

CORE STUDY #2: DEMENT & KLIETMAN 1957 (DREAMS)

Aim

The general aim was to explore the connection between eye movements and dream experiences.

There were 3 specific aims:

1. Does dream recall vary between REM and NREM sleep stages?
2. Is there a positive relationship between estimated dream duration and REM period length?
3. Do eye movements relate to the content of dreams?

Hypotheses

1. A significant correlation exists between REM sleep and the occurrence of dreaming.
2. A positive correlation can be observed between the estimated duration of dreams and the length of REM periods.
3. There is a significant connection between patterns of eye movements and the content of dreams.

Background

Aserinsky (1955), a student of Kleitman, discovered that individuals awakened from REM sleep were more likely to report vivid, visual dreams compared to those awakened from NREM sleep. This research also revealed the alternating sleep stages involving REM and NREM. Dement and Kleitman then went on to question whether there is a correlation between sleep stages and dreaming (mainly REM sleep) and a correlation between eye movements and dream content.

They used a range of tools in their study:

- **EEG** (electroencephalogram): Monitors cyclical changes in brain activity during sleep by placing electrodes around the skull.
- **EOG** (electrooculogram): Tracks eye movements during sleep using electrodes positioned around the eye area.

The two stages of sleep involved were:

- **REM** (Rapid Eye Movement): A sleep stage associated with vivid dreaming.
- **NREM** (Non-Rapid Eye Movement): A different sleep stage.

Method

Participants

- Nine participants were recruited through opportunity sampling, consisting of 7 males and 2 females. The initial group of 5 participants underwent a detailed study, while an additional 4 participants were included to corroborate the results.
- Among the primary participants, 5 individuals spent between 6 and 17 nights in the lab, experiencing approximately 50 to 77 awakenings. The remaining 4 participants spent 1 to 2 nights in the lab and experienced 4 to 10 awakenings. Each participant was identified by their initials.

Design

- Laboratory experiment: employed distinct methods to investigate each research objective.
- Approach 1 employed a natural experiment with a repeated measures design.
 - └ The independent variable (IV) was whether participants woke up from REM or NREM, while the dependent variable (DV) focused on whether they could recall a dream.
- Approach 2 utilized a true experiment within a correlational study framework, also adopting a repeated measures design.
 - └ The IV involved waking participants after 5 or 15 minutes into REM sleep, and the DV centred on participants' estimates of dream duration (5 or 15 minutes). A correlational analysis was employed to validate participants' estimated dream duration and the word count in their dream narratives.
- Approach 3 involved a natural experiment with a repeated measures design.
 - └ The IV in this case pertained to participants' eye movement patterns, and the DV revolved around the content of their dreams.

Procedure

- Participants arrived at the laboratory before their usual bedtime and maintained their regular diet, with the exception of refraining from caffeine to avoid alertness and alcohol to prevent drowsiness on the day of the study.
- They slept in a dark, quiet room equipped with 2 EOG electrodes near their eyes and 2/3 EEG electrodes attached to their scalps.
- A doorbell was used for standardization to randomly wake participants up from REM or NREM sleep.
 - └ All participants returned to sleep within 5 minutes.
- In Procedure 1, participants were woken up at various times to assess their dream recall during both REM and NREM sleep.
 - └ Dream narratives were recorded on a tape recorder to eliminate researcher bias. Participants were asked whether they had a dream, and if so, they documented it. Dreams were only considered if the recall was clear.

- Procedure 2 - Participants were awakened either 5 or 15 minutes into their REM sleep and subsequently attempted to estimate the duration of their dreams.
 - ↳ Following their estimations, the word count of the dream narratives they provided was tabulated.
- Procedure 3 - Participants' eye movement direction was monitored using EOG, and they were awakened to report their dreams.

Results

- All subjects consistently experienced REM sleep every night, with individual variations in REM patterns. Nonetheless, each participant exhibited a regular REM pattern.
- On average, there was a 92-minute interval between different dreams, with a range spanning from 70 to 104 minutes.
- The average length of REM sleep was 20 minutes, with a range of 3 to 50 minutes, and it tended to be longer later in the night. Bursts of rapid eye movements occurred in sequences of 2 to 100.
- Participants awakened from NREM sleep typically returned to NREM sleep, while those awakened from REM sleep generally transitioned to NREM sleep (though sometimes returning to REM sleep to complete the final phase).

Results 1:

- ↳ Awakenings from REM sleep resulted in a dream recall rate of 79.6%, whereas awakenings from NREM sleep yielded a dream recall rate of only 7%.
- ↳ Waking participants within the first 8 minutes of completing their REM period led to the recall of 5 out of 17 dreams. In contrast, waking participants after 8 minutes resulted in the recall of just 6 out of 132 dreams.

Results 2:

- ↳ The estimation of REM duration was remarkably accurate, with a high accuracy rate of 88% for 5 minutes and 78% for 15 minutes.
- ↳ A positive correlation existed between REM duration and the length of dream narratives. A total of 152 dream narratives were collected, but 26 were excluded due to poor recording, leaving a final count of 126 narratives.

Woken 5 minutes into REM sleep		Woken 15 minutes into REM sleep	
51 tests		60 tests	
Correct	Incorrect	Correct	Incorrect
45	6	47	13

Results 3:

- ↳ Vertical eye movement occurred while standing at the base of a towering cliff and operating a hoist.
- ↳ Horizontal eye movement was observed in a scenario where two individuals engaged in a tomato-throwing exchange.
- ↳ Both vertical and horizontal eye movements were evident during conversations with people in close proximity.
- ↳ Little or no eye movement was detected when participants were either gazing at distant objects or fixated on a particular item.

Conclusions

- Dreams exclusively take place during REM (Rapid Eye Movement) sleep. Dreams reported during NREM (Non-Rapid Eye Movement) sleep are essentially remnants of prior REM episodes.
- The duration of dreams and the lengths of REM periods are remarkably similar, suggesting that dreams unfold in real time rather than as instantaneous events.
- Eye movements are reflective of the dreamer's focus and surroundings in the dream, emphasizing their non-random nature.

Evaluation

A strength of this study is that it is highly replicable. This is because it was conducted in a controlled laboratory environment with standardized procedures such as using the same doorbell sound for each participant and using the same EEG and EOG machines for each participant. This means another researcher can simply get another group of participants and repeat the procedure exactly and compare and test the results for accuracy. This allows the findings of the study to be tested, therefore increasing the validity of the study.

Another strength of this study is that it is highly reliable. This is because the study collected quantitative, objective data through scientific methods like EEG and EOG scans. The test was also standardised, with the same machines and doorbell sounds being used for each participant. This means that the results were not subject to interpretation and thus free from researcher bias. The participants were also not told the sleep stages they were woken up in so they could not change their answers, and so the results were free from social desirability and demand characteristics. This increases the validity of the results of the study.

A weakness of this study is that it used a very small sample size. This is because it used a small sample size of only 9 people, out of which only 5 underwent detailed study. Because of this, the results cannot be generalised to the wider population of individuals. The small sample size also increases the chances that the results may have been impacted by participant variables. This reduces the results of the study because they cannot be applied to a wide variety of people.

Another weakness of this study is that it lacks ecological validity and mundane realism. This is because it was done in a controlled laboratory environment with standardised procedures and the participants had to report their dreams to researchers and sleep under monitored conditions where they were woken up every five/fifteen minutes, which are not normal circumstances for people to sleep in. Because of this, the results cannot be applied to reality which reduces their validity.

Issues and Debates

- **Nature vs. Nurture:** The content of dreams is influenced by our experiences, representing a product of nurture. Conversely, the capacity to dream is inherent, stemming from nature.