The effect of hypnotically induced fatigue on reaction time¹

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As part of a program investigating the effects of attention on automobile driver performance, the use of hypnosis as a research tool was studied in relation to a reaction time task. Reaction time increased 57% as a result of the hypnotically induced "fatigue" state. Some restrictions are suggested in utilizing hypnosis as a research tool.

As part of a research program concerned with the process of attention as it affects automobile driver performance, the feasibility of utilizing hypnosis as a research tool was studied. The similarities between the variables employed to induce the hypnotic state, e.g., monotony and bright fixation points, and those variables encountered in driving on modern super-highways are striking. On this type of road, the driver experiences fewer of the demands commonly encountered when driving on more conventional roads, i.e., stop lights, cross traffic or pedestrians, steep grades or sharp curves. Oncoming traffic is usually shielded from the driver's direct vision by shrubbery. In short, he is subjected to monotonous, repetitive stimulation. The area of glare reflected from the road is constantly in his visual field and commonly maintained at an unvarying distance, as is the glare from the hood and the dashboard. Thus, the variables of monotony and bright fixation points, which are part of all conventionally employed hypnotic induction procedures, also are present in the driving situation.

Williams (1963) has demonstrated empirically that a person is capable of operating an automobile while in the hypnotic state, both in normal city traffic and on narrow country roads, with no recollection of ever having driven the automobile. Under such conditions, S's reaction time in changing gears and applying brakes appeared qualitatively slower than normal.

The purpose of the present experiment was to measure the effects of an experimentally induced hypnotic state on reaction time. To this end, data were obtained under four experimental conditions: Prehypnotic, used as the control or base line condition, Hypnotic-no fatigue suggested, Hypnotic-fatigue suggested, and Posthypnotic.

Method

Volunteers for the screening process were obtained from introductory psychology classes. Screening consisted of having a seated S fixate on a 1 in. white triangle mounted on a 24 x 18 in. black cloth in a dimly lit room from a distance of approximately 7 ft. The hypnotic state was induced by means of a standard induction procedure. The Barber Suggestibility Scale

(Barber & Calverley, 1963) was administered, and the 10 Ss, five males and five females, attaining the maximum score were selected for the reaction time task. Total screening time required was 1 h per S. Approximately 40% of those screened were selected. Including the screening procedure, Ss had from 1 to 19 h previous experience under hypnosis. Of those screened, there were no obvious differences between those Ss who were accepted and those rejected. Ss were paid two dollars per hour of participation.

The apparatus consisted of a Lafayette four choice stimulus-response device connected to a Hunter Klockounter. Reaction time was measured for each S under the four conditions described above. The Hypnotic-no fatigue and the Hypnotic-fatigue conditions were alternated between Ss to control for order effects. The stimuli were presented in a random order for a total of 50 trials per condition. S was seated before a 30 in. high table with his hand resting in his lap such that the distance between his hand and the stimulus-response device was 12 in. Hypnosis was induced as in the screening process. Under the Hypnotic-no fatigue condition S was instructed to remain in the hypnotic state but otherwise to feel exactly as he did prior to being hypnotized. The hypnotic-fatigue condition was induced by suggesting to S that he had been driving for many hours at night on a monotonous straight highway, his eyes ached, and his whole body was extremely fatigued. He was then told to open his eyes and again perform the reaction time task.

Results

The data expressed in terms of mean reaction time are: control or Prehypnotic 0.713 sec, Hypnotic-no fatigue 0.865 sec, Hypnotic-fatigue 1.119 sec, and Post-hypnotic 0.725 sec. Expressed as a percentage, this corresponds to a performance decrement of: 21% under Hypnotic-no fatigue, 57% under Hypnotic-fatigue, and 2% under the Post-hypnotic condition.

Significant values of *t* for matched samples (one tailed test, *df*=998) are: Pre-hypnotic, Hypnotic-no fatigue (*t*=3.46, *p*<.005); Pre-hypnotic, Hypnotic-fatigue (*t*=6.95, *p*<.005); and the Pre- and Post-hypnotic conditions were not significantly different (*t*=0.27).

Discussion

Reaction time under hypnotically induced fatigue was slower than normal. The decrement in performance reflects slower reaction time and, as observed by E, an increased tendency to err in coordinating eye-hand movements. Verbal reports indicated Ss had

experienced the effects of long distance superhighway driving prior to being hypnotized and it was relatively easy for them to reproduce the behavior exhibited in this operationally defined fatigue state.

It was expected that no difference would obtain between the pre, post, and no fatigue conditions. However, the 21% performance decrement in the no fatigue condition may have been due to an experiential factor. Six Ss had had a minimum of seven hours previous hypnotic experience. The data from the six experienced Ss show a performance decrement of only 2% under the no fatigue condition. This view is supported further when the experience of the hypnotist is considered. Two hypnotists, one experienced and the other relatively inexperienced, employed the induction procedure, and there was essentially no difference in performance

between the two groups. In the laboratory setting, the major factor seems to be the experience of the S, not of the hypnotist.

It is concluded that hypnosis can be a useful research tool in studies of skilled performance under certain conditions, namely, using experienced Ss and suggesting situations with which they have had previous experience.

References

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Note

1. This study was conducted as part of a research program sponsored by the Transportation Research Center, The Pennsylvania State University. Daniel B. Yoppi assisted in the collection of data.