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SERIAL POSITION CURVE FOR INTEGRATION OF INFORMATION ABOUT JOBS

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Footnote

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Abstract

Prospective job seekers judged attractiveness of jobs described by sequences of adjectives. Job descriptions were prepared from a 2^4 design with serial position as factors and positive and negative pieces of information as the two levels. The serial position curves prepared according to the logic of information integration theory were of bow-shape for both the successive and simultaneous presentation conditions. Individual subject analyses, however, disclosed that all respondents did not have similar serial position curves. Accordingly, the attention-change explanation seemed to be more appropriate than the verbal-memory hypothesis. Implications of these results were discussed for preparation of job descriptions and for job satisfaction.

Serial Position Curve for Integration of Information about job

We receive information about any job in bits and pieces from diverse sources. The order in which various kinds of information are obtained may play an important role in our response to the job. An early information may serve as base and frame for processing the subsequent information. Or a late information because it is fresher in the memory may minimize the importance of the early information. Such primacy and recency processes have been subject to considerable study in experimental (Klatzky, 1975) as well as social (Anderson, 1974) psychology. However, they have not been studied at all in evaluation of jobs, an important area of organizational psychology. The primary goal of the present research was to examine the role of serial position of information in evaluation of jobs, using methods of information integration theory (Anderson, 1974).

According to integration theory, information available at each serial position carries a certain valence or scale value, $\underline{S}$, and a certain importance or weight, $\underline{W}$. The $\underline{S}$ represents the information's location along the dimension of judgment. For example, the information that monthly pay is Rs. 200/- and Rs. 2,000/- have different values along the scale of liking for the job. The $\underline{W}$ reflects the information's importance in the judgment, that is, how important is information available at the first serial position in relation to those available at other serial positions. The overall evaluation of the job, $\underline{J}$, is assumed

to be a weighted average of all the information available at various serial positions. Quantitatively,

$$\underline{J} = W_1 S_1 + W_2 S_2 + \ldots + W_n S_n$$

$$= \sum_{i=1}^{n} W_i S_i , \qquad (1)$$

where subscripts 1, 2, ... n refer to the serial positions of the piece of information in the sequence of information about a job. The relative weights are required to sum to unity, the condition for an averaging model.

When serial positions are varied in a factorial design with positive and negative information as two levels, then main effects of serial positions from analysis of variance provide estimates of $\underline{W}$ of information present at those serial positions. Because the positive ($\underline{P}$) and negative ($\underline{N}$) information are assumed to have the same natural weight, the difference in their ratings at each serial position reflects $\underline{W}$ of that serial position. The theoretical expression for the difference in judgments of $\underline{P}$ and $\underline{N}$ levels at serial position 1 may thus be written as

$$D_1 = \overline{P} - \overline{N} = W_1 (S_P - S_N). \qquad (2)$$

Since the difference in $\underline{S}$ of the P and N information is constant, Equation 2 implies that D_1 is directly proportional to W_1. Estimates of $\underline{W}$ for other serial positions, from 2 to n, can be made from D_2 to

D_n in the same way. Graphic plots of D_i across the serial positions of information yield a serial position curve which mirrors step-by-step course of integration.

Some studies have employed this method of estimating $\underline{W}$ of information available at different serial positions (Anderson, 1973; Anderson & Farkas, 1973; Dreben, Fiske, & Hastie, 1979; Shanteau, 1970, 1972; Weiss & Anderson, 1969). Results from these studies suggest that shape of serial position curve is primarily linked with the nature of the experimental task, and that serial position curves for evaluations and for recall of information which serves as bases of evaluations hardly resemble (Anderson & Hubert, 1963; Riskey, 1979). Personality impression tasks (Anderson, 1973) generally yield primacy, whereas inference-estimation task (Shanteau, 1970), "book-bags-and-poker-chips" task (Shanteau, 1972), and length averaging task (Weiss & Anderson, 1969) yield recency. Attitude formation-change task (Anderson & Farkas, 1973) also yields recency, but this effect is obtained at only the last serial position. Anderson (1974) has suggested that both primacy and recency processes are accountable by attention process, and that changes in weight across serial positions reflect how the subject paid attention to information available at those serial positions.

The present paper reports two experiments which examined changes in weight of information about jobs as a function of serial position of

information. This task differs from the other tasks studied so far in one important respect. Whereas other tasks did not have any direct implication for the subjects, the present task did. The job one selects affects his well-being directly. It is, therefore, important to know how order of presentation of positive and negative aspects of a job influences attraction of job seekers toward it. Such an information may be of practical use not only in preparation of suitable job advertizements but also in making one accept the offered job.

Method

Two similar experiments were performed. Experiment 1 required subjects to evaluate some jobs described by four characteristics. Each characteristic was presented one by one, and the subject was asked to evaluate the described job after receiving each new piece of information. The method of presentation of information was thus successive. In Experiment 2, the subjects rated the same set of jobs after receiving information about all the four characteristics. The method of presentation of information was simultaneous; hence, each job was evaluated just once.

Design and Job Descriptions

The experimental design was a 2 x 2 x 2 x 2 factorial in which the four factors were serial positions of the information in job

descriptions. Each factor had positive and negative information, for example, high paying-low paying, as the two levels.

Two sets of sixteen job descriptions were written according to the design specification. The first set of jobs were prepared from four context factors (Herzberg, Mausner, & Snyderman, 1959) of pay, job security, physical environment, and interpersonal relations. The second set of sixteen job descriptions had four content factors of recognition, advancement, preferred task, and responsibility. Within each set, the four job factors were balanced over four serial positions in a 4 x 4 Latin square, making four subsets of job descriptions. These four subsets of job descriptions were used with four subgroups of subjects.

Four practice job descriptions were also constructed. These practice examples had five pieces of information. They were intended to serve as end anchors and to orient the subject toward the use of the entire scale of judgment (Dalal & Singh, Note 1).

In Experiment 1, each of the items of the sixteen job descriptions was typed on separate index card. All the four items of each job description were typed on the same card in Experiment 2.

Subjects

Thirty-two graduate students from the Indian Institute of Technology, Kanpur, India served as subjects in each experiment. They all

were prospective job seekers. They were randomly assigned in equal numbers to the four subgroups for the four subsets of each of the two sets of job descriptions. Each subject received Rupees five (Rs. 5/-) for his service.

Procedure

The subjects were run individually. Upon arrival, he received a typed sheet of instructions which introduced the task as one dealing with forming impressions of some jobs readily available to him. In Experiment 1, the subject received each of the four pieces of information one by one, and indicated his impression based on previous information and the new piece of information. Thus, each job was rated four times by the subject. In Experiment 2, impressions of jobs were indicated after receiving information about all the four characteristics.

Sixteen subjects indicated how much they would like to accept the job; the other sixteen subjects indicated how satisfied they would feel with the job. Within each judgmental condition, equal number of subjects (n = 8) rated job descriptions having either context or content factors.

The response measure was a vertical surface on which a sheet of white paper was pasted. It has 31 boxes on the subject's side. The extreme left box was labelled LOW and the extreme right box was

labelled HIGH. These boxes had numbers, 1-31, written on the experimenter's side. This vertical plank was fixed on a horizontal teakwood base. Subject was required to move a knob in order to bring the pointer to the appropriate box. Impression of job was indicated by bringing the pointer in the appropriate box. After each such judgment, the experimenter brought the pointer to its original position, that is, the extreme left point. The numbers assigned to these boxes were treated as rating scores.

Before presenting the actual sixteen jobs, subject received four practice examples. All queries by the subjects were also answered. During the regular session, the sixteen jobs were presented twice in different shuffled orders. Data from both replications of the design were coded and analyzed.

Results

Serial Position Curves

Experiment 1. Figure 1 displays four serial position curves for mean relative weight of information. The four curves are derived from responses made after receiving one (R_1), two (R_2), three (R_3), and four (R_4) pieces of information about the very jobs.

Figure 1 about here

The curves of Figure 1 have three noteworthy features. First, weight of information about a job seems to be linked with the serial

positions at which it appears. The initial and the latest information have received more weight in evaluation of jobs than the middle ones. Thus, the serial position curve for R_4 is clearly bow-shaped. This bow-shaped serial curve is obtained even with three serial positions. At R_2, there is obvious primacy: The weight of the information available at the first occasion is higher than that of information available at the second occasion. It seems that the primacy process applies only upto the second serial position; increase in relative weight begins from the third serial position. From these serial position curves, it is clear that judgments of jobs yield serial position curves different from those obtained with other judgmental tasks.

The D_i calculated for each individual subject were analyzed by one-way repeated-measurement analysis of variance. The mean D_i were significantly different at R_2, F (1, 31) = 4.68, $p < .05$, R_3, F (2, 62) = 3.08, $p < .07$, and R_4, F (3, 93) = 4.12, $p < .05$. Furthermore, the mean weight (D_i) over the serial positions for R_3 and R_4 had just the quadratic trend, F_{quad} (1, 62) = 4.05, $p < .05$, F_{Res} (1, 62) = 1.25, n.s. for R_3 and F_{quad} (1, 93) = 9.87, $p < .01$, F_{Res} (2, 93) = 1.72, n.s. for R_4. These statistical tests provide quantitative support for the visual interpretation of bow-shaped serial position curves for R_3 and R_4.

Second, as the number of information increases, the relative weights of serial positions decrease. This happens because the new

information requires the redistribution of weight over serial positions and takes higher weight for itself. This redistribution of weights follows directly from the averaging model, that is, Equation 1 mentioned earlier.

Third, information appearing at different serial positions were averaged and not added. According to the averaging hypothesis, addition of a neutral information reduces the slope of a curve based on just one piece of information. This seems to have been borne out by the results quite well. The difference between P and N information, that is, D_i, is much higher at R_1 which did not have any external neutral information than at R_4 which had three neutral information. Similar decrease in D_i is noticeable at R_2 and R_3. These results confirm the averaging operation (Dalal & Singh, Note 1; Singh, 1975) which served as the base for the present estimation of weights over serial position.

Experiment 2. Figure 2 presents serial position curves for liking to accept jobs, expected satisfaction, and combined ratings. All the three curves are bow-shaped, F_{quad} (1, 93) = 11.68, $p < .01$, and F_{Res} (2, 93) = 1.18, n.s. for combined, F_{quad} (1, 45) = 10.07, $p < .01$ and F_{Res} (2, 45) = 0.70, n.s. for liking, and F_{quad} (.1, 45) = 13.53, $p < .01$ and F_{Res} (2, 45) = 2.36, n.s. for satisfaction. These results from Experiment 2 show that bow-shaped serial curve for integration of information about jobs is reliable and genuine.

Figure 2 about here

Do the successive and simultaneous presentations affect the shape of the serial curve? The D_i obtained for R_4 of the two experiments were subjected to a 2 x 4, Mode of Stimulus Presentation x Serial Position of Information analysis of variance. This analysis yielded statistically significant effect of just the serial position, F (3, 186) = 6.56, $p < .01$. Other effects were nonsignificant which suggests that both the successive and simultaneous presentations produced similar bow-shaped curve.

Single Subject Analyses

Do individuals differ in their strategies to weigh information appearing at different serial positions? To answer it, separate analyses were made for each single subject of Experiment 1. On the basis of the pattern of relative weight assigned to four serial positions, subjects were classified into four types — recency effect, primacy effect, serial-position effect, and miscellaneous order effect. Serial position curves for these four types of subjects are shown in Figure 3.

Figure 3 about here

Figure 3 discloses three notable trends. First, the bow-shaped serial curve obtained from the group data characterized only nine subjects. This implies that group and individual subject analyses perhaps model task and person, respectively (Dalal, 1978). Second, subjects who

showed recency (n = 7), primacy (n = 3), bow-shaped serial curve (n = 9), and miscellaneous order effect (n = 13) in R_4 showed similar trend in R_2 and R_3. Perhaps relative weights reflect stable idiosyncratic attention style of the subjects (Ostrom & Davis, 1979). Finally, thirteen subjects yielded serial curve exactly opposite of what is expected by verbal memory hypothesis (Anderson & Hubert, 1963).

These results suggest that serial curves for evaluation of jobs differ widely over persons. Different people process job information differently, and information integration theory is well suited to the study of such individual differences (Lopes, 1976).

Mean Tree Diagrams

Figure 4 presents mean ratings of jobs as a function of nature and serial position of information. The lower left tree-diagram is based on data of all the thirty-two subjects of Experiment 1. The differences between impact of negative (N) and positive (P) information are less at Serial Position 2 than at any other three serial positions. At Serial Positions 3 and 4, the downward limb from P and the upward limb from N curves show crossovers which suggest that recency appears from Serial Position 3. The overall order effect thus conforms to the bow-shaped serial curve.

Figure 4 about here

The data of the nine subjects who had bow-shaped serial curve are shown in the lower right tree-diagram. The differences in impact of P and N information are much more marked at Serial Positions 1 and 4 than at Serial Positions 2 and 3. Also, the crossover of the downward limb from P and the upward limb from N curves appears at Serial Position 3 and becomes much stronger at Serial Position 4. Because of the bow-shape, the sixteen terminal mean responses indicate a good deal of precise discrimination.

The upper left tree-diagram reflects recency effect. The differences in the influence of P and N information tend to increase over serial positions. This can be noticed by the magnitude of crossover of the downward limb from P and the upward limb from N curves. It is also notable that most of the information sequences ending with P information have higher mean response than those ending with N information.

The upper right tree-diagram exhibits primacy. The first information has produced the maximum impact; the last one has produced the minimum impact. Differences in influence of P and N information also indicate gradual decline over the four serial positions. All the eight information sequences beginning with P item have, therefore, higher mean response as compared to those beginning with N item.

Results from the four tree-diagrams basically corroborate the picture presented by the serial position curve. This indicates that

serial position curves plotted on the basis of D_i provide much simpler but more informative picture of information weighting over serial positions.

Discussion

The findings of the two experiments reported in this paper consistently show that the serial position curve for integration of information about jobs is of bow-shape. This result is different from those obtained with other judgmental tasks (Anderson, 1973; Anderson & Farkas, 1973; Anderson & Hubert, 1963; Riskey, 1979; Shanteau, 1970, 1972; Weiss & Anderson, 1969). How can this different result be accounted for?

At the overt level, the bowed serial position curve reflects that evaluations of jobs were made on the basis of information stored in memory. Perhaps evaluations of jobs represent a learning situation for the job seekers; hence they learn the various items in their serial order. This explanation is based on the result that bowed serial curve has been obtained with only the present task.

Three results of the present research argue against this learning-memory interpretation. First, the learning-memory hypothesis would require stronger bow-shape in successive than simultaneous presentation condition. As the items were present before the subjects in the simultaneous condition, there was no need to retrieve information from memory.

Accordingly, the serial curve in Experiment 2 should have been flat. But the serial curve of Experiment 2 is identical to that of Experiment 1. Second, a good number of subjects showed a trend just opposite of what the learning-memory hypothesis requires. Their serial position curves are shown on the lower, left part of Figure 3. A comparison of the curves of the lower, left part with those on the lower, right part shows no similarity. Thus, the learning-memory hypothesis cannot account for the results called miscellaneous order effect. Finally, some subjects showed consistent primacy or recency tendency at the second, third, and fourth serial positions. Their results are also at odd with the learning-memory hypothesis.

Perhaps the most parsimonious explanation of the results of the present research is the attention-shift process (Anderson, 1974). The bow-shape curve at the group level and the primacy, recency, or miscellaneous order effects at the individual level analyses perhaps arose out of the different ways subjects paid attention to the items of the sequence. Those who paid decreasing attention to the items in the sequence yielded primacy effect; those who increased attention to the items in the sequence showed recency; those who paid more attention to both the beginning and end items than the middle ones yielded the usual bow-shaped serial position curves. Although the bow-shape curve was basic characteristic of only 9 of the 32 subjects, the group level curves had support from subjects obeying primacy and recency tendencies

According to Dalal (1978) and Ostrom and Davis (1979), the group and individual subject level analyses bear upon two different aspects of information processing and integration. The group level analysis elicits modal societal reactions to the task; the individual subject analysis reflects upon the basic characteristic of a particular subject. Results from the present research indicate that the group and individual subject level analyses do not always yield the same result. This supports the points made by Dalal and by Ostrom and Davis. Furthermore, evaluation of jobs is a task which has great potential to uncover individual differences, and integration theory detects those subtle differences whenever they occur. In this way, integration theory combines both nomothetic and idiographic approaches to the study of personality (Lopes, 1976; Singh, Sidana, & Saluja, 1978).

From the point of view of vocational guidance and selection, it is important to know how attention of a job seeker changes. If his attention style is known from an experimental study, it would be possible to expose him to only limited and right kind of information. The present results show that the attention style is reflected clearly even with three items of information. Perhaps a stable reaction builds up very quickly. Accordingly, a long and detailed job advertisement may appear redundant to any job seeker.

Job satisfaction typically depends upon a large number of factors (Locke, 1976), and the results of the present research as well as of the

early work (Dalal & Singh, Note 1; Singh, 1975) indicate that the different factors are averaged. A practical implication of the averaging process deserves mention. Addition of any new job factor to the set of already existing ones cannot always be expected to raise job satisfaction. Unless the new factor has its value higher than the average of all the factors around the job, it is likely to result in dissatisfaction among the previously satisfied employees. It is, therefore, necessary that the value of the new job factor be considered along with the background of employees in the organization before introducing any change.

Reference Note

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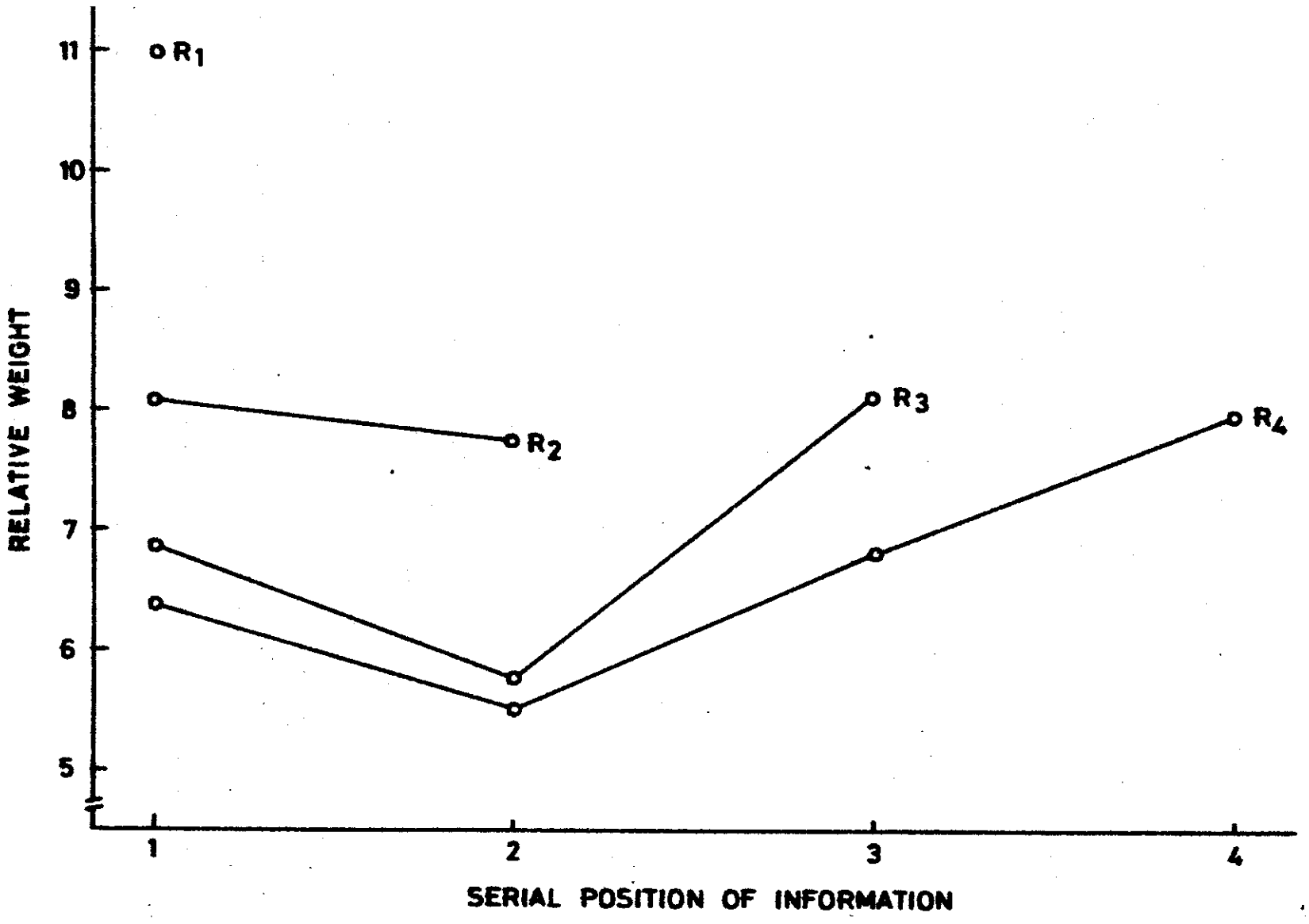
Figure Captions

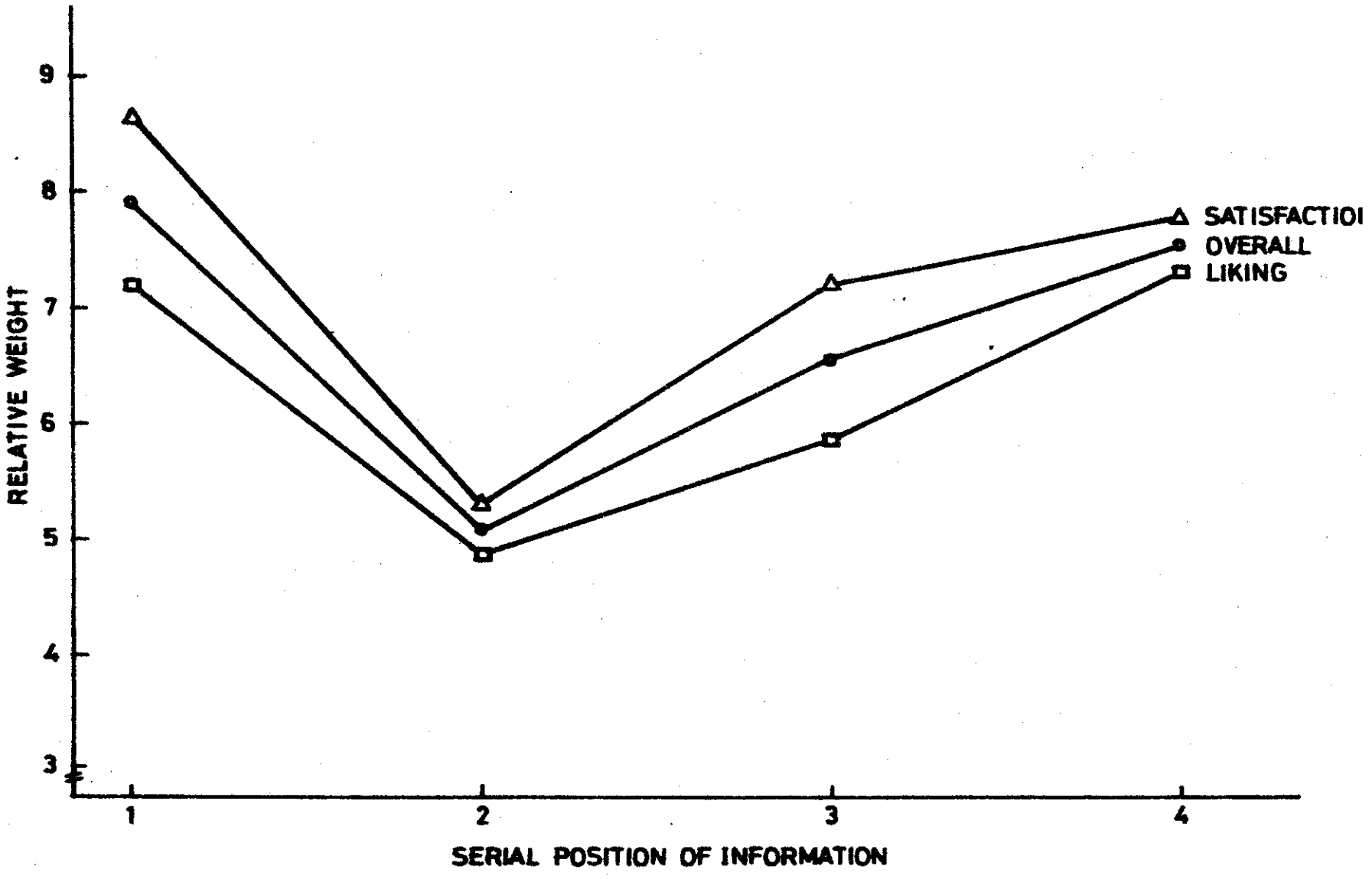
Figure 1. Serial position curves for responses at each of four successive serial positions. R_1, R_2, R_3, and R_4 denote responses made after receiving one, two, three, and four pieces of information, respectively. Data from Experiment 1.

Figure 2. Serial position curves for liking, satisfaction, and overall response made after receiving all the four pieces of information about jobs. Data from Experiment 2.

Figure 3. Serial position curves for four types of subjects classified from individual subject analyses. Data from Experiment 1.

Figure 4. Tree diagrams for mean response for each of the 16 sequences of information. P and N denote positive and negative information. Data from Experiment 1.


11
10
9
8
7
6
5
R1
R2
R3
R4
RELATIVE WEIGHT
1
2
3
4
SERIAL POSITION OF INFORMATION


RELATIVE WEIGHT
9
8
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1
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3
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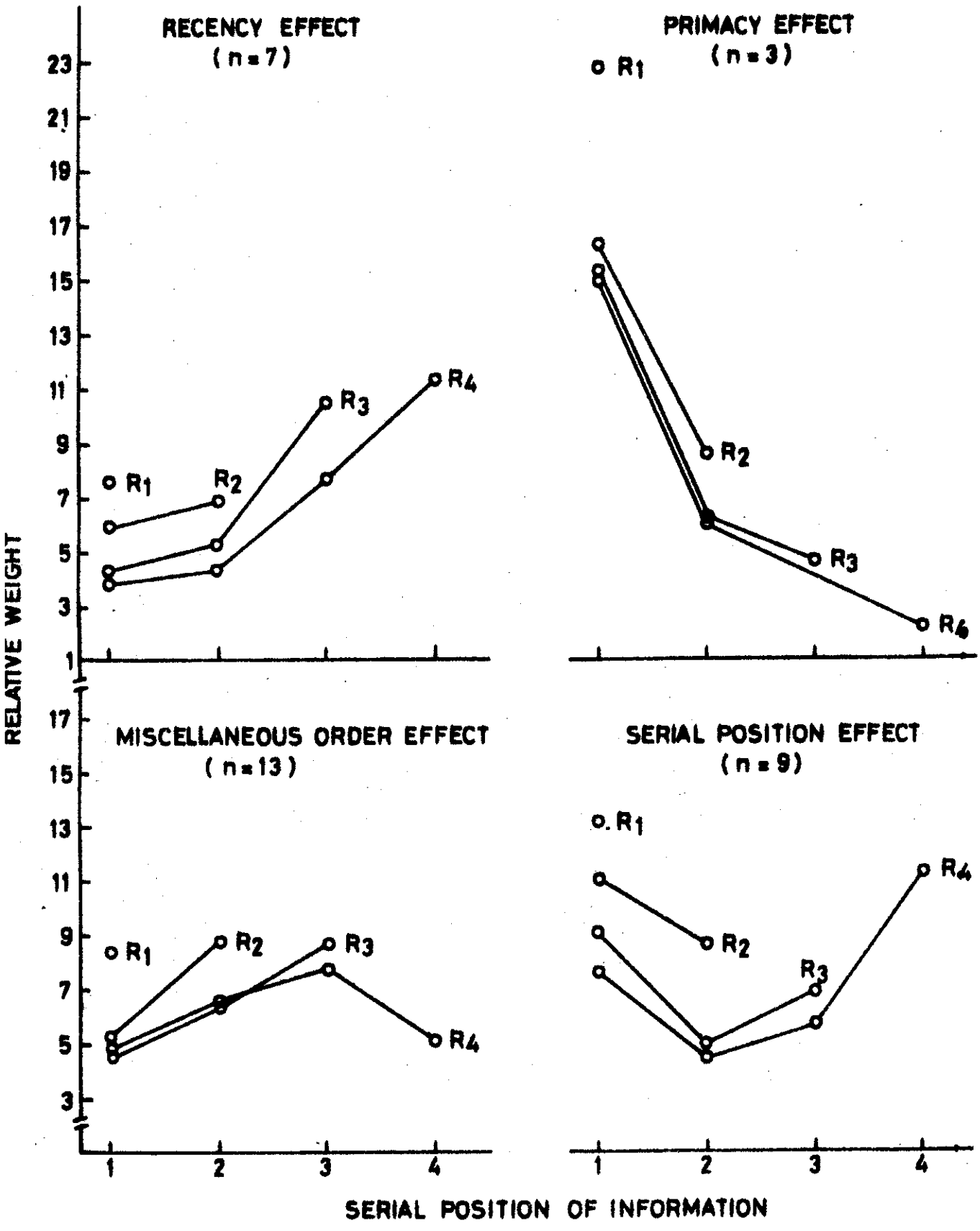
SERIAL POSITION OF INFORMATION
SATISFACTIOI
OVERALL
LIKING


RECENCY EFFECT
(n=7)
PRIMACY EFFECT
(n=3)
MISCELLANEOUS ORDER EFFECT
(n=13)
SERIAL POSITION EFFECT
(n=9)
R1
R2
R3
R4
RELATIVE WEIGHT
SERIAL POSITION OF INFORMATION
23
21
19
17
15
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11
9
7
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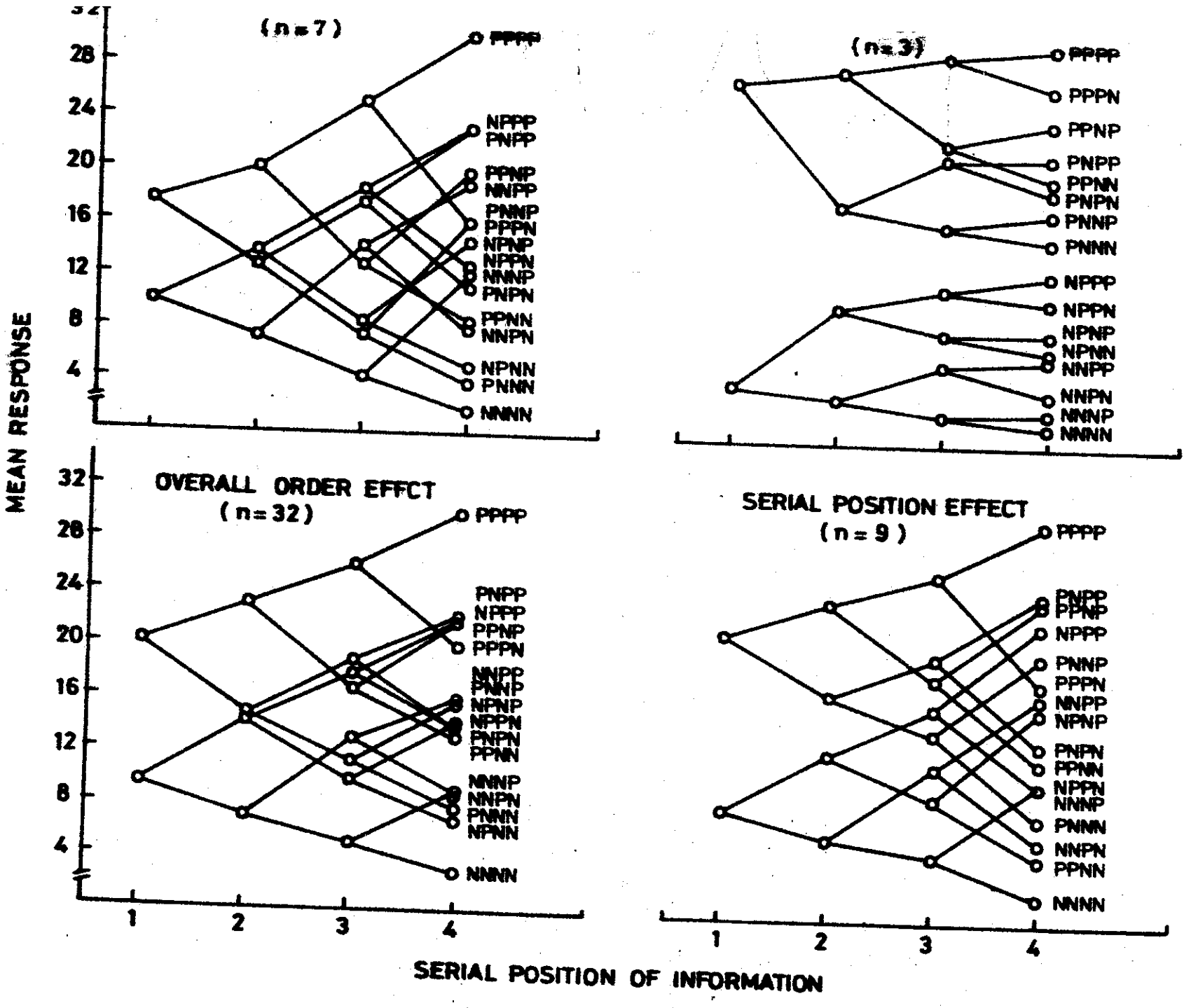
(n=7)
PPPP
NPPP
PNPP
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NNNN
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OVERALL ORDER EFFCT
(n=32)
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SERIAL POSITION EFFECT
(n=9)
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PNNN
NNPN
PPNN
NNNN
MEAN RESPONSE
32
28
24
20
16
12
8
4
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4
SERIAL POSITION OF INFORMATION