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# The Biological approach

## Main assumptions

1. Behaviour, cognitions and emotions can be explained in terms of the working of the brain and the effect of hormones, genetics and evolution.
2. Similarities and differences between people can be understood in terms of biological factors and their interaction with other factors.

## Dement and Kleitman [sleep and dreams]

The psychology being investigated

- Sleep → REM/n-REM sleep.
- Dreams

There are five stages of sleep. Stage 1 & 2 → lighter stages
3 & 4 → deep stages

- In the deeper stages, brain waves slow down and show a pattern of high amplitude and low frequency.
- The final stage is Rapid eye movement [REM] sleep. Here the brain waves high frequency and low amplitude, similar to when we are awake.
- Researchers often refer stages 1-4 as non-rapid eye movement (non-REM) sleep

Signs of REM sleep:

- Body temp changes
- Body twitching
- Increased blood pressure
- Increased brain activity
- Increased heart rate

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## Background

Psychometrics used in the study:

1. EEG (electroencephalogram) = traces cyclical changes that occur in brain activity during sleep. Electrodes are placed around the skull to analyse brain waves.
2. EOG (electrooculogram) = traces eye movements during sleep. Uses electrodes placed around the eye region.

- Aserinksy (1955) (student of Kleitman) revealed that participants who were woken from REM sleep were more likely to report vivid, ~~th~~ visual dream than participants who that woke up from n-REM.
- They also showed cased to have several sleep stages alternating between REM and n-REM.

## Aims

1. To see if dream recall occurs during REM or n-REM sleep.
2. To see if there is a link between the estimate of dream length and length of REM period.
3. To see if the pattern of eye movements [vertical/horizontal] is related to dream content.
4. To see if there is a positive co-relation between the length of REM and ~~the~~ number of words given in a dream narrative.

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## Research hypothesis

1. There will be significant association between REM sleep and dreaming.
2. There will be positive correlation between estimated dream duration and REM period length.
3. There will be significant association between eye movement patterns and dream content.

## Research method

A laboratory experiment, but different methods to test each aim.

## Research Design

Approach 1 : natural experiment ; repeated meseasures design. I.V - whether they woke up from REM or n-REM sleep.
D.V - whether they recalled a dream or not.

Approach 2 : True experiment using correlational study; repeated measures design.
I.V - waking participants after 5 or 15 minutes into REM sleep.
D.V - participants guess on dream duration (5-15 mins); correlational analysis used to cross check participants dream duration and the word count of their respective dream narrative.

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Approach 3 : natural experiment; repeated measures design.

I.V - eye movement patterns

D.V - dream content

Sample Size

7 males and 2 females were recruited through opportunity sampling. 5 studied in detail and 4 (control group) used to confirm the results of the first 5.

The study took place in a sleep laboratory at the University of Chicago, USA.

Procedure

Participants reported to the lab before their usual personal bedtime. They ate their normal diet but were asked to avoid caffine (alertness) and alcohol (drowsiness) on the day of study. They slept in a dark, quiet room. They had two EOG near their eye and 2/3 EEG electrodes to the scalp. A doorbell (for standardisation) had been used to wake participants up at random from REM or n-REM. All participants were woken up when an eye movement pattern lasted for atleast a minute. Everyone returned to sleep in less than 5 minutes.

Procedure 1 : They were woken up at various times to test their dream recall (during REM & n-REM).

Dream narrative recorded on a tape recorder.

They were asked if they had a dream or not, and if they did, then they recorded it.

Dream only counted if recall was clear.

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- Procedure 2: Participants were woken up after either 5 or 15 minutes into their rem sleep. Participants guessed the duration they had dreamt for. The number of words in the dream narrative was counted after the participants reported their dream.

- Procedure 3: Participants eye movement direction was detected with the EOG. Participants were woken up and they reported their dream.

Results

- All subjects showed REM sleep every night. REM patterns varied per individual but each individual had regular REM pattern.
- 92 minutes was the average time gap between different dreams. The range was 70 - 104 minutes.
- The avg. REM length was 20 minutes and the range was 3 - 50 minutes. It was longer later in the night. Bursts of 2 - 100 rapid eye movements.
- Those woken in n-REM returned to n-REM. Those woken in REM went to n-REM (but sometimes went to ~~compl~~ REM to complete the final phase.)

Results for aim 1:

Dream recall occured predominantly in REM sleep. Participants had a high incidence of dream recall following REM awakenings [80 percent] and low incidence of recall following non-REM awakening [7 percent].

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## Results for aim 2:

All participants were able to determine whether they had been dreaming for 5 or 15 minutes with high accuracy [correct 83% from 111 awakenings], with exception of one participant who was only correct 65% of time and tended to underestimate the length of time he had been dreaming.

## Results for aim 3:

- Vertical eye movements dream reports included looking at climbing on a cliff, climbing ladders and throwing a basketball.
- The only dream report following horizontal eye movements involved watching two people throwing tomatoes at each other.
- Little or no eye movement dream reports included driving a car.
- Mixed eye movement dream reports included talking to a group of people, searching for something and fighting with someone.

## Results for aim 4:

There was moderate pasitive correlation between duration of REM and no. of words in dream narrative. The avg. correlation coefficient was +0.58, with individual results ranging from +0.40 to 0.71.

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## Conclusion

Dreaming occured during periods of REM sleep in distinct episodes through out the night. The researchers concluded that dreaming can be objectively measured by recording REM cycles during sleep.

## Evalution of the study.

* Methodological issues.

1. Reliability : Reliability is high as it was a lab experiment with many controls. For example, the doorbell made people instantly wake up so that dreams wouldn't be forgotten by slow-woken people.

- Demand characteristics were avoided as participants were not told whether they were in REM or not as otherwise, they would try recalling harder.

2. Validity : exhibits validity as the details recorded focused on dreaming; the defination of 'dream' had been operationalised; asking participants to choose between 5 or 15 mins helped reduce participant variables such as ability to guess.

- Lacks ecological validity as people who are used to taking alcohol & caffine may experience atypical dreams. Sleeping in lab connected to electrodes would be unusual, and this may tamper with their sleeping behaviour.

* Objectivity & Subjectivity

1. Quantitative data such as brain waves, eye movement patterns, and REM sleep duration was collected through

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the EEG and EOG.

2. Qualitative data such as the dream content was collected, but it's subjective and can affect the validity since the narrative length is not only dependant on the REM phase length, but also on the participant's expressiveness.

* Generalisations

- Both genders were included thus, there's generalisability. However, the sample size is too small, therefore limiting generalisability.

Nature vs. Nuture

Dream content relates to our experience, so it is a product of nurture. However, the ability to dream is a product of nature.