

Studies on Sensory Deprivation: IV. Part 6. Effect of Sensory Deprivation upon Perceptual Function

著者	SUZUKI YUKIO, FUJII KEIKO, ONIZAWA TADASHI
journal or publication title	Tohoku psychologica folia
volume	24
number	1-2
page range	24-29
year	1966-01-10
URL	http://hdl.handle.net/10097/00122630

STUDIES ON SENSORY DEPRIVATION: IV.

PART 6. EFFECT OF SENSORY DEPRIVATION UPON PERCEPTUAL FUNCTION

By

YUKIO SUZUKI (鈴木由紀生), KEIKO FUJII (藤井啓子)

(*Department of Psychology, Tohoku University, Sendai*)

TADASHI ONIZAWA (鬼沢 貞)

(*Iwate University, Morioka*)

The effect of sensory deprivation upon the Müller-Lyer illusion, the spiral after effect, the judgement of the progressive weights, and the hearing acuity were investigated.

Main findings; The amount of the Müller-Lyer illusion decreased, the duration time of the spiral after effect increased, and the judgement of the progressive weights became relatively exact after sensory deprivation, while the results of the hearing acuity were not clear. Moreover, the effect of sensory deprivation seems to be reduced in process of time and considerably lost after 1 hour, and the individual differences in the duration time of the effect of sensory deprivation were also found.

METHOD

In general, the tests were administered to both the experimental and the control subjects. The experimental Ss were tested before and after the sensory deprivation of 18 hours, and the control Ss were tested at almost the same intervals. The control Ss did not, of course, experience the isolation. With reference to the Müller-Lyer test and the test of the spiral after effect, the pre-tests were carried out at the time just before the sensory deprivation in both Exp. G. I and Exp. G. II, but the post-tests were carried out one hour after the sensory deprivation in Exp. G. I and just after the sensory deprivation in Exp. G. II.

1. Müller-Lyer test

Procedure

The Müller-Lyer figure used in this study is shown in Fig. 1. The Ss were asked to make the length of BC equal to the length of AB. Ascending trial and descending trial were tried 4 times and the amount of the illusion was measured and the average was taken.

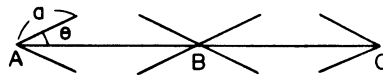


Fig. 1 The Müller-Lyer figure used in this test.

$a=3\text{cm}$, $AB=10\text{cm}$, $\theta=30^\circ$

AB is constant and BC is changeable.

RESULTS

The results are shown in Table I. The difference between the decrease of illusion of Exp. G. and Cont. G. was statistically significant (between Exp. G. I and Cont. G.: $P < 0.1$, between Exp. G. II and Cont. G.: $P < 0.05$, by t-test).

Table 1. Mean values in ML-test

Group	N	Pre-S.D.	Post-S.D.	Rate
Exp. I	11	23.8mm	22.3mm	- 5.2%
Exp. II	8	25.9mm	21.8mm	-15.5%
Cont	9	26.3mm	25.9mm	- 0.4%

2. Test of the spiral after effect

Procedure

The test figure is shown in Fig. 2. The rounding of the figure was for 40 seconds



Fig. 2 A spiral used in this test.
10cm in diameter, black area and white area were in ratio 1 : 1

at the speed of 90 r.p.m. The direction of the rounding was clockwise. After the Ss inspected the rounding figure at 150 cm. distance, they were asked to tell the time when the after effect faded out. In the Exp. G. I Ss were given one trial and in both Exp. G. I and Cont. G. the Ss were given 4 trials. The duration time of the S.A.E. was measured and average was taken.

RESULTS

The results are shown in Table 2. The difference between the increase of the

Table 2. Mean values in S.A.E.

Group	N	Pre-S.D.	Post-S.D.	Rate
Exp. I	11	26.0sec	33.7sec	26.4%
Exp. II	8	17.3sec	19.9sec	13.6%
Cont	9	18.6sec	19.7sec	6.6%

duration time of the S.A.E. of Exp. G.I and Cont. G. was not statistically significant, but between Exp. G. II and Cont. G. was significant ($P < 0.1$ by t-test).

3. The progressive weight test

Procedure

Twelve boxes identical in appearance were placed in front of the S, who was told that he was to compare box 1 with box 2, 2 with 3, 3 with 4, and so on, when presented one after another, saying each time whether the latter was heavier, equal or lighter than the former. The first 7 boxes were presented first 210 gr. in weight, next 230 gr., then 260gr., 290gr., 330gr., 365gr., and 410gr. The other 5 boxes presented next were the same in weight with the seventh presented first. We were interested in the judgements of 5 boxes from 8th to 12th, which were identical in weight. This test was not given to the Ss in Exp. G. I and the pre-test was not given in both Exp. G. and Cont. G.

RESULTS

The results are shown in Fig. 3. The statistical analysis of the data was not tried. But generally speaking, Exp. G. estimated the weight more exactly than Cont. G.

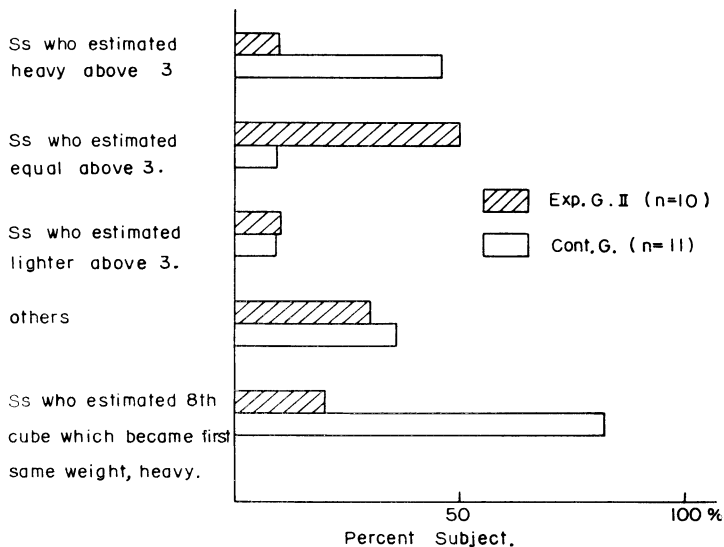


Fig. 3 The estimation of 5 cubes after 7th cubes in progressive weight test

4. Test of the hearing acuity

The hearing loss and the auditory difference limen were measured with an audiometer. This test was not given to Ss in Exp. G. II.

RESULTS

The results are shown in Fig. 4 and 5. The differences between Exp. G. I and Cont. G. were not clear in both hearing loss and auditory difference limen.

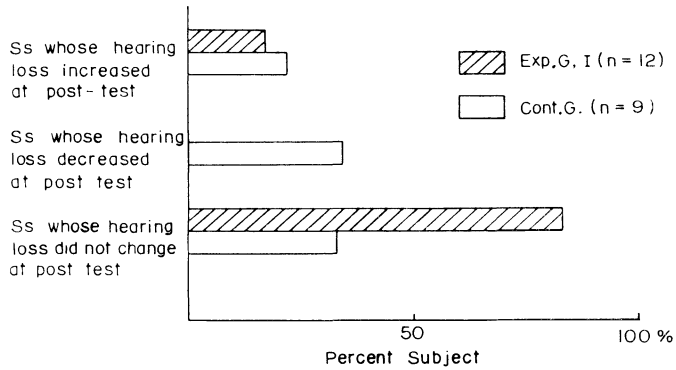


Fig. 4 Hearing loss

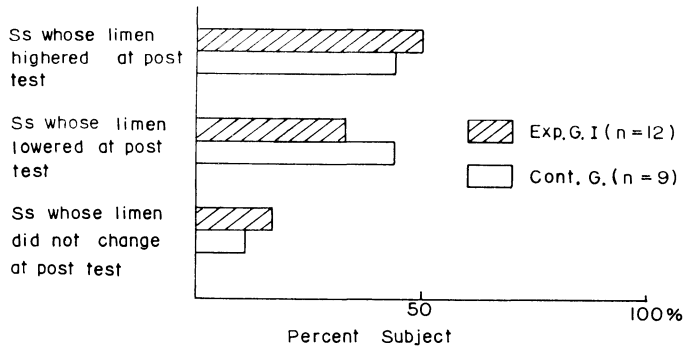


Fig. 5 Auditory difference limen

DISCUSSION

As to the Müller-Lyer illusion, the sensory deprivation influenced the Ss for decreasing their illusion. As to the genesis of Müller-Lyer illusion, many subjective and objective factors might be considered as the causes. But, to consider the result of the progressive weight test that the Ss of Exp. G. estimated the weight more exactly than those of Cont. G. without being influenced from the stimulus context, the decrease of the illusion in Exp. G. seems to have occurred by the subjective cause, chiefly the change of attitude from the normal to the more analytical. That is, the attitude of the form response which is dominant in normal state and produces the illusion, became weak, and the analytical attitude as pointed out by Benussi (2), which gives attention only to the main line of Müller-Lyer figure to be compared and neglects the other parts, and which decreases the illusion, became dominant.

As to the progressive weight test, the result seems to contradict that of other studies

which showed that the suggestibility was increased by sensory deprivation (5, 6). However, there are many differences between the suggestibility for the indirect suggestion such as this study and that for the direct suggestion, therefore we are going to investigate the effect of sensory deprivation upon the suggestibility for indirect suggestion in next study.

As to the S.A.E., it was found that the duration time of the S.A.E. of the Ss in Exp. G. increased more than in Cont. G. at the post-test and it is consistent with the result of Doane (2). To consider the fact found in our study that the two-point limen was lowered (9) and the gustory sensation sensitized (10) by sensory deprivation, the increase of the duration time of the S.A.E. seems to suggest that the function related to the S.A.E. belongs to the lower order functions like to the tactual sensation and the gustory sensation which are basic for the organisms.

The result of the hearing acuity measurement seems to be inconsistent with the our hypothesis that sensory deprivation sensitizes the lower order function basic for organism (5, 6). However, as the Ss in Exp. G. had been hearing the patternless noise of the room cooler as the masking noise during the whole time of sensory deprivation, the condition of auditory sensation was different from others such as visual, tactual, and gustory sensation etc. Moreover, the trouble is that the test of the hearing acuity took long time, the shortest case 20 minutes, the longest case 40 minutes. Accordingly, we are going to investigate the hearing acuity with other type of method as make up for this point in next study.

Lastly, the fact that in the Müller-Lyer test and the spiral after effect the results of Exp. G. II were different from that of Cont. G. more clearly than the results of Exp. G. I. were, seems to indicate that the effect of sensory deprivation is reduced in process of time as pointed out in other study (2). Although there are the valibilities among the reported duration times of the effect of the sensory deprivation (4, 11), it was found this study that the effects of sensory deprivation upon the perceptual functions such as Müller-Lyer illusion, the spiral after effect were considerably lost after 1 hour. And then the fact that the individual differences at the post-test were larger in Exp. G. I than in Exp. G. II, seems to indicate that there are the individual differences about the duration time of the effect of sensory deprivation such as that of the drug and the alcohol; some become free from the effect soon and the others are suffered from it for a long time.

REFERENCES

- (1) Benussi, V. *Zur Psychologie des Gestalterfassens*. In: *Meinongs Untersuchungen Zur Gegenstandstheorie und Psychologie*, 1904, 303.
- (2) Doane, B.K. Mahatoo, W., Heron, W., and Scott, T.H. Changes in perceptual function after isolation. *Canad. J. Psychol.*, 1959, 13, 210-219.
- (3) Ernest A. Haggerd. *Isolation and personality*. In Worchel and Byne, *Personality Change*. N.Y. Wiley & Sons, 1964, 433-469.
- (4) Heron, W., Doane, B.K., & Scott, T.H. Visual disturbance after prolonged perceptual isolation. *Canad. J. Psychol.*, 10, 13-18.

- (5) Jackson, C. Wesley, Jr., & Kelly, E. Lowell. Influence of suggestion and subjects' prior knowledge in research on sensory deprivation. *Science*, 1962, 135, 211-212.
- (6) Jones, Marshall B., & Goddson, James E. The effect of boredom on suggestibility. *USN Sch. Aviat. Med. res. Rep.*, 1959. Proj. No. NM 1601, II Sub. 16. No. I. ii, 10p.
- (7) Kitamura, S., and Ohkubo, Y. Studies on sensory deprivation: II. Part 6. General discussion and concluding remarks. *Tohoku Psychol. Folia*, 1964, 22, 86-89.
- (8) Kitamura, S., and Ohkubo, Y. Studies on sensory deprivation: III. Part 8. General discussion and concluding remarks. *Tohoku Psychol. Folia*, 1965, 23, 7-981.
- (9) Nagatsuka, Y., and Maruyama, K. Studies on sensory deprivation: Part 2. Effects of sensory deprivation upon perceptual and motor functions. *Tohoku Psychol. Folia*, 1963, 22, 5-13.
- (10) Nagatsuka, Y. Studies on sensory deprivation: Part 2. Effect of sensory deprivation upon perceptual function (3). *Tohoku Psychol. Folia*, 1965, 23, 56-59.
- (11) Zubek, John P., Flye, J., & Aftanasi, Cutaneous sensitivity after prolonged visual deprivation. *Science*, 1964, 144, 1591-1593.

(Received Aug. 1, 1965)

ZUSSAMENFASSUNG

Die Einflüsse von sinnlicher Entziehung auf der Müller-Lyer-Täuschung, der Schraube-Nachwirkung, der Wahrnehmung der allmählichen Gewichte und der Horkraft wurden erforscht.

Nach der sinnlichen Entziehung erwies sich die Verminderung der Müller-Lyer-Täuschung, die Zunahme der Schraube-Nachwirkung und genauere Wahrnehmung der allmählichen Gewichte.

Über der Dauerzeit der Einflüsse von sinnlicher Entziehung fand sich, dass im Verlauf der Zeit sich die Einflüsse von sinnlicher Entziehung dünner machten und nach einer Stunde sich ziemlich schwächten.