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An experiment to test the hypothesis:  
"the medium by which information is  
presented to a subject has a direct  
effect on the number of ideas verbalized  
by the subject and the way the ideas are verbalized"

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BOSTON UNIVERSITY

School of Public Relations and Communications,

Thesis

AN EXPERIMENT TO TEST THE HYPOTHESIS:

"THE MEDIUM BY WHICH INFORMATION IS PRESENTED  
TO A SUBJECT HAS A DIRECT EFFECT ON THE NUMBER  
OF IDEAS VERBALIZED BY THE SUBJECT AND THE WAY THE  
IDEAS ARE VERBALIZED

by

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TOPICAL OUTLINE

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## I. INTRODUCTION AND DISCUSSION

Words, whether spoken or written, have been considered man's best means of communication. The ritual dances and guttural intonations of our ancestors have evolved into language to fulfill an increasing need for better and more efficient means of communication (3)

Through linguistic communication man has been better able to build groups into cities, cities into nations, and nations into empires (2). Through the means of language, commerce was conducted over the face of the earth, and great religions were spread throughout the world.

The apex of the spread of language in the communication of concepts was probably in the nineteenth century. During this time the enormous changes of Western ideas on science and society were put into volumes of words and spewed at an accelerating rate from the printing presses of Europe and America. Also, within the same hundred years photography began to introduce itself into the volumes of printed words.

Previously, the art of painting was used to record. In this way it was probably recognized as communication. However, as the visual media began to be as widely circulated

as words were from the Gutenberg press, the horizon of the communicative possibilities of pictures was greatly expanded.

Today, especially in the field of science, the heavy strain upon words to express certain concepts has caused us to depend more and more on the use of charts, diagrams and pictures. We can only surmise what our civilization would be like if, instead of words on which to base our concepts, our communicative processes started and continued to develop with pictures, charts, and diagrams.

There are many theories on the origin of language. If we take one of them (ritual) and follow its account of the development of the instinctive dance, to the emphasizing of certain movements and sounds, to the separation of verbal words and the formation of elaborate concepts based on these words, to the formation of new words to express these concepts, we can see that up to now the visual media would have found it difficult to supplant the verbal media as a means of expressing increasingly complex ideas. Our new concepts are based on what has gone before; so the long term development of our language is bound by strong links to the primitive rituals of our ancestors.

In written language, there is more than just theory to support our knowledge of its history from pictorial presentation to the written symbol we know today (6). In a limited sense we can say the written word is a visual media of

communication, because we use our eyes to receive what it communicates. But, in actuality, the written word is a symbolic form of language quite removed physically from its referent. In most Western societies the alphabetical letter no longer represents, for example; a man walking, a soldier fighting, a woman weeping.

Not only does language "freeze" our ideas about reality (8) but it continues to change as the need for better means of communication grows. Our changing concepts of the universe about us make us continually search for more adequate means of expression. This, in the opinion of the writer, is apparently leading us in the direction of visual communication. Perhaps communication is engaged in another such change as that which occurred after the so-called ritual dance. Perhaps as the grunts of our ancestors gave way to words, the words that we utter more and more will be replaced by things that we see.

A few thousand years advancement of knowledge and changing concepts could play havoc with language as we know it.

However, an analysis of the functions of words in thinking, in concept formation, in the maintenance and movement of society, makes it more logical to say that words could not be abandoned, but that each medium would be assigned more specialized functions with the communication spectrum.

It is the specialized functions of media with which this present thesis deals. What interests us is not only what information can be communicated best by various media, but what is the effect on the subject by similar information given via different media.

For example, it is possible for a communicator to convey the idea of displeasure by grunts, gestures, or words, but it is the point of this thesis that while the communicatee perceives displeasure in all three cases, each expression of displeasure is perceived differently by the communicatee and in somewhat of a different psychological setting. Realizing this it is the communicator's responsibility to ascertain the nature of the displeasure he wants to convey and choose his medium accordingly.

Today, in addition to person-to-person communication, we have the so-called "mass" media of the printed word, radio, television and motion pictures. The problem of the proper use of media in the communication of ideas is naturally of great concern because of the large number of people exposed to one message.

It is not necessary to go into a long discussion on the difficulties of finding panaceatic formulae for communicating to large numbers of people. It is enough to say that the "mass" has little of the homogeneity the word seems to infer. We can only search for as many common denominators as we can

find and then build our communication on the knowledge, intelligence, and judgment of the communicator. Two such common denominators are the visual and aural senses -- almost all of us can see and hear . . . .

## II. PROBLEM

The present experiment presented "equated" visual (pictorial representations) and aural material to randomized groups of subjects in an effort to test the following hypothesis:

THE MEDIUM BY WHICH INFORMATION IS PRESENTED TO A SUBJECT HAS A DIRECT EFFECT ON THE NUMBER OF IDEAS VERBALIZED BY THE SUBJECT, THE NATURE OF THE IDEAS, AND THE WAY THE IDEAS ARE VERBALIZED.

The following are the writer's thoughts on the effects of the visual and aural media ... prior to the experiment testing the above hypothesis.

If three subjects are presented the same information, but for one this information is conveyed aurally, the second visually, and the third through use of both the aural and visual simultaneously, the information extracted, the ideas about this information, and the verbalization of these ideas should emerge in a pattern that is dependent on and different for each medium.

Visuals may result in immediate perception, while written or spoken words always result in delayed perception. For

example: "A sleeping black dog" awaits completion of a full phrase before one is aware of the information but the picture of a sleeping black dog is immediately perceived. So aural presentation should result in an immediate stimulation of the thought processes. The subject begins to think about the separate and joined words before the full idea is completely presented.

One of the manners in which the media differ is that visual stimuli may be perceived in a more passive mental state; the subject goes through less "mental gymnastics" than is required of subjects exposed to word stimuli.

Motion pictures may have to wait for the completion of an action before an idea or bit of information is complete.

Example: "A man walks to a door." Here the factor of time-lapse between stimuli and cognition of stimuli operates for both words and pictures. However, subjects viewing the film will see the same man and the same door. The subjects hearing the words alone had no such similarity of orientation. The man and door they perceive differ potentially in as many ways as there are different understandings of the words involved. Words are more individually determined and used abstractions of reality than visuals.

The perception of communicated and received ideas by a number of subjects is more uniform via visual stimuli than verbal stimuli. The perception of an input idea via aural

stimulus is much more diversified. The reasons for this are discussed in a more appropriate place.

The above describes the mental processes up to the point of perception of an idea. What happens when the subject is asked to verbalize about what he has perceived? As stated above, the aurally stimulated subjects have more diverse interpretations of what they have heard, although each may have heard the same words. The visually stimulated subjects, on the other hand, have similar perceptions, but the verbal expression of these perceptions is now more individualized, being more a function of these thought processes of each individual. With no stimulus words to orient the subject, his own verbal responses should be slower in coming. They will be the product of much more "thinking" and could therefore result in a greater variety of words, phrases and ideas about X.

### III. METHOD

The author was fully aware that Ss' written verbalization given immediately after their exposure to an idea is only one of many avenues of investigation. Whatever we hoped to obtain from the experiment we knew was only of value within the response medium.

#### Stimulus Materials

1) A one-minute motion picture sequence of a series of simple everyday events was made up. 2) These same events were expressed in words by the writer in as simple a manner as possible. The purpose was to equate, as much as possible, the visual with the word description. 3) Lastly, the word description was recorded on magnetic tape synchronous with the film. (See Appendix 1.)

The stimulus material was presented to three groups of female Ss who were freshmen and sophomores at the Mount Ida Junior College, Newton, Mass. Each group was randomly selected and exposed to only one of three media:

One group (n = 19) saw the film alone - to be referred to as input picture.

The second group (n = 18) heard the words only -- input sound.

The third group (n = 17) viewed the picture and heard the words synchronously -- input picture-sound.

### Procedure

Immediately after the stimulus material was presented to the subjects they were instructed to write down what they saw and/or heard depending on whatever the particular group they were assigned to. Ss were allowed five minutes for this. This is part 1.

Next the subjects were told to turn the page and try to write as much more information on what they saw and/or heard. They were allowed five minutes more. This was done to elicit as much information as possible within the ten minute period immediately following exposure to stimulus. This is part 1a.

After the above two sets of instruction the Ss were then instructed to write down their "thoughts about" the material presented; i.e., anything the material brought to mind such as images, recollections, philosophies, etc. This is referred to as part 2. They were given five minutes in order to complete this.

Lastly, the Ss were told to turn the page and try again as in part 2, being given five minutes to do this. This is referred to as part 2a.

Dependent Variables:

The following dependent variables were measured for each experimental group.

- 1) The number of words.
- 2) The average number of first person references.
- 3) The average number of input words repeated.
- 4) The average number of nouns.
- 5) The average number of adjectives.

IV. RESULTS

(Note: Part 1 - 1st 5 minutes after exposure subject was asked to write down what he could recall of input material.

Part 1a - 2nd 5 minutes, subject asked to recall as much more as he could.

Part 2 - 3rd 5 minutes. Subjects asked to write thoughts engendered by input material.

Part 2a - 4th 5 minutes. Subject asked to write more as in part 2.)

TABLE ITHE NUMBER OF WRITTEN WORDS

<u>Group</u>	<u>1</u>	<u>1a</u>	<u>2</u>	<u>2a</u>
Sound	79.50	76.66	62.83	53.27
Picture	77.68	56.21	61.68	32.68
Picture-Sound	101.58	63.11	90.41	31.05

TABLE IICOMPARISONS OF TWO GROUPS' MEAN NUMBER OF WRITTEN WORDS

<u>Groups being compared</u>	<u>Part</u>	<u>T value</u>	<u>df</u>	<u>P value</u>
Sound vs. picture	1	3.04	32	.01
	1a	12.6	32	.001
	2	2.62	32	.05
	2a	2.31	32	.05
Picture vs. picture-sound	1	2.94	32	.01
	1a	.945	32	.4
	2	2.83	32	.01
	2a	.315	32	.8
Sound vs. picture-sound	1	2.20	32	.05
	1a	1.575	32	.2
	2	2.73	32	.01
	2a	2.52	32	.05

The writer was aware of the impossibility in equating precisely all media. For example: the statement, "A bus pulls up and passengers alight," adequately describes a scene from the film. But those listening to the words, only, do not see the many details such as signs on the bus, the sex, wearing apparel, or number of passengers; they do not see the countless minor details from which those Ss exposed to the visuals can draw for their verbal responses.

In the light of this, one should predict a much greater number of words used in the responses of the subjects given visual stimulus than in the responses of subjects given aural stimulus. And, of course, the subjects receiving the visual and aural stimuli simultaneously should respond with the greatest number of words since they have both media and therefore greater information from which to draw for their information and responses.

A look at parts 1 and 2 in table I shows a consistently statistically significant smaller average number of words used in the responses of Ss exposed to the picture as compared to the average number of words in the responses of Ss exposed to sound and picture-sound. But we do find partial confirmation of our prediction: Ss exposed to picture and sound material use the most words.

In explaining these data we can reason that it is easier for the subject to merely repeat and write down in parrot-fashion those stimulus words that he heard. But in the process

of translating pictures to words there is a memory factor and an element of thought involved. This is borne out by the statistically significant sharp drop in parts 1a and 2a of the average number of words written by both the picture and picture-sound input subjects as opposed to the slight reduction in number of words written by the aurally exposed subjects.

This does not mean that the picture input Ss did not perceive more information, or that they might not have written much more than the sound input Ss if given more time to remember, and label the objects and occurrences recalled, but it does demonstrate that within the limits of our experiment (i.e., verbalization immediately after exposure) that the picture-exposed subjects were unable to translate a large portion of reality (as represented by the pictures) into written words.

As we pursue the results of our other analyses, we shall see that there is a more encompassing reason than those already stated for the limitation in verbalization of visual information.

As predicted, the Ss exposed to both visual and aural input produced the largest average number of words. However, one might suspect that they leaned more heavily on the aural than the visual stimuli for most of the material for their verbalizations. This statement finds strong support in our other analyses of their responses.

TABLE IIITHE NUMBER OF WORDS IDENTICAL WITH A WORD IN INPUT SOUND

Group	Part	<u>Average number of words repeated</u>			
		1	1a	2	2a
Sound		33.50	35.50	9.61	8.55
Picture		18.84	10.78	6.47	3.78
Picture-sound		33.58	16.11	9.17	3.05

TABLE IVCOMPARISON OF TWO GROUPS

Group	Part	T-Value	df	P-value
Sound vs. picture	1	3.67	32	.01
	1a	12.67	32	.001
	2	2.62	32	.05
	2a	2.31	32	.05
Picture vs. picture-sound	1	4.62	32	.01
	1a	2.83	32	.01
	2	1.57	32	.2
	2a	.735	32	.5
Sound vs. picture-sound	1	.010	32	.95
	1a	6.61	32	.001
	2	.21	32	.9
	2a	2.73	32	.01

A large number of words identical with those in input sound were found in the responses of the input visual subjects. While the greatest number of repetitions were produced by the groups of subjects exposed to the sound and picture-sound, the subjects exposed to the picture only, without even hearing the words, also produced over half as many words identical with sound input as those found in the responses of the sound and picture-sound subjects.

Additional evidence for this conventionality of labels is the fact that the words which received the greatest number of repetitions were the same for all three input media. (See Appendix 3.)

There seems to be little difference in the number of words repeated by input sound Ss as compared with the number of words repeated by input visual-sound subjects in part 1.

We also note that as time goes on, as represented by parts 1a, 2 and 2a, the numbers of repetitions by the sound and picture-sound Ss fall off sharply, although not at the same rate. This suggests that while the subjects depend on the media of sound for their choice of words immediately after exposure, as time passes, this dependence moves toward the visual. And if time does move the responses toward the visual, then it might follow (and this is outside the limits of this experiment) that the retention of information is much more lasting from visual stimulation than from aural stimulation.

On the basis of the above points we might reiterate a few remarks about words meaning different things to different people:

One could probably demonstrate, as pointed out earlier in this thesis, that when sound input subjects heard words like "people," "policeman," "parking," each individual, to some degree, had different mental images engendered by these words. But when the input visual subjects responded with these words, they all had very similar mental images.

This is nothing new, but what we wish to emphasize here is that the idea that words engender different images in each individual is only a one-way proposition. When words are used as a label for an object or experience to which everybody is exposed, then their images are similar and Ss' communication can be more uniform.

There is even more to this "one-way" proposition. The subjects exposed to words alone may attach an infinite number of differing meanings to a word; yet, the results of this experiment (see Index 3) and others strikingly show that each subject actually has stringent factors which place certain limitations on the number of words he can use for what he sees. LANGUAGE, EVEN WITH ITS NUMEROUS SIMILES AND DESCRIPTIVE TECHNIQUES, IMPOSES A POWERFUL RESTRICTION UPON OUR EXPRESSION OF WHAT WE SELECT FROM THE INFINITE REALITY ABOUT US. Presumably, this limitation would extend to those aspects of the thought processes in which language enters.

TABLE VTHE AVERAGE NUMBER OF NOUNS

	<u>Average No. of Nouns</u>				<u>Ratio to average no. of words</u>			
	1	1a	2	2a	1	1a	2	2a
Sound	19.22	18.50	13.22	10.27	1:4.1	1:4.2	1:4.7	1:5.1
Picture	19.21	12.94	7.42	6.52	1:4	1:4.3	1:8.3	1:5.1
Picture- sound	21.64	14.82	12.47	5.17	1:4.8	1:4.2	1:7.2	1:6

TABLE VICOMPARISONS OF TWO GROUPS

<u>Comparison being made</u>	<u>Part</u>	<u>T-value</u>	<u>df</u>	<u>P-value</u>	
Sound vs. picture	1	.0042	32	.99	
	1a	3.88	32	.01	
	2	2.52	32	.05	.02
	2a	1.78	32	.1	.05
Picture vs. picture-sound	1	1.15	32	.3	.2
	1a	1.26	32	.2	
	2	2.62	32	.05	.02
	2a	1.15	32	.3	.2
Sound vs. picture-sound	1	1.05	32	.4	.3
	1a	2.41	32	.05	.02
	2	.31	32	.8	.7
	2a	2.62	32	.05	.02

The grammatical function of nouns is to refer to and name things. Therefore, it was reasoned, if one knew the number of nouns in the Ss' responses to the various stimulus media, one could use this information as a partial indication of the number of concepts the subject was stimulated to verbalize.

In Table V, part 1, we see that the average number of nouns in the sound responses is equal to those in the picture responses. The number of picture-sound noun responses are a little greater.

In part 1a we see the comparatively sharp drop in the number of nouns in both the picture and picture-sound groups' responses. A look at the ratio portion of the same table shows us that this drop in the number of nouns is a reflection of the previously recorded drop in the number of words.

The difference seen in table VI for the results in this section are generally not statistically significant because the possibility of these results happening by chance goes to 1:100 in only one instance.

With this latter in mind, we look again at the ratio portion of Table VI, and we see in parts 1 and 1a the overall 1:4 ratio of the number of nouns to the number of words. This ratio goes up and fluctuates to a greater degree in part 2 and 2a, where the subject has been also stimulated to search "within himself," so to speak, for his verbal responses.

The writer is now disposed to say that the even ratios in parts 1 and 1a, whether produced in response to the input

media or not, are due as much to the grammatical habits in the subject's verbalization of material presented to him as to the media. And, to go further, these grammatical habits in the subject's verbalization appear to remain unchanged in the face of differing input media.

(NOTE: Our use of the word "idea" refers to an entity abstracted from the material presented and does not apply to its meanings in the area of reasoning abilities. Thus, we use a noun as the central part of an idea, and we use adjectives and adverbs as statements about an idea.)

media or not, are due as much to the grammatical habits in the subject's verbalization of material presented to him as to the media. And, to go further, these grammatical habits in the subjects' verbalization appear to remain unchanged in the face of the differing of input media.

TABLE VIITHE AVERAGE NUMBER OF ADJECTIVES AND ADVERBS

	<u>Average Number of Adjectives and Adverbs</u>				<u>Ratio to Average Number of Words</u>			
	1	1a	2	2a	1	1a	2	2a
Sound	12.61	11.88	9.72	8.27	1:6.3	1:6.4	1:6.4	1:6.4
Picture	11.68	8.15	7.05	4.10	1:6.6	1:6.8	1:8.7	1:7.9
Sound-picture	6.58	10.23	15.05	5.47	1:6.1	1:6.1	1:6	1:5.6

TABLE VIIICOMPARISON OF TWO GROUPS

<u>Comparison being made</u>	<u>Part</u>	<u>T-value</u>	<u>df</u>	<u>P-value</u>	
Sound vs. picture	1	.49	32	.6	.5
	1a	1.59	32	.2	.1
	2	1.57	32	.2	.1
	2a	3.04	32	.01	
Picture vs. picture-sound	1	2.41	32	.05	
	1a	2.10	32	.05	
	2	.42	32	.7	.6
	2a	1.36	32	.2	
Sound vs. picture-sound	1	1.99	32	.1	.05
	1a	1.26	32	.3	.2
	2	2.73	32	.01	
	2a	2.52	32	.05	.02

Here, also, we turn to a grammatical analysis of the verbal responses. The purpose of adjectives and adverbs is to describe and to modify. What we now ask is which of the media stimulates more descriptive words. We have previously reasoned that a count of nouns could be indicative of the number of concepts. We now say that a count of the number of words that modify and describe these concepts could indicate the amount of "thoughts about" the concepts that the subject may have. If these descriptive words are media-stimulated, we can say that the media which produces the greater number of descriptive words may be the media which produces the greatest amount of "thinking" (remembering, again, we are basing all our measurements only on the written responses of the subjects).

First, let us note the fairly close ratios in Table VII. As in the case of the nouns, the ratios are more similar in parts 1 and 1a, with a slightly greater divergence in parts 2 and 2a. Here again we can see possible evidence of the strong influence of grammatical habits.

In the left hand portion of Table VII for the sound alone and picture only responses, we see the same general results as the count of nouns produced. But the sound-picture data show a surprising divergence from the results of the count of the nouns. The initial descriptive responses of the sound-picture subjects are about half of those of each of the other two media.

Yet, part 1a shows a strong increase in the number of descriptive words, and the description in part 2 exceeds that of the two other media. In part 2a, the descriptive words appear to drop considerably. But, in consulting the ratio portion of Table VII again, we see there is a ratio of one descriptive word for every 5.6 words in the response of 2a - making it the proportionately strongest descriptive response in the table.

Our results indicate that the picture-sound input initially requires the least amount of "thinking about," because the initial response is based on enough information to make the subject feel little need for elaboration. But as the lapse of time becomes greater, the subject appears stimulated more toward thinking about aspects of the things he has seen. Furthermore, his memory is probably prodded by the aural input which functions to point up and accentuate certain portions of the visuals.

TABLE IXFIRST PERSON REFERENCES

	Average No. References				Ratio of References Per.No. Words			
	1	1a	2	2a	1	1a	2	2a
Sound	0	0	2.50	2.38	0	0	1:25	1:22.3
Picture	1.21	.63	3.5	1.52	1:64.2	1:89	1:19.5	1:21
Picture- sound	.70	.29	4.70	2.29	1:145.1	1:217.6	1:19.2	1:13.5

TABLE XCOMPARISON OF TWO GROUPS

Comparison being made	Part	T-value	df	P-value	
Sound vs. picture	1	4.23	32	.01	
	1a	3.30	32	.01	
	2	.64	32	.5	
	2a	1.12	32	.3	.2
Picture vs. picture-sound	1	.945	32	.4	.3
	1a	.945	32	.4	.3
	2	1.26	32	.2	
	2a	1.15	32	.3	.2
Sound vs. picture-sound	1	2.94	32	.01	
	1a	1.99	32	.1	.05
	2	2.10	32	.05	
	2a	.94	32	.4	.3

Since the sound material was presented in the third person, it would be reasonable to say that subjects, in merely parroting these words in their written responses, would be less stimulated to use the pronoun "I." This though is not the case for the picture only group. The subjects watching the film seemed more compelled to write "I saw" in their responses.

We may argue that first person responses could have been obtained from the input sound subject by presenting the material in the first person. This is obviously true. But this "I" would not be in reference to the subject's self; it would be in reference to the input-sound speaker. The subject could still be impersonal to what he writes.

There is statistical support indicating the validity of the hypothesis that there is greater reference to the self when a subject is visually stimulated, and no such tendency when the subject is verbally stimulated. This does not refute that a skilled writer could bring out first person involvement on the part of the subject, but it indicates that the involvement of the self is not inherent in the medium of words.

When we look at the considerably less number of first person references in the input picture and sound subjects than in the input-picture subjects, we may reason that the picture-sound subjects leaned much more heavily on the words of the narrator than on the pictures on the screen. The

reason for this is probably that the subject, in viewing the picture alone, has only himself to depend on. The subject exposed to the sound alone, or the sound and picture together, has another person from whom to obtain his information.

In parts 2 and 2a what seems to be the case is that once a person is motivated to write in terms of his self, then whatever may be the initial influence of differing input media lessens, although the visual input still has a tendency toward more first person involvement than either of the two other media.

## V. SUMMARY AND CONCLUSION

At the outset, we briefly discussed the uses and development of linguistic communication. We pointed to its important part in the progress of Mankind. Also, we noted the evolutionary restrictions imposed upon language ( " ... our new concepts are based upon what has gone before ... "). We suggested that language, as represented by verbal forms, may be now at a point where words are not enough, and that visual communication may assume a much more important function than has already been assigned it. We hastened to add that each media may be eventually assigned "more specialized functions within the communication spectrum." This leads us to ask what, if any, are the specialized functions of different media?

We presented the general hypothesis that there are differences in the effects of varying media whose input information are similar. To narrow down the field of our investigation and to put it within the limits of available facilities, we used the written verbal response of the subject as a basis for determining the validity of our hypothesis which now was:

THE MEDIUM BY WHICH INFORMATION IS PRESENTED TO A SUBJECT HAS A DIRECT EFFECT ON THE NUMBER OF IDEAS VERBALIZED BY THE SUBJECT, THE NATURE OF THE IDEAS, AND THE WAY THE IDEAS ARE VERBALIZED.

We then made a number of statements and hypotheses which were relative to our main hypothesis; these concerned the factors related to the subject's sequence of perception, his thought processes, and uniformity of perception and verbalization.

Our data were analyzed in five ways:

- 1) The number of words.
- 2) The average number of first person references.
- 3) The average number of input words repeated.
- 4) The average number of nouns.
- 5) The average number of adjectives.

The results of our experiment point up the restrictions (as noted earlier) upon measuring the effects of varying input media by the subjects' response in one medium. The results also support the findings of Miller (4) in his study on verbal habits, and the writings of Dewey and others in the general area of the "tyranny" of language.

We now feel more strongly that the verbal and grammatical habits imposed on us by language rigidly restrict the number of concepts obtained from input material which the subject can immediately verbalize. This is shown in Table V, by the overall even ratio of nouns to the total number of words in the responses of all subjects.

Where we seem to be able to obtain some information on the differing effect of media is when the verbal responses indicate the subject is "thinking about" what has been

presented to him, or when he is referring the input material to himself.

In this latter area we have found these differences indicated in the verbal responses to varying input media.

- 1) The reference to the self is more greatly induced by visual input than by sound.
- 2) The largest amount of description, after a time lag, is induced by the picture-sound input.

In reference to the main hypothesis, the experiment seems to indicate the following general conclusion:

- 1) The medium by which information is presented to a subject has little immediate effect on the number of ideas verbalized. (As shown by our count of nouns)
- 2) The input media does have some effect on the nature of the ideas verbalized - at least, to the extent of the description of the ideas and in personal involvement.
- 3) The differing input media might have an effect on the way ideas are verbalized to the extent of points 1 and 2 but the subject is surprisingly limited in the number of words he can use to express the information to which he is exposed. (See table III, and appendix 2.)

To an extent, we have found some differences in the effects of differing communication media upon verbalization.

The further research that can be suggested points to the area of a) increasing the time lag after exposure, b) using many more known techniques of investigation other than analysis of written verbalization. These could indicate the amount of "internalization" and use of information by the subject, c) invention of new techniques to better measure the actual effects of media.

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APPENDIX I  
WORD DESCRIPTION

There is an empty street. The parking meters on the sidewalk are unoccupied.

There is a building. The clock on the building tells us the time.

There is a street in the city. The parking meters are still empty, but cars are beginning to move in the street.

A few pedestrians are now walking on the sidewalk.

A tall policeman points out directions to a short woman.

The moving traffic is becoming heavier.

The parking lot is full. Cars are now parked bumper-to-bumper.

A bus pulls up and passengers alight.

A train pulls into a station.

People come out of a subway entrance.

The policeman is busy directing traffic.

The sidewalks are now full of pedestrians.

They are walking quickly.

Two women open a glass door. They enter. The door closes behind them.

APPENDIX II

SOUND & PICTURE

I.Q.	<u>No. of 1st Person Ref.</u>				<u>No. of Nouns</u>				<u>No. of Adj. and Adv.</u>				<u>No. of re-peated words</u>				<u>No. of Words</u>				
	1	1a	2	2a	1	1a	2	2a	1	1a	2	2a	1	1a	2	2a	1	1a	2	2a	
1.	119	0	0	4	2	30	18	20	4	15	9	19	4	31	19	8	1	128	85	111	27
2.	123	0	0	2	0	11	23	3	0	7	15	2	0	15	23	1	0	47	114	20	0
3.	112	0	3	7	6	23	12	18	2	20	9	19	9	46	16	11	2	102	66	118	57
4.	114	0	0	4	3	19	8	7	7	15	8	13	5	29	5	7	2	69	29	54	40
5.	111	0	0	0	1	20	18	18	11	17	8	13	2	27	26	13	6	113	71	84	36
6.	120	0	0	2	1	17	24	10	12	16	15	18	6	36	32	12	9	83	103	100	50
7.	123	0	0	3	0	28	8	12	0	20	8	16	0	53	9	6	0	132	38	85	0
8.	116	0	0	2	1	18	9	11	5	16	9	22	6	28	20	6	5	98	48	91	38
9.	108	2	0	15	3	28	15	21	6	29	11	17	10	40	16	19	3	142	78	122	39
10.	95	0	0	4	5	21	15	11	7	19	12	9	9	32	22	4	6	101	66	81	49
11.	87	0	0	2	0	28	10	15	4	15	10	18	5	43	10	8	3	116	52	106	37
12.	100	0	0	4	3	18	11	7	2	13	7	4	4	33	14	20	8	189	46	44	21
13.	102	2	1	4	0	20	11	7	0	17	8	11	0	35	8	8	0	102	46	72	0
14.	94	0	0	2	1	21	8	10	4	14	5	8	4	48	14	20	8	101	42	100	22
15.	100	3	1	5	8	23	22	9	3	22	15	12	13	21	19	12	1	114	88	84	66
16.	93	5	0	12	3	21	24	16	11	15	14	24	11	25	13	20	4	111	42	130	22
17.	100	0	0	8	2	22	16	17	4	12	10	21	5	29	8	7	0	79	59	135	24



PICTUREHigh I.Q. - 121

I.Q.	<u>No. of 1st Pers. ref.</u>				<u>No. of Nouns</u>				<u>No. of adj. &amp; adv.</u>				<u>No. of re-peated words</u>				<u>No. of words</u>				
	1	1a	2	2a	1	1a	2	2a	1	1a	2	2a	1	1a	2	2a	1	1a	2	2a	
1.	119	1	0	1	0	19	17	7	1	11	11	5	3	28	8	2	1	89	72	51	10
2.	125	0	0	6	1	23	7	9	9	11	5	6	5	24	9	6	5	92	30	45	34
3.	123	0	0	6	5	24	11	17	12	10	12	12	7	23	5	7	6	91	57	89	60
4.	121	0	0	2	3	8	8	11	7	8	7	3	7	2	4	1	2	42	29	50	45
5.	124	1	1	0	0	21	13	0	0	8	7	0	0	21	15	0	0	72	62	0	0
6.	122	2	0	2	0	30	21	15	0	24	16	17	0	30	19	4	0	132	86	81	0
7.	115	4	4	6	3	19	9	13	4	20	6	8	5	8	5	8	0	99	47	74	22
8.	120	1	0	4	4	24	16	11	11	17	11	4	6	28	11	2	2	96	68	56	61

Low I.Q. Average - 99.5

9.	98	6	2	1	0	19	7	14	4	16	7	8	3	17	8	7	5	84	38	74	22
10.	96	3	1	3	1	9	14	6	5	4	6	4	4	10	12	3	1	46	38	36	20
11.	110	0	2	4	1	12	18	9	10	7	8	3	4	8	19	8	8	43	80	46	32
12.	88	0	1	7	5	12	9	16	11	10	6	4	6	12	9	8	8	53	33	65	45
13.	110	0	0	9	2	28	14	25	8	19	14	10	8	28	13	18	7	131	80	127	71
14.	101	3	0	1	1	23	16	15	3	4	7	5	3	25	10	11	3	81	66	61	21
15.	106	0	0	3	1	15	9	10	3	7	5	6	0	14	10	8	2	56	36	52	18
16.	93	0	0	1	0	15	14	13	9	10	6	10	7	22	12	2	6	67	56	50	40
17.	105	1	1	2	0	27	12	11	7	9	4	11	2	31	6	7	4	127	62	60	32
18.	92	0	0	1	1	23	15	25	14	13	7	7	6	16	19	4	11	105	63	102	67
19.	96	1	0	1	1	14	16	14	6	4	10	11	2	14	11	7	1	40	65	53	21

BREAKDOWN OF WORDS IN Ss' VERBAL RESPONSES IDENTICAL WITH  
THOSE IN INPUT SOUND

	Picture Response								Sound			
					Picture & Sound							
	1	1a	2	2a	1	1a	2	2a	1	1a	2	2a
Alight					6	2			2	7		1
Becoming					5		2			1	1	1
Beginning	3	3	1		15	7	6		14	6	6	2
Behind					4	1			1	4		
Building	16	11	5	4	10	16	3		8	11		2
Bumper-to-bumper					10	4	1		9	10		3
Bus	23	10	9	3	19	12	4	2	10	15	5	5
Busy	2	1	6	1	9		4		6	8	3	3
Cars	23	20	8	6	20	6	7	2	33	22	8	3
City	6	1	11	2	8	3	16	6	7	7	21	17
Clock	8	7	3		8	11			7	11		1
Closes					4	3			2	5		
Come	15	4	4	5	15	5	6	2	16	11	8	3
Directing	6	3	1	1	15	5	2	1	9	9	4	2
Door	7	4			12	9		3	7	12	1	2
Empty	1		1	1	19	4	2	1	20	16	4	7
Enter	9	1			5	5	1	1	3	3		1
Entrance	2				1				1	2		5
Few	2	1			8	4	7	1	10	11	1	5
Full		1			2				4	1		

	<u>Picture Response</u>				<u>Picture-sound</u>				<u>Sound</u>			
	<u>1</u>	<u>1a</u>	<u>2</u>	<u>2a</u>	<u>1</u>	<u>1a</u>	<u>2</u>	<u>2a</u>	<u>1</u>	<u>1a</u>	<u>2</u>	<u>2a</u>
Glass	1				8	4		3	5	9	1	1
Heavier					4		1		11	10	4	1
Lot	9	11	3	2	15	9	4	4	15	17	2	5
Meters	5	3	1	2	18	5	2		21	18	2	2
Move moving	6	5	4	1	2		2		7	6	2	
Now	1			2	7	3	1		19	22	1	2
Open	5	2		1	6	3		1	4	6	4	2
Out	5	3	3	1	10	5	10		6	8	2	
Parking- parked	16	26	7	5	41	17	10	3	49	42	8	7
Passengers					1				1	6		1
Pedestrians					6	3	2		4	7		2
People	32	12	17	10	34	18	21	7	34	24	12	14
Points		1			2					1		
Policeman	19	6	4	2	19	7	7	1	20	18	9	3
Pulls	4	1	1	1	5	3			8	11		
Quickly	1				2	2			1	2		
Short					10	5			13	14	1	2
Sidewalk	3	1	3		5	3			12	10		2
Station	12	6	2	2	12	5	2		6	6		1
Still				1	4	1	1	2	4	4	1	2
Street	23	15	6	10	47	19	13	1	57	41	16	13
Subway	10		3	1	12	3	4	2	9	13	1	3

	<u>Picture Response</u>				<u>Picture-Sound</u>				<u>Sound</u>			
	<u>1</u>	<u>1a</u>	<u>2</u>	<u>2a</u>	<u>1</u>	<u>1a</u>	<u>2</u>	<u>2a</u>	<u>1</u>	<u>1a</u>	<u>2</u>	<u>2a</u>
Tall					5	8			12	12	5	1
Tell	1				3				3	5		1
There	16	16	6	1	10	6	8	2	49	55	8	8
Traffic	15	10	6	3	34	8	8	1	21	21	12	6
Train	16	6	9	3	8	7	4	4	11	14	3	6
Two	5	6			12	7	2	1	3	13	2	5
Unoccupied	1				3	2	1		5	5	2	1
Up	6				8	4	2		8	11	4	2
Walking	9	3	2	1	4	8			8	8	2	1
Woman	16	10	1		21	12	3	1	11	19	3	6