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Schiff, Sheldon K., Bunney, William E., and Friedman, Daniel X. "A study of ocular movements ~~in~~ hypnotically induced dreams," never ment Dis, 1961, 133, 59-68.

This study is based upon the earlier research of Aserinsky and Kleitman and W. Dement, who found correlations between the occurrence of dreams and observed eye movements in natural sleep. (1953, 1957). The authors explore the possibility of a similar relationship existing between eye movements and hypnotically induced dreams; if such a relation can be found, it will be possible to devise further research in which both dream content and eye movement can be controlled "to delineate more clearly the relation between dreams and ocular activity in dreams of normal sleep" (59).

The relationship between EEG patterns, eye movement, and type of activity in the trance state dream, and in the post-hypnotic/suggestive state dream, were studied intensively in one subject. She was 25 years old, white, unmarried, and extensively trained in hypnosis experiments. There is no control subject. Seven silver electrodes were applied to S for recording EEG and eye movement. A sound-proof room with a one-way mirror was utilized, and in all experiments at least 1-2 observers were present in the adjoining recording room. The hypnotist sometimes remained in her room and at other times observed her from the recording room. She was fully aware of his ability to see and hear her, but it is not mentioned whether she understood the nature of the experiment.

The S was hypnotized during each of 12 sessions to dream either in the trance state or to dream post-hypnotically. Some instructions controlled the amount of activity within a specific content; others controlled the dreamer's activity; some instructions directly influenced the amount of eye movement. In addition, S was occasionally requested to signal at the beginning and end of a hypnotically induced dream by a prearranged motor act (crossing her legs).

The results indicate 1) an abrupt change in eye movement patterns when going from trance state to waking or vice versa. The change is from little to no eye activity in the trance, to a great deal of random activity in the waking state. There is no change in EEG from the trance to waking states. i.e., the trance state EEG remains typical of the waking EEG pattern; 2) Activity vs. passivity of dream scene: There is a great deal more eye movement noted in the 'active' dream recordings than in the 'passive', though eye movement does not altogether disappear. (note: all results are shown graphically by segments of the actual Electroencephalograph recordings). 3) Attempt to control eye movement: It was very difficult to eliminate all eye movement by hypnotic suggestion. The S found it difficult to keep from peeking around, even when instructed to fix her gaze. There was one successful attempt. When she was instructed to have an active dream which would remain pleasant only so long as she kept her eyes fixed, no eye movements whatsoever were recorded, although she expressed disappointment at not being able to find out what was in the periphery of the dream scene. 4) Control of the point of view of the dreamer; in relation to dream content: The S was instructed to view a very active ping-pong match. During the match she was told, "You have a mask completely covering your face now." Then she was told that it had been removed. The eye movement sequence went abruptly from very active, to minimal, to very active, corresponding directly to the sequence of events in the dream. She described herself as being very uncomfortable when the mask was on. In a second experiment, the S was instructed first to be a participator



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in a sports match and then to be an observer. When asked if she remembered her dream, she replied "...I had two dreams. In the first one I was in a good volleyball game. It was very exciting. When you put the mask on I was afraid the ball was going to come down on my head so I looked around whenever I heard it bounce." (65) In this sequence, no eye movement diminution was noted when the mask was on, although it had been found on all previous occasions. However in the second part of her dream, as observer, the effect of the mask was to diminish the eye movements completely. **S** post hypnotically suggested dreams: When S was instructed to go into a deep natural sleep 15 minutes after the trance, the EEG indicated deep sleep for about 2 hours, but without the appearance of eye-movements and light sleep associated with the natural dream state. The specific dream that was supposed to take place $\frac{1}{2}$ hour after deep sleep did not occur.

Discussion:

"It is clear that dreaming during a hypnotic trance, dreaming during sleep as a post-hypnotic task, and dreaming during natural sleep share certain characteristics with respect to the phenomenal experience and to ocular movements, and differ with respect to the EEG. Natural dreams have the EEG of light sleep; trance and post-hypnotic dreams have an essentially waking EEG." (65) "...It is assumed ...that these differences in the EEG reflect differences in special states of consciousness and in the conditions which induce such states, rather than differences in the essential nature of dreaming" (66).

The results of this study were in agreement with those of Dement. "Eye movements similar to the waking state occurred during hypnotic dream and the frequency and amplitude of these movements were related to the amount of activity in the dream" (66). It was very hard for the S to eliminate all movement of the eyes when instructed to fixate. "S seemed to have a strong need to orient herself within the perceptual field; she used sound as a cue...when looking was prohibited." (66) In other words, the interference with S's desire to scan and orient herself \star in the dream scene was essentially disrupting to her.

Eye movements are seen to correlate more with an "active attitude" of the dreamer, than with the activity per se, "in the sense either of his own participation or of his ability to create, 'project', or tolerate a great deal of movement in his dream scene" (67).