

HD-A137 282

BLOCKING OF PERSON INFORMATION IN SMALL SOCIAL
GROUPINGS: THE INFORMATION. (U) OHIO STATE UNIV
COLUMBUS DEPT OF PSYCHOLOGY C D MCCANN ET AL

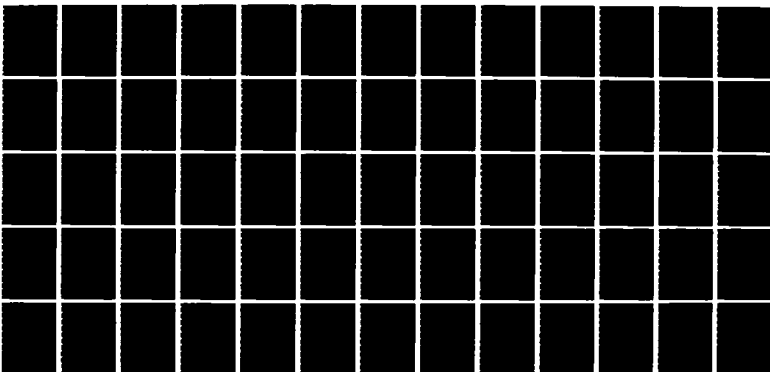
1/1

UNCLASSIFIED

20 DEC 83 SOCIAL PSYCHOLOGY BULL-83-1

F/G 5/10

NL



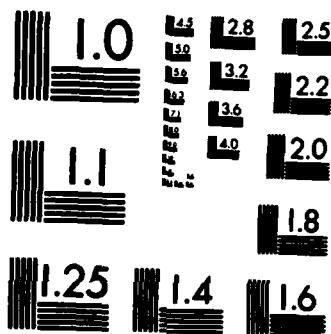
END

FILED

DEC

83

BTIC



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

AD A 137282

BLOCKING OF PERSON INFORMATION IN SMALL SOCIAL GROUPINGS:

THE FORMATION OF PERSON CATEGORIES

C. Douglas McCann

York University

Mark L. Mitchell

Villa Maria College

Thomas M. Ostrom

Ohio State University

John A. Herstein

SUNY--Stony Brook

and

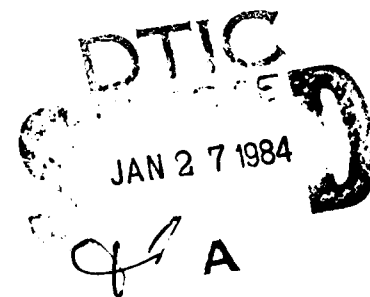
Thomas P. Pusateri

Ohio State University

Technical Report Number TR/ONR-9

December, 1983

Social Psychology Bulletin 83-1



DTIC FILE COPY

Reproduction in whole or in part is permitted for any purpose of the United States Government. This report was supported by contracts on the Organizational Effectiveness Research Program. Office of Naval Research United States Navy (Code 452) under control No. N000014-81-K-0112, NR 170-927.

APPROVED FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED

84 01 27 060

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER TR/ONR-9	2. GOVT ACCESSION NO. 10-A137 282-	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Blocking of person information in small social groupings: The formation of person categories		5. TYPE OF REPORT & PERIOD COVERED Technical Report
		6. PERFORMING ORG. REPORT NUMBER RF 762498/713444
7. AUTHOR(s) C. D. McCann, T.M. Ostrom, M.L. Mitchell, J. A. Herstein, and T.P. Pusateri		8. CONTRACT OR GRANT NUMBER(s) N00014-81-K-112
9. PERFORMING ORGANIZATION NAME AND ADDRESS The Ohio State University Research Foundation 1314 Kinnear Road Columbus, Ohio 43212		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS NR170-927/10-15-82 (440)
11. CONTROLLING OFFICE NAME AND ADDRESS Organizational Effectiveness Research Programs Office of Naval Research (Code 452) Arlington, VA 22217		12. REPORT DATE December 20, 1983
		13. NUMBER OF PAGES 45
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Person perception, information processing, group interaction, free recall, blocking		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Information about others in one's immediate social environment is encountered sequentially over time. A great deal of variability exists over different social groupings in the patterning of this information. The information may be completely blocked by person (i.e., the information about each person is received in a single, uninterrupted blocked), completely random by person (i.e., the information about each person is interspersed among items about others in the group), or anywhere in between.		

DD FORM 1 JAN 73 1473

EDITION OF 1 NOV 65 IS OBSOLETE
S/N 0102- LF-014-6601

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Block 20 (Abstract) - Continued

↘ Sequential blocking was varied continuously from complete person blocking (100%) to chance blocking (0%) in the present study. Also included in the present study were two variables designed to increase the salience of persons as organizing categories. The results of the present study revealed that increases in the degree of person blocking of the stimulus input led to a linear increase in the extent to which the information received by subjects about other persons was organized according to person categories. Blocking was also shown to affect the subjects' recall of the stimulus items. The relative viability of two competing theoretical explanations for the blocking results are discussed along with the implications of the present results for current theoretical and empirical orientations toward impression formation research. ↗

Blocking of Person Information in Small Social
Groupings: The Formation of Person Categories¹

C. Douglas McCann

Thomas M. Ostrom

Mark L. Mitchell

Ohio State University

John A. Herstein

Thomas P. Pusateri

State University of New York

Ohio State University

at Stony Brook



A-1

¹This work was supported by Contract N00014-81-K-0012, NR 170-927,
Organizational Effectiveness Research Program, Office of Naval Research.
The authors would like to thank Patricia G. Devine for comments on an
earlier draft of this paper.

Abstract

Information about others in one's immediate social environment is encountered sequentially over time. A great deal of variability exists over different social groupings in the patterning of this information. The information may be completely blocked by person (i.e., the information about each person is received in a single, uninterrupted blocked), completely random by person (i.e., the information about each person is interspersed among items about others in the group), or anywhere in between. Sequential blocking was varied continuously from complete person blocking (100%) to chance blocking (0%) in the present study. Also included in the present study were two variables designed to increase the salience of persons as organizing categories. The results of the present study revealed that increases in the degree of person blocking of the stimulus input led to a linear increase in the extent to which the information received by subjects about other persons was organized according to person categories. Blocking was also shown to affect the subjects' recall of the stimulus items. The relative viability of two competing theoretical explanations for the blocking results are discussed along with the implications of the present results for current theoretical and empirical orientations toward impression formation research.

Most past research in impression formation involves studying reactions to an isolated target person. This stands in marked contrast to the manner in which we typically receive information about others. That is, in our everyday life we frequently acquire information about a particular other person while in a social context. The stimulus field often contains more than one person and so we are exposed to information about more than one person. Sometimes we may be able to control this information flow so that we gain information about one person at a time. But often our control over this aspect of social information acquisition will be less than perfect and we will receive that information in a more haphazard sequence. Thus, one of the salient features of everyday stimulus fields is the sequential patterning of the information items contained in that field.

Social interactions have a specific system and structure (e.g., Bales, 1950). Structural aspects of the situation often impose constraints upon social interaction and communication patterns (e.g., Barker & Wright, 1955) and consequently, upon the sequence in which specific information items are received by perceivers. These variations in the sequential patterning of social information can be the result of both formal (e.g., Robert, 1981) and informal conventions (e.g., Jefferson and Schenkein, 1977).

When the perceiver's stimulus field includes several pieces of information about each of several persons, two logical extremes in the patterning of that information are possible. First, it may be that the situation is structured in such a way that each individual is given the opportunity to deliver his/her information without interruption by

others. On the other hand, a less formally structured situation may result in an arbitrary alteration of participants, each of whom contributes to the group on a variety of different occasions (episodically unpredictable) over the course of the discussion. Such extremes in information patterning can be seen in formal paper sessions where each participant has an allotted position in the sequence of speakers in which to deliver his/her views as opposed to the more informal round table discussions where there are no explicit rules governing who speaks when. In addition, of course, it is possible for the patterning of information transmission to fall somewhere between the two extremes. For example, some participants confine their contribution to one uninterrupted temporal block and others offer brief comments throughout.

When the stimulus field contains more than one other person, the perceiver may cognitively organize the information in a variety of ways. Pryor and Ostrom (1981) have shown that such social information will not necessarily be organized on a person-by-person basis, especially when the persons are unfamiliar to the perceiver. Instead, the information might be organized temporally (e.g., early vs. late in the group meeting), through the use of descriptive categories (appearance vs. attitudinal information), or through social setting categories (bowling alley events vs. birthday party events). Of particular concern to the field of impression formation is the study of person organization. An item of information cannot be built into the structure of person impressions unless it has been cognitively organized along with the

previous facts learned about that person.

The present paper examines the extent to which blocking of social information affects person organization. We begin by reviewing the previous empirical research on the effects of categorical blocking on cognitive organization. We then outline the primary theoretical explanations that have been advanced for these findings. Finally, we evaluate the extent to which this body of research aids in understanding person organization and impression formation processes.

Past Research on Blocking and Categorical Organization

Experimental psychologists have evidenced a keen interest in the effects of information exposure patterns on prose learning (e.g., Balser, 1972; Frase, 1969 a and b; Myers, Pezdek and Coulson, 1973, Perlmutter and Royer, 1973) and categorical list learning (e.g., Bousfield, 1953; Cofer, Bruce and Reicher, 1966; Puff, 1966; Dallett, 1964). In that research, interest focused primarily on how the sequential structure of the input information affects subjects' recall organization of that information.

In both of these research areas information patterning was typically manipulated in an all-or-none fashion. In the categorical list learning research, for example, the stimulus information was presented either blocked completely (100% blocking) or in a random fashion (0% blocking). In the 100% blocking conditions, each of the information items from one category is presented contiguously before the items of any other category are presented. This corresponds to the example of the formal paper session presented earlier. In the random conditions, the information items are

randomly presented without regard to category membership. This corresponds to the round table discussion presented earlier. Intermediate blocking levels falling between these two extremes are (with one exception) never presented. The dominant dependent measures in this research include both the number of items recalled and some index of categorical clustering present in recall. Such clustering measures reflect the degree to which information items from the same category appear contiguously in the recall protocols (see Murphy, 1979, or Ostrom, Pryor & Simpson, 1981, for a discussion of these measures).

Empirical findings. In the prose learning research, investigators were primarily concerned with evaluating the effectiveness of name and attribute blocking for learning in educational contexts. To examine this issue, subjects would be presented with prose material that could be categorized on either a name or an attribute basis. For example, Di Vesta, Schultz and Dangel (1973) presented subjects with prose passages concerning six attributes (e.g., type of society, geography, death rate, etc.) of six fictitious nations. The information was presented either blocked by name or blocked by attribute. In the name blocked condition, information was given on a nation by nation basis. That is, all the information concerning each particular nation was presented contiguously before any information was presented about any other nation. In the attribute blocked condition, the information was given on an attribute by attribute basis. That is, the status of all nations on one attribute was presented contiguously before information concerning

any of the remaining attributes was presented. These prose learning studies were consistent in demonstrating rather pronounced effects of input organization on subjects' organization of that material in their free recall protocols. More specifically, the manner in which subjects recalled the information mirrored the type of blocking to which they had been exposed in learning the material (e.g., Perlmutter and Royer, 1973; Schultz and Di Vesta, 1972). Subjects were more likely to cluster information items on a nation by nation basis in their recall when the information was 100% name blocked than when it was blocked either at a chance level (0%) or blocked by attribute.

In the list learning research the items presented to subjects for recall typically consisted of single words. The list contained words from each of several categories. The lists were presented in either a completely blocked or completely random fashion. As with the prose learning studies, higher clustering was found for 100% blocking than for 0% blocking (e.g., Cofer, Bruce & Reicher, 1966; Dallett, 1964, Puff, 1966).

The research in these two areas is consistent with the assumption that blocking directly affects the categorical structure of information in long term memory. Unfortunately, a methodological problem was present in much of this research that uncritically accepts this conclusion. The problem stems from two characteristics of this research. Blocking affected total recall as well as clustering and most of these studies employed clustering indices that were computationally affected by

the total number of recalled items. Increases in recall necessarily produced higher clustering scores for these indices (see Ostrom et al., 1981, for a discussion of this point). This leads us to be unsure about which caused which. However, recent measurement advances allow the present research to avoid this problem by the use of a clustering index (i.e., ARC--Roencker, Thompson & Brown, 1971) that is computationally independent of total recall.

Theoretical explanations. Two major classes of explanations have been advanced in the verbal learning literature to account for the effects of information exposure patterns described above. One class of explanation assumes that categorical clustering in recall is a function of implicit associative responses (IAR's) elicited by items associatively or categorically related to one another (e.g., Puff, 1966; Wallace and Caldron, 1969; Wallace, 1968; Wood and Underwood, 1967). Implicit association responses have been defined as words implicitly elicited by the occurrence, for example, of an item in a list learning task. These IAR's are assumed to be words associatively related to the list item. When two list items elicit common IAR's, they are viewed as having 'conceptual similarity' (Wood & Underwood, 1967). According to Wallace (1970) for example, "during the learning task contiguous experience of specific list members is responsible for the development of associations, associations which determine specific unit content and consistency in ordering recall (p. 58)." Such contiguous experience is presumably a function of IAR's elicited in common. Thus, it might

be expected that contiguous presentation of category members would serve to facilitate common IAR occurrence, thereby promoting categorical clustering in recall.

The other major theoretical explanation of the obtained blocking effects centers on the effects of contiguous presentation on the salience of the categorical structure inherent in the list (e.g., Bruder and Segal, 1972; Dallett, 1964; Di Vesta, Schultz and Dangel, 1973; Newman, 1967, Puff, 1973; Schultz and Di Vesta, 1972). The degree of organization imposed at list acquisition is seen to be a function of the salience of the categorical structure of the list, this discovery being facilitated by the blocked presentation method. Schultz and Di Vesta (1972), for example, concluded that, ". . . subjects identified organizational cues from the passage and incorporated those cues into the acquisition or selection of a clustering strategy (p. 251)."

The Effects of Blocking on Person Organization

The major independent variable of interest in the present study concerns the sequential pattern of information exposure to subjects (i.e., blocking). Included in the present study, as a within subject variable, are ten levels of person blocking ranging from 0% (or chance blocking) to 100% blocking. The blocking level is manipulated by varying the number of person repetitions contained in any particular information set. Person repetitions refers to the number of times one fact about a particular person is followed immediately by another fact about that same person.

It was expected, based upon the research reviewed above, that an increase in blocking would lead to an increase in organization by person category. This increased person organization of the material should be reflected in increased clustering in free recall.

Salience and Associative Interpretations of Information Patterning

Although previous research has established that 100% blocking produces more categorical organization than 0% blocking, almost nothing is known about the shape of the function between these two extremes (for a single exception, see Puff, 1966). These intermediate levels of blocking are of special interest in social psychology since the communication patterns in most natural groups will most often fall somewhere between the two extremes. The two previously mentioned interpretations of previous blocking research lead to different predictions regarding the shape of the blocking function.

According to the implicit associative response interpretations of blocking effects (e.g., Wallace, 1970), items from the same categories are clustered together in recall as a function of the connections established by the mediating common associative responses elicited at item presentation. This suggests that category clustering in recall will be a direct result of the number of implicit associative responses generated at list acquisition. Implicit associative responses should increase as a function of the extent to which items from the same category are presented contiguously. This has a one-to-one correspondence with the present manipulation of blocking as a continuous

variable. Increments in blocking correspond linearly to increments in the number of contiguously presented items from the same person category. Thus, the association-based interpretation of the blocking effect predicts a linear increase, across blocking level, in categorical clustering in recall.

The salience interpretation of blocking effects suggests that categorical clustering in recall is a function of the extent to which the categorical structure inherent in the stimulus list is salient to the subjects as an organizing structure. Predictions were more complicated to derive from the salience explanation. In this list learning research, the category label is never presented to a subject. High blocking facilitates the discovery of those categories. In contrast, person information cannot be meaningfully presented without simultaneously presenting the person (i.e., category) at the same time.

It is instructive to note that salience has been used in the past in a relatively undifferentiated fashion. The concept of category salience should relate both to the awareness of the category and the willingness to actually use those categories as an organizing structure at either encoding or retrieval. Unlike most past research, the categorical structure of the present information set is unambiguous since the categories (i.e., person names) are presented along with the to-be-remembered information (e.g., Henry Lowry writes poetry). Salience in the present context, therefore, refers more to subjects' motivation to use the inherent categorical structure in encoding and

retrieving the information.

In general, there appeared to be no necessary reason that salience would lead to a linear increase in clustering as a function of blocking. The use of persons as organizing categories may increase rapidly at the lower levels of blocking and level off at the higher levels. Or possibly, the most rapid rise would be in the mid region, with the slope being relatively flat at the two extremes. This uncertainty led us to include two additional factors in the study. We were not convinced that salience processes necessarily apply to person categories, but wanted to examine several plausible alternative contexts that might facilitate the contribution of salience.

In addition to the blocking variable, two additional variables related to category salience were included in the present research. First, one-half of the subjects were exposed to a yearbook-type photo along with the person information in each information set (Photo Condition). In this condition, each information item about a particular person was accompanied by the same photo. For the remaining subjects, no photo accompanied the information items (No Photo Condition). Unfamiliar persons tend not to be organized by person (e.g., Pryor and Ostrom, 1981), but increasing the discrimination between persons by including a photo has shown to increase person organization (Tyner, Note 1). We would expect that if blocking effects are due primarily to salience, they should be reduced by the inclusion of a photo. This is because photos should make the individual persons as salient in low

blocking as in high blocking.

The other salience-related variable concerns the distribution of input person repetitions across the persons represented in a stimulus deck. Recall that blocking level was manipulated by varying the number of person repetitions, or times in which facts about the same person immediately follow each other, contained in a stimulus set. A fixed number of stimulus person repetitions can be distributed across the persons in the stimulus fields in either of two ways. They can be either equally distributed across all persons in that information set (Multiple Person Salience Condition) or concentrated into the fewest number of persons in that set (Single Person Salience Condition). It was expected that the shape of the function relating blocking level to clustering in recall would differ as a function of the Multiple-Single Person Salience Manipulation.

If use of the categorical structure inherent in the stimulus input list is elicited by the coherence (defined as contiguous items during presentation) of at least one stimulus person, we would expect person clustering to start high (at 0% blocking) and negatively accelerate across blocking levels in the Single-Person Salience Condition. In contrast, the Multiple-Person Salience Condition should show greatest acceleration between 50% and 75% blocking. This is the first point in the present stimulus sets at which all facts about one person are contiguously presented.

If use of the inherent structure is elicited by a minimum level coherence (i.e., at least one repetition) at input of each of the

stimulus persons, we would expect person clustering to start high and show negative acceleration in the Multiple-Person Salience Condition. On the other hand, the Single-Person Salience subjects should start lower and show maximum acceleration near 80% blocking, since it is not until then that all four group members have at least one contiguous information pair.

It is clear that the shape of the functions relating clustering in recall and blocking should differ depending upon whether the associative or salience interpretations are relevant to person organization. The above possibilities are evaluated through testing the linear, quadratic, and cubic components of the blocking function, and by examining the interaction of Blocking with Photo and Person Salience.

Objectives of this Study

One of the primary objectives of the present study is an examination of the effects of social information patterning on subjects' categorization of information about others. As such, the present research is intended to establish the importance of analyzing features of the stimulus field confronting social perceivers in social groupings. Most impression formation research has ignored the effects of such features in the process of forming impressions of other persons. The present study also allows for a determination of whether blocking affects the clustering of social information. The implications of past blocking research are equivocal because clustering indices typically employed in that research are confounded with item recall. In addition, one of the major theoretical explanations for those past effects (i.e., category

salience), as discussed above, may not apply to situations in which information is acquired for which the categories (i.e., persons) are of necessity salient.

The present research also allows for a determination of the shape of the function relating blocking and person clustering in recall. Most past research in this area has manipulated blocking in an all or none fashion. In addition, the present research allows for an assessment of blocking as it is affected by the Photo and Person Salience manipulations. This provides an opportunity to assess the relative viability of the two theoretical explanations of past blocking effects discussed above.

Method

The present experiment was designed to assess the degree to which subjects would impose person organization on a series of social information sets to which they were exposed. Person organization was assessed by measuring the amount of person category clustering evidenced in subjects' recall protocols. The specific measure of clustering employed was the ARC measure developed by Roencker, Thompson and Brown (1971). The design of the experiment crossed Multiple and Single Person Salience with the presence of an accompanying Photo or No Photo. Ten blocking levels ranging from 0% to 100% blocking were included as a within-subject variable.

Subjects. Eighty male and female undergraduates from Ohio State University participated as subjects. Forty volunteer subjects were run

in the fall quarter of 1981 and forty paid subjects were run in the summer quarter of 1982. Sessions in both phases were conducted by the same Experimenter utilizing the same materials and procedure.

Stimulus materials. Each of the information sets contained 16 facts (four facts about each of four persons) of the form, "person name behavioral exemplar." Examples of the items used in the present study includes "Bill is president of the Ski Club," "Sam drinks beer every day," "Gary would like to be an architect." Both male and female names were used.

All person names were fictitious and unfamiliar. No name was used more than once across all the information sets. In addition, the facts about each of the four persons contained in any particular information set were not systematically related to one another, either within persons or between persons.

Subjects encountered each of the ten information sets at different blocking levels, making blocking a within subject factor. The blocking level of any particular information set was manipulated by varying the number of person-category repetitions in that set. A person-category repetition was defined as occurring any time that two facts about the same person were presented contiguously in the stimulus set. The ten person-category repetition levels (i.e., blocking) utilized in the present research ranged from three repetitions (0% or chance level) to 12 (100% of maximum blocking). The order in which subjects received each of the ten blocking levels was determined by a ten by ten Latin

Square. This Latin Square counterbalancing design, in addition to controlling for the order of treatment presentation, also controlled for pairwise distance and priority balancing (see Ostrom, Isaac, and McCann, Note 1 for a discussion of the virtues of this type of sequencing procedure). The practice deck was always presented at the 50% blocking level.

Photo and salience conditions. The information sets were also varied, on a between-subjects basis, according to the factors of Photo-Non-photo and Multiple and Single Person Salience. In the Photo condition, a yearbook photo, randomly assigned to each person, was presented along with the information items associated with that particular person. Photos were attached to each sheet of paper above the information item. No photo was used for more than one person and a total of 40 different faces were used in the experimental decks. All of the faces used were Caucasian. In the No-Photo condition, the photo was not presented.

The information sets also varied in the salience of the person-category repetitions. Multiple-Single Person salience was manipulated by varying the extent to which person repetitions were relatively evenly distributed across the persons represented in that particular information set (Multiple Person Salience) or were grouped into the fewest number of persons possible (Single Person Salience). The biggest difference occurred at 0% blocking, which consisted of three person repetitions. In the Single Person Salience Condition, all three

repetitions involved one person, whereas in the Multiple Condition one repetition was associated with each of three persons. Obviously, as the person-category repetition level increased the difference between the distribution of the repetitions between the Multiple and Single Person Salience information sets decreased (e.g., there is only one way to distribute 12 category repetitions across 16 facts about four persons).

Procedure. Subjects, who had signed up for a 'Person Perception' experiment, were met individually by the experimenter and were escorted to a small experimental room. Here they were seated facing the experimenter and were instructed as follows:

You will be asked to read facts from sheets of paper. Each information set has 16 sheets. These 16 sheets contain information about four persons and each person has four sheets of paper with information concerning him/her. Thus, there are four facts about each of four persons, 16 facts in all. Each sheet will look like this (Experimenter shows the subject a sample information sheet).

I will present the sheets to you. I want you to read each fact aloud. After you have read the entire set, I'll present the sheets to you again and you will read them out loud again.

After you have read the set for the second time, I want you to count backwards from a number I will give you by 3's. I will have you count for about 15 seconds.

When I tell you to stop, I'll give you a recall sheet (experimenter shows the subject a sample). On it I want you to write down as many of the underlined phrases from the set that you can remember, in any order in which they come to mind. You do not have to write down the names. Please write one phrase per line.

When you have written down as many of the underlined phrases as you can remember, I'll take the recall sheet back. Then I'll give you a personality impression rating form (Experimenter shows the subject a sample) and I want you to circle any one of the dots that corresponds with how each person in the deck has impressed you, with -10 being the least favorable and +10 being the most favorable.

We will follow this procedure for each deck. The first set is a practice set, and then we will continue with the other ten sets. Are there any questions?

Subjects were requested to indicate their impressions of each of the stimulus persons on a 21-point scale ranging from 'favorable' to 'unfavorable'. This task was included merely as an inducement for the subjects to think about the facts related to each person together and consequently was not analyzed. After subjects had completed all of the information sets, which took approximately 50 minutes, they were thoroughly debriefed.

Dependent measures. The two major dependent variables were the amount of person clustering (ARC) and the number of items recalled. Items were scored correct if the gist of the items was represented in recall. In arriving at the person clustering scores, persons were considered as categories and interest centered on the extent to which information items within such person categories were reproduced contiguously in recall. The clustering measure used in the present study was the 'adjusted ration of clustering' (ARC) proposed by Roencker, Thompson and Brown (1971) and advocated by Ostrom et al. (1981).

Results

The ARC and recall measures were analyzed by a 2 X 2 X 2 X 10 X (10) analysis of variance (Photo Condition X Salience Condition X Subject Sample Replication X stimulus set Counterbalancing Order X Blocking Level), with the latter factor being a within-subject variable. Counterbalancing order was a random effect and therefore provided the basis of the error terms.

Clustering. It was expected that increases in Blocking Level would

lead to significant increases in person clustering as measured by ARC. The analyses indicated that the overall Blocking effect was significant, $F(9,648) = 3.18, p < .0001$. Figure 1 shows that there was a monotonically

Insert Figure 1 about here

increasing relationship between blocking and clustering in free recall. By using ARC as the index of organization, these data verify that blocking affects clustering independent of its effects on total recall.

Shape of the blocking relationship. An important virtue of the present design was that it enabled us for the first time to determine the form of the relationship between blocking and clustering. A linear relationship was expected on the basis of blocking facilitating the formation of IAR's. The contribution of categorical salience should be reflected through quadratic and/or cubic components. These predictions were tested to examine the linear, quadratic, and cubic components of the blocking main effect. These analyses produced a significant linear trend, $F(1,72) = 39.45, p < .00001$. Neither the quadratic, $F(1,72) = .13$, nor the cubic, $F(1,72) = 1.45$, components of the blocking effect were significant.

No support was found for the contribution of category salience to the blocking effect. Not only was there no significant curvilinearity component to the blocking effect, but the other factors included to explore salience effects yielded no significant findings. No significant overall interactions were obtained between Blocking, and factors

of Photo, $F(9,648) = .41$, Saliency, $F(9,648) = 1.50$, and Photo X Saliency, $F(9,648) = .71$. Similarly, the linear, quadratic, and cubic components of these interactions were also nonsignificant (all F 's(1,70) < 2).

Supplementary results. Although the linear blocking effect held for all conditions, it appeared to be stronger in Replication 2. This was reflected in a significant Blocking X Replication linear trend component, $F(1,72) = 7.09$, $p < .01$.

Neither the Photo, $F(1,72) = 2.14$, nor the Saliency main effects, $F(1,72) = .89$, reached an acceptable level of significance. In addition, none of the interactions with these variables reached significance except for one involving Saliency and Blocking. This interaction, however, was inconsistent in direction across the two replications. This resulted in a significant Blocking X Saliency X Replication interaction, $F(9,648) = 1.88$, $p < .05$, with its significant linear trend, $F(1,72) = 9.86$, $p < .003$. The strongest linear trends appeared in the Low Saliency condition of Replication 2 and the Hi Saliency condition of Replication 1. The reasons for this difference between the two replications were not clear. No other significant effects were observed.

Recall

The recall analysis of variance revealed a significant Blocking effect, $F(9,648) = 7.81$, $p < .0001$, of which the linear, $F(1,72) = 43.06$,

Insert Figure 2 and Table 1 about here

$p < .001$, was dominant (see Figure 2). The cubic trend, $F(1,72) = 5.67$, $p < .02$, was also significant. The significant linear component is consistent with the implicit associative response interpretation of blocking effects. Increased organization should lead to improved recall. No obvious explanation of the cubic component was evident.

The Blocking X Photo interaction, $F(9,648) = 1.82$, $p < .06$, and its linear component, $F(1,72) = 5.26$, $p < .03$, were found to be significant (see Figure 2). Table 1 shows that the linear increase in recall as a function of blocking levels was strongest in the Photo Condition.

Supplementary results. Neither the Photo, $F(1,72) = .92$, $p < .34$, nor the Multiple-Single Person Salience, $F(1,72) = 2.12$, $p < .15$ reached an acceptable level of significance. There was, however, a difference between the two replications in recall, as evidenced in the significant Blocking X Replication main effect; $F(9,648) = 4.34$, $p < .0001$. The linear component of this interaction was also significant, $F(1,72) = 18.43$, $p < .0001$. This interaction revealed that the linear component dominated primarily in Replication 2. Again, the reasons for these differences are not clear. No other effects were significant.

Correlation of Clustering and Recall

The relationship between organization and recall, although theoretically straightforward, has been empirically inconsistent (e.g.,

Crowder, 1976). Things have been confused further in past research by the use of clustering indices that are computationally confounded with total recall. It is, however, generally assumed that increased organization leads to increased recall. In the present experiment, we assessed this relationship by correlating recall and ARC scores. This analysis revealed a significant correlation over all conditions ($r(798) = .36, p < .0001$) and within each of the ten blocking levels (the respective r 's(78) from 0% to 100% blocking being, .25, .32, .40, .38, .47, .43, .18, .33, .35, .27, all p 's $< .001$). Although the direction of causality is necessarily ambiguous with these correlations, they do support the assumption that persons who do organize social information by person tend to show higher recall. Further, these individual differences appear to be unrelated to blocking level.

Between Subjects Analyses of Blocking

Interest in the effects of blocking on the organization of social information results from both theoretical and analogical concerns. In our interactions with others in groups we are often confronted with social information in a variety of patterns. Our inclusion of blocking as a within-subject variable reflects the fact that the patterning of social information may vary dramatically from moment to moment and from group to group over a short period of time. It is also of interest to know how blocking affects organization when one first moves in to a social grouping (vs. moving from one grouping to another). This suggests a concern for the effects of blocking considered as a

between-subjects variable.

The design of the present study allowed for an examination of blocking on recall and clustering for subject's first trial. Because of the counterbalancing procedure used, all blocking levels were represented equally often on the first trial across subjects. Accordingly, subject's recall and clustering scores were analyzed by means of separate 2 X 2 X 10 completely crossed between-subjects analyses of variance, replication being considered a random factor. Here our interest centered primarily on the effects of blocking.

ARC. The analysis of the clustering scores revealed a significant linear increase as a function of blocking, $F(1,9) = 4.84$, $p < .03$. The slope of the linear function (+.039) was comparable to that obtained in the within-subject analysis (+.034). The mean ARC was .222 for the within-subject analysis and .015 for the between-subjects analysis.

Recall. The analysis of the number recalled revealed a marginally significant linear trend, $F(1,9) = 3.32$, $p < .08$. The means and slopes for the within and between-subjects analyses were 8.54, +.158, 8.7 and +.180. These results provide clear support for the presence of both between and within-subject effects of social information patterning.

Seriation

One weakness of past blocking research is the general failure to evaluate the viability of seriation as an alternative explanation for the effects of blocking on clustering in recall. Seriation refers to a recall strategy observed in list learning experiments where subjects recall the list in an order similar to the serial order in which the

list items were recalled (e.g., Mandler & Dean, 1969). According to this explanation, the increased categorical clustering observed as a function of increased category blocking is simply a result of the fact that subjects recalling the information items in an order similar to input order will, of necessity, exhibit increased clustering in recall. Past blocking research has rarely evaluated this possibility.

In the present research, this possibility was evaluated in two ways. First, the rank order correlations between each subject's item recall order and the presentation order of those items recalled were calculated. This measure assesses the extent to which stimulus input and recall output orders were similar. In addition, the similarity between input and recall order was evaluated by means of a bi-directional pair frequency measure of intertrial repetition (e.g., Anderson & Watts, 1969; Rosner, 1970; Sternberg & Tulving, 1977). This index is traditionally used to assess the degree to which two items are recalled in the same or reverse order on a pair of recall trials. This measure was adapted for use by substituting stimulus input for one of the two recall orders used to derive the pair frequency value.

Rank order correlations. The rank order correlations between input and recall order were entered into a $2 \times 2 \times 2 \times 10 \times (10)$ analysis of variance. The only significant effect to emerge from this analysis was an uninterpretable Replication $\times$ Salience interaction, $F(1,72) = 8.26$, $p < .006$. These correlations within each of the blocking levels were significantly different ($p < .05$) from zero (except for the second

blocking level), and were low and negative (r 's = $-.132$, $-.067$, $-.133$, $-.110$, $-.131$, $-.157$, $-.117$, $-.117$, $-.179$, and $-.189$, from 0% to 100%, respectively). The seriation hypothesis would predict strong positive correlations across all blocking levels. These low negative correlations suggest that processes in addition to seriation are necessary to account for the obtained blocking effects. Perhaps a more appropriate index of seriation is the pair frequency (PF) intertrial repetition index which can be used to assess the extent to which a particular form of organization is maintained across two sets of item orders.

Intertrial repetition. The bi-directional pair frequency measure discussed by Sternberg and Tulving (1977) was calculated comparing stimulus input order and subjects' order of item recall. These measures were then entered into a $2 \times 2 \times 2 \times 10 \times (10)$ analysis of variance. This analysis revealed a significant Blocking main effect, $F(9,648) = 5.40$, $p < .00001$. In addition, the linear component of this effect also reached an acceptable level of significance, $F(1,72) = 18.77$, $p < .00001$. The mean values of this measure were significantly different from zero at each blocking level ($p < .05$) and increased linearly from 0% blocking to the 100% blocking level (PF 's = 0.34 , 0.71 , 0.59 , 1.01 , 0.76 , 0.91 , 1.07 , 1.29 , 0.90 , 1.51 , respectively).

Based on the seriation explanation of blocking, one would expect a consistently high level of intertrial repetitions across all blocking levels. There is no reason to expect a linear increase in intertrial repetitions as a function of blocking according to this explanation.

These results suggest that increases in blocking facilitated person organization in a manner not explained by the seriation hypothesis. Increases in person blocking would appear to facilitate the degree to which stimulus input order is reflected in subject item recall order. The increased match between input and output order would be expected if subjects were organizing the stimulus input by persons. Thus, it would appear that blocking at stimulus presentation facilitates the degree to which the stimulus information is organized by persons.

Discussion

The present study was designed to allow for an examination of the effects of variations in the sequential patterning of social information on subjects' representation and categorization of social information. To that end, subjects in the present study were presented with several social information sets varying in sequential patterning. The results were consistent with previous research in demonstrating that subjects' organization of the information items contained in those information sets increased as the level of person blocking at list presentation increased. Similarly, subjects' recall of the information items increased as a function of blocking level. These results were seen to be most compatible with an associative interpretation (e.g., Wallace, 1968).

Two additional manipulations designed to increase the salience of persons as organizing categories for representing the stimulus set

failed to affect person organization. The failure to find evidence for the effects of these two factors, combined with the linear shape of the function relating input blocking and recall organization casts doubt upon the viability of the salience interpretation of such blocking effects. In contrast, the implicit associative response explanation, described above, was compatible with all of the obtained results. It should be noted, however, that the present study was not specifically designed as a test of the relative viability of these two interpretations.

Seriation

The present research has also allowed for an examination of one plausible alternative explanation for this and other blocking effects. Typically, in this research, subjects are instructed to learn categorical list items presented in orders reflecting varying degrees of categorical blocking. The researcher's interest is in ascertaining the effects of blocking on subjects' categorical organization of the list items. Subjects' free recall protocols are subsequently scored for the number of category repetitions contained in them. These studies have typically found that increased categorical blocking at input leads to increased categorical clustering in recall. These effects have been attributed either to subjects' discovery and use of the salient categorical structure of the list or to the implicit associative responses elicited by common category membership.

However, the same effects could have been produced if subjects at all blocking levels merely recalled the items in the same serial

order in which they were presented. Because blocking refers to the number of categorical repetitions at input and clustering refers to the number of categorical repetitions in the recall protocol, a fixed amount of seriation at all blocking levels would yield a linear relation between blocking and the ARC index. Seriation has rarely been an organizing strategy of interest in this research and, consequently, researchers rarely examine its tenability as an explanation for their results (see Puff, 1966, for an exception).

Research in other areas has determined that seriation is often a favored and relatively pervasive organizing strategy under a variety of conditions (e.g., Mandler, 1967, 1979; Mandler & Dean, 1969; McCann, 1982). Given its plausible status as an explanation for blocking effects and the fact that it has rarely been systematically examined in past research, the present study was designed to allow for an evaluation of its contribution to the obtained blocking effects.

The seriation hypothesis was evaluated through an examination of the rank order correlation between presentation order and subjects' recall order and by means of an intertrial repetition index. The results of both of these analyses suggested that processes in addition to seriation were necessary to account for the obtained clustering results. Thus, the observed linear increase in person clustering as a function of increased blocking are not due to subjects' using the presentation order as an organizing strategy for recall.

Organization and Recall

The present research also allowed for an assessment of the relation between organization and recall. Early verbal learning researchers hypothesized that increased organization of information in memory would lead to increased recall (e.g., Cohen, 1963; Miller, 1956). The empirical results in examinations of this issue however, have not always been consistent with this hypothesis (e.g., Cofer et al., 1966; Puff, 1970).

In the present study, the reliable correlations obtained between person clustering and recall provides positive support for the predicted relationship. Clearly, additional research is required to clarify the reasons for the empirical discrepancies. However, at least for the kinds of social information used in the present study, there does seem to be a strong relationship between the two. These data, however, do not offer any direct evidence for statements regarding causal priority.

Trends in Impression Formation Research

Recent social cognition research has evidenced an increased interest in the nature of person categories (e.g., Cantor & Mischel, 1979). This theoretical and empirical activity can be seen as an extension of early impression formation research (e.g., Asch, 1946) and its focus on the nature of person gestalts. That line of research was designed to examine the nature of such person categories which were seen to be the primary organizational structure imposed upon social information about others. This past research, however, never directly

explored the conditions under which such person categories would be formed.

The present research serves to address the more basic issue of delineating those conditions facilitative of person organization. Along with other recent research (McCann, Devine & Ostrom, 1983; Ostrom, et al., 1981; Pryor & Ostrom, 1981), the present study serves to question the assumption of the automatic nature of person organization. By automatic we refer to the assumption that person categories are always the dominant organizing tendency when we encounter information about others in our social environment.

The results of the present study suggest that the formation of person gestalts or categories may not always be the dominant organizational strategy imposed upon a social stimulus array. Along with the effects of sequential information patterning, both the nature of the information presented (e.g., McCann, Devine & Ostrom, 1983; Pryor & Ostrom, 1981) and the perceiver's processing objectives (e.g., Srull, in press) have been shown to affect the extent to which social information is categorized with reference to persons. This research serves to underscore the need to further expand our interest in the more basic issue of under what conditions are person gestalts formed.

Much of the research currently being conducted within social cognition has been devoted to an examination of the effects of pre-existent cognitive structures on the manner in which individuals represent and evaluate their social world. Some of the structural concepts of

interest in this research have included schemata (Taylor & Crocker, 1981), scripts (Schank & Abelson, 1977), stored constructs (Higgins & King, 1981), frames (Minsky, 1975), plans (Miller, Galanter & Pribaum), prototypes (Cantor & Mischel, 1979), and stereotypes (Hamilton, 1981). Although differing in specific focus, each of these formulations shares the assumption that an individual's information processing mechanisms lend structure to the stimulus world. Features of the stimulus field serve primarily to instantiate particular cognitive structures which then guide the encoding, storage and retrieval of that information. Thus, an individual creates order from the stimulus field by imposing prior structural representations upon his/her experience of that information.

Although the results for this past research have been very robust in their demonstrations of the effects of such cognitive structures on individual representations of the social environment, they have often ignored the role played by features of the stimulus field itself. Here we are referring not so much to the content of the stimulus field itself, as to its structure, defined in terms of information patterning. Social information has a sequential structure and pattern independent of the specific information items contained in it (e.g., McCann, 1982; Ostrom, et al., 1981). Accordingly, research examining the effects of such features of the stimulus field provides an important counter-balance to the current emphasis on the effects of pre-existent knowledge structures on the representation of social events. Here we have shown

that the structure or patterning of a stimulus field containing information about several other persons can affect the degree to which such information items are organized according to persons in free recall. It serves to raise the question of what are the dominant organizational modes of social information if not person categories (see Ostrom et al., 1981, for a discussion of this point). This interest in features of the stimulus field becomes increasingly important given the renewed interest in the nature of social knowledge (e.g., Baron, 1980; Forgas, 1981; Ostrom, in press).

The present research nicely complements that research focusing on the effects of pre-existent knowledge structures. The empirical balance offered by the present study is reminiscent of the balance offered by proponents of stimulus based and structure based processing in other areas of knowledge acquisition (e.g., Gibson, 1979; Neisser, 1967). As in these other areas, it is likely that our understanding of such processing will be incomplete without an integration (e.g., Neisser, 1976) of both sets of factors.

Reference Note

1. Tyner, L. K. The effects of physical appearance on the organization of social information. Unpublished Masters Thesis, Ohio State University, 1981.

References

- Anderson, R. C., & Watts, G. H. Bidirectional associations in multi-trial free recall. Psychonomic Science, 1969, 15, 288-9.
- Asch, S. E. Forming impressions of personality. Journal of Abnormal and Social Psychology, 1946, 41, 258-90.
- Bales, R. F. Interaction process analysis: A method for the study of small groups. Cambridge, Mass.: Addison-Wesley, 1950.
- Balser, E. The free recall and category clustering of factual material presented in complex sentences. Psychonomic Science, 1972, 27, 327-8.
- Barker, R. G., & Wright, H. F. Midwest and its children: The psychological ecology of an American town. Evanston, IL: Row, Peterson, 1955.
- Baron, R. M. Contrasting approaches to social knowing. Personality and Social Psychology Bulletin, 1980, 6, 591-600.
- Bousfield, W. A. The occurrence of clustering in the recall of randomly arranged associates. Journal of General Psychology, 1953, 49, 229-40.
- Bruder, G., & Segal, E. Effects of temporal and spatial organization of lists on clustering. Journal of Experimental Psychology, 1972, 93, 151-5.
- Cantor, N., & Mischel, W. Prototypes in person perception. In L. Berkowitz (Ed.), Advances in experimental social psychology (Vol. 12). New York: Academic Press, 1979.
- Cofer, C. W., Bruce, D. R., & Reicher, G. M. Clustering in free recall as a function of certain methodological variations. Journal of Experimental Psychology, 1966, 71, 858-66.

- Cohen, B. H. Recall of categorized word lists. Journal of Experimental Psychology, 1963, 66, 227-34.
- Crowder, R. G. Principles of learning and memory. Hillsdale, N.J.: Erlbaum Associates, 1976.
- Dallett, K. M. Number of categories and category information in free recall. Journal of Experimental Psychology, 1964, 68, 1-12.
- Di Vesta, F. J., Schultz, C. B., & Dangel, T. R. Passage organization and imposed learning strategies in comprehension and recall of connected discourse. Memory & Cognition, 1973, 1, 471-6.
- Forgas, J. P. What is social cognition? In J. P. Forgas (Ed.), Social cognition: Perspectives in everyday understanding. New York: Academic Press, 1981.
- Frase, L. T. Cybernetic control of memory while reading connected discourse. Journal of Educational Psychology, 1969a, 60, 49-55.
- Frase, L. T. Paragraph organization of written materials: The influence of conceptual clustering upon the level and organization of recall. Journal of Educational Psychology, 1969b, 60, 394-401.
- Gibson, J. J. The ecological approach to visual perception. Boston: Houghton Mifflin, 1979.
- Hamilton, D. L. (Ed.) Cognitive processes in stereotyping and intergroup behavior. Hillsdale, N.J.: Erlbaum Associates, 1981.
- Higgins, E. T., & King, G. Accessibility of social constructs: Information-processing consequences of individual and contextual variability. In N. Cantor & J. F. Kihlstrom (Eds.), Personality, Cognition, and Social Interaction. Hillsdale, N.J.: Erlbaum Associates, 1981.

- Jefferson, G., & Schenkein, J. Some sequential negotiations in conversation: Unexpended and expended versions of projected action sequences. Sociometry, 1977, 11.
- Mandler, G. Organization and memory. In K. W. Spence & J. A. Spence (Eds.), The Psychology of Learning and Motivation. Vol. 1. New York: Academic Press, 1967.
- Mandler, G. Input variables and output strategies in free recall of categorized lists. American Journal of Psychology, 1969, 82, 531-9.
- Mandler, G., & Dean, P. J. Seriation: Development of serial order in recall. Journal of Experimental Psychology, 1969, 81, 207-15.
- McCann, C. D. Preserving sequential order: Goal-directed processing and social cognitive consequences. Unpublished Doctoral Dissertation, The University of Western Ontario, 1982.
- McCann, C. D., Devine, P. G., & Ostrom, T. M. The effects of behavioral consistency and patterning of group participation on person organization. Paper presented at the Annual Convention of the Midwestern Psychological Association, Chicago, IL, 1983.
- Miller, G. A. The magical number seven plus or minus two: Some limits on our capacity for processing information. Psychological Review, 1956, 63, 81-97.
- Miller, G. A., Galanter, E., & Pribram, Plans and the structure of behavior. New York: Holt, Rinehart & Winston, 1960.
- Minsky, M. A framework for representing knowledge. I. P. H. Winston (Ed.) The psychology of computer vision. New York: McGraw-Hill, 1975.

- Murphy, M. D. Measurement of category clustering in free recall. In C. R. Puff (Ed.) Memory organization & structure. New York: Academic Press, 1979.
- Myers, J. L., Pezdek, K., & Coulson, D. Effect of prose organization upon free recall. Journal of Educational Psychology, 1973, 65, 313-20.
- Neisser, U. Cognitive psychology. New York: Appleton-Century-Crofts, 1967.
- Neisser, U. Cognition & reality. San Francisco: W. H. Freeman, 1976.
- Newman, S. E. Multitrial free recall: Effect of clustered presentation, element-sharing and instructions. Journal of Verbal Learning and Verbal Behavior, 1967, 6, 844-50.
- Ostrom, T. M. Social knowledge. In R. S. Wyer (Ed.), Handbook of Social Cognition, Vol. 1. Hillsdale, N.J.: Erlbaum Associates, in press.
- Ostrom, T. M., Pryor, J. B., & Simpson, D. D. The organization of social information. In E. T. Higgins, C. P. Herman, & M. P. Zanna (Eds.), Social Cognition: The Ontario Symposium Volume 1. Hillsdale, N.J.: Erlbaum Associates, 1981.
- Perlmutter, J., & Royer, J. M. Organization of prose materials: Stimulus, storage and retrieval. Canadian Journal of Psychology, 1973, 27, 200-209.
- Pryor, J. B., & Ostrom, T. M. The cognitive organization of social information: A converging-operations approach. Journal of Personality and Social Psychology, 1981, 41, 628-61.

- Puff, C. R. Clustering as a function of the sequential organization of word lists. Journal of Verbal Learning and Verbal Behavior, 1966, 5, 503-6.
- Puff, C. R. Role of clustering in free recall. Journal of Experimental Psychology, 1970, 86, 384-6.
- Puff, C. R. Effects of types of input structure upon recall and different clustering scores. Bulletin of Psychonomic Society, 1973, 2, 271-2.
- Robert, H. M. The Scott-Foresman Robert's rules of order--newly revised. Glenview, IL: Scott-Foresman, 1981.
- Roencker, D. L., Thompson, C. P., & Brown, S. C. Comparison of measures for the estimation of clustering in free recall. Psychological Bulletin, 1977, 35, 677-88.
- Rosner, S. R. The effects of presentation and recall trials on organization in multitrial free recall. Journal of Verbal Learning and Verbal Behavior, 1970, 9, 69-74.
- Schank, R., & Abelson, R. Scripts, plans, goals & understanding: An inquiry into human knowledge structures. Hillsdale, N.J.: Laurence Erlbaum Associates, 1977.
- Schultz, C. B., & Di Vesta, F. J. Effects of passage organization and note taking on the selection of clustering strategies and on recall of textual materials. Journal of Educational Psychology, 1972, 63, 244-52.
- Srull, T. Organizational and retrieval processes in personal memory: An examination of processing objectives, presentation format, and the possible role of self-generated retrieval cues. Journal of Personality and Social Psychology, in press.

- Sternberg, R. J., & Tulving, E. The measurement of subjective organization in free recall. Psychological Bulletin, 1977, 84, 539-56.
- Taylor, S. E., & Crocker, J. Schematic bases of social information processing. In E. T. Higgins, C. P. Herman, & M. P. Zonno (Eds.), Social cognition: The Ontario Symposium Vol. 1. Hillsdale, N.J.: Erlbaum Associates, 1981.
- Wallace, W. P. Consistency of emission order in free recall. Journal of Verbal Learning and Verbal Behavior, 1970, 9, 58-68.
- Wallace, W. P., & Calderone, R. W. Implicit responses in incidental learning. Journal of Verbal Learning and Verbal Behavior, 1969, 8, 136-42.
- Wood, G., & Underwood, B. J. Implicit responses and conceptual similarity. Journal of Verbal Learning and Verbal Behavior, 1967, 6, 1-10.

Table 1

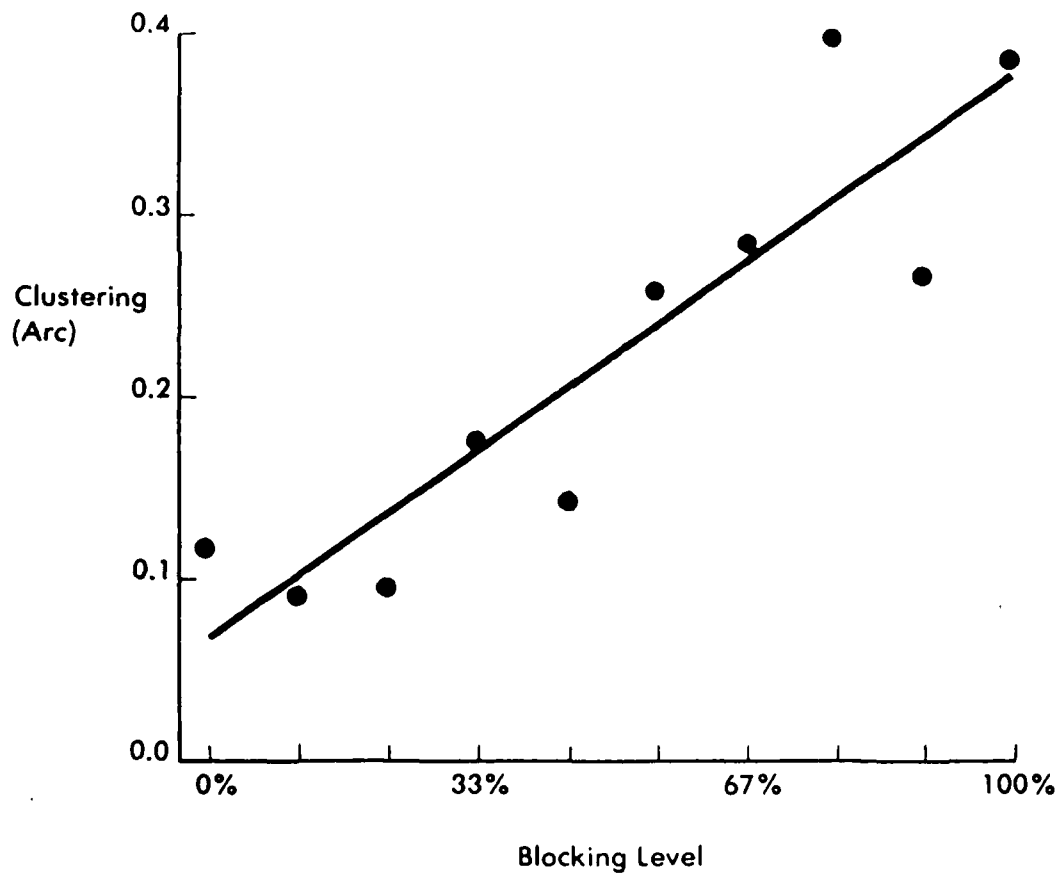
Total Recall as a Function of Blocking and Photo Condition

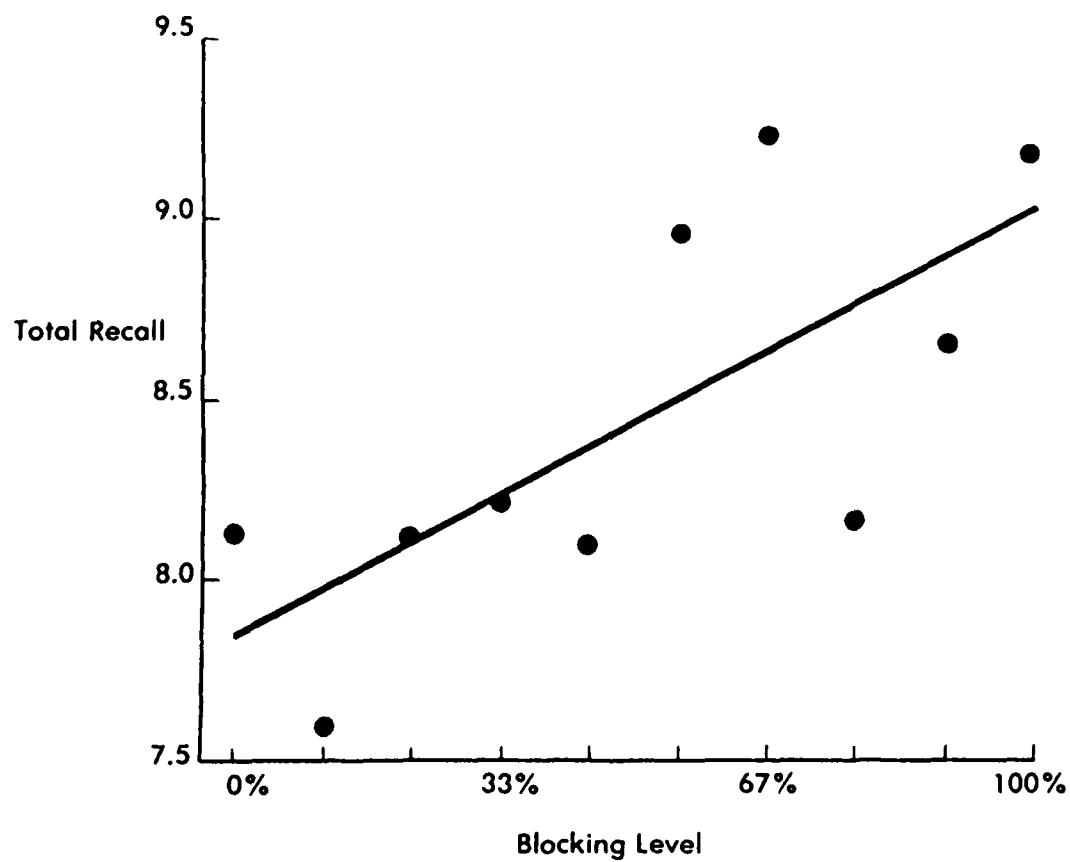
Photo Condition	Blocking Level									
	1	2	3	4	5	6	7	8	9	10
Photo	8.50	8.25	8.52	8.57	8.22	8.80	9.22	9.32	8.32	9.50
Non- Photo	7.80	6.92	7.70	7.87	8.00	9.62	8.97	9.00	8.95	8.92

Figure Captions

Figure 1. Categorical Clustering (ARC) as a Function of Blocking Level.

Figure 2. Total Number of Items Recalled as a Function of Blocking Level.





4420E DISTRIBUTION LIST

LIST 1
MANDATORY

Defense Technical Information Center (12 copies)
ATTN: DTIC DDA-2
Selection and Preliminary Cataloging Section
Cameron Station
Alexandria, VA 22314

Library of Congress
Science and Technology Division
Washington, D.C. 20540

Office of Naval Research (3 copies)
Code 4420E
800 N. Quincy Street
Arlington, VA 22217

Naval Research Laboratory (6 copies)
Code 2627
Washington, D.C. 20375

Office of Naval Research
Director, Technology Programs
Code 200
800 N. Quincy Street
Arlington, VA 22217

4420E
Aug 83

LIST 2
ONR FIELD

Psychologist
Office of Naval Research
Detachment, Pasadena
1030 East Green Street
Pasadena, CA 91106

LIST 3
OPNAV

Deputy Chief of Naval Operations
(Manpower, Personnel, and Training)
Head, Research, Development, and
Studies Branch (Op-115)
1812 Arlington Annex
Washington, DC 20350

Director
Civilian Personnel Division (OP-14)
Department of the Navy
1803 Arlington Annex
Washington, DC 20350

Deputy Chief of Naval Operations
(Manpower, Personnel, and Training)
Director, Human Resource Management
Plans and Policy Branch (Op-150)
Department of the Navy
Washington, DC 20350

Chief of Naval Operations
Head, Manpower, Personnel, Training
and Reserves Team (Op-964D)
The Pentagon, 4A478
Washington, DC 20350

Chief of Naval Operations
Assistant, Personnel Logistics
Planning (Op-987H)
The Pentagon, 5D772
Washington, DC 20350

LIST 4
NAVMAT & NPRDC

NAVMAT

Program Administrator for Manpower,
Personnel, and Training
MAT-0722
800 N. Quincy Street
Arlington, VA 22217

Naval Material Command
Management Training Center
NAVMAT 09M32
Jefferson Plaza, Bldg #2, Rm 150
1421 Jefferson Davis Highway
Arlington, VA 20360

Naval Material Command
Director, Productivity Management Office
MAT-00K
Crystal Plaza #5
Room 632
Washington, DC 20360

Naval Material Command
Deputy Chief of Naval Material, MAT-03
Crystal Plaza #5
Room 236
Washington, DC 20360

Naval Personnel R&D Center
Technical Director
Director, Manpower & Personnel
Laboratory, Code 06
Director, System Laboratory, Code 07
Director, Future Technology, Code 41
San Diego, CA 92152

(4 copies)

Navy Personnel R&D Center
Washington Liaison Office
Ballston Tower #3, Room 93
Arlington, VA 22217

4420E

Aug 83

LIST 5
BUMED

Commanding Officer
Naval Health Research Center
San Diego, CA 92152

Psychology Department
Naval Regional Medical Center
San Diego, CA 92134

Commanding Officer
Naval Submarine Medical
Research Laboratory
Naval Submarine Base
New London, Box 900
Groton, CT 06349

Director, Medical Service Corps
Bureau of Medicine and Surgery
Code 23
Department of the Navy
Washington, DC 20372

Commanding Officer
Naval Aerospace Medical
Research Lab
Naval Air Station
Pensacola, FL 32508

Program Manager for Human
Performance (Code 44)
Naval Medical R&D Command
National Naval Medical Center
Bethesda, MD 20014

Navy Health Research Center
Technical Director
P.O. Box 85122
San Diego, CA 92138

4420E
Aug 83

LIST 6
NAVAL ACADEMY AND NAVAL POSTGRADUATE SCHOOL

Naval Postgraduate School (3 copies)
ATTN: Chairman, Dept. of
Administrative Science
Department of Administrative Sciences
Monterey, CA 93940

Superintendent
Naval Postgraduate School
Code 1424
Monterey, CA 93940

U.S. Naval Academy
ATTN: Chairman, Department
of Leadership and Law
Stop 7-B
Annapolis, MD 21402

Superintendent
ATTN: Director of Research
Naval Academy, U.S.
Annapolis, MD 21402

4420E
Aug 83

LIST 7
HRM

Officer in Charge
Human Resource Management Detachment
Naval Air Station
Alameda, CA 94591

Officer in Charge
Human Resource Management Detachment
Naval Submarine Base New London
P.O. Box 81
Groton, CT 06340

Officer in Charge
Human Resource Management Division
Naval Air Station
Mayport, FL 32228

Commanding Officer
Human Resource Management Center
Pearl Harbor, HI 96860

Commander in Chief
Human Resource Management Division
U.S. Pacific Fleet
Pearl Harbor, HI 96860

Officer in Charge
Human Resource Management Detachment
Naval Base
Charleston, SC 29408

Commanding Officer
Human Resource Management School
Naval Air Station Memphis
Millington, TN 38054

Human Resource Management School
Naval Air Station Memphis (96)
Millington, TN 38054

List 7 (Continued)

Commanding Officer
Human Resource Management Center
1300 Wilson Boulevard
Arlington, VA 22209

Commanding Officer
Human Resource Management Center
5621-23 Tidewater Drive
Norfolk, VA 23511

Commander in Chief
Human Resource Management Division
U.S. Atlantic Fleet
Norfolk, VA 23511

Officer in Charge
Human Resource Management Detachment
Naval Air Station Whidbey Island
Oak Harbor, WA 98278

Commanding Officer
Human Resource Management Center
Box 23
FPO New York 09510

Commander in Chief
Human Resource Management Division
U.S. Naval Force Europe
FPO New York 09510

Officer in Charge
Human Resource Management Detachment
Box 60
FPO San Francisco 96651

Officer in Charge
Human Resource Management Detachment
COMNAVFORJAPAN
FPO Seattle 98762

4420E
Aug 83

LIST 8
NAVY MISCELLANEOUS

Naval Military Personnel Command (2 copies)
HRM Department (NMPC-6)
Washington, DC 20350

Naval Training Analysis
and Evaluation Group
Orlando, FL 32813

Commanding Officer
ATTN: TIC, Bldg. 2068
Naval Training Equipment Center
Orlando, FL 32813

Chief of Naval Education
and Training (N-5)
Director, Research Development,
Test and Evaluation
Naval Air Station
Pensacola, FL 32508

Chief of Naval Technical Training
ATTN: Code D17
NAS Memphis (75)
Millington, TN 38D54

Navy Recruiting Command
Head, Research and Analysis Branch
Code 434, Room 8001
801 North Randolph Street
Arlington, VA 22203

Navy Recruiting Command
Director, Recruiting Advertising Dept.
Code 40
801 North Randolph Street
Arlington, VA 22203

Naval Weapons Center
Code 094
China Lake, CA 93555

Jesse Orlansky
Institute for Defense Analyses
1801 North Beauregard Street
Alexandria, VA 22311

4420E
Aug 83

LIST 9
USMC

Headquarters, U.S. Marine Corps
Code MPI-20
Washington, DC 20380

Headquarters, U.S. Marine Corps
ATTN: Scientific Adviser,
Code RD-1
Washington, DC 20380

Education Advisor
Education Center (EO31)
MCDEC
Quantico, VA 22134

Commanding Officer
Education Center (EO31)
MCDEC
Quantico, VA 22134

Commanding Officer
U.S. Marine Corps
Command and Staff College
Quantico, VA 22134

4420E
Aug 83

LIST 10
OTHER FEDERAL GOVERNMENT

Defense Advanced Research
Projects Agency
Director, Cybernetics
Technology Office
1400 Wilson Blvd, Rm 625
Arlington, VA 22209

Dr. Douglas Hunter
Defense Intelligence School
Washington, DC 20374

Dr. Brian Usilaner
GAO
Washington, DC 20548

National Institute of Education
EOLC/SMO
1200 19th Street, N.W.
Washington, DC 20208

National Institute of Mental Health
Division of Extramural Research Programs
5600 Fishers Lane
Rockville, MD 20852

National Institute of Mental Health
Minority Group Mental Health Programs
Room 7 - 102
5600 Fishers Lane
Rockville, MD 20852

Office of Personnel Management
Office of Planning and Evaluation
Research Management Division
1900 E Street, N.W.
Washington, DC 20415

Chief, Psychological Research Branch
U.S. Coast Guard (G-P-1/2/TP42)
Washington, D.C. 20593

Social and Developmental Psychology
Program
National Science Foundation
Washington, D.C. 20550

Dr. Earl Potter
U.S. Coast Guard Academy
New London, CT 06320

LIST 10 CONT'D

OTHER FEDERAL GOVERNMENT

Division of Industrial Science
& Technological Innovation
Productivity Improvement Research
National Science Foundation
Washington, D.C. 20550

Douglas B. Blackburn, Director
National Defense University
Mobilization Concepts Development
Center
Washington, D.C. 20319

4420E
Aug 83

LIST 11
ARMY

Headquarters, FORSCOM
ATTN: AFPR-HR
Ft. McPherson, GA 30330

Army Research Institute
Field Unit - Leavenworth
P.O. Box 3122
Fort Leavenworth, KS 66027

Technical Director
Army Research Institute
5001 Eisenhower Avenue
Alexandria, VA 22333

(3 copies)

Head, Department of Behavior
Science and Leadership
U.S. Military Academy, New York 10996

Walter Reid Army Medical Center
Attn: Dr. Mary Lozano
W. R. Army Institute of Research
Division of Neuropsychiatry
Forest Glen
Washington, D.C. 20012

4420E
Aug 83

LIST 12
AIR FORCE

Air University Library
LSE 76-443
Maxwell AFB, AL 36112

Head, Department of Behavioral
Science and Leadership
U.S. Air Force Academy, CO 80840

MAJ Robert Gregory
USAFA/DFBL
U.S. Air Force Academy, CO 80840

AFOSR/NL
Building 410
Bolling AFB
Washington, DC 20332

Department of the Air Force
HQUSAF/MPXHL
Pentagon
Washington, DC 20330

Technical Director
AFHRL/MO(T)
Brooks AFB
San Antonio, TX 78235

AFMPC/MPCYPR
Randolph AFB, TX 78150

4420E
Aug 83

LIST 13
MISCELLANEOUS

Australian Embassy
Office of the Air Attache (S3B)
1601 Massachusetts Avenue, N.W.
Washington, D.C. 20036

British Embassy
Scientific Information Officer
Room 509
3100 Massachusetts Avenue, N.W.
Washington, DC 20008

Canadian Defense Liaison Staff,
Washington
ATTN: CDRD
2450 Massachusetts Avenue, N.W.
Washington, DC 20008

Commandant, Royal Military
College of Canada
ATTN: Department of Military
Leadership and Management
Kingston, Ontario K7L 2W3

National Defence Headquarters
DPAR
Ottawa, Ontario K1A 0K2

Mr. Luigi Petrullo
2431 North Edgewood Street
Arlington, VA 22207

Sequential by Principal Investigator

LIST 14
CURRENT CONTRACTORS

Dr. Clayton P. Alderfer
Yale University
School of Organization and Management
New Haven, Connecticut 06520

Dr. Janet L. Barnes-Farrell
Department of Psychology
University of Hawaii
2430 Campus Road
Honolulu, HI 96822

Dr. Gary Bowen
SRA Corporation
800 18th Street, N.W.
Washington, D.C. 20006

Dr. Jomills Braddock
John Hopkins University
Center for the Social Organization
of Schools
3505 N. Charles Street
Baltimore, MD 21218

Jeanne M. Brett
Northwestern University
Graduate School of Management
2001 Sheridan Road
Evanston, IL 60201

Dr. Terry Connolly
Georgia Institute of Technology
School of Industrial & Systems
Engineering
Atlanta, GA 30332

Dr. Richard Daft
Texas A&M University
Department of Management
College Station, TX 77843

Dr. Randy Dunham
University of Wisconsin
Graduate School of Business
Madison, WI 53706

List 14 (continued)

Dr. Henry Emurian
The Johns Hopkins University
School of Medicine
Department of Psychiatry and
Behavioral Science
Baltimore, MD 21205

Dr. Arthur Gerstenfeld
University Faculty Associates
710 Commonwealth Avenue
Newton, MA 02159

Dr. J. Richard Hackman
School of Organization
and Management
Box 1A, Yale University
New Haven, CT 06520

Dr. Wayne Holder
American Humane Association
P.O. Box 1266
Denver, CO 80201

Dr. Daniel Ilgen
Department of Psychology
Michigan State University
East Lansing, MI 48824

Dr. Lawrence R. James
School of Psychology
Georgia Institute of
Technology
Atlanta, GA 30332

Dr. David Johnson
Professor, Educational Psychology
178 Pillsbury Drive, S.E.
University of Minnesota
Minneapolis, MN 55455

Dr. F. Craig Johnson
Department of Educational
Research
Florida State University
Tallahassee, FL 32306

List 14 (continued)

Dr. Dan Landis
Department of Psychology
Purdue University
Indianapolis, IN 46205

Dr. Frank J. Landy
The Pennsylvania State University
Department of Psychology
417 Bruce V. Moore Building
University Park, PA 16802

Dr. Bibb Latane
The University of North Carolina
at Chapel Hill
Manning Hall 026A
Chapel Hill, NC 27514

Dr. Edward E. Lawler
University of Southern California
Graduate School of Business
Administration
Los Angeles, CA 90007

Dr. William H. Mobley
College of Business Administration
Texas A&M University
College Station, TX 77843

Dr. Lynn Oppenheim
Wharton Applied Research Center
University of Pennsylvania
Philadelphia, PA 19104

Dr. Thomas M. Ostrom
The Ohio State University
Department of Psychology
116E Stadium
404C West 17th Avenue
Columbus, OH 43210

Dr. William G. Ouchi
University of California,
Los Angeles
Graduate School of Management
Los Angeles, CA 90024

List 14 (continued)

Dr. Robert Rice
State University of New York at Buffalo
Department of Psychology
Buffalo, NY 14226

Dr. Irwin G. Sarason
University of Washington
Department of Psychology, NI-25
Seattle, WA 98195

Dr. Benjamin Schneider
Department of Psychology
University of Maryland
College Park, MD 20742

Dr. Edgar H. Schein
Massachusetts Institute of
Technology
Sloan School of Management
Cambridge, MA 02139

Dr. H. Wallace Sinaiko
Program Director, Manpower Research
and Advisory Services
Smithsonian Institution
801 N. Pitt Street, Suite 120
Alexandria, VA 22314

Dr. Richard M. Steers
Graduate School of Management
University of Oregon
Eugene, OR 97403

Dr. Siegfried Streufert
The Pennsylvania State University
Department of Behavioral Science
Milton S. Hershey Medical Center
Hershey, PA 17033

Dr. Barbara Saboda
Public Applied Systems Division
Westinghouse Electric Corporation
P.O. Box 866
Columbia, MD 21044

Dr. Harry C. Triandis
Department of Psychology
University of Illinois
Champaign, IL 61820

List 14 (continued)

Dr. Anne S. Tsui
Duke University
The Fuqua School of Business
Durham, NC 27706

Andrew H. Van de Ven
University of Minnesota
Office of Research Administration
1919 University Avenue
St. Paul, MN 55104

Dr. Philip Wexler
University of Rochester
Graduate School of Education &
Human Development
Rochester, NY 14627

Sabra Woolley
SRA Corporation
901 South Highland Street
Arlington, VA 22204

END

FILMED

02-84

DTIC