
1. (a) Name the technique used to measure brain activity. [1]

Electroencephalography (EEG)

(b) Identify *one* reason for using this technique to measure brain activity. [1]

It would help distinguish between rapid-eye movement (REM) and non-rapid-eye movement (nREM) stages of sleep for the researchers.

(c) Outline one of the dreams reported when vertical eye movement was recorded. [2]

One participant reported seeing themselves throwing basketballs at a hoop. They saw themselves looking up at the hoop and then downwards to pick up another ball.

2. In the study by Dement and Kleitman (sleep and dreams), participants were fitted with electrodes for the EEG (electroencephalogram).

(a) Describe the procedure after these electrodes had been fitted. [5]

After the electrodes had been fitted, the participants had to go off to sleep. They were then awoken from different rapid-eye movement (REM) and non-rapid-eye movement (nREM) of sleep throughout the night. A doorbell that was loud enough to wake them up from deep sleep was used. Once awake, participants had to report whether they had been dreaming or not. If they had, they had to record a description of their dream into a recording device near their bed. Then, they would go off to sleep again. Sometimes, the researcher would come into the room to clarify some aspect of the participant's dream with them.

3. Evaluate the Dement and Kleitman (sleep and dreams) study in terms of two strengths and two weaknesses. At least *one* of your evaluation points must be about the use of quantitative data. [10]

One strength of the study was the use of quantitative data. Researchers calculated the percentages of dream recall by participants following awakenings from rapid-eye movement (REM) and non-rapid-eye movement (nREM) stages of sleep. Similarly, they calculated the percentage of accuracy of their dream duration estimates when awoken from either 5-minute or 15-minutes of sleep. This helped researchers objectively compare in which stage of sleep participants reported a greater recall of dreams. Likewise, they objectively compared when their accuracy of dream duration estimates between the two durations of awakenings was better, without any bias. This increased the internal validity of findings.

Another strength of the study was the use of a highly controlled procedure. Researchers took care to maintain a quiet and dark room as participants slept to prevent their normal pattern of sleep from being disrupted in the laboratory. They also asked participants to eat normally but avoid consuming caffeine and alcohol for the same reason. Further, to prevent participants from being disrupted from their sleep by becoming entangled in the wires of the electrodes that they were sleeping with, they neatly tied all the wires into a ponytail behind the participants' head. These and other controls ensured that any dream-related activity of participants could be attributed only to the stages of sleep they were in and not to uncontrolled variables like the influence of alcohol or coffee, etc. that created disruption in sleep. This also increased the internal validity of findings.

However, one weakness of the study was that it lacked mundane realism. Participants were made to sleep in a highly controlled, unfamiliar laboratory environment which could be much quieter or darker than the home environment where most people usually sleep. Additionally, having to sleep with electrodes fitted on the scalp and near the eyes; and having to wake up several times in the night to report dream activity was also taken away from the usual sleeping that is done at home. Such artificiality in the environment and procedures makes the study's findings such as dreaming usually occurs in REM stage of sleep less generalisable to everyday sleeping and possibly more of a laboratory phenomenon. This reduces the ecological validity of findings.

Another weakness was the use of a very small sample for the study. There were only seven in total, out of which only five were studied in detail. It is possible that the sleeping patterns such as the duration and frequencies of the stages of sleep they experience could be different from that experienced by the rest of the population. That is, it is possible that given their specific sleep patterns, they would largely experience dreaming in the REM stage of sleep and not other people with other sleep patterns. This reduces the population validity of the findings.

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4. Outline *one* open question from the study by Dement and Kleitman (sleep and dreams). [1]

“Please describe the dream that you have just experienced.”

5. Dement and Kleitman (sleep and dreams) compared dream duration estimates for 5-minute and 15-minute REM periods.

Write a null hypothesis for this part of the study. [2]

“There is no significant difference between dream duration estimates for 5-minute and 15-minute REM periods. Any observed difference is due to chance.”

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