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SUGGESTION AS A DETERMINANT FACTOR OF APPARENT SIZE

EXPERIMENTAL REPORT

by

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On the effect of suggestion for the size perception, some experimental studies have been attempted. Hastorf (2) investigated the influence of suggestion offered to the meaning of stimulus object upon distance perception. Ashley et al (1) suggested to their subjects in hypnotic state that they held a certain economical status, and demonstrated the influence of the suggestion upon the estimated size of coins.

This paper, however, is not concerned with the effect of such indirect suggestion as those concerning the meaning of stimulus object or the economical status of subjects, but chiefly with the effect of direct suggestion such as those of the apparent size or distance itself. Therefore, the experiments were designed to examine the following problems.

a) Concerning the apparent size itself: Does the apparent size of the stimulus object change or not, in accordance with the suggestion that the stimulus object will be enlarged or reduced, while its objective size is kept constant? And if it does, how about the degree and the limit of the changing?

b) In relation to distance: Does the apparent size of the stimulus object change or not, in accordance with the suggestion that the distance of the stimulus object will be varied gradually, while its objective distance is kept constant? And if it does, how about the degree and the limit of the changing?

As we are first concerned with the effect of experimenter's suggestion itself, in designing the experiment other situational cues (e. g., meaning of the stimulus object, distance cue etc.) were reduced to the minimum.

Experiment I

In experiment 1, Ss were required to trace the apparent size of the stimulus object on the drawing board.

Apparatus; The apparatus is shown by a diagram in Fig. 1. At the distance of 56 cm from the S's eyes there was a homogeneous milk-white luminous square 20×20 cm, which was reflected from the B section of the apparatus in Fig. 1. The stimulus object was a diamond-shaped light patch (each angles 90°) which was made by cutting out a diamond from a black cardboard that covered the surface of a light-box. The size of the stimulus object was 7 cm in diagonal. It was placed 136 cm away from S's eyes and was located so as to be in the center of the luminous square. (C in Fig. 1.) It was viewed binocularly through two circular apertures. (A in Fig. 1.) The brightness of the luminous square was 18

milli-lambert and that of the stimulus object was 28 milli-lambert and the experimenter could switch on and off these two light patches at his own will. Subject could see nothing but these two overlapping light patches in the darkness. So, to subject the stimulus situation appeared as if in the center of the space of square at one side visual angle $20^{\circ}14'$, consisting of milk-white dense mist, a diamond-shaped light path was floating. In front of S there was a black screen with two apertures, so that S could not see the back of the apparatus. Obliquely downward from the S's eye there was a drawing board lighted by a 40w lamp from 30 cm above.

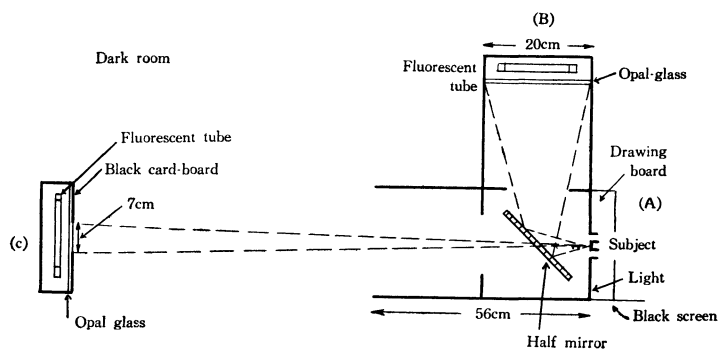


Fig. 1. Apparatus for experiment.

Subjects; 9 Ss in all, i. e., 8 undergraduates and 1 associate professor of psychological course. These Ss were quite uninformed of the apparatus and purpose of the experiment.

Procedure; a) *The suggestion of the stimulus size growing larger.* At first, the light square only was presented. Instruction was "See carefully! From now, you see in this foggy light square a diamond-shaped light patch. And then draw the apparent size of it as precisely as you can on the drawing board under your eyes." After the stimulus was presented and S finished drawing, a suggestion was given as follows. "Look carefully at this diamond! Now, this diamond is growing larger little by little, just a little. If you saw this diamond grow larger, draw the size of it as precisely as you can under the already drawn diamond on the board, . . . Now, this diamond grows a very very little larger! . . . Ready! . . ." At the same time, E dragged a paper on the desk behind the apparatus and made a faint noise for 15-20 sec. And then Ss were made to draw. After this, the next trial began likewise with the following suggestion: "See carefully, this diamond is growing larger, little by little, than it is now!" and so on. 5 trials were attempted likewise. After the trials were finished, the diamond only was eliminated. b) *The suggestion of the stimulus size growing smaller.* Before the presentation of the diamond, a comparatively strong noise of dragging paper was made a while. Then the stimulus was presented in the light square. The other procedure was quite the same as that of (a), except the suggestion of growing smaller of the stimulus object. c) *The suggestion of the stimulus object coming nearer.*

The procedure was almost the same as that of a) and b), except the suggestion of "Look carefully at the diamond! This diamond is coming nearer to your eyes very slowly! If you saw it come nearer, draw the apparent size of it on the board as precisely as you can. Now, this diamond is coming nearer to your eyes very slowly . . . Ready!" d) Likewise, *suggestion of the stimulus object receding farther* was given to Ss.

Verbal reports too were recorded every time according to the above mentioned 4 experimental procedures.

Result and discussion ; a) On the suggestion of growing larger. (Shown in Fig. 2) In the first trial in which no suggestion was given, generally the apparent size tended to approach the visual angle law, with some individual difference, as was the case with Sk, Ed. This finding seems to support the result of Kume (3) substantially, though our experimental condition were different from hers in some way. But, we could not find any case of over-constancy as Kume had found. In the second trial when we began to give suggestion, the increasing tendency of the apparent size was seen in a few Ss only to a slight degree. But in the trials 3 and 4 it increased rapidly. After several repetitions of trials the curve showing the increase ratio of it tended to form a plateau and there was no tendency to grow larger beyond the line of constancy law. Individual difference of increase ratio was observed., e.g., apparent size with Un increased 50.8%, while with Ng it remained unchanged. Anyhow, by comparing the results of trial 1 with those of trials 4, 5 and 6 was shown the remarkable tendency of increase of apparent size by the suggestion. Difference between the results of trial 1 and trial

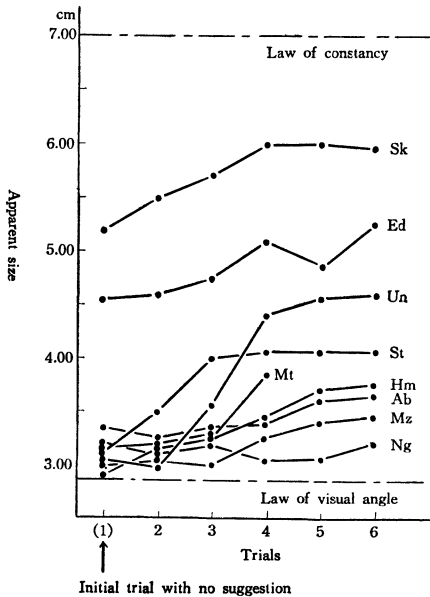


Fig. 2. Suggestion of the stimulus size growing larger.

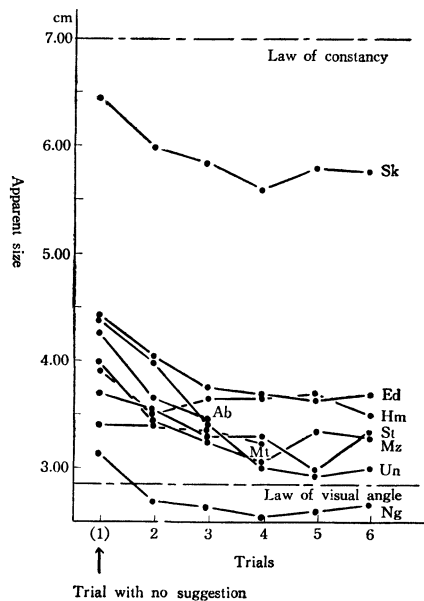


Fig. 3. Suggestion of the stimulus size growing smaller.

6 was at the significant level of $P < 0.01$ ($t = 5.02$). b) *On the suggestion of growing smaller.* (Shown in Fig. 3) In trial 1 in which no suggestion was given the apparent size and the individual difference of it tended to be larger than the result of the first trial of (a) in general. This tendency seems to be an after-effect of fore-going suggestion experiment (a). This after-effect was found also in the first trial of other suggestion experiments (c) and (d). The result of Un showed this tendency typically as seen in Fig 6. In suggestion trials of 2, 3 and 4, the tendency of the strikingly rapid reduction of apparent size appeared but in the trials 5 and 6 this tendency disappeared gradually. Except Ng, no Ss showed the tendency of reduction beyond the line of visual angle law. Difference between trial 1 and 6 was at the significant level of $P < 0.001$ ($t = 45.00$) c) *On the suggestion of coming nearer.* (Shown in Fig. 4) With this suggestion, except Sk and Ng, the apparent size tended to enlarge gradually, but each S in a characteristic way and not so much as in the case of (a). Difference between trial 1 and 6 was at the significant level of $P < 0.05$ ($t = 0.49$). d) *On the suggestion of receding farther.* (Shown in Fig 5) With these suggestion trials, apparent size with all the Ss reduced gradually as seen in Fig 5. Difference between trial 1 and 6 was at the significant level of $P < 0.001$ ($t = 6.61$).

Results of (c) and (d) seem to be ascribed to the S's concept that, when the size of an object was kept constant, if it was located near the eye, the size of it must appear larger than if far away from the eye, that is, the S's concept of size-

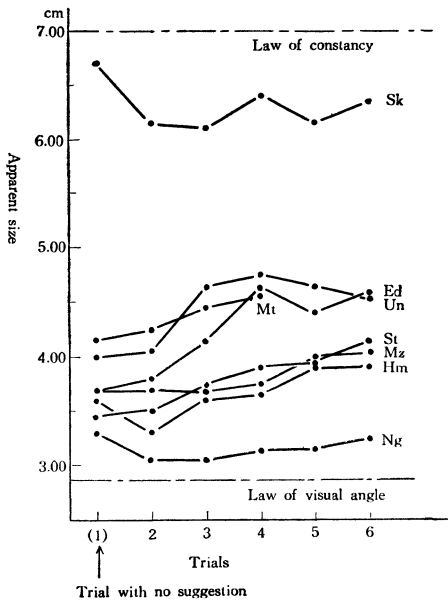


Fig. 4. Suggestion of the stimulus object coming nearer.

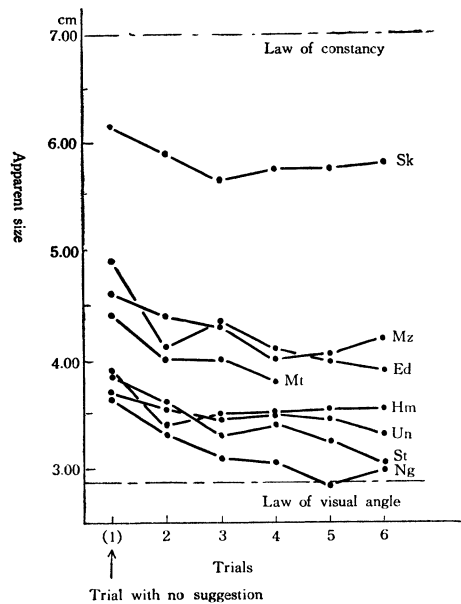


Fig. 5. Suggestion of the stimulus object receding farther.

distance relationship seems to determine the apparent size*

According to the introspection of Ss, changes of the size of the presented stimulus was thought to be effected by the operation of the experimenter, who, behind the apparatus, stopped the iris or changed the distance of light patch from the S's eyes. All the Ss reported confidently the changing of apparent size, apart from the degree of it.

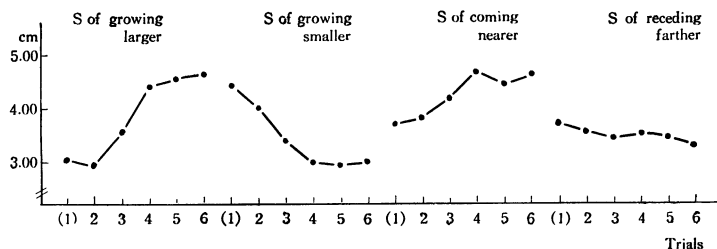


Fig. 6. A case most influenced by suggestion (Result of Un).

Experiment II

For the purpose of testing whether the results of experiment 1 are true of experiments of another method or not, the method of adjustment was applied to experiment 2.

Apparatus; The same as that of experiment 1, except that the size of diamond was variable from 1 cm to 20 cm in diagonal by the operation of experimenter.

Subjects; 4 Ss of showing a high suggestion effect were selected from the Ss of experiment 1. They were all undergraduates.

Stimulus and procedure; Almost the same as those of experiment 1, with only the following difference: If the apparent size of stimulus changed by suggestion, experimenter adjusted the size of it by requesting the subject to reproduce the original size which he thought he had seen before the suggestion was given, and then its size was recorded, 5 trials. After each trial, the stimulus was eliminated once and faint noises were made, then a diamond-shaped stimulus object, 7 cm in diagonal, was presented in the next trial.

Results and discussions; In Table 1, the average change of apparent size of 5 trials are shown. The sign of + in the table shows that to Ss the apparent size now seen has become larger than the size before the suggestion was given, that is, + means that Ss perceived the stimulus size smaller than 7 cm. The sign of - in the table indicates that to Ss the apparent size of stimulus seemed to become smaller than the size before the suggestion was given. As seen in Table 1, it seems that the results of experiment 2 also support the results of experiment 1.

* In the results of several Ss who had scrupulously inspected the apparatus before experiment and had full knowledge of the apparatus, either no effect of the suggestion was found or if any, in a reverse direction. Results of these Ss were to be reported in the next report.

Table 1. Results of experiment II.

Ss	Suggestion of growing larger	Suggestion of growing smaller	Suggestion of coming nearer	Suggestion of receding farther
S. k.	+ 1.1%	- 2.6%	+2.3%	-5.1%
S. t.	+ 8.6	- 4.3	+5.7	-5.7
M. t.	+ 3.7	- 2.3	+1.1	0.0
U. n.	+11.7	-42.0	+2.9	-6.9
M	+ 6.3	-11.8	+3.0	-4.4

Average of the results of 5 trials in percentage

From the above two series of experiments, we have found that in our experimental situation, the apparent size of stimulus is determined by experimenter's suggestion, that is, by the human interaction between experimenter and subject. Sherif et al (4) have shown the effect of situational factors in autokinetic movement experiments. The experimenter's suggestion seems to have served as "reference frame" in size perception as well. It is thought necessary to carry out further experiments by controlling positively experimenter's suggestion as experimental variable.

Summary

Under our experimental condition in which the stimulus object was unknown to the subject and distance cue was poor; 1) The apparent size of stimulus changed by the suggestion of experimenter, i. e., by the suggestion of growing larger, the apparent size became large and by the suggestion of growing smaller, the apparent size became small. 2) By the suggestion of the stimulus object coming nearer the apparent size of it increased, on the contrary, by the suggestion of receding farther, the apparent size of it decreased gradually. 3) The apparent size was, however, changeable by the suggestion only within the limits between the visual angle law and the constancy law. 4) Several repetitions of suggestion trials increased the effect of it, but afterwards the effect decreased gradually. 5) Some individual differences were found among suggestion effects. 6) Also the experiments by the method of adjustment supported the results described above.

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