x 3 within subjects factorial design was utilized. The two factors included type of attributional pattern (person or entity) and the number of discrepancies (0, 4 or 8 missing cells) from the "ideal" pattern. The ideal pattern of effects required for a person and entity attribution was taken from Kelley (1967).

A 3 x 3 x 3 Kelley cube was created by developing sentences corresponding to all possible combinations of three persons, three situations, and three times/modalities. To illustrate, for one set of sentences, three persons (Sue, Bob, Chris), three sports (racquetball, tennis, handball), and three times (Fall, Winter, Spring) were combined in this manner. Thus, a sample sentence was "Sue plays tennis in the Fall." Ideal person and entity patterns were created through having the event uniquely associated with one person or one entity, respectively. For example, for the entity pattern of sentences, all three persons (Sue, Bob, Chris) "played" tennis during all three times (Spring, Fall, Winter). In addition, Sue, Bob and Chris did not play racquetball or handball during all three time/modalities.

The discrepancy manipulation was accomplished by randomly changing 4 cells of the 27 cell cube to blanks. That is, information on 4 of the 27 possible cells was not presented to the subjects. These deletions would result in the creation of four discrepancies from the ideal pattern of effects. The eight discrepancy manipulation was accomplished in the same manner.

The creation of the discrepancy exemplars was subject to the restriction that the number of changes in any level of the cube was minimized. This restriction served to distribute the discrepancies as evenly as possible throughout the entire cube.

Each level of Pattern (Entity or Person) and number of discrepancies Missing was presented with one of six themes. These themes included sports, art, entertainment, transportation, food and clothing.

For puproses of the design and analysis, the six combinations of Pattern and Missing were arrayed as a single treatment variable. A 6 x 6 Greco-Latin square design was employed to balance treatment, position (trial), and theme. That is, each treatment was presented six times in each position and six times with each level of theme. Similarly, each theme appeared six times in each position.

Procedure

The subject was led into the experimental room and seated comfortably facing a projection screen. He/she was given instructions which covered the general procedure of the experiment and the use of the response materials. Each subject was told that he/she would be presented with six separate recognition problems. Once the subject understood the procedure, the presentation of slides began.

Each subject was then presented with a series of between 19 and 27 sentences depending upon the order of the discrepancy conditions. Each sentence comprised one of the 27 spaces in the Kelley cube.

Each sentence was presented for a period of 5 seconds. The subjects was asked to repeat the stimulus sentence out loud during this 5 second period. An intertrial interval of 1 second ensued between the presentation of each stimulus slide.

After all of the sentences had been presented, the subject was asked to perform an intervening task which consistent of counting backwards from 1,000 by 17's for 2 minutes to prevent rehearsal.

Subjects then began the recognition phase of the experiment. Subjects were shown a series of 30 sentences during this phase of the experiment. Each sentence was presented for a period of 5 seconds. The subject was asked to identify each sentence as being "old" or "new." The primary dependent variable of interest was the accuracy of recognition of each of these sentences during the test trials.

One-third of the recognition sentences were exact duplicates of the sentences seen during the initial phase of the experiment. Another third of these sentences were distractors which involved the same person, entity and time but in which the effect had been reversed. An example of this would be altering the sentence "Chris plays tennis in the Winter" to read "Chris does not play tennis in the Winter." The final 10 distractors consisted of sentences that used two of the original three elements (person, entity, time) while varying a third element. This third element was composed of a level of person, entity or time which was not seen during the original sentence presentation. For example, the sentence "Bob plays tennis in the Spring" would be changed to read "Mary plays tennis in the Spring." In this example, the element "Mary" would not have been viewed during the sentence presentation phase of the study. The "old" sentences that were included in the recognition task were randomly selected from the sentences viewed during the presentation of stimuli. The specific elements altered to create the distractor sentences were randomly selected.

## Manipulation Check

Following the final (sixth) recognition task, each subject was asked to make a causal attribution for the series of effects presented in the final task. Using a procedure adapted from McArthur (1972), each subject was asked to indicate the most probable cause for the pattern of effects. Subjects were asked to determine whether something about the (a) person, (b) entity, (c) circumstance, or (d) some combination of the previous factors caused the pattern of effects. In the case where a subject selected possibility (d), the subject was asked to indicate which of the preceding three factors was responsible for the effects. In addition, each subject was asked to allocate percentages to each factor that indicated the degree to which that factor caused the pattern of effects. Therefore each factor selected in alternative (d) was assigned a percentage. The percentages assigned for these elements were constrained to sum to 100%.

Each combination of stimulus items and recognition items represented one problem. The number of sentences correctly recognized was computed for each subject for each problem and served as the dependent variable in the analyses.

# Results

## Preliminary Analyses

The present design is a 6 x 6 Greco-Latin Square with six levels of the treatment variable, six levels of the theme variable, and six levels of the position (trial) variable. The design is balanced such that across subjects every combination of treatment and position as well as treatment and theme are represented an equal number of times.

Two interactions, treatment by position and treatment by theme, constitute the two potential artifacts that must be examined in this design. In the first case, the effects of the manipulated treatment variable could depend upon the position in which they were presented. If a treatment by theme interaction were present, the effects of treatment variable would be contingent upon the type of theme with which they were presented.

A strategy was developed to test these artifacts using both Between Subjects and Repeated measures ANOVAs (Winer, 1971). The recognition score was utilized as the dependent variable in each of these analyses. Using the analysis strategy, it was determined that the Position by Treatment interaction was nonsignificant, $\underline{F}(20,150) = .21$. The Theme by Treatment interaction was also found to be nonsignificant, $\underline{F}(20,150) = .71$. Hence it may be concluded that any observed effects of the treatment variable were not partially a function of the experimental procedure.

The two main effects of Theme and Position were then tested using the multivariate approach to Repeated Measures ANOVA (see Harris, 1975) with the recognition score being utilized as the dependent measure. The Theme main effect failed to reach conventional levels of significance, Multiple $\underline{F}(5,26) = 1.37$, $\underline{p} < .24$. However, the Position main effect was significant, Multiple $\underline{F}(5,26) = 4.19$, $\underline{p} < .001$. The significant Position main effect is perfectly distributed across conditions as a result of the present design. Therefore, the only result of the Position main effect is to inflate the error term and reduce the power of the main statistical tests (Cook & Campbell, 1979). In other words, the Position main effect can only serve to obscure a true relationship between the treatment variable and the dependent variable.

Main Analyses

Recognition. The Treatment variable was split into the two independent variables of interest for the main analysis. These variables were Pattern (e.g., Entity or Person) and Missing (e.g., level of discrepancy: 0, 4 or 8 missing cells). A 2 x 3 Repeated Measures ANOVA was conducted using Pattern and Missing as the independent variables and Recognition score as the dependent variable. This analysis showed a significant main effect for Pattern, $F(1,35) = 7.95$, $p < .008$ with an entity pattern producing a higher mean number of recognition errors (M = 9.91) than a person pattern of effects (M = 8.14; see Table 1). In addition, a significant main effect was found for Missing, $F(2,34) = 15.06$, $p < .0005$. A review of Table 1 indicates that the zero discrepancy condition produced the lowest mean number of recognition errors (M = 7.64), the four discrepancy condition the next highest (M = 8.71) and the eight discrepancy condition the highest mean number of errors (M = 10.72). The Pattern by Missing interaction failed to reach statistical significance, $F(2,34) = .31$.

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Insert Table 1 about here

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Following Keppel (1982) a Repeated Measures Newman-Keuls test was performed on the Missing variable to determine which of the three cell means differed significantly from one another. This analysis showed that the zero and eight discrepancy conditions differed significantly, $\underline{t}(3,35) = 5.33$, $\underline{p} < .01$. The four and eight discrepancy conditions also differed significantly, $\underline{t}(2,35) = 3.14$, $\underline{p} < .01$. The difference between the zero and four discrepancy conditions did not reach statistical significance, $\underline{t}(2,35) = 1.48$.

Attribution. Each subject was asked to attribute the cause of the effects which they observed in the final recognition problem to something about the entities dimension, something about the persons dimension, something about the particular circumstances of the scenario or some combination of these three factors. In order to determine whether the pattern of manipulation was effective, the percentage of entity and person attributions made in each experimental condition was computed. This descriptive summary showed that when the entity pattern of effects was presented, 67% of the cause for the effects was attributed to the entities dimension while 26% of the cause for the effects was attributed to the person dimension. When the final pattern of effects suggested a person attribution, 77% of the cause was attributed to something about the person's dimension while 14% was attributed to one of the entities in the scenario. These results would suggest that the perceived cause of each pattern of effects was congruent with the intended manipulation.

Discussion

The present study investigated the processing of effects information that varied in its consistency with either a person or an entity attributional template. A decrease in the memory for effects information was found when effects information did not fully match either a person or an entity template. That is, as the number of effects missing from the "ideal" pattern of effects increased, subjects made progressively more errors in recognition. The less complete the initial pattern of effects was the less well they approximated an ideal person or entity pattern of effects, and the worse was the subsequent memory for these effects. It is suggested by these data that the templates were less likely to be activated as the number of missing effects increased. This is particularly evident in the eight missing condition which produced the highest mean number of errors and was significantly different from both the zero and four missing conditions.

The present results provide further insight into the influence that attributional constructs have on the organization of memory for social information. Few previous studies have examined the link between attribution and memory. Previous researchers on this question have explored the influence of covariation information on the memory for stimulus sentences (Smith & Miller, 1979). Furthermore, past research has focused on the influence which the making of an attribution has on the subsequent memory for refined covariation information (Wells, 1982). That is, the memory for the basic effects information was not assessed, but rather only the memory for refined covariation information was measured in which the relationship between the person, entity and time/modality dimensions was already provided.

The effects information (e.g., Bob does not play tennis in the Spring) is the basic information available which the observer may utilize to determine covariation with each of the three dimensions on in the Kelley cube. In prior research, the covariation of the effects with each of the dimensions have been summarized and presented to the subjects. As Crocker (1981) has noted, this procedure eliminates the subject's need to decide what data are relevant to a covariation judgment and to sample these data accordingly. A better understanding of how people process covariation information and make covariation judgments outside of the laboratory can be accomplished by engaging these data sampling processes in naive observers. The present study contributes to this understanding by showing that the memory for the effects themselves are influenced by the person and entity attributional templates.

An unpredicted main effect was also observed for the type of attributional pattern (e.g., person or entity). The person pattern of effects produced higher mean recognition scores than the entity pattern. This would suggest that the person template provides a stronger organizational influence on memory than the entity template.

Some supportive evidence for the relative strength of person schemata is given by the literature on person memory. Research in this area indicates that strong cognitive representations of persons are developed and may involve the activation of a pre-existing person schema or set of schemata based on personality related content. When forming an impression of an individual, many separate items must be integrated into a coherent whole. This may best be accomplished by comparing these items to the pre-existing person schema (Fiske & Taylor, 1984; Hamilton, 1981). It has been shown that this organizational process also aids memory by creating links between the individual items (Fiske & Taylor, 1984).

Further evidence for the relative strength of the person pattern of effects is provided by the manipulation check utilized in the present study. In examining the percentage of cause attributed to the person dimension when a person pattern of effects was presented, it was found that 77% of cause for the effects was attributed to the person dimension. This can be contrasted against the entity pattern which produced an attribution of 67% of the cause of the entities dimension when its pattern was presented, replicating earlier results by McArthur (1972). The present results expand upon the findings of McArthur by showing that this person pattern as compared to the entity pattern exerts a stronger influence on memory as well as on the attribution of causality.

In sum, the present study provides evidence that attributional templates exert an organizing influence on memory for social information. Specifically, the present study makes an initial effort at examining the influence of attributional templates on memory for effects information. However, much research remains to be done with many questions of interest remaining unanswered. Of particular interest are the effects of template inconsistent information on memory for the observed effects. It is reasonable to hypothesize that patterns of effects which are inconsistent with a person or entity template will also produce reduced accuracy in memory for these observed effects. A second question of interest is the degree to which incomplete effects information and the decrement in memory which it produces influence attributions which are made at a subsequent point in time based on the memory for the original effects.

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Footnote

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Table 1

*Mean Number of Recognition Errors as a Function of Attributional Pattern and Number of Missing Cells*

| ATTRIBUTIONAL PATTERN | NUMBER OF MISSING CELLS ZERO | FOUR | EIGHT | ROW MEANS |
|---|---|---|---|---|
| Entity | 8.28 | 9.86 | 11.58 | 9.91 |
| Person | 7.00 | 7.56 | 9.86 | 8.14 |
| Column Means | 7.64 | 8.71 | 10.72 | |

NOTE: Recognition errors may range from 0-30; 15 errors would be expected from random guessing.