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THE QUALITATIVE EFFECTS OF LEAVE BEHIND ON RECALL

By

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fulfillment of the requirements for the
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TABLE OF CONTENTS

CHAPTER	PAGE
I. INTRODUCTION	1
II. RESEARCH FINDINGS	6
Conditions of Learning	6
Subject Variables	9
Conditions of Recall	12
III. METHOD	17
Procedure	17
Subjects	23
Materials	23
Equipment	23
Hypotheses	24
IV. DEFINITION OF TERMS	25
Scoring the Written Recalls	26
Accuracy	25
Intrusions	25
Drive Arousal	25
Criteria for Arousal	26
Classification of Trials	27
Classification of Samples	27
V. RESULTS	31
Tests on the Total Sample	31
Treatment Effects	31
Comparison Between 1st and 2nd Sessions	34
Proportional Scores	40

CHAPTER	PAGE
High Arousal and Low Arousal Samples . . .	42
High Arousal (1) and Low Arousal (1) . .	42
High Arousal (2) and Low Arousal (2) . .	46
Other Analyses	54
Individual Comparisons	54
Passage Effects	54
Tentative Analyses	56
VI. DISCUSSION	59
Problems of Measurement	61
Recall Scores	61
Sexual Arousal Scores	62
Problems in the Inducement of Sexual Arousal	63
Suitability of Arousal Procedure	63
Blurring of the Difference Between E and C	
Conditions	64
Other Irrelevant Emotions	65
Substantive Issues in Emotion and Memory .	65
Further Research	69
VII. SUMMARY AND CONCLUSIONS	71
BIBLIOGRAPHY	74
APPENDIX I: INSTRUCTION SHEETS AND QUESTIONNAIRES	77
APPENDIX II: PASSAGES AND SCORING MANUALS	87

LIST OF TABLES

TABLE	PAGE
1. Distribution of High, Moderate and Low Arousal Trials in the Different Samples	40
2. Accuracy and Intrusion Scores in the Total Sample. Experimental-Control Comparison for Each Passage Type	33
3. Accuracy Scores in 1st and 2nd Sessions. Neutral Passages Only.	35
4. Accuracy Scores in 1st and 2nd Sessions. Symbolic Passages Only.	36
5. Accuracy Scores in 1st and 2nd Sessions. Sexual Passages only.	37
6. Intrusion Scores in 1st and 2nd Sessions	39
7. Proportional Scores in the Total Sample	41
8. Accuracy, Intrusion, and Proportional Scores in the High Arousal (1) Sample	43
9. Accuracy and Intrusion Scores in the Low Arousal (1) Sample	45
10. Accuracy Scores in High Arousal (2) and Low Arousal (2) Samples. Neutral Passages only.	47
11. Accuracy Scores in High Arousal (2) and Low Arousal (2) Samples. Symbolic Passages Only.	48

TABLE	PAGE
12. Accuracy Scores in High Arousal (2) and Low Arousal (2) Samples. Sexual Passages Only	49
13. Intrusion Scores in High Arousal (2) and Low Arousal (2) Samples. Neutral Passages only.	51
14. Intrusion Scores in High Arousal (2) and Low Arousal (2) Samples. Symbolic Passages Only.	52
15. Intrusion Scores in High Arousal (2) and Low Arousal (2) Samples. Sexual Passages Only	53
16. Frequency of Confirmations and Dis- confirmations of Hypotheses Based on Comparison of Arousal and Non-Arousal Conditions Within Each Trial.	55
17. Means and Ranges of the Four Passage Sets	57

LIST OF FIGURES

FIGURE	PAGE
1. Relationship between the easiness of the passages, and the effect of emotional arousal on accuracy scores. . .	58

CHAPTER I

INTRODUCTION

Is our ability to remember affected by what we feel and what we want, and if so, in what ways? These questions would certainly rank high among the things most people would like to know about memory, yet for many years they were outside of the mainstream of psychological research. This was not an oversight. The Associationists were committed to the view that all behaviour could be reduced to atomistic connections, and that the making and breaking of these connections were governed by a small number of mechanistic principles. The Gestalt programme was concerned with the primacy of contextual factors, and of innate intellectual organization. Neither movement had much room for human motives, emotions and individuality.

The Psychoanalysts, on the other hand, devoted themselves almost entirely to the study of human emotions and motives, their development and vicissitudes. They stressed particularly the role of unconscious motivation. This movement was quite ready to tackle the large questions in the area of memory, as in other areas, but for most of the first half of this century it held aloof from formal quantitative research.

That is not to say that there was no research on emotion and memory. However, even the studies which were

done usually ignored the subject's emotional and motivational condition during the experiment. These variables are the central concern of the present study, whose specific focus is the drive state of the subject at the time of recall.

The predominance of unconscious determination in psychoanalytic theory has been cited by Schachtel (1959) as an example of the "nothing but" fallacy. In fact, this is a charge that could justly be made against any of the highly competitive schools of psychology. With the erosion of these schools a more balanced approach to the significant problems of memory became possible. The advent of ego psychology finally brought psychoanalysts into the community of academic psychology. They accepted its research methods on the whole and recognized the validity of a great many cognitive and associational phenomena in learning and memory. These developments in psychoanalysis have taken place in the last twenty to thirty years. They marked a change in direction, but did not represent a break with the Freudian tradition.

Freud maintained that the origin of memory was the pressure to discharge need-tension. By association, drive states come to arouse images of the need-satisfying object, and other accompanying stimuli. As long as primary processes dominate, these memory images provide some immediate tension release. The images brought to consciousness

are, at the outset, indistinguishable from sensory percepts, and, because cathexis in early infancy is free rather than bound, they need not be related to one another in any objective or rational way. The transfer of cathexis from one representation of a drive to others, is governed by such principles as displacement, condensation, and concrete symbolism, rather than by the laws of logic. Now the tension of anxiety causes disequilibrium, as does any other drive state; hence memories brought to consciousness tend to be associated with relief from anxiety rather than with its excitation.

The foregoing account is not disputed by ego psychologists. In Rapaport's view, these mechanisms constitute the drive organization of memory. Similarly, what Rapaport (1951) characterizes as the conceptual organization of memory clearly has its origin in the writings of Freud.

The trouble with tension reduction through hallucination is that it does not last. Freud describes in detail the process by which the growing child learns to delay the discharge of tension by affect and imagery, and with the energy saved, develops the capacity to use logic and reality to obtain genuine satisfaction of needs. This available energy is the source of bound cathexis--no longer free to shift arbitrarily from one image to another, but bound by practical and rational considerations. Memories, images, and thoughts can no longer be magically summoned to

consciousness, or banished from it, without regard to the real world. Memories are no longer organized around drives, but are arranged in conceptual and logical frames of reference. They do not require drive arousal to emerge in consciousness. This is a second system which Freud (1938) recognizes "is bound to quite different mechanical conditions from those which obtain under the control of the first system." Like the first system, the second is designed to reduce tension; it does so more effectively, and as soon as the need-gratifying object is obtained, the inhibition of discharge is lifted, and the tensions "flow off into motility."

Secondary processes (the second system) gain ground steadily as the individual matures, but they never completely supersede the primary processes. This, essentially, is the basis of Rapaport's dual theory of memory organization.

The questions asked at the beginning of this paper would get much the same general answer from Freud and Rapaport--though the latter would be more inclined to translate them into operational terms. Memories are at times affected by drives and emotions, especially when, for whatever reason, drive tension cannot be contained. The relations between drives and memories aroused, in these cases, and among the memories themselves, are a-logical, personal, and idiosyncratic, but the general trend in such remembering and

forgetting is in the direction of wish-fulfillment. At other times, memory is completely independent of drives.

What remains is a difference in emphasis, but it turns out to be a significant difference. Rapaport and the ego psychologists take autonomous ego functions very seriously. They do not automatically give a drive interpretation of phenomena, if a conceptual interpretation will do. Repression becomes less ubiquitous as an explanation of forgetting. Moreover, the ego psychologists are interested in investigating empirically the conditions which determine the amount of influence of each of the two memory systems. They also want to know how other autonomous ego functions, such as "cognitive styles", are related to memory organizations. The result is that psychoanalytic psychologists are joined with psychologists of other traditions in the pursuit of precise answers to the most interesting problems of memory.

Despite the long period of relative neglect, there is by now a considerable body of research in this area. It is characterized by a wide variety of theoretical and methodological approaches, so that results from different experiments are not always comparable. There are also differences in the kinds of questions the studies attempt to answer. Not many can be said to relate directly to the effect on memory of feelings and desires, which is the chief interest of the experiment proposed here. A brief review follows.

CHAPTER II

RESEARCH FINDINGS

There are a number of ways in which emotions and drives could influence memory. They could have their impact at the time of learning, through the materials presented, or through the set, the task, or the drive state at the time of presentation. They could represent relatively stable characteristics of the subjects, which are related to habits or styles of thinking. Or, finally, the emotion or drive could be introduced for the first time at the recall stage of the experiment. It is not always easy to distinguish between these three possibilities. There has frequently been confusion, for example, between the effects of drives on learning, and their effects on retention. Nevertheless, the three kinds of influence are treated separately in the review which follows.

It will be seen that only a minority of the studies reviewed deal with the manipulation of the subject's drive state; still fewer deal with the part played by state of arousal at the time of recall.

Conditions of Learning

Some of the early studies in this category focused on the "hedonic tone" of stimuli. Kowalewski (1904) asked his subjects whether they remembered better the pleasant or

the unpleasant experiences of their lives. Most of his subjects (aged 10-13) turned out to be "memory optimists". This was clearly a survey of opinion rather than a test of memory, but it laid the ground for further experimentation. Tait (1913) had his subjects judge the pleasantness of a series of colours. He found that pleasant stimuli were better recalled on a recognition test. But Gordon (1905), in a very similar experiment, obtained insignificant results. Sharp (1930) classified pairs of nonsense syllables in advance as socially-inacceptable or innocuous in their connotations, and found that the innocuous pairs were better remembered. In a review of 51 hedonic tone studies, Zeller (1950) found pleasant stimuli better recalled in 32, unpleasant better recalled in 14, and no clear preference in 5.

Rapaport (1950) has criticised these experiments on the grounds that they do not provide a test of repression, as many of them claim to do. Repression requires a personally relevant experience of anxiety. But this criticism would not be decisive as long as these experiments illuminated the memory process in their own way. A more serious objection is that in most cases the independent variable was not manipulated in the laboratory. "Pleasantness" was prejudged by experimenter or subject, leaving open the possibility that other relevant variables, such as familiarity, were not held constant. Diven's (1937) experiment went some

way towards satisfying both of the foregoing criticisms. He found that associating an electric shock to neutral word pairs, resulted in impaired ability to recall.

In an impressively controlled study, Zeller (1950) showed that after a single presentation of learning material, it was possible to lower and then raise recall performance by first inducing, then eliminating personal stress in the subject. This came very close to a convincing demonstration on repression in the laboratory, although Zeller himself felt that the subject's change in attitude could not be ruled out as a factor.

Zeigarnik's (1927) demonstration that unfinished tasks are better remembered than finished ones, stimulated a considerable amount of research. Rosenzweig (1938) confirmed Zeigarnik's results with task oriented subjects, but found that subjects who were made to believe that the tasks were a test of intelligence, remembered the completed ones better. He believed that his results illustrated the operation of Freud's reality and pleasure principles. Whether this claim is justifiable or not, the Zeigarnik and Rosenzweig experiments provide impressive evidence of the effect of needs and motives, of various kinds, on the memory process.

These studies, together with the work of Zeller, are noteworthy because they involve an emotional state which is personally relevant to the subject. This is in marked contrast

with the hedonic tone studies, in which there was neither control nor measurement of emotional state. In fact, there is no good reason to suppose that subjects in hedonic tone studies were aroused at all, except perhaps intellectually, in their desire to perform the task adequately. The success of Rosenzweig and Zeller in inducing a drive state under experimental conditions, was itself a major contribution to research in this area.

Subject Variables

Sharp (1938) carefully selected pleasant and unpleasant word pairs, on the basis of her subjects' personal histories. She compared neurotics with normals, and found that in both groups the unpleasant material was hard to learn, and poorly retained. Compared with neutral material, pleasant material was also hard to learn, but there was no impairment in its retention.

Adelson and Redmond (1958) compared the performance in a verbal recall task of "anal retentives", with that of "anal expulsives". Subjects were classified on the basis of their scores on the Blacky Test, Anal retentives were superior in their reproduction of both a neutral passage, and a "disturbing" passage with sexual and aggressive themes.

In a similar study, Marcus (1967) found anal retentives superior on delayed recall, but not on immediate recall. He also found that their superiority extended to non-verbal

responses.

Adelson and Redmond attribute the poor performance of anal expulsives to weak impulse control, and a consequent disturbance of concentration. Other researchers have explained poor memory on the basis of a tendency to repress. Using an index of repression derived from the MMPI, Erickson (1952) found that subjects high on repression recalled fewer incompleting tasks. The same measure was used by Truax (1957) who found that it was significantly related to repression in the type of condition employed by Zeller.

Fitzgerald and Ausubel (1963), on the other hand, stress the primacy of cognitive factors over affective factors. Their subjects had to learn an extended verbal passage of a controversial nature. Subsequently, the influence of attitudinal bias was compared with that of conceptual clarification. The results were complex, but the authors interpret them to mean that attitudinal factors did not affect retention. This conclusion is contradicted by a number of other studies on the role of attitudes in memory (Weiner, 1966a).

One body of research which tends to de-emphasise the role of drives in memory, has come from an unexpected quarter. The ego psychologists, who still belong within the psychoanalytic tradition, have devoted most of their energies to the study of autonomous, structural components of

the ego. Klein (1959) believes that motivational factors have often been overrated. He and others have sought to discover consistent patterns of cognitive functioning, which are conceived of as preferred modes of adaption to reality, rather than responses to emotional conflicts. These "cognitive styles" belong in the "conflict-free" sphere of the ego. But they do have an important role in helping to determine the amount and the manner of impulse control, and even in the choice of defenses.

Klein distinguishes between levellers and sharpeners, who differ in the degree of complexity and articulation which they perceive in their stimulus field. Levellers do not make fine distinctions among different elements, either in their perception or in their memory. Now Freud's account of repression involves the assimilation of connected material to what was originally repressed. Klein (1959) therefore hypothesized that repression, as measured by the Rorschach test, would be related to tests of levelling. The hypothesis was confirmed.

Paul (1959) investigated memory styles more directly. He contrasted skeletonization, which involves "stripping, fragmenting, and segregating" of material, with importation-- "the addition of material, often extraneous but seldom conceptually unrelated." He related his subjects' performance on retention tests, to their imaginative capacity, and to the size of their vocabulary and found evidence of consistent

styles, which cut across different areas.

This kind of generality is taken by ego psychologists as further evidence of the autonomous role played by cognitive styles. Field-dependence-independence is another dimension which has achieved an impressive degree of consistency across different areas of psychological functioning. Using this cognitive style as an underlying parameter, Witkin (1964) has successfully interrelated a variety of perceptual, intellectual, and personality variables.

Field dependent individuals are expected to be more responsive to external, especially social stimuli. In a test of the application of this theory to memory, Fitzgibbons, Goldberg and Eagle (1965) predicted that field dependent subjects would show better recall of incidental social stimuli. The results confirmed their hypothesis.

These studies demonstrate the importance of some non-associational factors in memory, and by linking memory with personality, make even less plausible the view of memory as a separate, cognitive function. They do not, however, throw light on the effects of transient emotional or drive states.

Conditions of Recall

When arousal is introduced at the stage of recall, it is safer to assume that the effect is on memory rather than learning. Some of the studies on the Zeigarnik task showed that incentives introduced at the time of learning, influence recall. But subsequent research indicated that there was

no effect when the incentives were presented at the time of recall. This suggested that the earlier results could be accounted for by selective learning (Weiner, 1966a). In his studies on short-term memory, Weiner (1966b) went to considerable pains to rule out selective learning as an interpretation of his findings. Contrary to his expectations, there was no improvement in recall when incentives were introduced during the period of trace retrieval. On the other hand, while incentives introduced at the time of stimulus presentation resulted in enhanced recall at an interval of 15 seconds, they had no effect at an interval of 4.67 seconds. Weiner argues that learning must therefore have been equal in incentive and non-incentive conditions, and that the effect can only have been on memory.

Ehrlich (1966) sought to determine whether the intrinsic quality of an affect may not be a crucial factor, without regard to its intensity or its personal significance to the subject. She induced pleasure and anxiety in her subjects through hypnosis. It was found that memory span was a monotonically decreasing function of level of anxiety. Pleasure produced less consistent results which were partly related to personal characteristics of the subjects. Anxiety produced decrements in recall whether it was introduced at the stage of acquisition, retention or retrieval.

Studies on hunger appear to come closer to being tests of the drive theory of memory. Epstein and Lewitt (1962) pre-

sented a series of paired associates, some of which were food words. They found better retention of food related paired associates by subjects hungry at recall. Williams (1950), however, using essentially the same experimental technique did not obtain significant differences. It is possible that the recall test used by Williams was somewhat less sensitive.

Two comments seem to be called for on studies of this kind. First, although hunger is undeniably a drive, it is not very much affected by repression. Hence, it will not tend to be discharged by means of free cathexis, which is a necessary condition for access to the drive organization of memory. These studies then, are not good tests of the drive theory of memory, although that does not mean that research in this area may not be useful and interesting for its own sake. Secondly, positive results in experiments using manifest references to conscious, unrepressed drives, are open to a response-probability interpretation. That is to say, hungry subjects will tend to think and talk about food regardless of the material with which they are presented, and regardless of how well it is remembered.

The foregoing studies on hunger are noteworthy for their attempt to bring about selective recall, by means of an induced drive state. Rapaport (1951) has suggested that there are a number of altered states of consciousness which, in addition to drive states, result in a tendency to select materials from

the drive organization of memory. Paul (1964) tested the retention of drive-related verbal material while his subjects were under the influence of LSF-25. He found that drugged subjects showed greater impairment in the recall of neutral than of drive-related material. Ehrenberg (1967?) used symbolically sexual learning material. He aroused his subjects by showing them pictures of nude females in the presence of the experimenter. There was a tendency for aroused subjects to recall selectively the symbolic drive units of the passages learnt. As predicted, this was not the case when guilt was aroused in the subjects.

The study proposed here is also a test of selective remembering, and like others in this section deals directly with controlled arousal at the recall stage of memory. Unlike Ehrenberg's study, it includes separate neutral, and manifestly sexual passages as controls, in addition to the symbolically sexual passages. This should help to obtain a more precise understanding of the selection process. Subjects will be required to recall samples of all three kinds of passages in unaroused conditions, and in conditions of sexual arousal.

Another feature of the present study is the care taken over arousal procedures. Despite their verbal assurances, there is room for doubt about the quality and quantity of sexual arousal in Ehrenberg's subjects. How genuine

could their sexual arousal be, with the experimenter looking at them across a table all the time, and with instructions to attend to the aesthetic qualities of the stimulus materials? To what degree was the sexual arousal mixed with anxiety and embarrassment?

In the present study steps will be taken to minimize the natural resistance of the subjects. The goal of sexual arousal will be frankly stated, and their cooperation sought. There should be room for some individual attention. Moreover, privacy and confidentiality will be ensured and emphasized. The purpose of these measures, described more fully in the next chapter, is to produce in the subjects, strong but comfortable arousal, as free as possible from feelings of shame or anxiety.

CHAPTER III

METHOD

There is clearly something artificial about arousing a subject sexually in a psychological laboratory. That is why the arousal procedure of this experiment is of such importance. It is hoped that something approaching clinical sensitivity can be brought to bear on the delicate problem of maximizing genuine sexual arousal.

E's honesty and empathy should help. Instructions are not read to S, but after memorization, are delivered informally. In the introduction to the whole experiment, there may be some individual variations according to need. Complete privacy is arranged for S during the learning, arousal and recall. Confidentiality is also assured; only a phone number and a name to get him to the phone is provided. There is no other identification. S is informed of the reasons for these precautions at the beginning of the experiment.

It is necessary to use S's own report as a measure of his sexual arousal, since connecting him to complex polygraphic equipment would not be conducive to a relaxed comfortable atmosphere. Here one must rely on the candour which should characterize the relationship between E and S. S must also be convinced that there is no "desirable" level of stated arousal, when he reports at the end of the experiment.

From start to finish, the key to success is S's willing cooperation, and his freedom from tension and suspicion.

Procedure: When S enters he is told: "In this experiment we are interested in some of the problems of emotional arousal in people. We know that some people have a greater capacity to become aroused than others. We'd like to know more about the things that make arousal easier, and the things that make it harder. Now we are going to arouse you with two different emotions which we'll come to in a minute. But I can tell you already that neither of them is unpleasant; in fact we hope you will be able to enjoy them both. We do need your cooperation in this, because you have to try to get really aroused in a situation which is artificial. I think it's natural to feel awkward about it, or to feel silly, but I hope you'll try to overcome these feelings and concentrate on the emotions we suggest. Remember, we will not suggest any upsetting emotion, such as anger or disgust.

"Now we've done a few things to make it easier for you to enjoy the suggested pleasant emotions, without feeling tense or embarrassed. It should make you feel freer to know that you will remain anonymous. All I need is a phone number and a name to get you to the phone. So I probably won't need to take your family name, or your address. Another thing is the privacy you will have. For most of the experiment you will be alone in this room. No-one will see

you, hear you or interrupt you. The idea is to help you to feel as free as possible to relax and enjoy the emotions which are suggested to you. There will be a different emotion in each of the two parts of today's session.

"Most of your instructions are in sheets in these numbered folders. There are separate sheets for the different stages of the experiment. There is also a tape recorder over there, which I will show you how to use. The first Instruction Sheet will direct you to turn on the tape recorder, which will not be turned off till I return to the room. At certain points you will receive instructions from the tape recorder, and you will be directed to the other Instruction Sheets. Altogether, there will be some passages to listen to, some instructions on getting aroused, and a few tests. Let's start with a warm-up trial to give you an idea of what it's like. I'm going to stay here to guide you for this trial, but I won't be here when we start the actual experiment."

The warm-up trial closely resembles the experimental trials described below. It includes a neutral passage and the arousal of "parental love", through selected pictures and music. During the warm-up trial, E urges S to be flexible in his use of the stimulus material. S is advised to concentrate on the pictures which work best for him, to use fantasy or personal memories if he wishes, and to regulate the volume of the music to any level,

so long as the instructions can still be heard. S does not write a recall of the warm-up passage. At the end of the warm-up trial, E offers to answer any questions. He then reminds S that the next trial will take longer and will include three passages and different emotions. E leaves the room, reminding S that he is to start by opening the first folder and reading the instructions.

The first Instruction Sheet tells S that he is going to hear three short passages, and that there will be a test of recall later, "to make sure you heard them properly". He is directed to turn on the tape-recorder as soon as he is ready. The tape begins with the reading of three passages, and in all cases the order is:

1) Neutral 2) Symbolic 3) Sexual. A short pause separates the passages. When all three have been read once, they are repeated in the same order. The tape then asks the subject not to switch off, but to open Folder Number 2, and read the instructions.

The sheet states: "In this part of the experiment, we are going to try to arouse you sexually (aesthetically, in the Control condition). Do not rehearse the passages you have just heard, but try to experience the emotion as intensely as you can, and enjoy it spend your time looking at the pictures that work best for you

Continue until you are asked to close the album and open the next folder"

After a fixed period, the tape asks S, in a quiet voice to open the next folder. The same kind of music then continues, while S reads and carries out the instructions to reproduce the three passages as accurately as possible in writing. He is asked to call E, either when he has finished, or when he receives instructions to do so from the tape, after 14 -- 20 minutes.

When E comes in, he removes the tape recorder in order to change the cassette. He leaves S with two self-rating scales on degree of arousal, one for the arousal stage and one for the recall stage. Each scale has 5 points. He also gives S a page full of arithmetic exercises, followed by a self-rating scale on concentration. After about five minutes E returns with a new cassette, and the same procedure is repeated, using a second set of parallel passages, and the other condition (Experimental or Control). The arithmetic exercises, and the five minute interval, are designed to give the previous arousal state a chance to wear off.

For purposes of replication, S is recalled at a later date, when the same procedure is followed with two additional sets of passages. After this second session, there is a detailed interview in which E inquires about S's emotional and physical responses during the sexual

arousal stages, and the recall stages which followed. He also finds out whether S noticed the sexual symbolism in the Symbolic passages. S is asked how much he enjoyed the experiment, and he is urged to comment. Finally, E answers any of S's questions about the experiment and its purpose.

For the first visit of S to the laboratory, there are four sequences of passage sets and arousal conditions. Thus a set of four such trials results in a balancing across conditions, of subjects, passage sets and the order in which the two conditions are presented:-

- 1) Set I, Sexual Arousal; Set 2, Aesthetic Arousal
- 2) Set 2, Aesthetic Arousal; Set I Sexual Arousal
- 3) Set I, Aesthetic Arousal; Set 2 Sexual Arousal
- 4) Set 2, Sexual Arousal; Set I Aesthetic

Ss are assigned by chance to these sequences, but an equal number does each sequence. When Ss return for the second session, they are presented with the arousal condition in the opposite order, which leaves only two possible sequences. They are assigned to these by chance, as on the first trial.

It should be noted, that the Aesthetic Arousal mentioned above, is really the Control condition, and is frequently referred to below as Non-arousal. Sexual Arousal, which is the Experimental condition, is usually called simply Arousal.

Subjects: There were 26 subjects used altogether. All were City College undergraduate males, who volunteered to participate. They were each paid \$4 altogether for the two sessions.

Materials: For the Experimental, or Sexual Arousal, condition, there was soft, sometimes dreamy music, from a tenor saxophone. A large black album contained a variety of pictures of nude and semi-nude females with different degrees of erotic explicitness. These were collected from several men's magazines.

For the Control, or Aesthetic Arousal, condition, the taped music was Baroque, mostly by Vivaldi. The pictures were awesome or pretty scenes illustrating the beauty of nature. Many of them were found in the National Geographic Magazine. These pictures were placed in a large white album.

There were three different kinds of passages: overtly sexual in content; symbolically sexual in content; and neutral with regard to drive. There were four parallel sets of passages, two for the 1st Session, and two for the 2nd Session. Each set contained one Neutral, one Symbolic, and one Sexual passage, always in that order.

Equipment: A shaded table lamp of moderate intensity was used. It did not illuminate the whole room, but gave enough light to read the instructions.

The passages, music and verbal instructions, were

recorded and played on a Sony cassette tape-recorder.

Hypotheses:-

- I. Sexual and Symbolic passages will be recalled better in the Arousal condition, than in the Non-arousal condition. Sexual Arousal will not affect the recall of Neutral passages.
- II. When samples are selected predominantly from trials in which Arousal in the Experimental condition is high, the effect predicted in Hypothesis I will be more pronounced than in samples in which Arousal in the Experimental condition is generally mild. Such samples are referred to below as High Arousal and Low Arousal Samples, respectively.
- III. When passage, order, and treatment effects are all held constant, High Arousal samples will score higher in Sexual and Symbolic passages than Low Arousal samples. Scores in Neutral passages will be about the same in both kinds of samples. This effect will be most pronounced in the Arousal Condition.
- IV. The above hypotheses will apply equally to errors of commission and omission. Wherever high scores are predicted, there will be fewer of both kinds of error.

CHAPTER IV

DEFINITION OF TERMS

I. SCORING THE WRITTEN RECALLS

Accuracy

For each passage there was a scoring manual which consisted of 30 information units. A point was given for each unit mentioned in a subject's recall, and there were no half points. When he scored the passages, E was unaware of the experimental conditions under which they were written. Difficult scoring decisions were recorded to maintain consistency. All passages were scored twice by E.

Intrusions

These are errors of commission. When items of information were added to the recall, they were scored as intrusions if E judged them to be significant. Intrusions included material taken from one of the other two passages in the set. There is evidence that people differ in their tendency to make errors of this kind, and that individual intrusion scores are fairly stable (Paul, 1966).

II. DRIVE AROUSAL

The independent variable in this study was sexual arousal. Successful arousal meant the enducement of a

drive state with its energizing and directing properties. It is often possible to detect a drive by observing behavioural and verbal responses, but a drive can never be measured directly. It is an inferred state. There can be no single "operational definition", but rather separate measures of the same thing. These measures may vary between different people and situations. For example, sexual arousal in many men may reliably be inferred from the presence of an erection, but impotent men also become sexually aroused, and their arousal can be inferred from other responses. The inference of sexual arousal, which is an essential part of this study, is based here on a number of criteria.

Criteria for Arousal

After each trial subjects filled out two 5-point self-rating scales, one for the arousal stage of the trial, and one for the recall stage. Subjects who rated themselves at the lowest point on the sexual arousal scale ("very mildly aroused") for both stages, were rejected from the sample. When a subject had completed his trials, he was closely questioned on his experience during the sexual arousal trials. Particular attention was paid to the presence of physical sensations, such as an erection, increased heart rate, or perspiration. These indices, together with the stimulation, instructions and setting

described above, were felt to justify the inference of a sexual drive state.

Classification of Trials

Because it was thought that degree of arousal, as distinct from its presence or absence, may be an important variable, all trials were classified as High Arousal, Moderate Arousal, or Low Arousal. A High Arousal trial was one in which a subject rated himself at at least the second highest point ("highly aroused") on one of the two 5 point scales, and at least the second lowest point ("mildly aroused") on the scale for the recall stage. Mildly Aroused trials were those with a minimum of "mildly aroused" for the recall stage, plus the report of some definite physical sensation related to sexual arousal. Low Arousal trials required a minimum of "mildly aroused" on either of the two scales.

Classification of Samples

The main hypotheses were tested on a total sample of 40 trials, from the 20 subjects who were sexually aroused to some degree on both trials, and who scored above zero on all the passage recalls. A further possibility to be tested was that the experimental effect would be more pronounced when subjects were more highly aroused. Accordingly, two sub-samples, High Arousal (1) and Low Arousal (1) were selected, each with 20 trials.

Now it was not possible to form these samples by simply selecting the 20 most highly aroused trials. In order to ensure that each passage, subject and order of presentation were equally represented in the experimental and control conditions, trials had to be selected in groups of four. Consequently, the High Arousal (1) sample did not consist entirely of High Arousal trials, and the Low Arousal (1) sample was similarly diluted. The distribution of levels of arousal in these two samples, is presented in Table 1.

Within each of these samples, comparisons can be made between the experimental and control conditions, but no comparison is possible between samples. This is because the proportion of 1st session trials and 2nd session trials (the replication for each subject) differs from one sample to the other. This means that passage effects are not balanced across samples.

In order to make this comparison possible, two new samples, High Arousal (2) and Low Arousal (2), were selected from High Arousal (1) and Low Arousal (1). These new samples each had 16 trials, and the number of 1st and 2nd session trials was the same for the two samples. The question that can now be put is this: Will subjects in High Arousal trials recall more than subjects in Low Arousal trials, regardless of the experimental condition? It is a subject variable rather than a treatment variable

which is being tested here. It would be especially interesting if this High Arousal--Low Arousal effect was found in the Sexual and Symbolic passages, but not in the Neutral passages.

The distribution of levels of arousal in the trials of the samples described above, are presented in table 1.

Table 1

Distribution of High, Moderate, and Low Arousal Trials
in the Different Samples

	High Arousal Trials	Moderate Arousal Trials	Low Arousal Trials	Total Trials
Total Sample	17	10	13	40
High Arousal(1)	15	4	1	20
Low Arousal(1)	3	4	13	20
High Arousal(2)	13	3	0	16
Low Arousal(2)	2	3	11	16
All Subjects	20	13	13	46

NOTE: The last line of Table 1 does not represent a sample. "All Subjects", includes six trials from the three subjects who were excluded from the Total Sample because they scored zero on at least one **passage recall**. One of these trials, in which the recall score was above zero, is included in the two High Arousal samples.

CHAPTER V

RESULTS

The comparisons of interest in the results presented below, are all within the different passage types. We do want to know whether there are any effects which occur with one kind of passage and not with the others, but there are no direct comparisons across passage types. While scores may well have been influenced by passage type, this is an influence on the learning process; the focus of the present experiment is on the effect of emotion on recall. In keeping with this interest, there was no attempt to balance either the difficulty or the order of presentation of the different types of passages. As outlined above, passages, subjects, and order of presentation, were all balanced for comparisons between the experimental and control conditions.

1. TESTS ON THE TOTAL SAMPLE

Treatment Effects

It was predicted that recall of the Symbolic and Sexual passages would be superior in the Arousal (Experimental) Condition, and that there would be no difference between conditions in recall of the Neutral passages. The means and standard deviations of the Accuracy Scores in the Total Sample, are presented in

Table 2. It is plain that none of the differences between conditions is significant. In fact, within each passage type, they are remarkable for their similarity. Three subjects were excluded from the Total Sample because they scored zero on at least one passage recall. Their inclusion in a corresponding sample of 20 subjects, did not alter the non-significant nature of the findings. The test used here, and in other comparisons between pairs of means, is the t-test for correlated measures.

The mean differences in the Intrusion Scores, are very far from significant. The data on Intrusions are also presented in Table 2. To confirm the experimental hypothesis, Intrusion Scores would have had to be lower in the Arousal Condition, for the recall of the Symbolic and Sexual Passages. Intrusion Scores in the Neutral passages were expected to be about the same in both conditions. Thus, a correlation was expected between errors of omission and commission.

Although there were no significant results in either case, it may be noted in passing that the Intrusion Scores do seem to follow the same pattern as the Accuracy Scores. The greatest number of errors of omission and commission, occurs in the Symbolic passages, the next greatest in the Neutral passages, and the least in the Sexual passages. This tends to lend support to the theory that Intrusions occur where there are gaps in a subject's accurate information (Faul, 1966)

Table 2

Accuracy and Intrusion Scores in the Total Sample

Experimental--Control Comparison for each Passage Type

Accuracy Scores

<u>Passage Type</u>	<u>No. of Trials</u>	<u>No. of Ss</u>	<u>Arousal</u>		<u>Non-arousal</u>		<u>t</u>	<u>l</u>
			<u>Mean</u>	<u>S.I.</u>	<u>Mean</u>	<u>S.I.</u>		
Neutral	40	20	16.17	5.19	16.22	5.13	<1	NS
Symbolic	40	20	14.57	4.93	14.62	4.48	<1	NS
Sexual	40	20	19.87	5.20	19.25	5.48	<1	NS

Intrusion Scores

Neutral	40	20	1.30	1.12	1.30	1.35	<1	NS
Symbolic	40	20	1.42	1.28	1.62	1.41	<1	NS
Sexual	40	20	1.05	1.16	1.12	1.47	<1	NS

NOTE: The Experimental Condition, here and elsewhere in this study, is sexual arousal. The Control Condition is non-arousal.

Comparison Between 1st and 2nd Session

All subjects came to the laboratory twice, following the same procedure on each occasion, but with different sets of passages. The means, standard deviations and analyses of variance of Accuracy scores in the three passage types, are presented separately in Tables 3, 4 and 5. The test used in these analyses, was the Analysis of Variance for Repeated Measures (Winer, 1962).

Familiarity with the experimental situation could have affected scores in the 2nd session, but this effect is very hard to identify with any degree of precision, since it is wholly confounded with passage effects. Of chief interest here is the interaction between treatment and session effects; that is to say, does experimental arousal influence scores more in one session than in the other? No prediction was made regarding the session in which this influence would be stronger.

The one significant result in the analyses of variance, is a session effect in the Sexual passages. Table 5 shows that Accuracy Scores in the Sexual passages are higher in the 2nd session, regardless of the experimental condition. In the Symbolic passages, the session effect comes close to significance. Once again there is a tendency for scores to be higher in the 2nd session (Table 4). In Table 3 it can be seen that in Neutral passages, interaction between treatment and session effects approaches significance.

Table 4
Accuracy Scores in 1st and 2nd Sessions

Neutral Passages only

<u>Session</u>	<u>Condition</u>	<u>Trials</u>	<u>No. of Ss</u>	<u>Mean</u>	<u>S.D.</u>
1st	Arousal	20	20	16.15	4.54
1st	Non-arousal	20	20	15.30	5.41
2nd	Arousal	20	20	16.20	5.77
2nd	Non-arousal	20	20	17.15	4.65

Analysis of Variance

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Sessions (A)	1	18.05	0.68	NS
A x subj w. groups	19	26.44		
Arousal (B)	1	0.05	0.00	NS
B x subj w. groups	19	20.44		
A x B	1	16.20	3.27	<.10
AB x subj w. groups	19	4.96		

Table 4
Accuracy Score in 1st and 2nd Session
Symbolic Passages Only

<u>Session</u>	<u>Condition</u>	<u>Trials</u>	<u>No. of Ss</u>	<u>Mean</u>	<u>S.D.</u>
1st	Arousal	20	20	14.35	4.96
1st	Non-arousal	20	20	13.50	4.84
2nd	Arousal	20	20	15.10	5.09
2nd	Non-arousal	20	20	15.60	4.79

Analysis of Variance

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>I</u>
Sessions (A)	1	40.16	4.21	<.10
A x subj w. groups	19	9.53		
Arousal (B)	1	0.61	0.05	NS
B x subj w. groups	19	13.32		
A x B	1	9.11	0.66	NS
AB x subj w. groups	19	13.74		

Table 5
Accuracy Scores in 1st and 2nd Session
Sexual Passage Only

<u>Session</u>	<u>Condition</u>	<u>Trials</u>	<u>No. of Ss</u>	<u>Mean</u>	<u>S.L.</u>
1st	Arousal	20	20	17.20	4.06
1st	Non-arousal	20	20	17.00	5.03
2nd	Arousal	20	20	22.55	4.83
2nd	Non-arousal	20	20	22.50	4.42

Analysis of Variance

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Sessions (A)	1	588.61	64.59	<.001
A x subj w. groups	19	9.11		
Arousal (B)	1	0.31	0.02	NS
B x subj w. groups	19	13.81		
A x B	1	0.11	0.01	NS
AB subj w. groups	19	14.66		

In the absence of significant main effects, this near-significant result is hard to interpret. It does suggest that sexual arousal might have influenced the scores in some way; on the other hand, inspection of the means in Table 3 makes it clear that the treatment effect does not approach significance in either of the two sessions.

A possible interpretation of the significant session effect in the Sexual passages is that arousal level varied consistently from one session to the other, so that the differences are due, after all, to emotional arousal. The role of arousal level is examined more closely below, but in an attempt to explain the significant session effect, a comparison was made between arousal levels in the two sessions. Six subjects were more highly aroused in the 1st session than in the 2nd, 6 were more highly aroused in the 2nd than in the 1st, and 8 were equally aroused in both sessions. There seems nothing in the above analyses to support the experimental hypotheses.

Intrusion scores in the 1st and 2nd sessions are presented in Table 6. The insignificant results obtained in a series of t-tests, and inspection of the means in this table, reveal that there are no significant treatment or session effects, and most probably, no significant interactions between them.

Table 6
Intrusion Scores in 1st and 2nd Sessions

<u>Session</u>	<u>Condition</u>	<u>No. of Trials</u>	<u>No. of Ss</u>	<u>Mean</u>	<u>S.I.</u>
<u>Neutral Passages</u>					
1st	Arousal	20	20	1.25	1.09
1st	Non-arousal	20	20	1.35	1.59
2nd	Arousal	20	20	1.35	1.15
2nd	Non-arousal	20	20	1.25	1.04
<u>Symbolic Passages</u>					
1st	Arousal	20	20	1.70	1.42
1st	Non-arousal	20	20	1.35	1.19
2nd	Arousal	20	20	1.15	1.10
2nd	Non-arousal	20	20	1.90	1.55
<u>Sexual Passages</u>					
1st	Arousal	20	20	1.00	1.05
1st	Non-arousal	20	20	1.20	1.36
2nd	Arousal	20	20	1.10	1.26
2nd	Non-arousal	20	20	1.05	1.56

NOTE: t-tests on differences between individual means, within each passage type, (Arousal--Non-arousal and 1st--2nd Session) are all non-significant.

Proportional Scores

At the recall stage of the experiment, subjects had to write what they remembered of a set of three passages, one of each type. Let us assume that to some degree different information units have to compete with one another for inclusion in a limited memory space. In that case, the means absolute scores in, say, the Sexual passages may be no different in the Arousal and Non-arousal conditions; but the share of the Sexual passage in the recall of each set may still be greater in the Arousal condition. Such a result would be a convincing demonstration of the influence of emotional arousal on memory.

For each set of passages recalled by the subjects, the proportion of the total recall taken by each type of passage was calculated. In this way all absolute scores were converted to proportional scores. It was predicted that recall of the Sexual and Symbolic passages would be superior in the Arousal condition, and that recall of the Neutral passages would be about the same in both conditions.

The means and standard deviations of these scores, in the three types of passages, are shown in Table 7. It is clear that converting Accuracy scores to proportions of total recall does not yield significant results. Obviously, such a conversion is not applicable to Intrusion scores.

Table 7
 Proportional Scores in the Total Sample

Passage Type	No. of Trials	No. of Ss	Arousal		Non-arousal		t	i
			Mean	S.D.	Mean	S.D.		
Neutral	40	20	31.86	7.22	32.71	6.36	<1	NS
Symbolic	40	20	28.80	6.50	28.48	5.70	<1	NS
Sexual	40	20	39.34	6.59	38.81	6.23	<1	NS

NOTE: In each trial subjects recalled a set of three passages, one of each type. A Proportional Score in any trial, refers to the percentage of the total recall of the set, accounted for by the recall of a particular passage type. Proportional Scores are percentages of Accuracy Scores, not Intrusion Scores.

II. HIGH AROUSAL AND LOW AROUSAL SAMPLES

These samples, fully described in Chapter IV, are selected out of the Total Sample. They are designed to test the role of level of arousal.

High Arousal (1) and Low Arousal (1)

The comparisons here are between Arousal and Non-arousal conditions within each passage type. It was predicted that in both of the above samples, the Arousal condition would be associated with higher scores, in the Sexual and Symbolic passages, and that recall of the Neutral passages would be unaffected by arousal. It was also predicted that the influence of arousal on scores would be greater in High Arousal (1) than in Low Arousal (1).

Means and standard deviations of Accuracy Scores in High Arousal (1), are presented in Table 8. None of the mean differences is significant. The result closest to significance is in the Sexual passages, where, in accordance with the hypothesis, Arousal scores are higher than Non-arousal scores. The mean difference is significant at the .10 level.

As explained in Section I in this chapter, Intrusion scores were expected to be low, wherever Accuracy scores were expected to be high. But Table 8 shows that results for Intrusions in the High Arousal (1)

Table 6
Accuracy, Intrusion, and Proportional Scores
in the High Arousal (1) Sample

<u>Passage</u> <u>Type</u>	<u>No. of</u> <u>Trials</u>	<u>No. of</u> <u>HS</u>	<u>Arousal</u>		<u>Non-arousal</u>		<u>t</u>	<u>L</u>
			<u>Mean</u>	<u>S.I.</u>	<u>Mean</u>	<u>S.I.</u>		
<u>Accuracy Scores</u>								
Neutral	20	14	15.25	4.41	14.35	5.22	<1	NS
Symbolic	20	14	13.40	3.90	13.70	3.78	<1	NS
Sexual	20	14	19.85	4.94	18.35	5.31	1.48	<.10
<u>Intrusion Scores</u>								
Neutral	20	14	1.55	1.28	1.65	1.53	<1	NS
Symbolic	20	14	1.35	1.01	1.65	1.35	<1	NS
Sexual	20	14	1.15	1.11	1.30	1.79	<1	NS
<u>Proportional Scores</u>								
Neutral	20	14	31.21	5.30	30.33	6.57	<1	NS
Symbolic	20	14	27.97	5.49	30.01	5.75	<1	NS
Sexual	20	14	40.98	5.62	39.63	5.79	<1	NS

NOTE: See the note on Proportional Scores under Table 7

sample, are all far from significance. Predictions for Proportional Accuracy scores were the same as for absolute Accuracy scores. As can be seen in Table 8, none of the mean differences in the Proportional Accuracy scores of the High Arousal (1) sample, approaches significance.

Means and standard deviations of Accuracy scores in Low Arousal (1) are presented in Table 9. The data on Intrusion are presented in the same table. It is clear that in the Low Arousal (1) sample, no mean difference between Arousal and Non-arousal conditions comes near significance, either in the Accuracy or the Intrusion scores.

It was predicted that the treatment effect would be stronger in High Arousal (1) than in Low Arousal (1). The near-significant finding cited above, in the Sexual passages in High Arousal (1), gives some slight support for this hypothesis, but there is no evidence which reaches statistical significance.

There was no calculation of Proportional scores for the Low Arousal (1) sample. Since the Low Arousal (1) and High Arousal (1) samples together, make up almost exactly the Total Sample, and since all of the results for the Proportional scores in the latter two samples are very far from significance, it was felt that a further analysis for the Low Arousal (1) sample was unnecessary.

Table 9
Accuracy and Intrusion Scores
in the Low Arousal (1) Sample

<u>Passage Type</u>	<u>No. of Trials</u>	<u>No. of Ss</u>	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>	<u>t</u>	<u>F</u>
<u>Accuracy Scores</u>								
Neutral	20	14	16.90	5.61	17.65	4.93	< 1	NS
Symbolic	20	14	16.00	5.61	15.70	4.93	< 1	NS
Sexual	20	14	20.20	5.45	21.00	5.23	< 1	NS
<u>Intrusion Scores</u>								
Neutral	20	14	1.00	0.89	0.95	0.97	< 1	NS
Symbolic	20	14	1.45	1.53	1.65	1.42	< 1	NS
Sexual	20	14	0.25	1.19	0.90	1.04	< 1	NS

High Arousal (2) and Low Arousal (2)

These two samples were designed so that comparisons could be made, not only between Experimental and Control conditions, but also, directly, between the two levels of arousal. Predictions regarding the treatment effect were the same as for High Arousal (1) and Low Arousal (1); but here it was also predicted that, with the treatment variable held constant, High Arousal (2) scores would be higher than Low Arousal (2) scores. This effect was expected to be more pronounced in the Experimental condition. The test used is the Analysis of Variance for a Two Factor Experiment with Repeated Measures on One Factor (Winer, 1962).

The data for Accuracy scores are presented and analysed in Tables 10, 11 and 12. Each passage type is considered separately. It can readily be seen that there are no significant results either for main effects or for interactions, in any of the passages. None of the results even reaches significance at the .10 level.

Nevertheless, the direction of the results is worthy of comment. In the Neutral passages the Low Arousal sample scores higher than the High Arousal sample. This is true in the Symbolic passages too, though to a lesser extent. This trend disappears in the Sexual passages, where the largest differences are due to the

Table 10

Accuracy Scores in High Arousal (2) and Low Arousal (2) Samples
Neutral Passages Only

<u>Sample</u>	<u>Condition</u>	<u>No. of Trials</u>	<u>No. of Ss</u>	<u>Mean</u>	<u>S.E.</u>
High Arousal(2)	Arousal	16	11	15.75	4.44
High Arousal(2)	Non-arousal	16	11	14.12	4.86
Low Arousal(2)	Arousal	16	8	17.50	4.39
Low Arousal(2)	Non-arousal	16	8	17.37	4.40

Analysis of Variance

<u>Source</u>	<u>df</u>	<u>SS</u>	<u>F</u>	<u>F</u>
Arousal Level (A)	1	100.00	2.19	NS
Subj w. groups	17	45.99		
Treatment (B)	1	12.25	0.39	NS
A x B	1	9.00	0.29	NS
B x subj w. groups	17	31.10		

Accuracy in High Arousal (2) and Low Arousal (2) Samples

Symbolic Passages Only

<u>Sample</u>	<u>Condition</u>	<u>No. of Trials</u>	<u>No. of Ss</u>	<u>Mean</u>	<u>S.I.</u>
High Arousal(2)	Arousal	16	11	14.62	4.08
High Arousal(2)	Non-arousal	16	11	14.43	3.32
Low Arousal(2)	Arousal	16	8	15.68	5.20
Low Arousal(2)	Non-arousal	16	8	15.87	5.19

Analysis of Variance

<u>Source</u>	<u>df</u>	<u>SS</u>	<u>F</u>	<u>F</u>
Arousal Level (A)	1	91.00	1.29	NS
Subj w. groups	12	62.91		
Treatment (B)	1	0.00	0.00	NS
A x B	1	0.57	0.04	NS
B x subj w. groups	12	14.32		

Table 12

Accuracy Scores in High Arousal (2) and Low Arousal (2) Samples
Sexual Passages Only

<u>Sample</u>	<u>Condition</u>	<u>No. of Trials</u>	<u>No. of Ss</u>	<u>Mean</u>	<u>S.E.</u>
High Arousal (2)	Arousal	16	11	20.81	4.79
High Arousal(2)	Non-arousal	16	11	18.87	5.42
Low Arousal(2)	Arousal	16	8	19.12	5.49
Low Arousal(2)	Non-arousal	16	8	18.87	5.49

Analysis of Variance

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>I</u>
Arousal Level (A)	1	0.57	0.01	NS
Subj w. groups	17	28.08		
Treatment (B)	1	3.06	0.11	NS
A x B	1	36.00	1.29	NS
B x subj w. groups	17	27.82		

treatment effect.

The results for Intrusions are also entirely non-significant. The data and analyses are presented in Tables 13, 14, and 15, with a separate table for each passage type. But once again the Low Arousal sample scores fewer errors in the Neutral passages. This time the trend is absent in both the other passage types, where the small differences which exist are due to treatment effects. These differences, like the differences in the Accuracy scores of the Sexual passages, are in the predicted direction.

It was hypothesized that High Arousal samples would score higher in the Sexual and Symbolic passages, and that there would be no differences in the Neutral passages. There seem instead to be a slight tendency for High Arousal samples not to score lower in the Sexual passages, as they do in the Neutral passages, and perhaps in the Symbolic passages.

These speculations are based on the fact that the largest differences were found in the Neutral passages, and appeared to be due to level of arousal. But it remains true that the experimental hypotheses regarding the High Arousal (2) and Low Arousal (2) samples, are not supported by a single significant or near-significant result.

Table 13

Intrusion Scores in High Arousal (2) and Low Arousal (2) Samples
Neutral Passages Only

<u>Sample</u>	<u>Condition</u>	<u>No. of Trials</u>	<u>No. of Ss</u>	<u>Mean</u>	<u>S.I.</u>
High Arousal(2)	Arousal	16	11	1.56	1.41
High Arousal(2)	Non-arousal	16	11	1.75	1.60
Low Arousal(2)	Arousal	16	8	1.00	0.79
Low Arousal(2)	Non-arousal	16	8	0.87	0.93

Analysis of Variance

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>P</u>
Arousal Level (A)	1	8.27	2.63	NS
Subj w. groups	17	3.15		
Treatment (B)	1	0.02	0.01	NS
A x B	1	0.38	0.15	NS
B x subj w. groups	17	2.54		

Table 14

Intrusion Scores In High Arousal (2) and Low Arousal (2) Samples
Symbolic Passages Only

<u>Sample</u>	<u>Condition</u>	<u>No. of Trials</u>	<u>No. of Ss.</u>	<u>Mean</u>	<u>S.D.</u>
High Arousal(2)	Arousal	16	11	1.25	1.09
High Arousal(2)	Non-arousal	16	11	1.04	1.39
Low Arousal(2)	Arousal	16	8	1.56	1.58
Low Arousal(2)	Non-arousal	16	8	1.75	1.44

Analysis of Variance

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>I</u>
Arousal Level (A)	1	0.06	0.02	NS
Subj w. groups	17	2.04		
Treatment (B)	1	4.06	0.75	NS
A x B	1	1.00	0.25	NS
B x subj w. groups	17	4.06		

Table 15

Intrusion Scores in High Arousal (2) and Low Arousal (2) Samples
Sexual Passages Only

<u>Sample</u>	<u>Condition</u>	<u>No. of Trials</u>	<u>No. of Ss</u>	<u>Mean</u>	<u>S.D.</u>
High Arousal(2)	Arousal	16	11	1.00	1.12
High Arousal(2)	Non-arousal	16	11	1.25	1.71
Low Arousal(2)	Arousal	16	8	1.00	1.27
Low Arousal(2)	Non-arousal	16	8	1.00	1.06

Analysis of Variance

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>F</u>
Arousal Level (A)	1	0.25	0.07	NS
Subj w. groups	17	3.44		
Treatment (B)	1	0.25	0.08	NS
A x B	1	0.25	0.08	NS
B x subj w. groups	17	3.09		

III. OTHER ANALYSES

Individual Comparisons

A comparison between Arousal and Non-arousal scores was made for every subject in every session, to see whether a trend could be detected in the direction of the experimental hypotheses. This applied to the Sexual and Symbolic passages only. Whenever an Arousal score for any subject was greater than the Non-arousal score for the same trial, this was regarded as a confirmation of the hypothesis; when the Non-arousal score was higher it was a disconfirmation.

It should be borne in mind that there is no control here for passage difficulty. If one passage set was much more difficult than another, it could result in an equal number of confirmations and disconfirmations, even though there were significant results based on the mean Accuracy scores. The results of this analysis, for the Total Sample and for a sample consisting of all the High Arousal trials (see Chapter IV), are presented in Table 16. As predicted, results for the High Arousal trials, are somewhat better than for the Total Sample; but the findings are not significant in either case.

Passage Effects

Table 17 presents all the means and ranges for the four passage sets. Each passage is considered

Table 16

Frequency of Confirmations and Disconfirmations of Hypotheses
Based on Comparison of Arousal and Non-arousal Conditions
Within Each Trial

	<u>Symbolic Passages</u>	<u>Sexual Passages</u>
<u>Total Sample</u>		
Confirms Hypothesis	14	18
Disconfirms Hypothesis	10	17
Scores Equal	7	5
<u>High Arousal Trials Only</u>		
Confirms Hypothesis	9	10
Disconfirms Hypothesis	7	7
Scores Equal	3	2

NOTE: Higher scores were predicted in the Arousal condition, for recall of the Symbolic and Sexual Passages. The results are not significant, either in the Total Sample or the High Arousal sub-sample.

individually. It is worth noting the high variability within the passages, due presumably to differences between subjects. Looking down the Mean columns, we get some idea of the differences between the passages, although this may be confounded to some degree with the degree of arousal of the subjects. Now passage difficulty and subject ability were balanced out in the experimental design, but the amount of variability noted above might have added substantial "noise" to the phenomenon which it was hoped to detect.

It is possible that the difficulty of the passages was related to the effect of emotional arousal. To investigate this, the difference between Experimental (Sexual Arousal) scores and Control (Non-arousal) scores, was calculated for each of the 12 passages, and the results were compared with the overall mean for each passage. Figure 1 portrays this relationship. There is obviously no discernable trend of any kind.

Tentative Analyses

Some experimentation was carried out with the conversion of Accuracy scores to rank scores. An attempt was also made to see whether eliminating very low scoring subjects would make a difference. Neither of these procedures appeared to alter the non-significance of the findings.

Table 17
Means and Ranges of the Four Passage Sets

	<u>Set</u>	<u>Experimental</u> <u>Mean</u>	<u>Range</u>	<u>Control</u> <u>Mean</u>	<u>Range</u>	<u>B+C</u> <u>Mean</u>
<u>Neutral</u>	1	14.2	16	13.9	20	14.1
	2	15.0	9	16.7	17	17.3
	3	13.6	24	16.7	16	16.2
	4	15.6	12	15.6	16	17.1
<u>Symbolic</u>	1	13.9	17	16.4	9	15.1
	2	13.6	17	11.9	12	12.8
	3	13.5	9	16.2	18	14.8
	4	17.1	19	15.0	9	16.0
<u>Sexual</u>	1	15.5	14	17.9	17	16.7
	2	18.0	10	16.1	15	17.5
	3	20.9	21	21.4	17	21.1
	4	24.2	13	23.6	11	23.9

NOTE: The Experimental Condition is sexual arousal. The Control Condition is non-arousal.

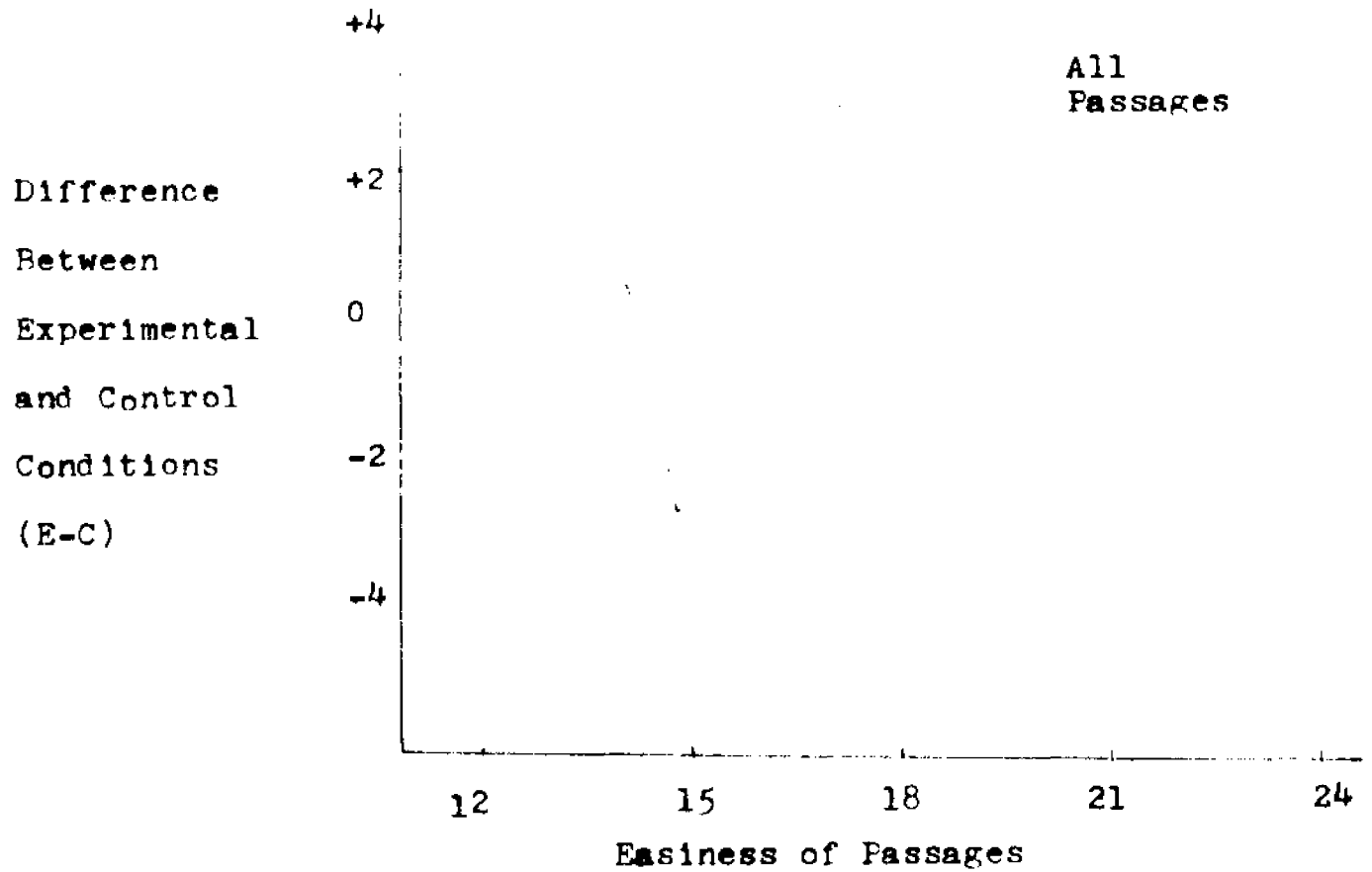


Fig. 1 Relationship between the easiness of the passages, and the effect of emotional arousal on accuracy scores.

Subjects also rated themselves on their enjoyment of the experiment, their degree of concentration during the Arousal and Recall stages, and their awareness of the sexual theme in the Symbolic passages. None of these indices seemed to be related to confirmation of the hypotheses. Most subjects did notice the sexual symbolism, and most said that they enjoyed the experiment.

CHAPTER VI

DISCUSSION

As noted in the last chapter, there are some data which suggest that drive arousal, and the level of that arousal, may contribute towards the recall of verbal material related to the aroused drive. In the High Arousal (1) sample, subjects who were aroused tended to score higher than those who were not aroused, and the difference came close to significance. This result was in the predicted direction. It had also been predicted that findings which conformed with the hypotheses, would be more likely in the High Arousal (1) sample than in Low Arousal (1).

In High Arousal (2) and Low Arousal (2) none of the results approached significance. However, it was tentatively suggested that relative to corresponding Low Arousal (2) scores, High Arousal (2) scores were not so poor in the Sexual and Symbolic passages, as they were in the Neutral passages. It is arguable that this gives some support to the hypothesis that a high level of arousal will selectively enhance the recall of sexual and symbolically sexual material.

The findings outlined above are suggestive, but none of them reaches statistical significance. In fact

what emerges most clearly from this experiment is the consistent failure of the results to confirm the hypotheses. In most cases there is no discernable trend whatever in the predicted direction. It is fair to conclude that this study provides no convincing evidence that drive state exercises a selective effect-ive on recall.

Now there are strong theoretical reasons, and a substantial amount of research, to make us believe that emotion and memory are not unrelated. It remains to inquire what features of this experiment might be responsible for the negative findings, and whether any modifications are called for in the theory of emotion which the experiment was designed to test.

I. PROBLEMS OF MEASUREMENT

Recall Scores

A description of recall scores is given in Chapter IV. Although every effort was made by E to standardize his procedures, it was not possible to ensure that all the units of measurements would be exactly equal; and the scoring of the passage recalls could not be made completely objective.

This method of scoring was

designed to be more sensitive than an objective test of recognition or identification, and to give subjects the widest possible latitude with respect to their styles of learning and remembering.

It is quite possible that the resulting error in the scoring of the passage recalls, contributed towards the high variability between passages and subjects. Two observations can be made here. The first is that high subject variability is common in memory tests of this kind. The other is related to the design of the experiment. Subject and passage factors were so balanced, that they should have had no effect on mean differences. They might have made the scores less stable, and increased the variance within groups, but that would not account for the extremely small differences found between the means in different conditions. An explanation for the negative findings will have to be sought elsewhere.

Sexual Arousal Scores

Drive levels are obviously very difficult to calibrate. It is a matter of individual judgment whether the self-ratings and interviews used in this experiment, provide a valid measure. A rationale for this approach is offered in Chapter IV. Again, the more objective method was not felt to be appropriate to this study. Polygraphic indices would have been inconsistent with the

relaxed, non-evaluative atmosphere which it was hoped to create.

Is it possible that certain "demand characteristics" in the experiment induced subjects to overrate their level of arousal in order to please E, or assert their own manhood? This cannot be ruled out, but it is unlikely to have affected scores substantially.

First, in his introductory statement, E made it clear that he was interested primarily in the factors which brought about emotional arousal. It was E's technique, and not S's character which was to be tested. Secondly, the self-rating arousal scores were in fact widely distributed, with only a few at the very top and the very bottom of the scale.

II. PROBLEMS IN THE INDUCEMENT OF SEXUAL AROUSAL

Suitability of Arousal Procedure

Maximum flexibility was sought by providing subjects with a wide variety of pictures, and inviting them to make whatever use they wished of the visual and auditory stimuli available. They were also free to use their own fantasies. Still, there is no doubt that for some subjects it would have been better to leave some out. The length of time spent on the arousal stage also turned out to be too long for some, although it was

just right for others. Nor was the music to everyone's liking. Emotional arousal is a very individual matter. Although stimuli were chosen to suit the population from which the subjects were drawn, a greater variety of stimuli, or more compelling kinds of stimuli, might well have intensified the arousal state, in many cases.

But in the event, most subjects did seem to become aroused to a substantial degree. There is also empirical evidence (Clark, 1952; Ehrenberg, 1967), if such evidence is needed, that pictures of nude women are sufficient to arouse male subjects sexually. The insignificant results obtained in this experiment, cannot plausibly be accounted for, by a failure to induce a drive state in the subjects.

Blurring of the Difference Between E and C Conditions

Paradoxically, there is some reason to suspect that too much sexual arousal might have weakened the effect of the independent variable. The last passage in each set read out to the subject was sexual, and in each case it was explicitly erotic. It is hard to gauge to what extent this caused sexual arousal in the control condition, or how often this irrelevant emotion endured throughout the aesthetic arousal procedure; but several subjects reported that their attempts to become aesthetically aroused were hindered by spontaneous sexual

arousal. Such an overlap in the experimental treatment, would, of course, militate against obtaining large mean differences between the conditions.

If it is true that there was a certain amount of sexual arousal in both conditions, then the relatively high scores in the sexual passages would be consistent with the experimental hypothesis. Sexual arousal leads to recall of sexual material. Moreover, the order in which the passages were presented, with the sexual passage always last and hence closest in time to the recall stage, might be an insufficient explanation for the higher scores on the sexual passages. After all, the symbolic passage was always presented second, but it was recalled worst of the three. But this line of thought is entirely speculative. There was no control for the difficulty of the different passages, and in any case the superior scores on the sexual passages might well have been due to differences in learning rather than recall.

Other Irrelevant Emotions

It is impossible to prevent subjects from having unscheduled feelings of their own, and these could interfere with the experimental arousal. There was, for example, occasional evidence of veiled hostility and suspicion. Apart from personally idiosyncratic feelings, peculiar to individual subjects, some might have resulted from

features of the procedure, or the instructions. Placed in a permissive setting with strong sexual stimulation, some subjects might have felt a mixture of sexual arousal and anxiety. There was also the subject's awareness of the recall task which was to follow. Even if he did not actually rehearse the passages, which he was asked not to do, the thought of an imminent achievement test, might have caused some tension.

The danger of producing mixed feelings in subjects, in experiments of this kind, can never be entirely eliminated. It points up the general problem of fine tuning emotional arousal in standardized laboratory situations.

III. SUBSTANTIVE ISSUES IN EMOTION AND MEMORY

Negative findings do not prove the Null Hypothesis, but the consistency of the results in this experiment is noteworthy. No matter how they are sliced, 1st Session or 2nd Session, H.A. Sample or L.A. Sample, the results are always the same. This gives a kind of reliability to the negative findings, and warrants further examination of their implications.

In one respect, the results seem consistent with those obtained by Ehrenberg (1967). He found that drive state did not affect recall when the drive implications of the verbal passage were manifest. In this experiment there was no effect in either the sexual or

the symbolic passages, but most subjects claimed to have noticed the sexual implications of the symbolic material. This would suggest that the drive organization of memory, from which material is selected during drive arousal, is exclusively unconscious, and does not include material whose drive content is undisguised. Indeed, the whole purpose of selective recall may be to provide a safe and indirect channel to discharge tension.

Unfortunately, Ehrenberg did not ask his subjects whether they noticed the symbolism in his disguised passage, so the above explanation of the discrepant results must remain tentative.

Perhaps the most novel aspect of the present study, is its openness, and permissiveness in the area of sexual arousal. subjects were asked to cooperate in becoming sexually aroused, and were made to feel that sexual feelings were acceptable and even desirable.

What effect might this have had? It could have been somewhat threatening to some subjects, as suggested above. This might have resulted in anxiety and defensiveness, which would have effectively prevented a strong and relaxed sexual drive state. But observation of the subjects, and such evidence as is available, indicates that this was probably not the case. Most subjects appeared to be relaxed, and most said that they found the experiment a pleasant experience.

When a subject is consciously aroused, in a setting where these feelings are encouraged, how will his tension be discharged? It does not seem likely that he will need to have recourse to symbolic material, or to sanctioned memory tasks. He may not even have to indulge in fantasy wish-fulfillment. He can think about his drive state realistically, and pursue satisfaction through secondary processes. In the interview at the end of the experiment, some subjects said they had been thinking about their girl friend, or other girls they knew, and some had been thinking about what they might do with their girl friend when they saw her.

In his experiment on sexual arousal, Clark (1952) obtained overt sexual imagery in response to T.A.T. cards, when his subjects were aroused in a permissive setting. The T.A.T. permits personal responses, and if these responses openly reflect the subject's drive state, as they did in Clark's study, they are capable of expressing what that subject thinks, what he wants, and even what he plans to do.

Subjects in the present experiment may have been so uninhibited in their sexual arousal, that they had no need for an indirect substitute in the form of selective recall.

To summarize, it has been argued that the negative findings in this study might tentatively suggest an

elaboration of the theory of selective recall. First, it may be that selective recall in a drive state, will only apply to material whose drive content is disguised.

Secondly, selective recall will only occur when the subject is unaware of his drive state, or when he is not able to express it freely.

IV. FURTHER RESEARCH

Future experiments along the lines of this one, might do well to avoid some of the shortcomings outlined above. Sexual passages could be made less arousing, and symbolic passages could be made less obvious. (But even obvious symbolic passages serve the purpose of eliminating the danger of reinforcing recall of the sexual passages through related aspects of the erotic material.) By using separate subjects for each condition, one could prevent them from knowing, and thinking about, the recall of the passages. Finally, it might be useful to experiment with longer term memory, where the processing and storage of information, as postulated by Rapaport, will have more time to take effect.

Going beyond this experiment, it should be possible to test some of the interpretations of the results offered above. The effects of different levels of awareness and encouragement of sexual arousal, could be compared. In one condition, a strict task orientation could be

imposed, with emotional expression implicitly discouraged. A second condition might leave the subject with no guidance as to how he ought to feel, and a third might actively encourage emotional arousal, as did the present experiment. Most selective recall would be predicted for the first condition.

CHAPTER VII

SUMMARY AND CONCLUSIONS

The general purpose of this study was to investigate the role of drives in recall. It was hypothesized that drive arousal would have a selective effect on memory, favouring the recall of material related to the aroused drive. Specifically, it was predicted that sexual arousal would enhance the recall of sexual and symbolically sexual passages, and that it would have no effect on the recall of neutral passages. It was also predicted that this effect would be more pronounced in subjects who were more highly aroused.

The theory most closely related to this study is that of David Rapaport. Rapaport elaborated on Freud's distinction between Primary and Secondary Processes, and postulated two separate memory organizations: the Drive Organization and the Conceptual Organization. The former is arranged around drives, conflicts and arbitrary personal associations; the latter is based on logic and reality. An alternative formulation of the aim of this study, would be an investigation of the conditions which give access to material stored in the Drive Organization of memory.

There are three features of this experiment which together distinguish it from previous research: 1) a design

which makes mean differences attributable to effects on recall and not on learning 2) a separate examination of the effects of drive arousal on overtly drive related material, symbolically drive related material, and unrelated material 3) an individualized laboratory setting which encourages openly, the relaxed and enjoyable arousal of the sexual drive.

The subjects were male college students, Each subject was his own control, and in addition each repeated the whole procedure at a later date, after his first session at the laboratory. During most of the session the subject was alone in a softly lit room. He first heard a taped reading of three passages, one Neutral, one Symbolic and one Sexual. This was followed by the Sexual Arousal stage (or Non-arousal, in the Control condition). Finally, he was requested, through the tape-recorder, to write what he could recall of the three passages. Subjects then proceeded directly, during the same session, to the Control condition (or to the Experimental condition, if the Control was first).

Some of the results were suggestive. In one of the High Arousal sub-samples, recall of the Sexual passages was superior in the Arousal condition, and the difference between conditions approached significance. This result was in the predicted direction. Results from

two other sub-samples (one predominantly High Arousal, the other predominantly Low Arousal), suggested indirectly, a tendency for the recall of Sexual and Symbolic passages, but not Neutral passages, to be improved by a high level of sexual arousal, rather than a low one. These latter findings were very far from significance, and in any case, their relevance to the hypotheses is somewhat questionable.

The overall findings were consistently negative. None of the predicted results reached significance, and most results showed no tendency at all to confirm the hypotheses. Some technical shortcomings and weaknesses in the experiment, were considered in Chapter VI; it seemed possible that they contributed towards the failure to obtain significant results.

In addition, two substantive explanations for the non-significant findings were offered tentatively. Selective recall of drive material during arousal, might only apply to verbal material whose drive content is not evident to the subject. In this experiment, most subjects noticed the sexual theme in the symbolic passages. A second possibility relates to the permissive atmosphere engendered during the sexual arousal procedure. It may be that subjects who accept and are aware of their sexual feelings, have no need to express them indirectly through selective recall. Such subjects can seek real satisfaction through secondary processes.

BIBLIOGRAPHY

- Adelson, J. and Hedmond, J. Personality differences in the capacity for verbal recall. J. abnorm. soc. Psychol., 1958, 57, 244-248.
- Clark, H.A. The projective measurement of experimentally induced levels of sexual motivation. J. Exp. Psychol., 1952, 53, 182-86
- Liven, K. Certain determinants in the conditioning of anxiety. J. Psychol., 1937, 3, 291-308
- Ehrenberg, B. The effect of drive arousal on the recall of drive related verbal material. Unpublished Doctoral Thesis, New York University, New York, 1967.
- Ehrlich, E. A. W. Effects of anxiety and pleasure on memory span. Dissertation Abstracts, 1966, 27 (2-B), 622.
- Epstein, S. and Lewitt. Influence of hunger on the learning and recall of food related words. J. abnorm. soc. Psychol., 1962, 64, 130-135.
- Eriksen, C. W. Defense against ego-threat in memory and perception. J. abnorm. soc. Psychol., 1952, 47, 230-235.
- Fitzgerald, G. and Ausubel, D. Cognitive versus affective factors in the learning and retention of controversial material. J. of ed. Psychol., 1963, 54, 73-84.
- Fitzgibbons, D., Goldberger, L. and Eagle, M. Field dependence and memory for incidental material. Perceptual and Motor Skills, 1965, 21, 743-749.
- Freud, S. The interpretation of dreams. In The Basic Writings, New York, Modern Library, 1938, 179-548.
- Gardner, R.W., Hozman, P.S., Klein, G.S., Linton, Harriet and Spence, D. P. Cognitive control: a study of individual consistencies in cognitive behaviour. Psychol. Issues., 1959, 1, No. 4.
- Gordon, K., Ueber das Gedächtnis fuer affektiv bestimmte Eindruecke. Arch. ges. Psychol., 1905, 4, 437-458.
- Kowalewski, A. Studien zur Psychologie des Fessismus. Grenzfrogen des Nerven und Seelenbens, 1904, 4, 437-458.
- Marcus, M. Relation of personality to capacity for memory structure. Dissertation Abstracts, 1967 (B).

- Paul, I. H. Studies in remembering: the reproduction of connected and extended verbal material. New York: International Univ. Press, 1959. Psychological Issues, 1959, I,
- Paul I. H. The effects of a drug-induced alteration in state of consciousness on retention of drive related verbal material. Journal of Nervous and Mental Disease, 1964, 138, 367-374.
- Paul, I. H. Some methods and materials for studying the way people learn and remember connected and extended verbal material. 1966. Unpublished.
- Rapaport, P. Emotions and Memory, New York, International Universities Press, Inc., 1950.
- Rapaport, P. Toward a theory of thinking. In Organization and Pathology of Thought, New York: Columbia University Press, 1951.
- Rosenzweig, S. The experimental study of repression. In Murray (Ed.), Explorations in Personality, Oxford Univ. Press, 1938, 472-490.
- Schachtel, E. G. Metamorphosis, New York: Basic Books, Inc., 1959.
- Sharp, A. A. The influence of certain emotional inhibitions on learning and recall. Unpubl. thesis on file Univ. Chicago Libr., 1930.
- Sharp, A. A. An experimental test of Freud's doctrine of the relation of hedonic tone to memory revival. J. exp. Psychol., 1938, 22, 395-418,
- Tait, W. P. The effect of psychophysical attitudes on memory. J. abnorm. Psychol., 1913, 8, 10-37.
- Truax, C. B. The repression response to implied failure as a function of the hysteria-psychasthenia index. J. abnorm. soc. Psychol., 1957, 188-193.
- Weiner, B. Motivation and memory. Psychol. Mon., 1966 a, 626.
- Weiner, B. Effects of motivation on the availability and retrieval of memory traces. Psychol. Bull., 1966 b, 65.
- Williams, M. The effect of experimentally induced needs upon retention. J. exp. Psychol., 1950, 40, 139-151.
- Winer, B. J. Statistical Principles in Experimental Design, New York: McGraw Hill Book Company, 1962.

- Witkin, H. A. Origins of cognitive style. In Cognition Theory Research and Promise. Shearer (Ed.), Harper & Row, 1964.
- Zeigarnik, B. Das Behalten erledigter und unerledigter Handlungen. Psychol. Forsch., 1927, 2, 1-85.
- Zeller, A. P. An experimental analogue of repression. 1. Historical Summary. Psychol. Bulletin, 1950, 47, 39-51.

APPENDIX I

Instruction Sheets and Questionnaires

Instruction Sheet #1

When you switch on the tape recorder you will hear three short passages read out loud. Each passage will be read twice. To make sure you heard them properly, there will be a test of recall later.

After the passages have been read, you will be asked to open the next folder. (#2).

Make yourself comfortable, and turn on the tape as soon as you are ready.

Instruction Sheet #2Arousal of parental love:

In this part of the experiment, we are going to try to arouse feelings of parental love. Do not rehearse the passage you have just heard, but try to experience the emotion as intensely as you can, and enjoy it. The music is meant to help you to get into the mood. Leaf through the pictures in the album at your leisure; they are quite varied, so spend your time looking at the ones that work best for you.

Continue until you are asked to close the album and open the next folder (#3).

Try to relax and enjoy the experience.

Instruction Sheet # 2Sexual Arousal:

In this part of the experiment, we are going to try to arouse you sexually. Do not rehearse the passages you have just heard, but try to experience emotion as intensely as you can, and enjoy it. The music is meant to help you to get into the mood. Leaf through the pictures in the album at your leisure; they are quite varied, so spend your time looking at the ones that work best for you.

Continue until you are asked to close the album and open the next folder (#3).

Try to relax and enjoy the experience.

Instruction Sheet # 2Aesthetic arousal (appreciation of beauty) :

In this part of the experiment, we are going to try to arouse you aesthetically. Do not rehearse the passages you have just heard, but try to experience the emotion as intensely as you can, and enjoy it. The music is meant to help you to get into the mood. Leaf through the pictures in the album at your leisure; they are quite varied, so spend your time looking at the ones that work best for you.

Continue until you are asked to close the album and open the next folder (#3).

Try to relax and enjoy the experience.

Instruction Sheet #3

Please write down what you can recall of the three passages you heard a short time ago. Be as accurate as possible, but where you cannot remember the words used in the passages, use your own words to convey the meaning.

Use a separate sheet for each passage.

You will be asked to stop in 15-20 minutes. If you finish before then, please call the experimenter. But you have plenty of time, so do not rush. Take all the time you need.

In this part of the experiment an attempt was made to arouse you sexually. How aroused did you become?

A) during the arousal stage (pictures and music):

/	/	/	/	/
very highly aroused	highly aroused	moderately aroused	mildly aroused	very mildly aroused

B) during the recall stage (written recall and music):

/	/	/	/	/
very highly aroused	highly aroused	moderately aroused	mildly aroused	very mildly aroused

N.B. These scores refer to sexual arousal only.

If you have any comments please add them in the space below.

In this part of the experiment an attempt was made to arouse you aesthetically. How aroused did you become?

A) during the arousal stage (pictures and music):

very highly aroused	highly aroused	moderately aroused	mildly aroused	very mildly aroused
---------------------------	-------------------	-----------------------	-------------------	---------------------------

B) during the recall stage (written recall and music):

very highly aroused	highly aroused	moderately aroused	mildly aroused	very mildly aroused
---------------------------	-------------------	-----------------------	-------------------	---------------------------

N.B. These scores refer to aesthetic arousal only.

If you have any comments please add them in the space below

Circle every number that can be divided by 3, and bracket
() every number that can be divided by 7. Cross out X
every other number. This is partly a test of concentration.

253 9401 98 8376 161 63 7714 451 18 826 7
597 384 486 997 123 5032 6191 21 84 307
815 1739 64755 1030 7101 6111 367 2592 31
17696 15655 9510 7495 522 77436 3443 381 59
4906 735 2328 984 513 50374 6659 288 583
6914 600 5605 33 841 3487 79 9016 788 36
3733 9465 49 428 48274 54855 445 650 478
870 3159 122 6062 128 34691 6121 380 4273
6416 89 39323 493 88434 387 735 3090 83054
800 8669 3029 564 4533 985 995 267 351 620
9297 9532 5777 7406 319 5979 9698 6624 24015
9674 75 557 2645 13351 501 9096 3367 69096
3358 49800 534 2198 852 2636 9292 6592 43
155 7966 6032 713 357 8363 730 8722 967 7

How good was your concentration on this task?

very poor poor fair good very good

In order to get a better understanding of the results of this experiment, I should like to know more about how you felt during the sexual arousal procedure in both sessions. Would you please, as openly and completely as you can, describe the way you felt, the thoughts you had, and the bodily sensations you experienced. Was the first session different from the second? If so, in what ways?

How would you describe this experiment, to a friend, if you wished to be perfectly frank?

APPENDIX II

Passages (Neutral, Symbolic and Sexual), and Scoring Manuals

NEUTRAL PASSAGES

1.

Edgar pointed his nubbly finger at the yellow balloon rising towards the puffy clouds. The park was deserted that autumn afternoon, and his weary nurse-maid shut her eyes, grateful for a moment of repose. Edgar stared intently as the leaves of the tall oak tree trapped the balloon. The warm wind rustled the branches and he prayed that the trembling balloon would free itself.

SYMBOLIC PASSAGES1.

The atmosphere in the basement was charged as William exhibited his skill at billiards. A pretty girl was watching the match, and this made him anxious to perform well, but he had stiff opposition and was fully extended. Quivering with suspense, William raised his long cue-stick, and planned a deer cushion shot. He felt a surge of excitement as the shining balls converged. And the girl gasped as the blue ball bounced off the cushion, and sank smoothly into the pocket.

SEXUAL PASSAGES

1.

Sitting on Gerald's lap in the cozy basement, the blonde teenager seemed not to care that her parents were upstairs. Gerald was worried, but a thrill of passion swept through his body when he handled her firm breasts, and she began to squirm on his erect penis. They tumbled to the floor, and he clutched her behind, clasping her tightly to him. Her miniskirt was about her waist. He could not stop himself now.

NEUTRAL PASSAGES

1.

Stephen, the new school-principal, greeted his students with a broad smile, and made his way through the crowded schoolyard to a group of chattering teachers. They stopped their gossiping and welcomed him respectfully. Stephen responded with a friendly gesture, and then called aside one of the older women for a brief spell. The children had quieted down when they noticed how nervous their teachers had grown. But they were laughing freely again as the warning bell ended the recess.

SYMBOLIC PASSAGES

2.

Leading his party of explorers, Alex penetrated deep into virgin territory of the steaming jungle. The young girl who was guiding them wanted to stop while they could still withdraw safely; but Alex insisted on pressing on, and he rose successfully to every challenge. Soon, the terrain grew gentler, and he enjoyed its soft contours as he glided through the yielding foliage. The girl breathed easier when they reached their destination. And he felt well satisfied with his manly performance.

SEXUAL PASSAGES

2.

Sydney sat in the drive-in with his date. She was a newcomer to the neighbourhood. He enjoyed her open-mouthed kisses, and the feel of her slim body, but it was not enough, and he wondered desperately whether he could go any further. Now only ten minutes remained to the end of the film. Suddenly she took his hand and pressed it into her crotch, and he felt her trembling with desire. As his fingers probed inside her, she quickly pulled down his zipper. Sydney was only sorry she had waited so long.

NEUTRAL PASSAGES

3.

Horace carefully eased his truck on to the highway and adjusted the rear-view mirror. He squinted hard as headlights began to stream past, flooding his windshield with glare. Feeling tense, Horace asked his wife, sitting beside him, to turn on the radio. She found some pleasant music, and whistled along with it, then handed her husband a lighted cigarette. He knew that he would have to relax for the long trip ahead. Finally, the music took hold of him, and he felt easier.

SYMBOLIC PASSAGES

3.

Richard guided the racing boat round a gentle curve into the final stretch. The brown-haired girl watched fascinated from the shore as the oars went in and out rhythmically and relentlessly, and the long vessel cut powerfully through the water. The race was nearing its climax but Richard did not slacken his thrust. The girl let out a cry of delight as he produced a final spurt of energy and leapt over the finishing line. He had made it again.

NEUTRAL PASSAGES4.

The boat drifted lazily as Robert held the fishing rod, and wistfully waited for his first bite. His pretty cousin had fallen asleep an hour before, and though he fought to stay alert, he too dozed off. Robert awoke to screams of delight from his cousin. A fat blue fish was swinging through the air at the end of her line; and soon the two of them were reeling about the boat, struggling to get a hold of the cold slippery creature.

SYMBOLIC PASSAGES4.

Lawrence was oblivious to the other children in the playground. He gently stripped the bark off the piece of wood, then shaped it and smoothed it with a pointed knife, making it long and rounded. A freckle-faced girl stopped to look, but he remained absorbed in his work. She gazed intently as the grain emerged, and the wood looked hard and soft at the same time. Lawrence did not know what he was making. He just wanted to let it come out the way it had to.

SEXUAL LANGUAGE4.

Philip and his girl-friend quietly left their friends on the beach and ran into the woods. He was in high spirits as he undid her bikini top, then pinched her nipples; and they laughed together at his difficulty in pulling down his swimming trunks over his swollen penis. Philip turned suddenly at the sound of voices calling his name. But the cries grew fainter, and he turned back to find her lying naked on the long grass. She was beckoning to him with a playful wink.

SECRETIANUALNeutral 1

- 1) The hero's name was Edgar.
- 2) He pointed his finger.
- 3) His finger was rubbly.
- 4) What he pointed at was a balloon.
- 5) It was a yellow one.
- 6) It was rising.
- 7) The direction it took was towards the clouds.
- 8) The clouds were ruffy.
- 9) He was in a park.
- 10) The park was deserted.
- 11) It was autumn.
- 12) It was in the afternoon.
- 13) He was with his nurse-maid.
- 14) She was weary.
- 15) She was grateful or felt relieved or tranquil.
- 16) She shut her eyes.
- 17) She took a rest.
- 18) She was going to rest for a moment (only).
- 19) Edgar stared (at the balloon or what was happening to it).
- 20) He did so intently.
- 21) The balloon was trapped.
- 22) It was trapped in the leaves (of a tree).
- 23) The tree it was trapped in was an oak.
- 24) The oak was tall.
- 25) It was warm.
- 26) There was a wind (blowing).
- 27) It rustled the branches.
- 28) The boy prayed.
- 29) His wish or prayer was that the balloon should free itself or be blown free (from the tree).
- 30) The (trapped) balloon was trembling.

SCORING MANUALSymbolic 1

- 1) The hero's name was William.
- 2) The locale was a basement.
- 3) The atmosphere was charged.
- 4) He was exhibiting his skill.
- 5) The game was billiards.
- 6) The girl present was pretty.
- 7) She was watching the match.
- 8) He was anxious to perform well.
- 9) This was because of the girl.
- 10) He had stiff opposition in the game.
- 11) He was fully extended.
- 12) He quivered.
- 13) This resulted from suspense.
- 14) He raised his cue-stick.
- 15) The cue was long.
- 16) He planned his shot.
- 17) It was to be a deep one.
- 18) It was to be a cushion shot.
- 19) He had a surge of feeling.
- 20) The feeling was excitement.
- 21) The ball bounced.
- 22) It rolled across the table.
- 23) It struck the cushion.
- 24) The ball bounced.
- 25) It bounced off the cushion.
- 26) It was the blue ball.
- 27) It shot into the pocket.
- 28) It did so smoothly.
- 29) The girl gasped.
- 30) Her gasp accompanied his successful shot.

SCORING MANUALSexual 1

- 1) The hero's name was Gerald.
- 2) The locale was a basement.
- 3) The basement was cozy.
- 4) The girl was blonde.
- 5) She was a teenager.
- 6) She was sitting on his lap.
- 7) Her parents were upstairs.
- 8) She did not seem to care about (7).
- 9) Gerald was worried.
- 10) He felt a thrill.
- 11) It was a thrill of passion.
- 12) It swept through his body.
- 13) He handled her.
- 14) What he handled were her breasts.
- 15) Her breasts were firm.
- 16) She squirmed.
- 17) She began to do so.
- 18) She did so on his penis.
- 19) His penis was erect.
- 20) (10) occurred at the same time as (13) or (16).
- 21) They tumbled (down).
- 22) When they tumbled they reached the floor.
- 23) Her held her behind.
- 24) He held it very firmly or clutched it.
- 25) He clasped her to him.
- 26) He clasped her tightly.
- 27) Her skirt was about her waist.
- 28) It was a miniskirt.
- 29) He could not stop himself.
- 30) (29) was not possible at that stage ("now").

COGNITIVE MAPNeutral

- 1) The hero's name was Stephen.
- 2) He was a school-principal.
- 3) He was new at his job.
- 4) He greeted some people.
- 5) The people he greeted were his students.
- 6) His greeting was accompanied by a smile.
- 7) It was a broad one.
- 8) He made his way, or walked, through the schoolyard.
- 9) The schoolyard was crowded.
- 10) He walked to some teachers.
- 11) They were chattering.
- 12) They were in a group.
- 13) They stopped gossiping, (or talking.)
- 14) They welcomed him.
- 15) They did so respectfully.
- 16) Stephen responded with a gesture, (or gestured.)
- 17) It was a friendly gesture.
- 18) He called one (a teacher) aside.
- 19) The teacher he called aside was a woman.
- 20) She was one of the older teachers.
- 21) He kept her for a brief spell, or a short while.
- 22) The children quieted down.
- 23) The teachers grew nervous.
- 24) The children noticed (23).
- 25) (23) accompanied or followed (24).
- 26) The children laughed.
- 27) They had laughed previously ("again").
- 28) The warning bell sounded or the bell rang.
- 29) It ended the recess.
- 30) (26) accompanied (28).

SCORING MANUALSymbolic 2

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|--------------------------------------------------------------|-----------------------------------------------------------------------|
| 1) The hero's name was Alex. | 20) This happened soon. |
| 2) He was with a party. | 21) He felt enjoyment (or pleasure). |
| 3) He was their leader. | 22) The enjoyment was caused by the contours (of the terrain.) |
| 4) They were explorers. | 23) The contours were soft. |
| 5) They penetrated virgin territory. | 24) He slid through the foliage. |
| 6) It was jungle territory. | 25) It was yielding foliage. |
| 7) The jungle was steaming. | 26) The girl breathed easier. |
| 8) They were deep inside (the jungle or territory.) | 27) This happened when they reached their destination. |
| 9) The girl with them was young. | 28) He was well satisfied. |
| 10) She was a native. | 29) What satisfied him was his performance. |
| 11) She was guiding them. | 30) It was a manly performance. |
| 12) She wanted to stop. | |
| 13) She wished to do so while they could still withdraw. | |
| 14) The withdrawal she suggested would have been a safe one. | |
| 15) Alex wanted to press on. | |
| 16) He was insistent on doing so. | |
| 17) He rose to every challenge. | |
| 18) He did so successfully. | |
| 19) The terrain grew gentler. | |

SCORING MANUALSexual 2

- 1) The hero's name was Sydney. 19) She pressed it against her body.
- 2) He was in a drive-in. 20) The part of her body involved was her crotch ("into her crotch").
- 3) He was with his date. 21) He felt her trembling.
- 4) She was a new-comer to the neighborhood. 22) It was desire which made her tremble.
- 5) He was enjoying himself. 23) He touched her or probed with his fingers.
- 6) What he enjoyed was her kisses. 24) His probing was inside her.
- 7) Her kisses were open-mouthed. 25) She pulled down his zipper.
- 8) He felt the feel of her body. 26) She did so quickly.
- 9) Her act was flit. 27) (1) and (26) happened at the same time.
- 10) (1) and (2) were not enough for him. 28) Sydney was sorry about something.
- 11) He wondered whether he could go any further. 29) That displeased him was that she had waited so long.
- 12) He wondered desperately. 30) That was all that displeased him ("only").
- 13) Ten minutes remained (for them to be together.)
- 14) In ten minutes the film would end.
- 15) That was the situation at this stage of the story ("now").
- 16) The time remaining seemed very little ("only").
- 17) She took his hand.
- 18) She did so suddenly.

SCORING MANUALNeutral 3

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|------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| 1) The hero's name was Horace. | 20) The tune she whistled was the one being played on the radio ("along with it"). |
| 2) He was driving a truck. | |
| 3) He was being driven to the highway. | 21) Horace had a cigarette. |
| 4) Getting on the highway he exercised great care ("carefully eased"). | 22) He received it from his wife. |
| 5) He adjusted his mirror. | 23) When she gave it to him it was lighted. |
| 6) It was a rear-view mirror. | 24) He was going to have to relax. |
| 7) He squinted. | 25) He knew this. |
| 8) The way he squinted was hard. | 26) Relaxation was needed for the trip ahead. |
| 9) There were headlights shining (towards him). | 27) It was a long one. |
| 10) They streamed past. | 28) The music took hold of him or affected him. |
| 11) There was glare or the lights caused glare. | 29) He felt easier or more comfortable. |
| 12) The glare flooded his windshield. | 30) (28) and/or (29) happened after some time ("finally"). |
| 13) (7) accompanied (9). | |
| 14) He felt tense. | |
| 15) His wife was with him or sitting beside him. | |
| 16) He asked her to turn on the radio. | |
| 17) She found some music. | |
| 18) The music was pleasant. | |
| 19) She whistled. | |

SCORING MANUALSymbolic 3

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|---------------------------------------------------|-----------------------------------------------------|
| 1) The hero's name was Richard. | 11) That we might have had a first finish. |
| 2) He guided a boat. | 12) He pulled out a boat. |
| 3) It was a racing boat. | 13) It was a very fast boat. |
| 4) He guided it round a curve. | 14) He produced a great effort (or a great effort). |
| 5) It was a gentle curve. | 15) He crossed the finishing line. |
| 6) He guided it into a stretch. | 16) He seemed to leap across it. |
| 7) It was the final stretch. | 17) Her only accompanier (i.e.) or (a.). |
| 8) The girl was brown-haired. | 18) His start or effort (i.e.) was a final one. |
| 9) She was watching (the boat or the race). | 19) He had made it (or won or succeeded). |
| 10) She was fascinated. | 20) He did so again (or not for the first time). |
| 11) She watched from the shore. | |
| 12) The oars went in and out. | |
| 13) They did so rhythmically. | |
| 14) They did so relentlessly. | |
| 15) The vessel (or boat) moved through the water. | |
| 16) It seemed to cut the water. | |
| 17) Its movement through the water was powerful. | |
| 18) The vessel was long. | |
| 19) The race was nearing its climax. | |
| 20) Richard did not slacken (or weaken). | |

SCORING NAT'ALSexual :

- 1) The heroine's name was Benjamin.
- 2) He was in the bathroom.
- 3) A girl walked in.
- 4) She was a house-smaid.
- 5) She was new at the job.
- 6) She was red-haired.
- 7) She smiled.
- 8) What made her smile was his embarrassment.
- 9) She stared (at him).
- 10) She was looking at his penis.
- 11) His penis was long.
- 12) He was holding it.
- 13) Her manner of staring was shameless.
- 14) He decided to call her bluff.
- 15) He reached out.
- 16) He did so in order to touch her.
- 17) The part of her he wanted to touch was her breasts.
- 18) She moved closer.
- 19) He felt her up.
- 20) She let him do so.
- 21) She remained silent (as she let him feel her up).
- 22) Her hand touched his penis.
- 23) It enveloped it.
- 24) Her hand was cool.
- 25) She squeezed it (his penis).
- 26) She raised it or began to do so.
- 27) She was the pulled it was back and forth.
- 28) She squeezed down.
- 29) She did so shortly after (it) and (it) ("soon").
- 30) She opened her mouth.

SCORING MANUALNeutral 4

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|----------------------------------------------------|-------------------------------------------------------|
| 1) The hero's name was Robert. | 20) A fish was on the end of her line or on her line. |
| 2) He was in a boat. | 21) It was a fat fish. |
| 3) The boat drifted. | 22) It was blue. |
| 4) It did so lazily. | 23) It swung or flew through the air. |
| 5) He held a fishing-rod. | 24) There was some reeling round the boat. |
| 6) He waited for a bite. | 25) Both of them took part. |
| 7) He felt wistful as he waited. | 26) This happened quickly ("soon"), or without delay. |
| 8) The bite he was waiting for would be his first. | 27) They attempted to get hold of the fish. |
| 9) The girl he was with was his cousin. | 28) They struggled to do so. |
| 10) She was pretty. | 29) The fish was cold. |
| 11) She had fallen asleep, or was asleep. | 30) It was slippery. |
| 12) This had happened an hour before. | |
| 13) He wanted to stay alert. | |
| 14) He fought or struggled to do so. | |
| 15) He dozed off or fell asleep. | |
| 16) There were screams. | |
| 17) They resulted from delight. | |
| 18) They woke Robert. | |
| 19) His cousin uttered them. | |

SCORING MANUALSymbolic 4

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|---------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) The hero's name was Lawrence. | 20) The girl gazed. |
| 2) He was oblivious (to something). | 21) She did so intently. |
| 3) What he was oblivious to was the other children. | 22) As she did so the grain emerged or she watched it emerge. |
| 4) The other children and/or Lawrence were in the playground. | 23) The wood looked hard. |
| 5) He stripped (something) off the piece of wood. | 24) It looked soft. |
| 6) What he stripped off was the bark. | 25) It looked both at the same time. |
| 7) He did so gently. | 26) Lawrence did not know (something). |
| 8) He shaped the piece of wood (or it). | 27) The thing he did not know was what he was making. |
| 9) He smoothed it. | 28) He wanted to let it come out or take shape. |
| 10) He did so with a knife. | 29) He thought it would come out the way it had to, if he let it. |
| 11) The knife was pointed. | 30) That was all he wanted ("just"). |
| 12) He made it (the piece of wood), long. | |
| 13) He made it rounded. | |
| 14) The girl was freckle-faced. | |
| 15) She stopped. | |
| 16) She did so in order to look (at Lawrence or what he was doing). | |
| 17) Lawrence remained unchanged or did not react. | |
| 18) He continued to be absorbed. | |
| 19) He was absorbed in his work. | |

SCORING MANUALSexual 4

- 1) The hero's name was Philip.
- 2) The girl he was with was his girl-friend.
- 3) They left their friends.
- 4) They did so quietly.
- 5) Their friends remained on the beach.
- 6) The couple ran.
- 7) Their destination was the woods.
- 8) He was in high spirits.
- 9) He undid her bikini-top.
- 10) He pinched her nipples.
- 11) They laughed.
- 12) They did so together.
- 13) He pulled down his trunks.
- 14) He had difficulty in doing so.
- 15) That was what made them laugh.
- 16) He had to pull his trunks over his penis.
- 17) His penis was swollen.
- 18) He turned.
- 19) He did so suddenly.
- 20) What he responded to was the sound of voices.
- 21) They were calling his name.
- 22) The cries grew fainter.
- 23) He turned back.
- 24) She was lying down or he found her so.
- 25) She was naked.
- 26) She was on the grass.
- 27) The grass was long.
- 28) She was beckoning to him.
- 29) She was doing so with a wink or she winked at him.
- 30) Her wink was playful.