Dement and Kleitman (1957)

Lesson 1.1.1 | Sleep and dreams | Cambridge 9990, 2027

Main idea: physiological recordings can help investigate dreaming, but dream experience is still inferred from what people remember and report.

1. Concepts and background

The biological approach explains behaviour, thoughts and emotions through the brain, hormones, genetics and evolution, interacting with other factors. This study linked eye movements and brain activity with dream reports; it did not directly test genes or hormones.

REM: rapid-eye-movement sleep, with characteristic EEG activity. **NREM:** non-rapid-eye-movement sleep; not uniformly deep sleep. **EEG:** brain electrical activity recorded through scalp electrodes. Eye electrodes record eye-movement-related potentials.

Dreaming: subjective experiences during sleep. **Dream recall:** remembering and reporting content after awakening. **Ultradian rhythm:** a biological cycle shorter than 24 hours, recurring within a day. Earlier research linked REM with dream reports; this study sought stronger, more objective evidence.

2. Three aims

1. Compare dream recall after REM and NREM awakenings.
2. Relate perceived dream duration to recorded REM duration.
3. Relate eye-movement patterns to visual dream content.

3. Sample and procedure

Nine adults: seven male, two female. Five were studied intensively; four provided limited confirmatory data. Total: 61 participant-nights and 351 awakenings. Recruitment was not reported; do not invent a sampling technique.

Participants ate normally but avoided alcohol and caffeine that day. They slept near their usual bedtime in a quiet, dark laboratory room. Scalp and eye electrodes recorded continuously; researchers monitored next door. A doorbell woke participants, who reported into a recorder before researcher questioning.

Recall criterion: a coherent, fairly detailed account of dream content. Saying "I dreamed" without content, or reporting only vague fragments, did not count as recall.

4. Research methods and controls

Experimental comparisons used repeated measures: the same people supplied different conditions. REM/NREM was the sleep-state IV; recall/no recall was the DV. In the duration test, the IV was 5/15 minutes of REM and the DV was judgement accuracy. Correlations and self-report/interviews were also used.

Participants were not told the current eye-movement state. Reporting before contact reduced suggestion. Awakening schedules varied: random-number tables, fixed patterns or researcher judgement. They were not identical for everyone.

Three investigations: key evidence

Results, procedures and conclusions to remember

1. REM versus NREM dream recall

Awakened from	Recall	No recall	Total
REM	152	39	191
NREM	11	149	160

Recall occurred after about **80% of REM** awakenings versus **7% of NREM** awakenings. These are repeated awakenings, not different people. REM was strongly associated with recall; this does not establish REM-only dreaming or causation.

Ultradian rhythm: REM recurred about every 92 minutes on average; individual mean intervals were 70-104 minutes. Uninterrupted REM periods lasted 3-50 minutes (mean about 20), tending to lengthen later in the night. Many other periods were cut short experimentally.

2. Dream duration

After a randomly selected 5 or 15 minutes of REM, participants chose which duration matched their dream. Earlier attempts to estimate to the nearest minute were too difficult.

5 minutes: 45 correct, 6 incorrect (about 88% accurate).
15 minutes: 47 correct, 13 incorrect (about 78% accurate).

Judgements broadly matched recorded time, but were not always correct. Longer REM periods also tended to accompany longer reports, measured in words. These two measured variables are **co-variables**, not manipulated IVs.

Positive correlations: DN +0.60; IR +0.68; KC +0.40; WD +0.71; PM +0.53. Word count is a proxy: talkativeness, reporting style and forgotten details affect it. Neither correlation nor accurate forced choice establishes exact dream timing.

3. Eye-movement patterns and visual content

Participants were awakened after a predominant pattern lasted at least one minute, then described the dream just before awakening. There were 35 awakenings in this investigation.

Pattern	Awakenings	Reported visual activity
Mainly vertical	3	Looking up/down: ladders or basketball.
Mainly horizontal	1	Watching two people throw tomatoes at each other.
Little/no movement	10	Watching distant activity or a fixed object.
Mixed movements	21	Nearby people/objects and varied activity.

Some recorded patterns corresponded to dream imagery. Pure horizontal/vertical examples were rare, and content relied on subjective recall. The evidence does not support decoding every dream from eye movements.

Evaluation and exam reminders

Explain how each study detail affects the evidence

1. Strengths

Objective recording: continuous brain/eye measurements reduced reliance on memory when identifying sleep state. Dream content itself remained subjective.
Controls and replicability: alcohol/caffeine restrictions, a controlled room and a consistent initial-report procedure reduced some unwanted influences and made replication easier.
Repeated measures: comparing conditions within the same people reduced stable individual differences. Quantitative counts supported comparisons; qualitative reports explained content.

2. Limitations

Generalisability: only nine adults, with most intensive data from five and an uneven sex distribution. Many awakenings do not create a large representative sample.
Ecological validity: electrodes, the laboratory and repeated awakenings may affect natural sleep and recall. However, REM regularity resembled earlier findings from uninterrupted sleep.
Measurement and interpretation: forgetting can produce no recall; word count depends on reporting style; matching dream content to eye patterns involves interpretation. Only one horizontal and three vertical observations weaken generalisation.

3. Ethics and issues/debates

Repeated awakenings raise welfare concerns; dream reports may contain private information. WD was told awakenings would occur only when recordings indicated dreaming, but REM/NREM awakenings were mixed: this involved deception.

Consider informed consent, withdrawal, confidentiality and debriefing as safeguards. The paper does not fully report these, so do not claim they were all present or absent.

Recurring REM supports a biological account, but nature and nurture were not directly compared. Individual rhythms varied, while laboratory conditions may also influence sleep. The method could help investigate stress or drugs, but this study demonstrated no treatment. It provides no direct evidence about children or non-human animals.

Common errors: no recall does not mean no dream; not every REM awakening produced recall; association does not prove causation; 351 awakenings do not mean 351 participants; report word count is not exact dream duration.

Hint: Build evaluation as point → specific study evidence → consequence for validity, reliability or generalisability.