Studies on Sensory Overload: II Part 2. Results of Sensory Tests

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PART 2. RESULTS OF SENSORY TESTS

By

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Two psychophysical tests were designed to examine: (a) facilitating effects of 5-hr. sensory overload (SO) upon the lower order functions of an organism, (b) the differences between the effects of SO and sensory deprivation (SD).

These tests reached substantially the same results as our previous ones. The facilitating effects of SO were, on the average, less prominent than those of SD. The individual difference in SO group was relatively small, while that in SD group was larger.

Introduction

In the psychological tests of our previous sensory overload (SO) experiment (Kikuchi et al., 1970), we had failed regretably to achieve the decisive results concerning effects of SO upon the lower order mental function of an organism. The leading causes would be summarized as follows, and some attempts were taken to remove them. No procedure successful enough to cope with them had been carried out.

A first cause was thought to be the rapid appearance of experimentally produced changes in sensory functions or the swift recovery to the normal level of them (Suzuki et al., 1965). So brief measurements were taken by the simple procedures, as soon as the stimulation in SO was completely finished.

A second cause was misunderstanding as to the control group and SD group. To be sure, SD condition contrasts with SO condition in quantity of stimuli, but the condition similar to the ordinarily daily life should be between them as the real control condition. Until three conditions, SO, Control and SD conditions, are successive in terms of quantity of stimuli, they are not completely compared with each other.

A third cause was the problem of an apparatus. At that point of time when our first SO experiment was made, we could not help using a less precise apparatus. In this experiment, careful use was made of a more precise one.

After these reflections concerning the previous experiment, only two kinds of test were made by brief procedures before and after confinement to investigate the effects of SO upon the lower order functions by comparing them in SD and Control conditions.

1) Test of Hearing of Loss

Method

Subjects; 21 male college students served as *S*s in three groups, SO group (N=8), **SD group** (*N*=5) and **Control group** (*N*=8). Their age ranged from 18 to 27 and the average age was 21. A member of the two former groups was confined for 5 hours, but a member of the other spent 5-hr. daily life.

Apparatus; A stimulus-generator was a JA-3A audiometer made by IWASAKI COMMUNICATION APPARATUS CO., Ltd. It was set in a room next to the confinement room. Hearing loss at the pure tone of 1,000 cps was measured by the step of 5 dB for 1 to 3 seconds via only right earphone. The difference of hearing loss on the different ear-conditions was likely to be little generally (Kikuchi et al., 1970).

Procedure; Wearing the translucent goggles in the dark confinement room, *S*s made their judgements with an electric switch in the right hand. They were instructed to push a button if they could catch any tone and to release it if they could not any more. Descending losses were measured five times immediately before and after the confinement, and the average was used as hearing loss of an individual.

Results

Table 1 shows that mean hearing losses in all of three groups decreased greatly after 5-hr. confinement or daily life. Especially in Control group, the variation from pre- to post-test was too great by comparison with the finding that the threshould of a well-motivated listener might show no consistent trend either upward or downward (Licklider, 1951). But no difference between the pre- and post-test, and among the groups was statistically significant. Even in the case where the percent change in mean hearing loss was very large, there was also no difference because of too great standard deviation (S.D.).

Table 1. Mean hearing losses (in dB) at 1,000 cps tone.

	Pre-test		Post-test		% change in Mean
	Mean	S.D.	Mean	S.D.	
SO G. (N=8)	9.6	9.6	8.2	3.7	−14.5
SD G. (N=5)	8.0	8.1	7.2	4.6	−10.0
Cont. G.(N=8)	10.0	8.0	6.5	6.0	−35.0

Fig. 1 represents that in SO group S.D. was reduced from pre- to post-test. In other groups there existed no remarkable shift. In point of the number of *S*s whose mean hearing loss only decreased, all the groups were very similar: SO group had five out of eight *S*s, Control group four out of eight and SD group three out of five.

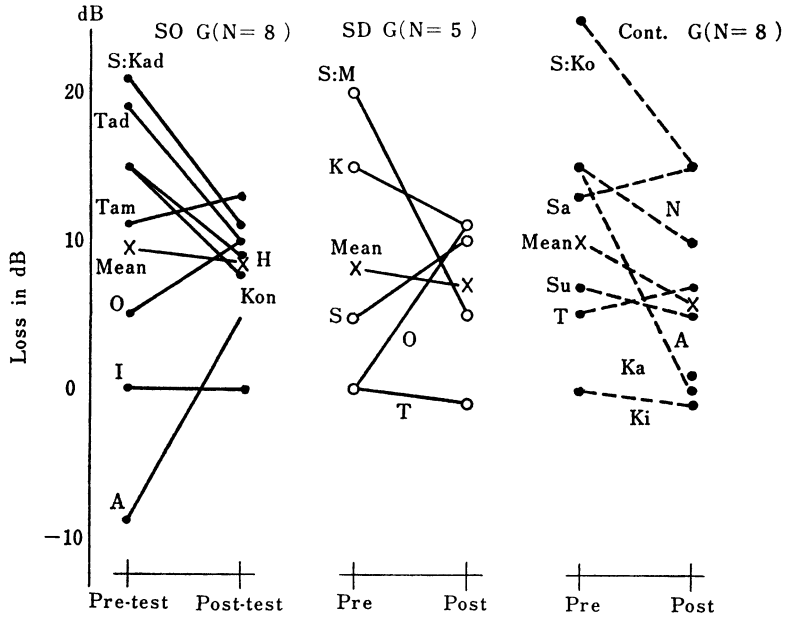

Fig. 1. Transitions of hearing loses per each *S* from Pre- to Post-Test in three groups.

2) *Test of Dot's Detection Time*

Method

Subjects: 3 male college students who had been discarded in the test of hearing loss were added to 21 *S*s, and so each group came to have equally 8 *S*s (and see Part 1 or "the test of hearing loss" in this part for the details).

Apparatus: Used was a TKK two-stimuli tachistoscope, which was well set in the confinement room and with which *S*s sitting up in the reclining seat were tested. The tachistoscope has the exposure time from 1 to 120 msecs by 1 msec step.

Stimulus: Two kinds of stimulus were used respectively: a black dot (1×1 mm in diameter, St I) used in Figure 1 of Bender-Gestalt Test and a white ellipse (2×1.5 mm, St II) in Figure 2. These simplest stimuli were used in order to re-examine progressively the results of Bender-Gestalt Test in the previous experiment.

Procedure: Detection time (DT) was measured immediately before and after (but later than the test of hearing loss) the 5-hr. confinement. Ascending trials were made three times. Orders to expose St I and St II were counterbalanced. All *S*s were trained to gain their approximate results the day before.

Results

Results are shown in Table 2. In respect of St I, (1) the mean DT in SD group decreased significantly from pre- to post-test ($p<0.05$, two-tailed t-test), (2) the

difference between the means in SO and Control group was significant in the post-test ($p<0.05$, t-test). With regard to St II, (1) the "pre-post" difference in SD group was at the 10% level of significancy, (2) the mean DT in SO group seemed to decrease more steeply than that in Control group ($p<0.10$, t-test).

Fig. 2 shows standard deviations (S.D.s) in each group, based upon the mean DT for *S*s; (1) in respect of St I, there were significant differences among the three groups, all at the 5% level ($p<0.05$, two-tailed F-test), (2) with regard to St II, the "pre-post" difference in S.D. was significant in both SO group ($p<0.01$, F-test) and SD group ($p<0.05$, F-test).

Table 3 represents the percent changes in the mean DT from the pre- to post-test. The mean percent change in SO group or SD group was larger than that in Control group, but S.D.s in all groups were relatively large.

Fig. 3 shows the percent change per each *S* to explain the fact that S.D. is too great. Concerning both St I and St II, there were only few *S*s in SO group whose percent changes were positive and large, while in SD group *S*s whose percent changes were negative and small tended to be rare. In Control group, half of *S*s were likely to have positive percent changes and the rest, on the contrary, negative ones.

Table 2. Means and standard deviations of dot's detection time.

Group		St I (●)		St II (○)	
		Pre-test	Post-test	Pre-test	Post-test
SO G. (N=8)	Mean	13.5ms	11.9ms	14.9ms	12.7ms
	S.D.	2.8	0.7	3.2	2.3
SD G. (N=8)	Mean	15.0	12.1	18.3	14.3
	S.D.	3.6	1.9	4.7	3.0
Cont. G. (N=8)	Mean	15.3	15.0	17.3	16.7
	S.D.	4.9	3.1	4.5	4.7

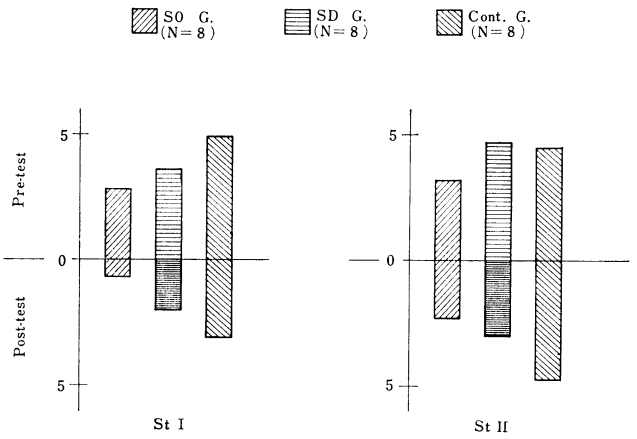

Fig. 2. Standard variations of dot's detection time for each group.

Table 3. Means of % changes from Pre- to Post-test.

	St I		St II	
	Mean	S.D.	Mean	S.D.
SO G. (N = 8)	− 9.6	13.2	−14.3	11.1
SD G. (N = 8)	−14.8	18.9	−17.5	23.1
Cont. G. (N = 8)	− 8.6	47.7	− 0.6	21.0

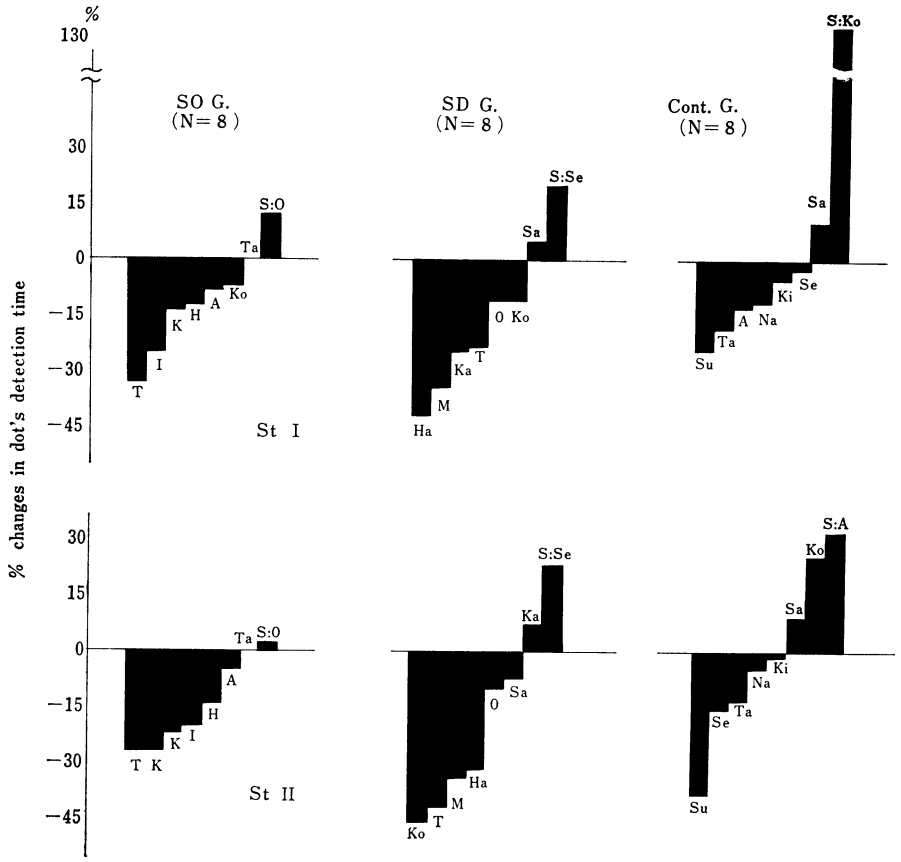

Fig. 3. Arrangements of the % change for each S $\left(\%\,\text{Change} = \frac{\text{Post.-Pre.}}{\text{Pre.}} \times 100\right)$.

Discussion

By these results of two psycholphysical tests in hearing loss and dot's detection time, it could be confirmed, though not yet cogently enough in every respect, that SO as well as SD facilitates the lower order mental functions of an organism. At least one of the effects of SO which Kitamura et al., (1970) had modestly stated in the first paper of

these serial studies may be thought to be a facilitating effect.

In addition to this finding, of interest was a difference between SO and SD. SO group showed the smallest standard deviation of all the groups. SO seemed to restrict the appearance of individual difference within a narrow range, while SD was prone to permit large difference to make frequent appearance.

It might be said that both SO and SD have a facilitating effect on the lower order mental function of an organism, but that what are meant by the "facilitating" effect may be, more or less, different in qualitity.

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Zusammenfassung

Die folgenden punkten wurden anhand der zwei sinnlichen Prufungen untersucht: (a) eine forderliche Wirkung von 5-stundigen sinnlichen Belastung auf niedrigen psychologischen Funktionen, (b) der Untershied zwischen dem Einfluss von den zwei Arten der Halt auf sinnlichen Funktionen.

Diese Prüfungen erreichten substantiell die Resultate wie unser fruher Resultate. Die foderliche Wirkung von der sinnlichen Belastung wurde, in Durchschnitt, nicht so auffahllend wie diejenige der sinnlichen Entziehung. Bei der Gruppe von der sinnlichen Belastung wurde die individuall Differenz kleiner, während die bei der Gruppe gross wurde.