

Studies on Sensory Deprivation: III. Part 6. On the Results of the Polygraphic Records

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journal or publication title	Tohoku psychologica folia
volume	23
number	3-4
page range	72-74
year	1966-03-19
URL	http://hdl.handle.net/10097/00123714

STUDIES ON SENSORY DEPRIVATION : III

PART 6. ON THE RESULTS OF THE POLYGRAPHIC RECORDS

By

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The polygraphic results indicated that the activation level of Ss under the condition of 24 hours of sensory deprivation corresponded with the activity rhythm of the organism in the daily life as that under the condition of previous studies of 48 hours.

The findings of our previous report concerning the polygraphic records during the sensory deprivation of 48 hours are summarized as follows: (1) In EEG, slow waves of the middle level appeared persistently throughout the most part of the 48 hour experimental period. (2) Other measures, typically in the heart rate, showed a W-shaped day-and-night rhythm. The aim of this paper is to examine whether these main tendencies are found or not under the condition of 24 hour sensory deprivation.

METHODS

Polygraphic recordings during 24 hours were made by a 8-channels EEG apparatus at every fifteen minutes for about 1 minute. EEG was conducted monopolarly from frontal, central and occipital area along median line through surface electrodes attached with paste for EEG and fixed with collodion. The EEG records were classified into five categories according to the classification by Jasper, H.H.: (1) deep sleep — δ -wave, (2) asleep — δ plus θ -wave, (3) drowsy— α suppression, (4) relaxed — α -wave and (5) excited — β -wave. GSR was recorded directly on Bridge-circuit from the electrodes attached on the palm of Ss' left hand. EMG and EKG were led by the surface electrodes for EEG placed on the neck and breast respectively.

RESULTS

The general findings of 7 Ss' EEG records, excluding the insufficient records of 3 Ss, are as follows: For records of 6 of 7 Ss, at the first-half period of the sensory deprivation, the α -wave dominantly appeared and the δ -wave intermittently. At the middle period the θ plus δ -wave and the α -suppression were dominant; at the latter half period, α suppression and α -wave dominant. In the EEG records of another subject was α -wave dominant throughout the whole period of the sensory deprivation.

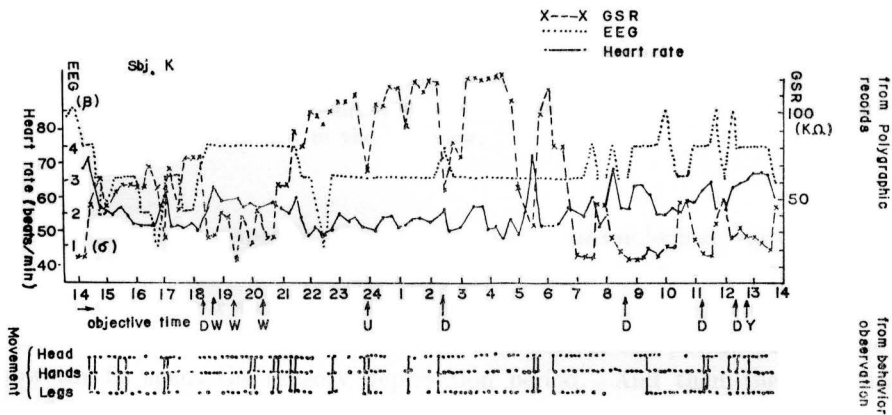
From the results of EKG, it was found that the mean heart rate in beats per minute was about 66.5 at the beginning of the sensory deprivation; After 8 or 9 hours from the beginning (at P.M. 9:00~10:00 hrs.), it began to reduce and then, in the midnight (at A.M. 2:00) it came to the lowest value (the mean value =46.0). In the

course of time, however, the mean heart rate began to increase. From these results, it can be seen that in the heart rate the curve follows a V-shaped course during 24 hours of the sensory deprivation.

The galvanic skin resistance value, excluding the insufficient records of 5 Ss, was taken as measure of GSR for 5 Ss. For 3 of 5 Ss the curve in resistance value drew an inverse V-shaped course during the experimental period. For one of the rest of subjects at the beginning the resistance value was lower and, with the lapse of time, began to increase: In the end, it came to a maximum value. This curve followed a J-shaped course. The value of the last one changed frequently, drawing a zig-zag shaped curve.

It was found that the results of EMG and respiration corresponded to these results of EEG, EKG, and GSR. Moreover, the frequent occurrences of EMG impulses go parallel with the overt body movement observed through the TV camera.

As for the result of EEG, EKG, and GSR, an example showing the typical tendencies is given in Fig. 1.



The connecting line of each point shows a movement of a whole body.

D=Drinking W=Whistling U=Urination Y=Yawning

Fig. 1. An example of the results obtained from polygraphic records and behavior observation during sensory deprivation.

DISCUSSION

From these polygraphic results it would be indicated that the activation level of Ss under this condition of 24 hours sensory deprivation corresponded with the rhythm of the organism in the daily life as that under previous condition of 48 hours⁽¹⁾; At the beginning and the end period of the sensory deprivation, that is, at 1:00-2:00 p.m. in this experiment, Ss showed higher activity, while at the middle period, that is in the midnight lowest activity. Furthermore, in examining the results of EEG in detail, it was found that intermittent occurrences of δ -wave in the beginning and, as show in previous studies (2) (1), the tendency toward a frequent appearance of chornic slow waves at the latter half of the experimental period. Further considerations are

desired on these points.

As for the GSR, further examination of the polygraphic records by case study may be needed; For example, Subject T of zig-zag type in GSR showed the body movement frequently through the experimental period and Subject K of J-shaped type reported the increasing need of affiliation and communication with other persons at the end of experimental period.

Further, in the next report the correspondence of the polygraphic records and the behavioral observations will be described.

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(Received January 10, 1965)

ZUSAMMENFASSUNG

Die polygraphischen Aufnahmen des Experiments zeigen, dass das Aktivierungsniveau unter der Bedingung der 24 Stunden lang sinnlichen Entziehung von einem Rhythmus des Organismus im täglichen Leben beeinflusst wurde, wie das unter der Bedingung der 48 Stunden.