Effects of Experience and Meaningfulness on Learning and Memory in a Sensory Restricted Environment

by

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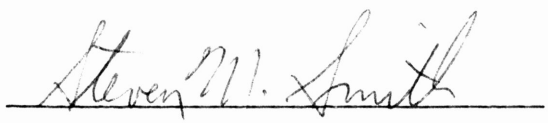

Dr. Steven M. Smith

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Abstract

This study examines two previously untested conditions in a sensory restricted environment: meaningfulness and experience. Meaningfulness was measured by employing three different levels of learning material. The learning material consisted of consonant trigrams, words, and paragraphs. Experience (or practice effect) was measured by having subjects perform the experiment on three different sessions with one day break between the sessions. Subjects in the restricted environment recalled significantly better on the most meaningful material--the paragraphs, while the control subjects recalled significantly better on the word list (less meaningful than the paragraphs, but more meaningful than the consonant trigrams). Therefore, the results obtained implicate that the sensory restricted environment used in this study can enhance the learning of higher cognitive tasks.

Acknowledgments

I would like to thank the people at the Texas A&M University Fellows Program for providing the opportunity to participate in this intellectually enriching program. This program gave me an immense appreciation and encouragement in experimental research. I also thank Kurt Hodges for helping to run the subjects. Further, I extend my gratitude to James Knetsch for helping in the conception of the project as well as helping to conduct the experiment.

I especially thank Dr. Steven Smith for teaching the basics of human experimental research. He was extremely patient and understanding with every phase of the project.

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Introduction

A sensory restricted environment, analogous to the term sensory deprivation among others in the literature (such as, perceptual deprivation, sensory alteration, homogeneous stimulation, invariant input, and "ganzefeld") (Brownfield, 1965), is defined in this study as an environment in which senses are not completely deprived but rather externally restricted. The sensory restricted environment will be discussed thoroughly in the materials and methods section. The diverse terminology related to sensory restriction has led to confusion in trying to synthesize information in this area and has slowed research in this field.

There have been several attempts at finding an effective sensory restricted environment. In 1954, a group of psychologists at McGill University published a series of reports on the effects of restricted environment (see figure 1 & 2) (Zubek, 1969). In this restricted environment, the most dramatic finding was that some subjects experienced hallucinations and were more prone to suggestion (Heron, 1953). As a result of this study, interest in brainwashing increased (Scheim, 1961). As a result, interest in the effects of space travel on humans came into focus because

*Fisher, R. P. and P. I. M. Craik. Interaction between encoding and retrieval operations in cued recall. Journal of Experimental Psychology: Human Learning and Memory, 1977, 3, 701-711.

people started asking, "Would humans start hallucinating and experiencing the same things that people experienced in this restricted environment?" (Haythorn and Altman, 1966). Since a unique environment was created in this study, people started thinking about creating a "model-psychoses" for its therapeutic value.

Lilly and Shurley, in the mid 50's, studied the reactions of subjects to immersion in water at body temperature (figure 3) (Shurley, 1963). For the first time total darkness and silence were obtained in a restricted environment. Another important condition obtained in their experiment was compensation for gravity.

There are a few cognitive effects attributed to sensory restriction (Reed, 1979). First, attention span is reduced. Subjects find themselves unable to concentrate on a given topic. Concentration is lost rapidly when the subjects try to work problems. Second, deterioration in logical or analytical thinking takes place. Subjects report the emergence of a free floating fantasy and diffused daydreaming which replaced logical coherence. Third, there is a heightened awareness of imagery. Finally, there is evidence of temporal disorientation. A majority of the studies indicate that most subjects underestimate time. All of these cognitive effects were reported in studies which required their subjects to stay in the restricted environment between several hours to several days.

In a recent study by Smith (1983), several cognitive effects of immersion in a restricted environment were examined. His primary purpose was to study the restricted environment's effect on context-dependent, or state dependent, memory. Context dependent memory operates when a familiar environment acts as a marker in memory enhancing recall and recognition. In another recent study by Smith (1978), subjects recalled better if their learning and recall environments were the same rather than different. For example, a student who attends a lecture in room A and takes the exam in room A will perform better than a student who learns in room A and is tested in room B. Smith's study operated on the hypothesis that the restricted environment provided both an unique environment and an unusual inner state which could lead to context-dependent memory effects. In 1979, Reed hypothesized that activities involving sequential processing (or analytical thought), such as attention, logic, and time perception, would suffer in a sensory restricted environment due to a shift in the mode of information processing. On the other hand, Reed hypothesized that a sensory restricted environment would enhance simultaneous or parallel processes such as imagery and holistic thinking. Smith examined sequential processes such as short term memory, time perception, analytic/ dimensional perception, learning and memory. Based on Reed's hypothesis these processes were predicted to suffer.

Smith's study, however, did not support Reed's hypothesis that the restricted environment would interfere with the cognitive skills examined (Table 1). The results showed that the subjects who were presented stimuli in the tank and tested in the tank recalled significantly better than in any of the other conditions. In previous studies, stimulus was not presented to the subject while they were inside the restricted environment, and as stated earlier, the subjects' stay inside the restricted environment was much longer than in the studies to be considered here.

The present study examines two things: (1) how experience in a restricted environment affects recall; and (2) how meaningfulness of learning material affects recall. The hypotheses under which this experiment was conducted are as follows. First, since the restricted environment offers less distraction, it should ehance learning and memory. Also, since the restricted environment may induce some receptive state (which is not well defined) in the subjects, recall should be enhanced. Finally, more meaningful material is expected to be relatively more enhanced by the restricted environment.

Materials and Methods

For a restricted environment, flotation tanks at Float to Relax were used (figure 4). These tanks are the same as those used in Smith's (1983) study. The water in the tanks contained epsom salt and iodine. The temperature was

maintained at 93°F to ensure comfort for the subjects. The density of the water due to the salt was such that one half of the body was in water and one half of the body was out of the water. Speakers were built into the walls of the tank. A microphone was placed at the "head" end of the flotation tank to monitor subject responses.

Inside the flotation tank, senses are not completely inoperative. Subjects can hear the sound of their heart beat, swallowing, water sloshing and the stimulus from the experiment. The subjects can not see anything except hallucinations which were reported by a few subjects (but with much longer exposure to the restricted environment than this experiment employed). Subjects can feel the water around them, and if necessary, they can feel their own body. Finally, the subjects can perceive an odor due probably to the tank's high salt content and chemicals. So, most sensory input is maintained; however, an unique restricted environment is created.

To examine the effects of experience in the floatation tank, the subjects were asked to participate in the experiment on three different days with one day break between each session. To examine the effects of meaningful material, three different levels of materials were presented during each session. The material consisted of consonant trigrams (figure 5), unrelated words (figure 6), and paragraphs (figure 7). The consonant trigrams were the

least meaningful of the materials while the paragraphs were the most meaningful. There were three randomly assigned lists of each material containing 20 items on each list. The paragraphs had 20 concepts each. The concepts were assigned to capture the essential meaning of the paragraph and are underlined in figure 7. The design of the experiment was sensitive to the variability within the different lists of materials (figure 8). The design also counter-balanced the easier and harder materials and detected any practice effects. A control group was run in the language lab (with study carrels) to depict a "normal" study environment (figure 9). All stimuli were presented on tape except the instructions given by the experimenter for getting into the flotation tank for final recall. Finally, the 37 subjects (20 control and 17 tank) used in this study were student volunteers from the introductory psychology classes at Texas A&M University.

Procedure

Subjects were allowed to float freely for ten minutes. This gave the subjects enough time to acquaint themselves with the tank. Then the subjects heard a stimulus set after which they were asked to verbally recall before being presented the next stimulus. During each session, the subjects were presented three stimulus sets and were asked to verbally recall all three sets while in the tank. After the subjects got out of the tank, they were given a final

recall test over all three stimulus sets.

The procedure for the control subjects was similar but not exactly the same. For the period in which the experimental subjects were preparing to enter the flotation tank, the control subjects were doing nothing. Control subjects were run in groups whereas the tank subjects were run individually. However, the density of control subjects was equivalent in all three conditions. For the controls, this could have created social facilitation (Lefrancois, 1980). Social facilitation is when people try harder performing a task in the presence of an audience. This will be considered further in the discussion section. Control subjects were given the final recall test in the same place as their initial recall test whereas the tank subjects were given theirs in a different environment (figure 10).

Results

An analysis of variance (ANOVAs) was computed both for initial recall scores and for final recall scores. Initial recall was taken as a measure of learning. Final recall was used as a measure of memory or retention. Separate analyses were computed for each stimulus type (consonant trigrams, words, and paragraphs) for each session (first, second, and third), comparing tank and control subjects.

Initial Recall. Overall, control subjects had higher initial recall scores than the tank subjects (see Table 2). In the initial recall of the consonant trigrams, the control

subjects had a higher mean recall over all three sessions (3.20 to 2.86) although the difference was not significant [$F(1,35) = 0.5$, $p > 0.05$]. The effect of sessions was significant [$F(2,70) = 10.03$, $p < 0.001$]. This indicates that there was a practice effect. To detect where the practice effects occurred in the consonant trigrams, the Newman-Keuls test was employed with r = 3 (sessions 1, 2, and 3), and critical values of 1.29 and 1.40 for the control and tank subjects, respectively, were obtained. The control subjects did significantly better on the second (observed mean difference = 0.91) and third (observed mean difference = 0.11) sessions than the first; however, there was no significant difference between the second and third sessions of the control subjects. The tank subjects exhibited the same trend, but the effects failed to reach significance.

With regard to the initial recall of the words, there was a significant difference between the tank and control subjects. The control subjects overall did significantly better than the tank subjects [$F(1,35) = 12.12$, $p < 0.001$], but this significance was primarily due to the first session. This was determined by using the Newman-Keuls test with r = 2 (control and tank subjects). This test yielded critical values of 2.64 and 2.86 for control and tank subjects, respectively, giving an observed mean difference of 1.44 between the control and tank subjects in the first session. Significance was not observed in the other

sessions between control and tank subjects. Upon examination of the effect of sessions, significance was also observed [$F(2,70) = 4.12$, $p < 0.02$]. To see exactly where the practice effect was occurring, the Newman-Keuls test was administered again with r = 3. Critical values of 2.19 and 2.38 were obtained for the control and tank subjects, respectively. This analysis showed that the only practice effect occurred in the tank subjects, in which the subjects performed significantly better on the third session than on the first session (observed mean difference = 0.27).

When examining the initial recall of the paragraphs, there was no significant difference between the control and tank subjects [$F(1,35) = 1.64$, $p > 0.05$]. Also, there was no significant practice effect in either case [$F(2,70) = 1.60$, $p > 0.05$].

Final Recall. Again, the control subjects overall did better than the tank subjects (see Table 3). With respect to the final recall of the consonant trigrams, there was no significant difference between the control and tank subject$(1,35) = 3.21$, $p > 0.05$]; however, the effect of sessions was significant [$F(2,70) = 6.14$, $p < 0.003$]. Using the Newman-Keuls test with r = 3, critical values of 1.01 and 1.19 were obtained for control and tank subjects, respectively. With this analysis, significant practice effect was seen only in control subjects who did better on the second session than the first (observed mean difference

= 0.05).

When examining the final recall of the words, significant difference was observed between the control and tank subjects. [$F(1,35) = 11.55$, $p < 0.002$]. The control subjects overall did significantly better than the tank subjects [$F(1,35) = 11.55$, $p < 0.002$], but this significance was primarily due to the first session. This was again determined by the Newman-Keuls test with r = 2. Critical values of 3.05 and 3.31 were obtained for control and tank subjects, respectively. This gave observed mean value of 1.40 between the control and tank subjects during the first session. Significance was not reached in the other two sessions. Upon examination of the effect of sessions, significance was not observed [$F(2,70) = 2.13$, $p > 0.05$].

The analysis of the final recall of the paragraphs yielded no significant difference between the control and tank subjects [$F(1,35) = 1.28$, $p > 0.05$]. When examining the effect of sessions, a significant practice effect was observed for the tank subjects between the first and second sessions [$F(2,35) = 5.08$, $p < 0.01$]. This was again accomplished by utilizing the Newman-Keuls test (r = 3) which yielded critical value of 2.11 for the tank subjects with observed mean difference of 0.71. Tank subjects did better on the second session than on the first.

The final mean recall was also adjusted by using the initial mean recall as a covariate (figure 11-13). This

adjustment had no effect upon the overall pattern of results, with one exception. The exception being that using adjusted final recall scores indicated a significant improvement of tank subjects over controls for the second session of the paragraph (see Table 4 and figure 13). This same effect did not quite reach significance when unadjusted scores were used. The final mean recall score adjusted by initial recall scores was also used to see if there was any difference between the stimuli (consonant trigrams, words, and paragraphs) used in this study. As predicted, there was a significant difference between the stimuli, (see figure 14) with subjects performing the best on the paragraphs and worst on the consonant trigrams. Finally, there was no significant difference between the tank and control subjects with regard to SAT scores and GPA.

Summary and Discussion

Significant enhancement of learning and memory did take place with regard to practice effects; however, there was differential amount of enhancement within the subjects as well as the different materials. With regards to the consonant trigrams, there was no enhancement of either learning or memory. With regards to the words, the control subjects did significantly better than the tank subjects in both cases (learning and memory). The tank subjects did better than the control subjects with the most meaningful material, the paragraphs. With regard to experience, the

tank subjects showed practice effects with the more meaningful material (words and paragraphs) while the control subjects showed practice effects only with the consonant trigrams. This showed that less meaningful material was adversely affected by the tank. Also, there was a differential amount of enhancement for the different materials for all the subjects. The subjects did best on the paragraphs and worst on the consontant trigrams. When the results are examined without considering significance, then an upwards trend is seen for all the stimuli between the first and second sessions. However, for every stimulus, recall decreased during the third session.

The practice effects observed in this study can be explained by several factors. The novelty of the tank environment during the first session in the tank could have caused increased apprehension on the part of the tank subjects. So, during the second session, the subjects were more at ease with the environment and therefore had higher recall. One reason that final recall could have decreased during the third session is the boredom of having to go through the same procedure for the third time. Also, the third session was on either a Thursday or Friday. These days are anxious days of the week for students. Hence, anticipation of the weekend could also explain the decline in free recall scores during the third session.

Several variations in the procedures of the control and

tank subjects could have accounted for higher overall learning (initial recall) occurring in the control subjects. The sound inside the tank is not as clear as the sound the control subjects heard through their headphones. Several tank subjects said that they had difficulty hearing the stimuli. In this study, tank subjects showed state dependent effects in that they were tested for their final recall in a different environment than where the stimulus was presented. As stated earlier, recall is higher when learning and recall environments are the same. The control subjects' learning and recall environment were the same. This is another reason why the control subjects had higher overall initial recall than the tank subjects. The reason the control subjects were asked for their final recall in the same environment was because of the time constraints involved. The subjects had only one hour time period in which to complete a session. Moving a group of control subjects to another room would have infringed on this one hour time period. The reason the final recall of the tank subjects took place in a different environment was because retention of the learning material can be pragmatically utilizied best outside the tank. In other words, the educational relevance of the tank was being scrutinized.

Also, since control subjects were run in groups, social facilitation may have taken place. This may be another reason the control subjects' initial recall was higher than

the tank subjects'. Furthermore, the control part of the experiment was conducted at a later part in the semester. In the psychology course that all the subjects were taking, the concepts in learning and memory (such as imagery, focus of loci and mnemonics) were covered just prior to the control part of our experiment being conducted. This gave the control subjects much more of an advantage over the tank subjects, since imagery and mnemonics can greatly enhance recall (Reed, 1982). Another variation in the procedure was that control subjects didn't have to disrobe and shower before and after their initial recall. This probably increased the chances of rehearsal taking place in the control subjects. Also, control subjects didn't have a comparable task of showering and putting their clothes back on as did the tank subjects prior to final recall. This further prevented the tank subjects from rehearsing. Finally, tank subjects had to encounter the distractions of the ongoing business at Float to Relax during their final recall. This may have distracted their attention enough to account for the decline in their final recall scores.

With the limitations of this study forementioned, the tank subjects still did better than the control subjects with the most meaningful material, the paragraphs. So, the main hypothesis of this study was verified. The procedures need to controlled more strictly for further validation of the hypothesis. This study showed the potential use of the

tank as an educational tool.

Suggestions for Future Research

Stricter procedures need to be administered for the control and tank subjects. The tank subjects ideally need to be run in a laboratory rather than a business environment. This can facilitate better control of the tank subjects with respect to the control subjects. A controlled disruption similar to showering and dressing (as for the tank subjects) needs to be performed with the control subjects to maintain a constant rehearsal for the two conditions. Also, tank and control subjects should be run simultaneously during the semester to reduce differential amount of learning in topics of learning and memory which enhance recall. Rather than running the control subjects in groups, they should be run individually. This would prevent any social facilitation in control subjects. The paragraphs need to be more standardized as well as being more complex and longer. Some subjects were scoring extremely high. This would be done to avoid possible ceiling effects. Also, with the paragraphs used in this study, optimum level of enhancement by the tank may not have been reached. Since the subjects' final session was on either Friday or Thursday, the subjects could have been bored, apathetic and/or anticipating the desired weekend. This factor may have hindered their improvement during the third session. To circumvent this problem, subjects should be run once a

week (preferably on a Monday or Tuesday).

In conclusion, the nature of this study was such that some of the problems encountered were unavoidable. However, the study proposed based upon the problems of this study can answer some very important educationally relevant questions. Although this study does not conclusively support the hypothesis, it does provide enough evidence to warrant further research.

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Figure Legends

Fig. 1: This condition was employed in the original McGill University studies, and it served as a prototype for subsequent sensory restricted research. Shown in this cut-away diagram are an air-conditioner, exhaust fan, microphone above the subject, EEG leads attached to the subject's head, translucent eye covering, and cardboard cylinders enclosing the lower portions of the arms. The eye covering prevented pattern vision and the room was dimly lighted. In this condition, the subjects were scheduled for 2 to 3 day sessions (Solomon, 1961).

Fig. 2: This condition is a variation of the one employed in the original McGill University studies. In this condition, the subjects were scheduled for 8-hour sessions (Goldberger and Holt, 1958).

Fig. 3: This is a vertical water condition and is considered to be the severest of all laboratory-created sensory restricted environment. The subject only wears a head mask and he is instructed to inhibit all movements. The temperature of the water is maintained at 93.5 degrees Fahrenheit. Because of the severity of this condition, subjects could be only used for short-term experiments. For the first time, this condition compensated for gravity. Also, light and sound are greatly reduced (Shurley, 1963).

Fig. 4: These are the flotation tanks which are used in this study as a sensory restricted environment. (a) shows the inside of the tank. The water is 12 to 14 inches deep. After the subject gets into the tank, he manually closes the sliding door of the tank to ensure complete darkness. The microphone is to the left (head) side of the tank. (b) shows the placement of the shower next to the tank. (c) and (d) show subjects getting in and out of the tank, although they are nude when they get in and the light is turned down.

Fig. 5: This is one of the list of the consonant trigrams that was used. There were three different lists in all.

Fig. 6: This is one of the word list that was used. There three different lists in all.

Fig. 7: This is one of the paragraphs that was used. The underline phrased represent the concepts that were used as correct responses. Again, there were three paragraphs that were used.

Fig. 8: This is the design of the experiment. Each of the three conditions represents the sequence of the lists of material the subjects recieved. For example, a subject in Condition I was presented consonant trigram (list a), then word (list b), and paragraph (list c) during the first session. During the second session, the same subject was presented the stimuli in the following order: Word (list c), paragraph (list a), and consonant trigram (list b). On the third session, the same subject was presented the paragraph (list b), then word (list a), and consonant trigrams (list c). The consonant trigrams are represnted by CCC.

Fig. 9: This is the room in the Modern Language Lab where the control part of the experiment was conducted (a). The individual subject was sitting in a modified study carrel as seen in (b).

Fig. 10: This is the reception area of Float to Relax, where tank subjects' final recall was administered.

Fig. 11: This is the adjusted mean final recall using the initial recall as a covariate. NCORECT--number correct out of possible 20; SESS--sessions (first, second, or third); CCC--consonant trigram.

Fig. 12: This is the adjusted mean final recall of the words. Again, the initial recall was used as a covariate. NCORECT--number correct; SESS--sessions.

Fig. 13: This is the adjusted mean final recall of the paragraphs using the initial recall as the covariate. NCORECT--number correct; SESS--sessions.

Fig. 14: This graph shows all three adjusted mean final recall relative to one another.

Fig. 1

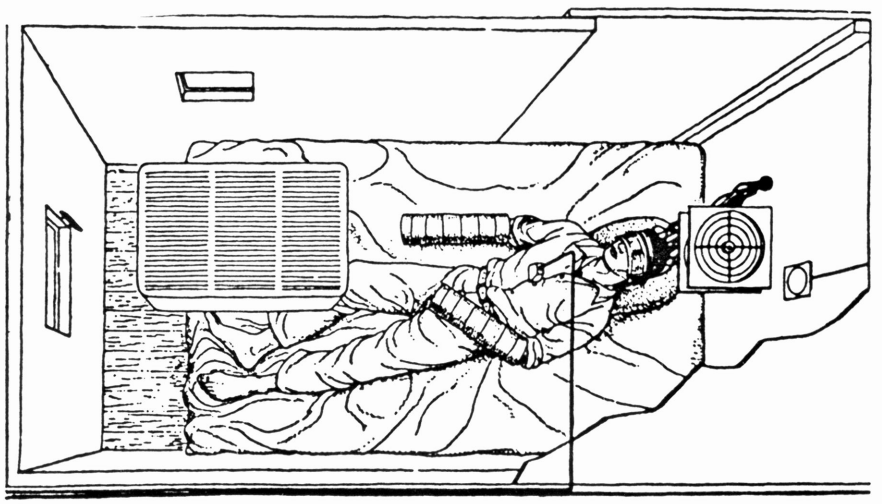
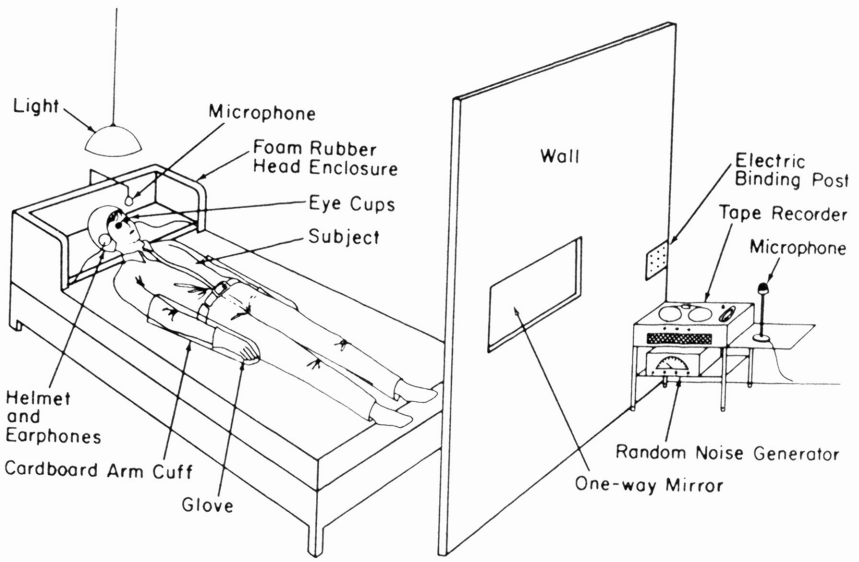


Fig. 2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Eye Cups
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Random Noise Generator
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Fig. 3

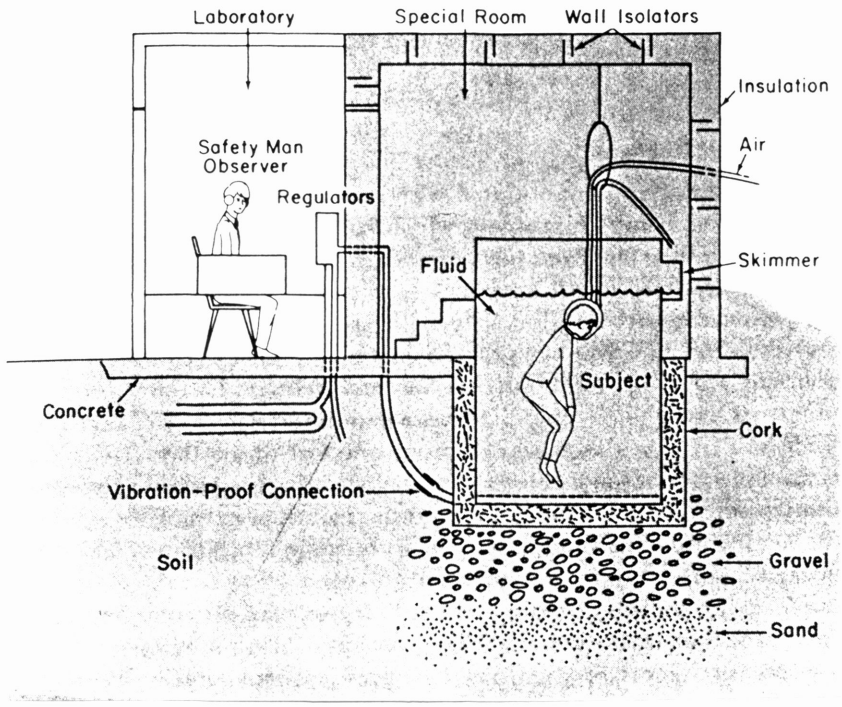
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Fig. 4(a)

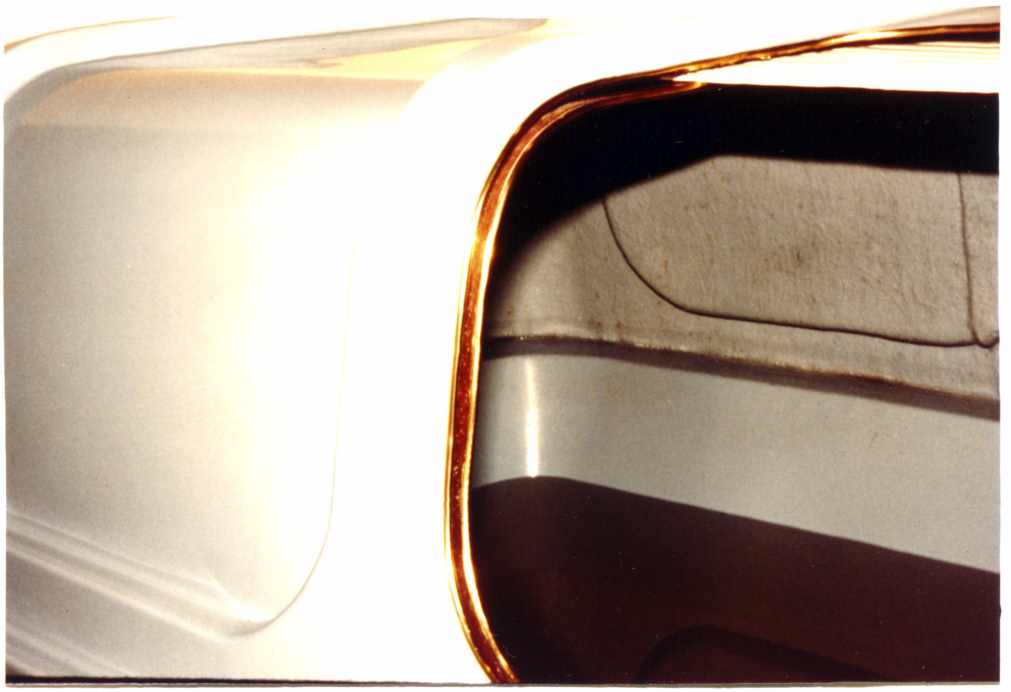

Fig. 4(b)

Fig. 4(c)

Fig. 4(d)

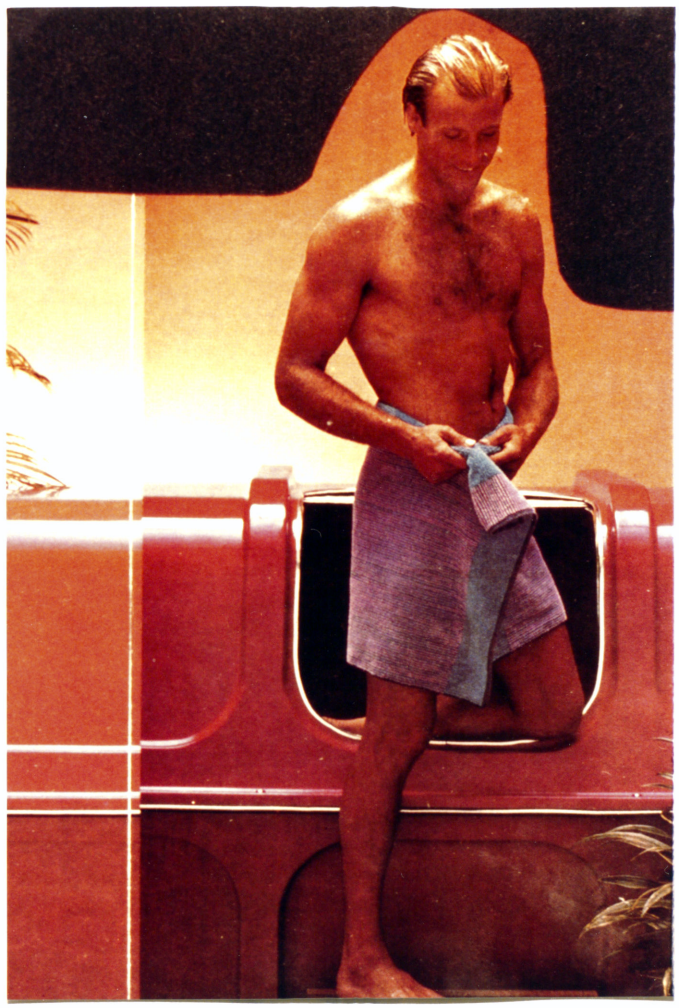

Fig. 5

LIST A. CONSONANT TRIGRAMS

1. NTC
2. JNV
3. BWR
4. HCV
5. JCG
6. XGF
7. KRX
8. LNH
9. SRB
10. GHD
11. CWT
12. SVZ
13. LJQ
14. LMT
15. BGS
16. FBN
17. SPT
18. YHC
19. CDH
20. TFB

Fig. 6

LIST B. WORDS

1. BACK
2. MATE
3. DRESS
4. BELT
5. BLOCK
6. SNOW
7. DREAM
8. HORN
9. SMILE
10. GOLD
11. RAIN
12. CLOCK
13. YARN
14. TREE
15. BOAT
16. SHOE
17. GIFT
18. SKIN
19. VOICE
20. KNIFE

Fig. 7

PARAGRAPH C

Jack calls his pet Dusty and keeps it in a cage. He feeds it seeds and lettuce. Some days Dusty plays outside his cage. Instead of flying he plays on a wheel that goes round and round. Dusty does not sing or even whistle. He has soft brown fur and tiny paws. Jack's pet is a hamster.

Fig. 8

	SESSION		
	1	2	3
CONDITION I	CCC(a) Word(b) Paragraph(c)	Word(c) Paragraph(a) CCC(b)	Paragraph(b) CCC(c) Word(a)
CONDITION II	Word(c) Paragraph(a) CCC(b)	Paragraph(b) CCC(c) Word(a)	CCC(a) Word(b) Paragraph(c)
CONDITION III	Paragraph(b) CCC(c) Word(a)	CCC(a) Word(b) Paragraph(c)	Word(c) Paragraph(a) CCC(b)

Fig. 9(a)

Fig. 9(b)

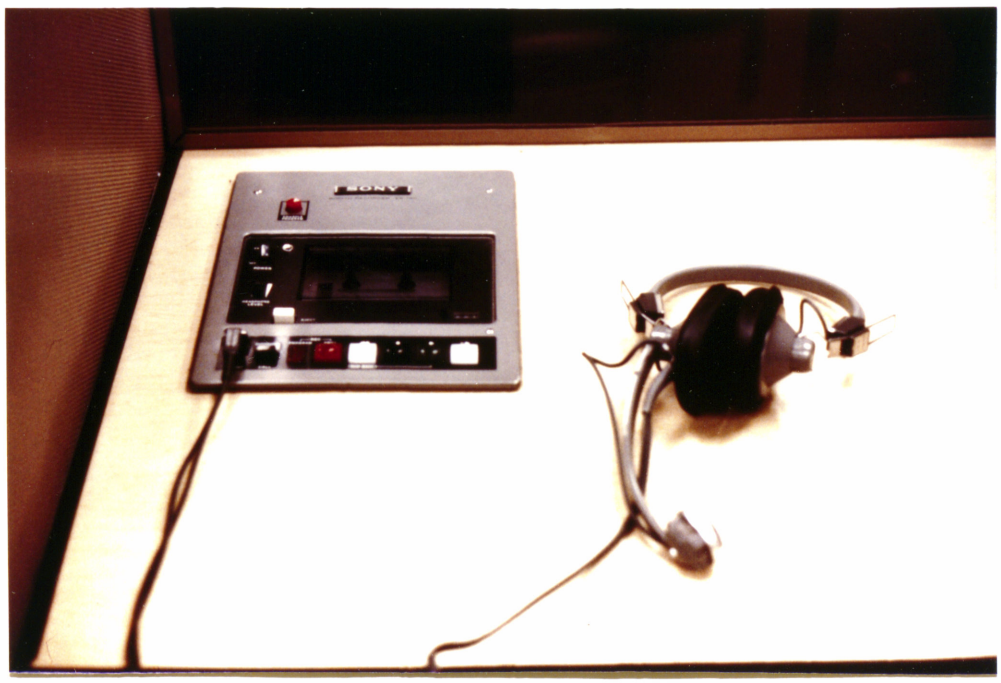

Fig. 10

Fig. 11

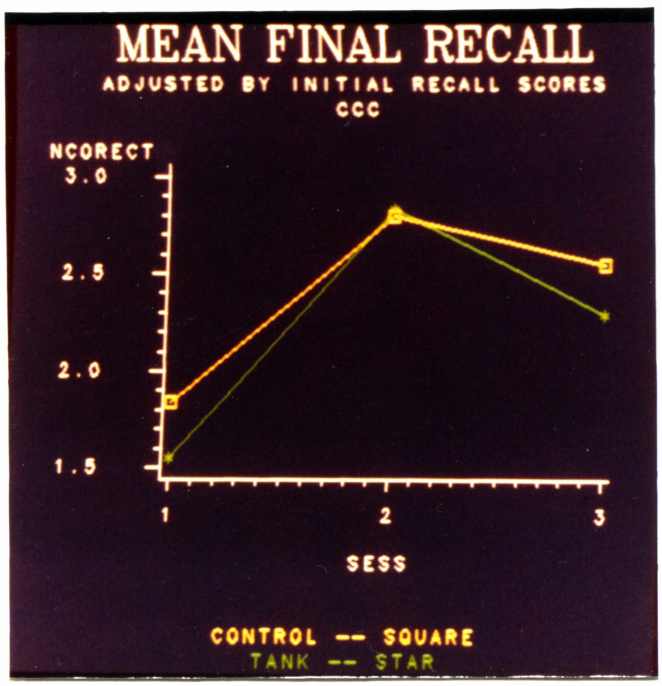
MEAN FINAL RECALL
ADJUSTED BY INITIAL RECALL SCORES
CCC
NCORECT
3.0
2.5
2.0
1.5
1
2
3
SESS
CONTROL -- SQUARE
TANK -- STAR

Fig. 12

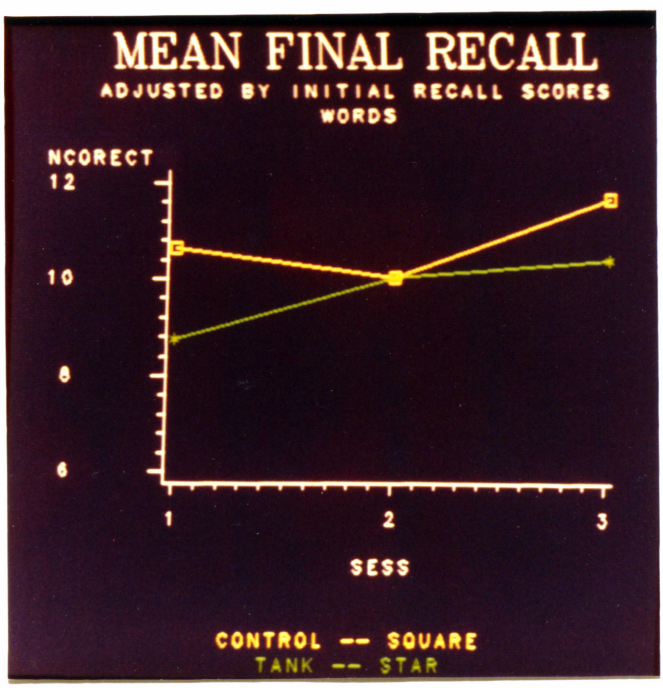
MEAN FINAL RECALL
ADJUSTED BY INITIAL RECALL SCORES
WORDS
NCORECT
12
10
8
6
1
2
3
SESS
CONTROL -- SQUARE
TANK -- STAR

Fig. 13

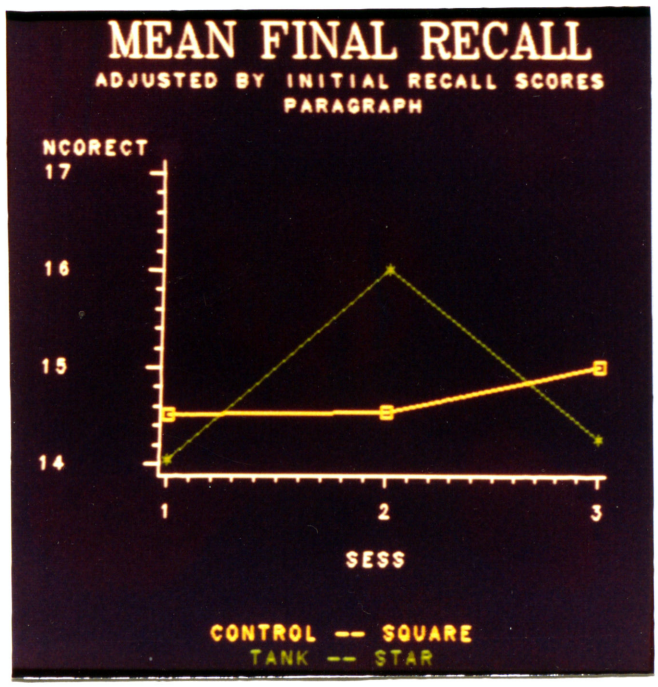
MEAN FINAL RECALL
ADJUSTED BY INITIAL RECALL SCORES
PARAGRAPH
NCORECT
17
16
15
14
1
2
3
SESS
CONTROL -- SQUARE
TANK -- STAR

Fig. 14

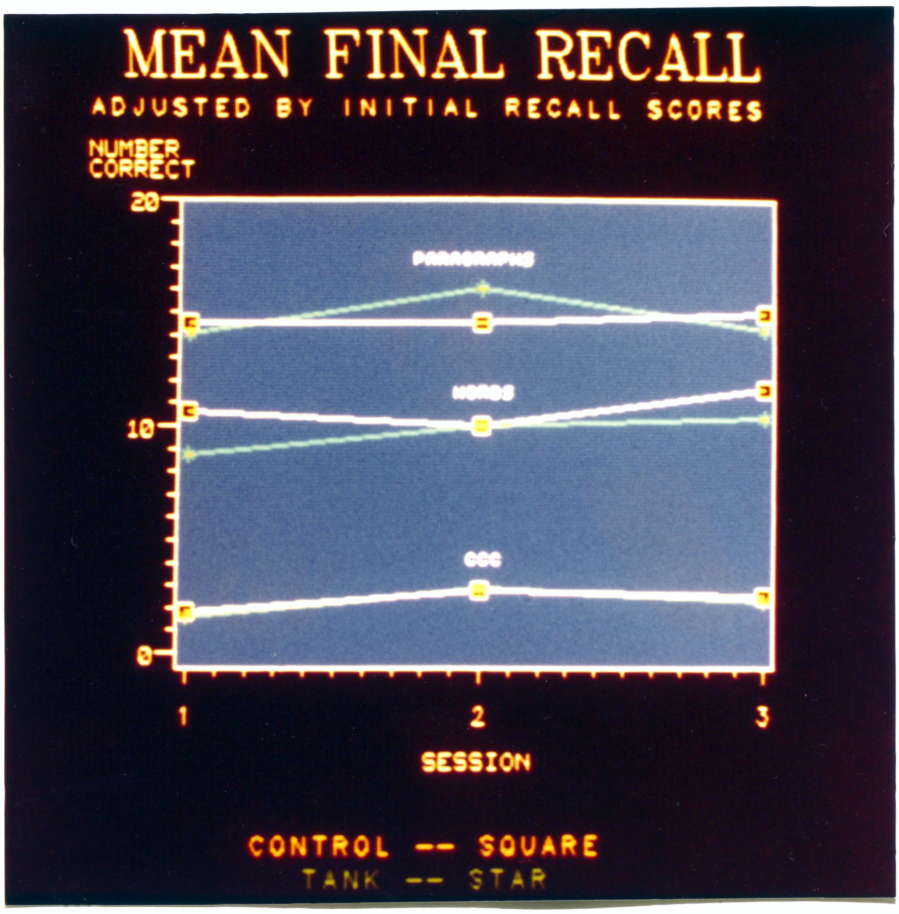
MEAN FINAL RECALL
ADJUSTED BY INITIAL RECALL SCORES
NUMBER CORRECT
20
10
0
PARAGRAPHS
WORDS
CCC
1
2
3
SESSION
CONTROL -- SQUARE
TANK -- STAR

Table 1

Group	Free Recall
Tank-Tank	13.00
Dry-Dry	8.00
Dry-Tank	8.00
Tank-Dry	8.63
F	4.66
p	0.01

*Smith (1983).

TABLE 2

Initial Recall

	Control	Tank
CCC1	2.00	2.18
CCC2	4.20	3.24
CCC3	3.40	3.18
Word1	12.95	8.65
Word2	11.85	10.53
Word3	13.80	11.29
Paragraph1	15.10	13.47
Paragraph2	15.40	15.24
Paragraph3	15.35	14.71

Table 3

Final Recall

	Control	Tank
CCC1	1.90	1.47
CCC2	3.05	2.53
CCC3	2.85	1.94
Word1	11.95	7.24
Word2	10.75	9.18
Word3	12.40	9.53
Paragraph1	15.35	13.06
Paragraph2	14.65	15.88
Paragraph3	15.25	14.00

*In both tables, CCC stands for Consonant Trigrams. 1, 2, and 3 refer to the first, second, and third sessions.

Table 4

Adjusted Mean Final Recall

	Control		Tank
CCC1	1.83		1.55
CCC2	2.79		2.83
CCC3	2.55		2.29
Word1	10.65	*	8.76
Word2	10.02		10.03
Word3	11.67		10.39
Paragraph1	14.52		14.04
Paragraph2	14.54	*	16.01
Paragraph3	15.02		14.27

*Indicates Significance.

CCC refers to consonant trigrams. 1, 2, and 3 stand for first, second, or third session.