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What Determines the Dreams Recalled?

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ABSTRACT

In this paper, I sought to understand what determines the dreams that are recalled so that I could learn a possible way to relieve recurring nightmares. Previous research has predicted dream recall frequency by variables such as time of day one is asleep, sleep awakenings, and interest in dreams. In my correlational study, I tested the strength of these relationships by examining naturalistic daily changes in their variables longitudinally over a period of 11 days. I measured time of day one is asleep by bedtime and sleep duration, sleep awakenings by recording awakenings during the night, interest in dreams by a daily assessment on a five-point scale, and dream recall frequency by number of dreams recalled with and without content. A significant correlation was found between sleep awakenings and dream recall frequency in the study. This correlation suggests that one possible explanation for what dreams one recalls is how many times one wakes up. This study provides an interesting starting point for future studies that could be conducted to determine the reasoning behind this correlation between dream recall and sleep awakenings.

1. Introduction

1.1 Research Problem

There are some people who do not remember their dreams, some who remember very vague and bland dreams, and some who clearly remember strange dreams almost every night. I believe that understanding what causes these kinds of dreams could be helpful for those dealing with nightmares. Going to the root of the issue and understanding what makes dreams more "creative" could help, in turn, to keep them less terrifying. Developing a better understanding of this aspect of the human mind could help reduce stress in many people who suffer from such issues around sleeping. A good night's sleep is paramount to a healthy and productive lifestyle, so solving this problem, and or finding ways to mediate it, is equally important.

1.2 Case History

This study's participant has had quite an extensive history with dreams. They have always experienced very vivid dreams that are odd and sometimes off-putting. They, in the past, have reached out to friends and family inquiring about if this is a common experience or possible reasonings behind this. They received a variety of explanations ranging from sleeping on your side, to eating cheese before bed, and none of which were very insightful from a psychological

perspective. This participant's interest in the subject only grew when they started having recurring nightmares, starting about 6 months ago. This caused a lot of stress around sleeping for the participant as these nightmares would of course be upsetting but not only that, when they would wake up from the nightmare they would be so unsettled they could not get back to sleep, virtually ruining their next day, as they would be so tired. This, understandably, caused even more anxiety around going to sleep. The participant explained that they experience these nightmares periodically and no more than twice a month. They have not looked into what could be the cause of this other than so far as there seems to be no apparent cause; the circumstances around this aren't easily identifiable as 'happening when they are more stressed' or something to that nature. They have started thinking if it is a genetic predisposition or something to do with their past, though they believe it is more likely to be circumstantial/environmental.

1.3 Literature Review

One factor previously found to predict dream recall frequency is sleep chronotype/circadian rhythms. For example, in a survey/observational study by Choo et al. (2023), researchers performed a cross-sectional study – a study that took place at a specific time, as opposed to over a long period – in which they had 87 healthy participants with no underlying sleep disorders, fill out questionnaires about their chronotype (i.e., at what time they naturally go to sleep/wake up and sleep activity) and then undergo a polysomnography - a measurement that records body functions such as brain waves, breathing, or heart rate as you sleep. The study found that those with the eveningness chronotype, who go to bed and wake up later, were not only more likely to have a recall of their dreams but they also had a higher tendency to have nightmares. Based on these results, the researchers suggested that since those with the eveningness chronotype sleep more during the second half of the night and wake up at an earlier time in the circadian rhythm (physical and mental changes someone experiences over a 24-hour cycle), they are more likely to recall vivid dreams.

Another factor previously found to predict dream recall frequency is interruptions during sleep. For example, in a correlational study by van Wyk et al. (2019), researchers observed participants from two groups: High Frequency Recaller (HRF) and Low Frequency Recaller (LFR). The participants spent two non-consecutive nights in a sleep laboratory where they underwent a polysomnography and then, upon waking, were asked to fill out a form on their most recently recalled dream. Researchers found that participants who were HFRs experienced significantly more awakenings during Non-Rapid Eye Movement (NREM) sleep than those who were LFRs. Based on these results, the researchers suggested that dream recall frequency relates to the number of awakenings during NREM sleep.

A third factor previously found to predict dream recall frequency is attitude towards dreams. For example, in a correlational survey study by Schredl et al. (2019) that took place over a period of five years, researchers had participants fill out surveys regarding their attitude towards dreams (e.g., how interested they were in dreams) and their dream recall frequency. The results of this were as expected; they found there was a positive correlation between attitude towards dreams and dream recall frequency that was very stable over time. Based on these results, the researchers suggested that

changes in an individual's dream recall frequency over time are likely due to an interest, or lack thereof, in the subject.

1.4 Hypotheses

Based on the above literature review, I predicted the following hypotheses:

- Hypothesis #1: If one goes to bed later in the night then dream recall frequency will increase.
- Hypothesis #2: If sleep awakenings decrease then dream recall frequency will decrease.
- Hypothesis #3: If interest in dreams increases then dream recall frequency will increase.

2. Methods

2.1 Participant

The author of this paper served as the participant in its studies. The participant was 18 years old at the time of this study, and is female. The participant was an undergraduate student at Camosun College who completed the current study as a research project for Psyc 110 ("Experimental Psychology") due to their interest in dreams.

2.2 Materials and Procedures

I performed a correlational study to test concurrently all of our hypotheses by examining naturalistic daily changes in their variables longitudinally. The participant kept a study journal with them at all times over this study's 11 day period in order to record self-observations of the following four variables: (1) time of day one is asleep, (2) sleep awakenings, (3) interest in dreams, and (4) dream recall frequency.

2.2.1 Time of Day One is Asleep

The participant kept note of when they were in bed trying to sleep, the last recalled time before they fell asleep, and the time immediately as they woke up. They recorded the duration of their sleep each night as well as which hours of the day it took place over. For performing correlations of bedtime with the other variables, clock times were expressed as the number of minutes after midnight when the participant went to bed for the night, where negative numbers represent the number of minutes before midnight and positive numbers represent the number of minutes after midnight. If the participant was awake for a long period of time during the night, they took note of this too.

2.2.2 Sleep Awakenings

The participant recorded the number of times they woke up during the night, to measure sleep awakenings. They kept a notebook and pencil nearby while they slept so that anytime they were consciously awake, they would put down a tally mark, the total indicating how many sleep awakening they experienced in the night.

2.2.3 Interest In Dreams

The participant used a 5-point scale (0 = not at all, 1 = not much, 2 = slight interest, 3 = somewhat interested, 4 = interested, 5 = very interested) to determine their interest in dreams for the day and record it before they went to bed.

2.2.4 Dream Recall Frequency

The participant kept a detailed dream journal every morning, as soon as they woke up, describing everything they could remember from their dreams. The number of separate dreams recalled was counted to assess the degree of the dream recollection. If the participant could not recall any dreams

from that night then the entry was left blank and the dream recall count was recorded as zero, to indicate that no dreams were recalled. The participant also recorded the number of separate dreams they recalled without content.

2.3 Planned Analyses

To assess the strength and statistical significance of associations between variables predicted by my three hypotheses, I performed Pearson product moment correlations of their predictor variables time of day one is asleep, sleep awakenings, and interest in dreams with their outcome variable dream recall frequency. For testing Hypothesis #1, I correlated separately bedtime and sleep duration with dream recall frequency using dreams just with content, dreams just without content, and all dreams. For testing Hypothesis #2, I correlated the number of awakenings during sleep with dream recall frequency using dreams just with content, dreams just without content, and all dreams. For testing Hypothesis #3, I correlated interest in dreams during the day with dream recall frequency using dreams just with content, dreams just without content, and all dreams. A correlation coefficient was considered statistically significant if the probability of its random occurrence (p) was < .05 (i.e., less than 5% of the time expected by chance alone).

3. Results

Table 1 lists the descriptive statistics for the variables in this study. All variables were normally distributed except for sleep duration, which was negatively skewed due to one outlier night with an extremely low (330 minutes) sleep duration. At least one dream could be recalled on 10 (91%) of the 11 study nights. On those 10 nights in which dreams occurred, dream content could be recalled for 75% of the dreams and not for 25% of the dreams.

As depicted in Table 2, the results of the correlational study indicate that dream recall frequency was significantly correlated with sleep duration and sleep awakenings but not with bedtime or interest in dreams. Bedtime was not significantly correlated with dream recall frequency when using dreams just with content, dreams just without content, and all dreams (respectively, r = 0.35, -0.20, and 0.22, p = 0.31, 0.57, and 0.52; see Figures 1, 2, and 3). Sleep duration was not significantly correlating with dream recall frequency when using dreams just with content or dreams just without content (respectively, r = 0.47 and 0.32, p = 0.15 and 0.34; see Figures 4 and 5) but was when using all dreams (r = 0.68, p = 0.02; see Figure 6). However, when the outlier night with an extremely low sleep duration was removed, that correlation was no longer significant (r = 0.19, p = 0.62). Sleep awakenings was significantly correlated with dream recall frequency when using dreams just with content and all dreams (respectively, r = 0.65 and 0.79, p = 0.03 and 0.003; see Figures 7 and 9) but not when using dreams just without content (r = 0.20, p = 0.56; see Figure 8). Interest in dreams was not significantly correlated with dream recall frequency when using dreams just with content, dreams just without content, and all dreams (respectively, r = 0.18, 0.09, and 0.24, p = 0.61, 0.80, and 0.49; see Figures 10, 11, and 12). In a comparison of all the correlations in this study, the strongest correlation was between sleep awakenings and dream recall frequency using all dreams (r = 0.79).

4. Discussion

4.1 Summary of Results

The first hypothesis predicted that if one goes to bed later in the night then dream recall frequency will increase, which was not supported by the results of this study. The second hypothesis predicted that if sleep awakenings decrease then dream recall frequency will decrease which was supported by the results of this study. Finally, the third hypothesis predicted that if one's interest in dreams increases then dream recall frequency will increase, which was not supported by the results of this study.

4.2 Relation of Results to Past Research

Unlike previous studies, the current study showed no statistically significant correlation of time of day one is asleep with dream recall frequency. Similar to this study was a past observational survey study by Choo et al. (2023). However, that past study differed from the current study as it was conducted with multiple participants, all of which were over 18 years old. That study took place at a sleep laboratory where participants were monitored using polysomnography. The age discrepancy and different locations could be possible reasons for the differing results. Future tests could be done to determine if the difference in results had to do with a confounding variable such as age or location of the study, by setting up two groups where the only difference is the age or location of the study. Another factor to consider would be the outcome variable; in the previous study it is never explicitly stated whether there was differentiating between dreams with content or dreams without as dream recall frequency was recorded on a scale rather than number of dreams recalled.

In accordance with another previous study by van Wyk et al. (2019), the current study showed a statistically significant correlation between the number of sleep awakenings and dream recall frequency. The previous study was also a correlational study where participants underwent polysomnographic recordings for two consecutive nights. Participants in the past study were of the same age range or older, and spent time in the sleep laboratory where the study was conducted, prior to the study, to familiarize themselves with the location as well as the equipment. The metric for measuring dream recall frequency was different between the current study and the previous one, however the recording of sleep awakenings was similar (i.e., both recorded the number of times the participants woke up during the night). Overall, the similarities between the two studies and the precautions taken in the past study to eliminate confounding variables, likely contributed to their similar results.

Unlike a previous study by Schredl et al. (2019), the results of the current study did not show a statistically significant correlation between interest in dreams and dream recall frequency. The past study was longitudinal correlation study, spanning five years. The participants in that past study were in the same age range as the participant in the current study. However, the past study's methods were vastly different than the one's utilized in the current study; the past study did not record daily interest in dreams but rather had participants fill out a survey on both interest in dreams and dream recall frequency, twice over a five-year period. Though they found a stable correlation over time, the results of this study do not suggest a day-to-day correlation between the two variables.

4.3 Implications of Results

This study was originally conducted to find a way to control the vividness of dreams and in turn reduce nightmares. I sought to understand which dreams are recalled by determining what factors are correlated with dream recall frequency. However, it would be hard to use the results of the current study to produce any change in one's self in terms of which dreams are recalled. In addition, this study only focused on dream recall, not the vividness of dreams or emotions attached to it. It remains for future studies to see if there is an achievable solution to regulating nightmares. That being said, I believe this study showed that a possible explanation to what dreams are recalled is how many times one wakes up. This could be due to having a chance to consciously recognize the dream before falling back asleep or something of that nature. Questions such as that remain for future studies to test. Overall, this study provided an interesting start to a better understanding of dreams.

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Schredl, M., Braband, M., Gödde, J., Kreicker, S., & Göritz, A. S. (2019). Dream recall frequency and attitude toward dreams: Stability over a 5-year period. *Dreaming, 29*(4), 303.

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Table 1

Descriptive Statistics for Study Variables Across Days

Variable	*n*	Mean	Median	Mode	Minimum	Maximum	Range	Standard deviation	Skewness	Kurtosis
Bedtime (minutes after midnight)	11	-10.9	-10	-60, 0, 30	-60	40	100	35.1	0.0	-1.2
Sleep duration (minutes)	11	537.7	560	No mode	330	620	290	78.2	-2.1	5.3
Sleep awakenings (frequency)	11	3.5	4	5	1	5	4	1.4	-0.5	-1.1
Interest in dreams (0-5 scale)	11	1.8	1	0	0	4	4	1.8	0.2	-2.0
Dreams with content (frequency)	11	2.3	2	1, 4	0	4	4	1.4	-0.1	-1.4
Dreams without content (frequency)	11	0.7	0	0	0	2	2	0.9	0.6	-1.5
All dreams (frequency)	11	3.0	3	4	0	5	5	1.4	-0.8	0.6

Note: *n* = number of days. Distributions were considered normally distributed if they had both skewness (non-symmetry) values between -1 to +1 and kurtosis (peakedness) values between -2 to +2.

Table 2

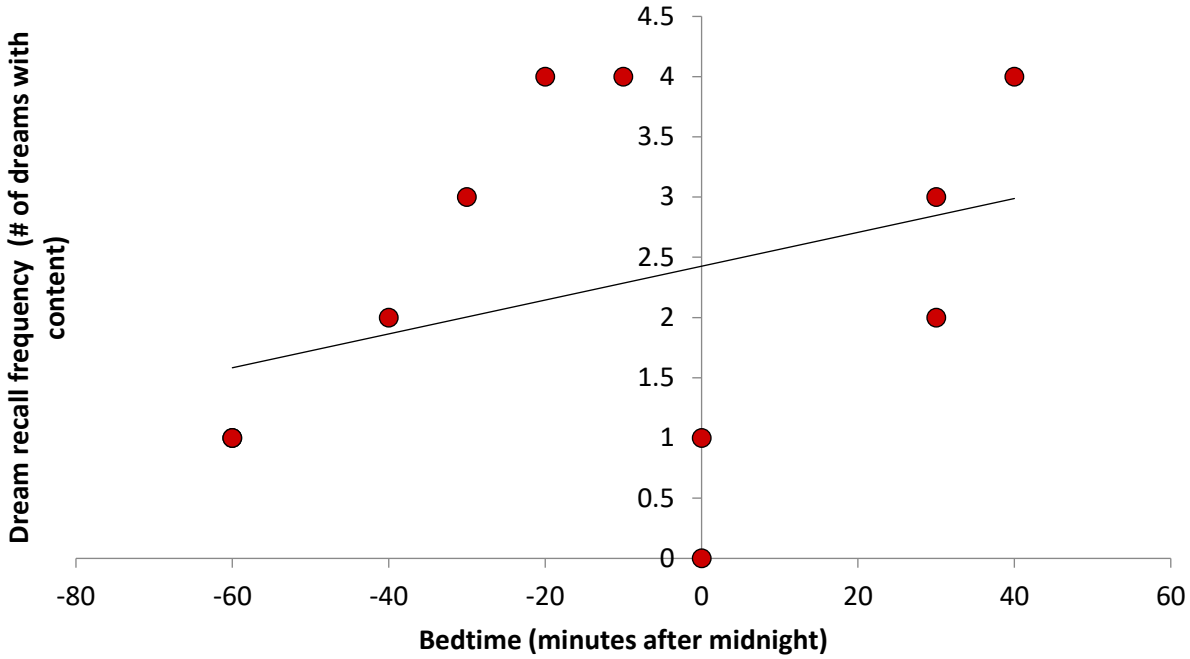
Correlations of Predictor Variables with Dream Frequency Across Days

Predictor variables	Dream recall frequency					
	Dreams with content		Dreams without content		All dreams	
	r	*n*	*r*	*n*	*r*	*n*
Bedtime	0.35	11	-0.20	11	0.22	11
Sleep duration	0.47	11	0.32	11	0.68*	11
Sleep awakenings	0.65*	11	0.20	11	0.79*	11
Interest in dreams	0.18	11	0.09	11	0.24	11

* $p < .05$.

Figure 1

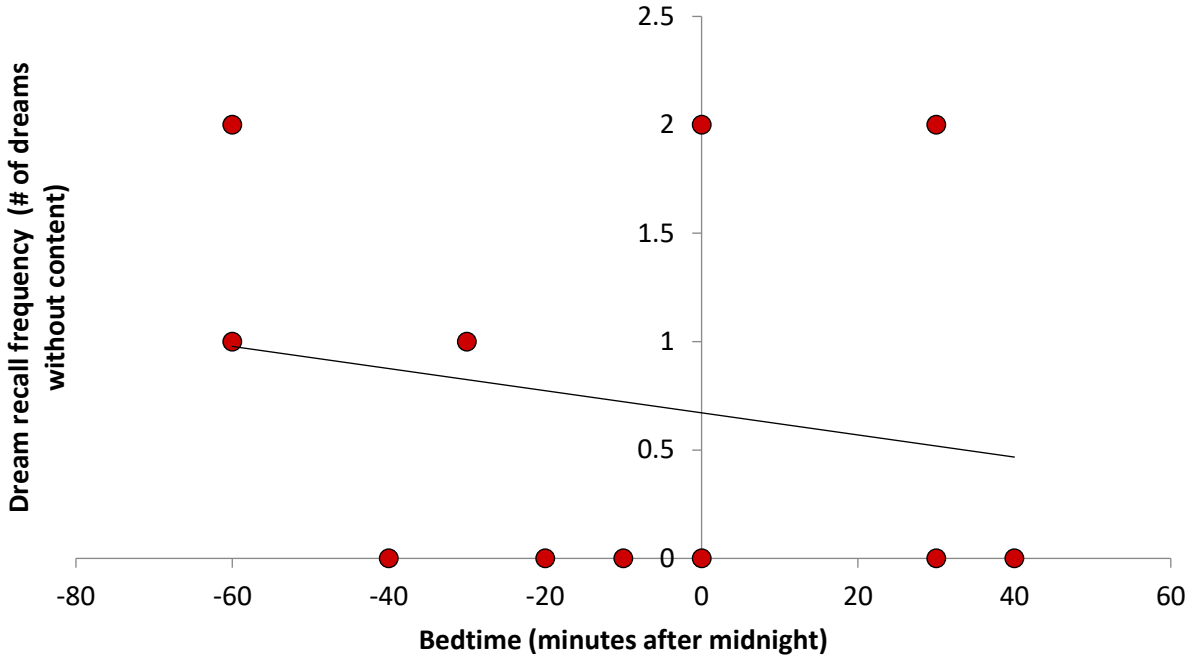
Association Between Bedtime and Dream Recall Frequency Using Dreams Just with Content



Notes. Some data might not be visible in the figure due to overlapping markers.

Figure 2

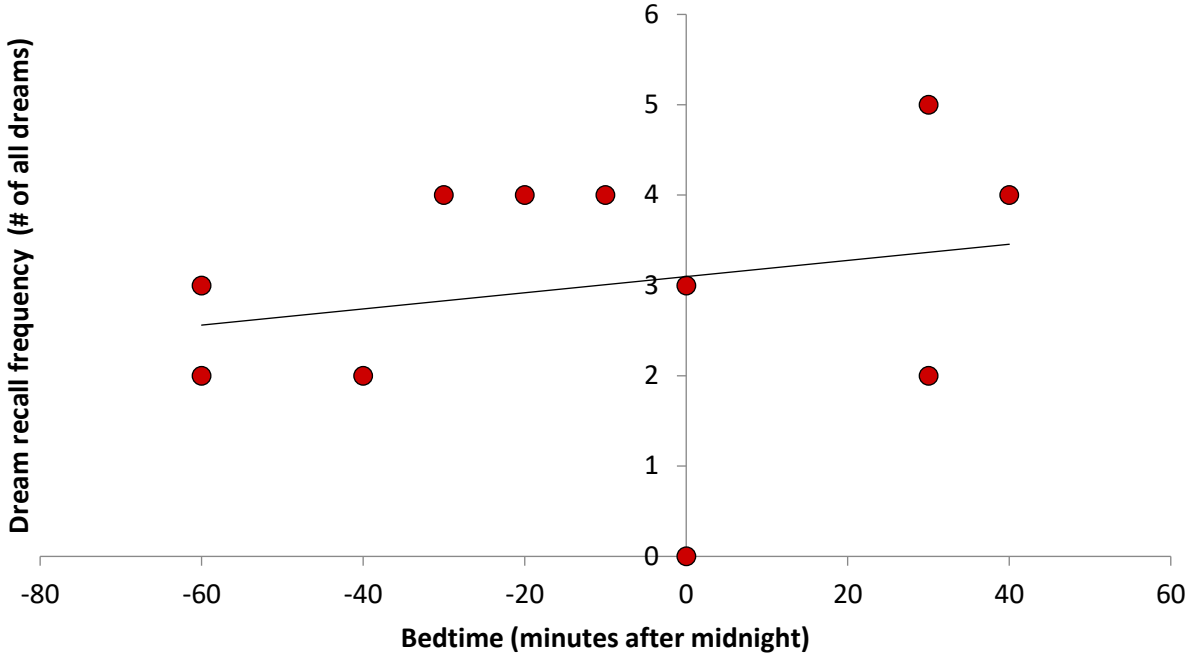
Association Between Bedtime and Dream Recall Frequency Using Dreams Just Without Content



Notes. Some data might not be visible in the figure due to overlapping markers.

Figure 3

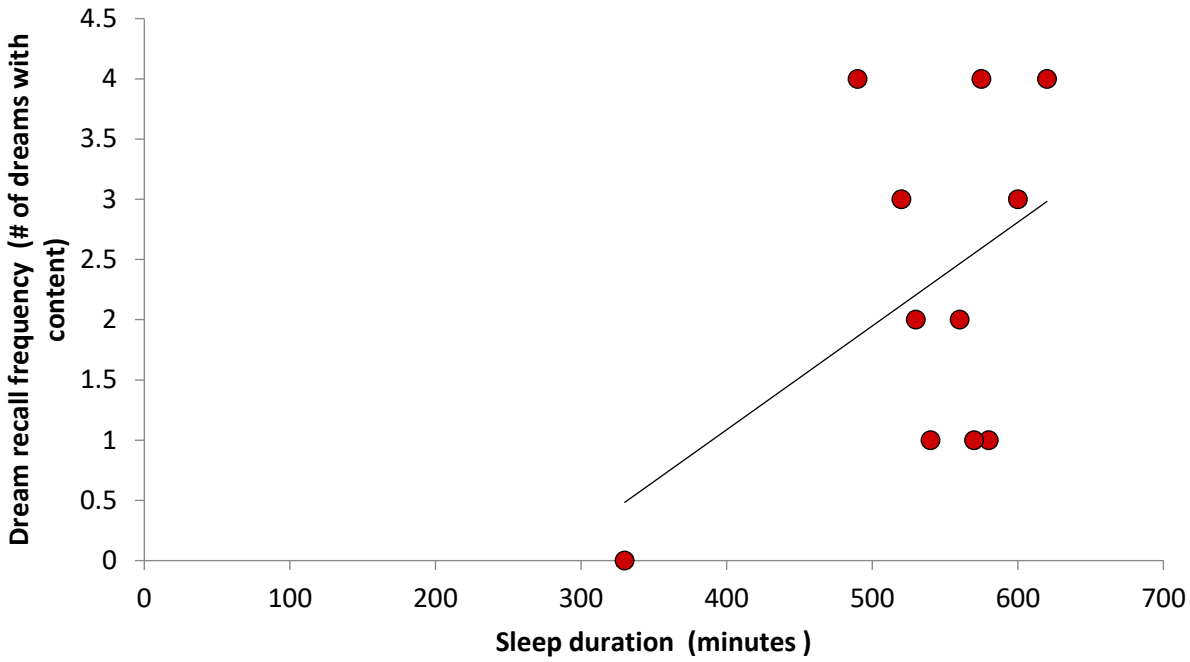
Association Between Bedtime and Dream Recall Frequency Using All Dreams



Notes. Some data might not be visible in the figure due to overlapping markers.

Figure 4

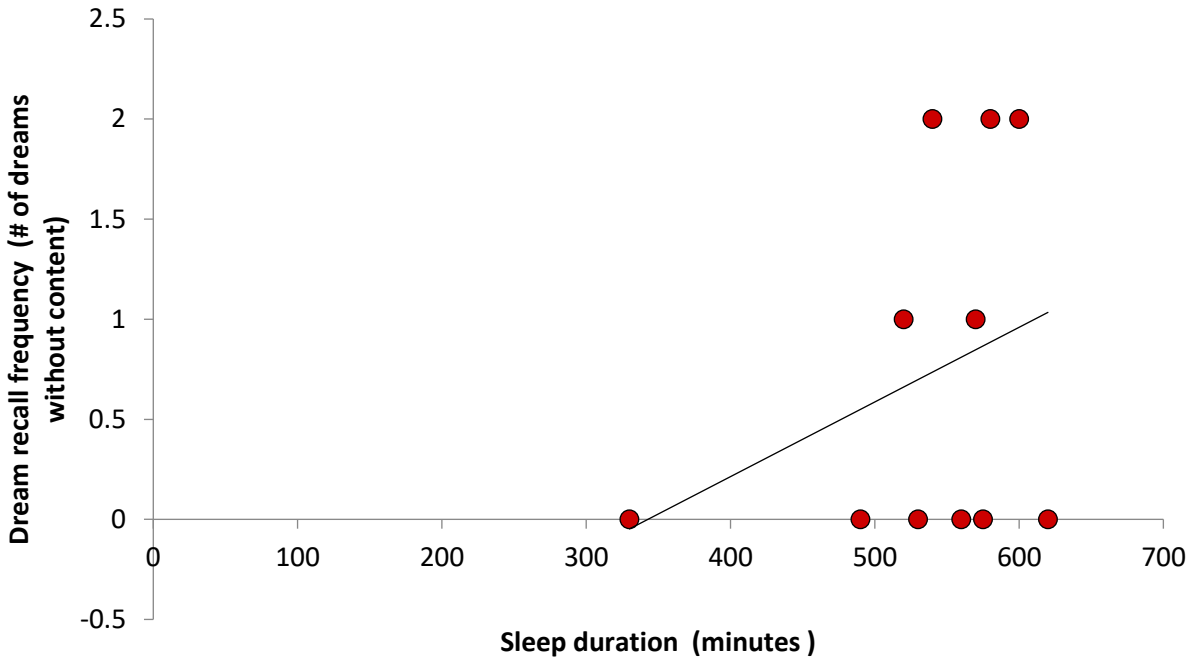
Association Between Sleep Duration and Dream Recall Frequency Using Dreams Just with Content



Notes. Some data might not be visible in the figure due to overlapping markers.

Figure 5

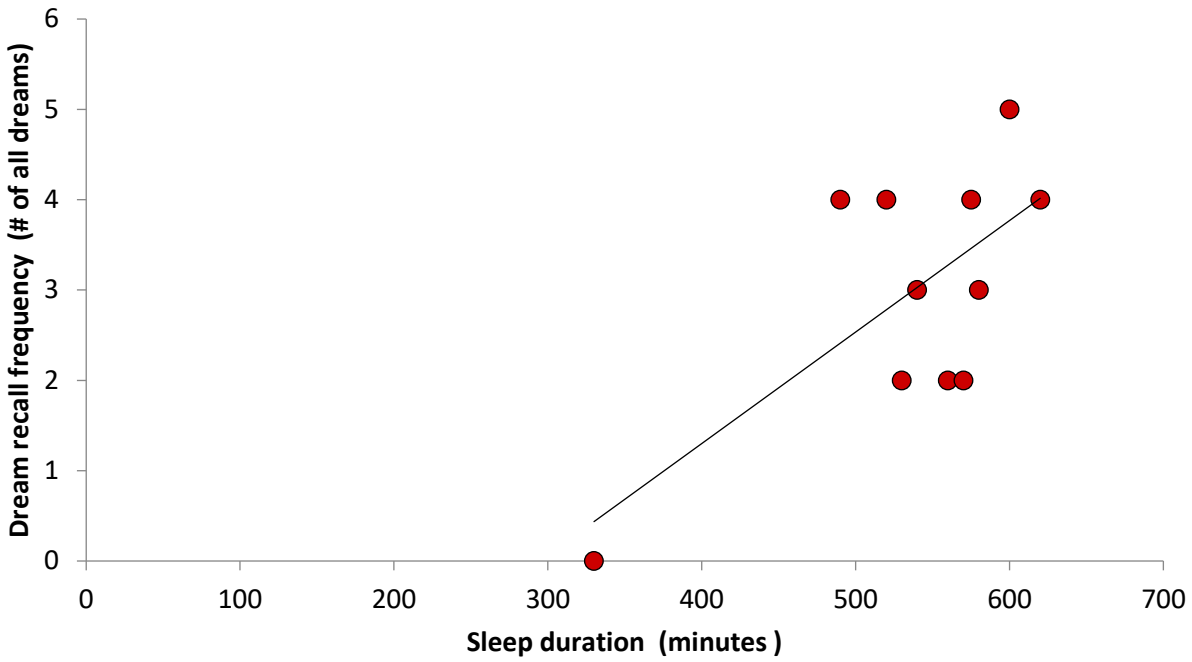
Association Between Sleep Duration and Dream Recall Frequency Using Dreams Just Without Content



Notes. Some data might not be visible in the figure due to overlapping markers.

Figure 6

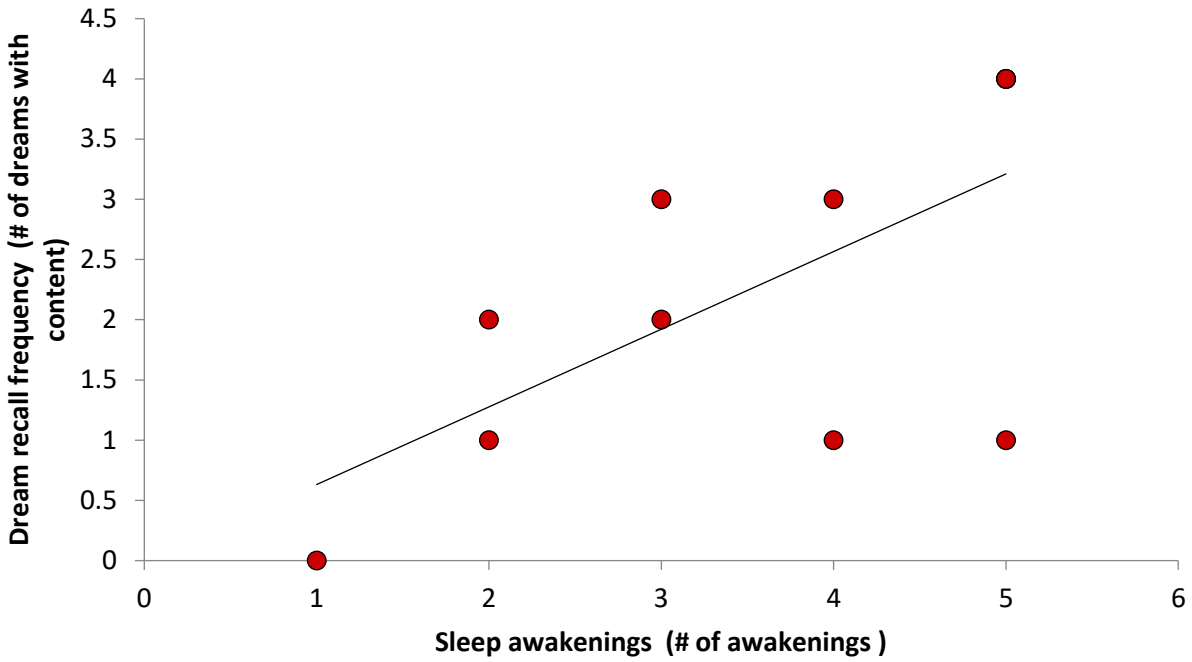
Association Between Sleep Duration and Dream Recall Frequency Using All Dreams



Notes. Some data might not be visible in the figure due to overlapping markers.

Figure 7

Association Between Sleep Awakenings and Dream Recall Frequency Using Dreams Just with Content



Notes. Some data might not be visible in the figure due to overlapping markers.

Figure 8

Association Between Sleep Awakenings and Dream Recall Frequency Using Dreams Just Without Content

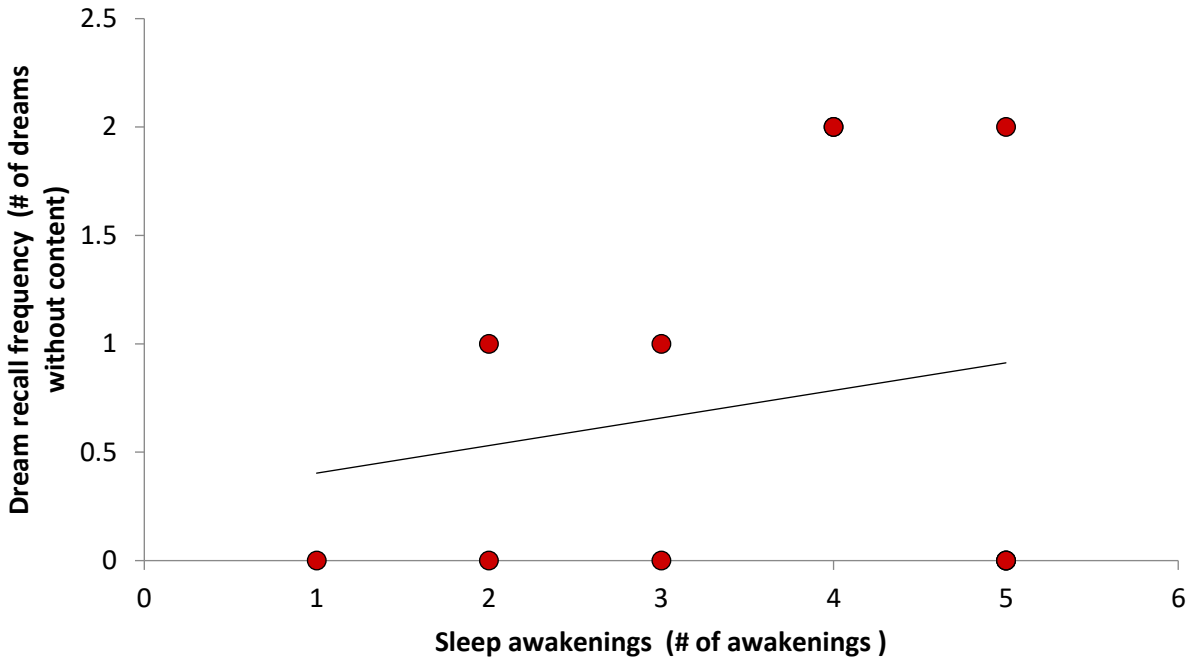


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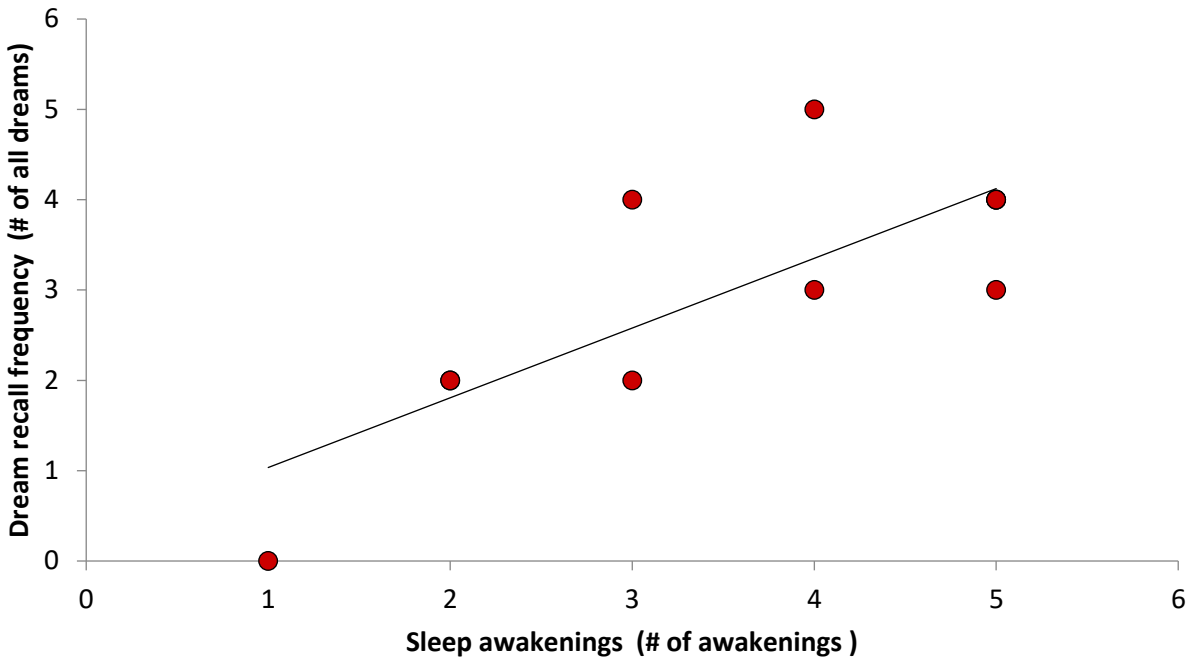
Figure 9

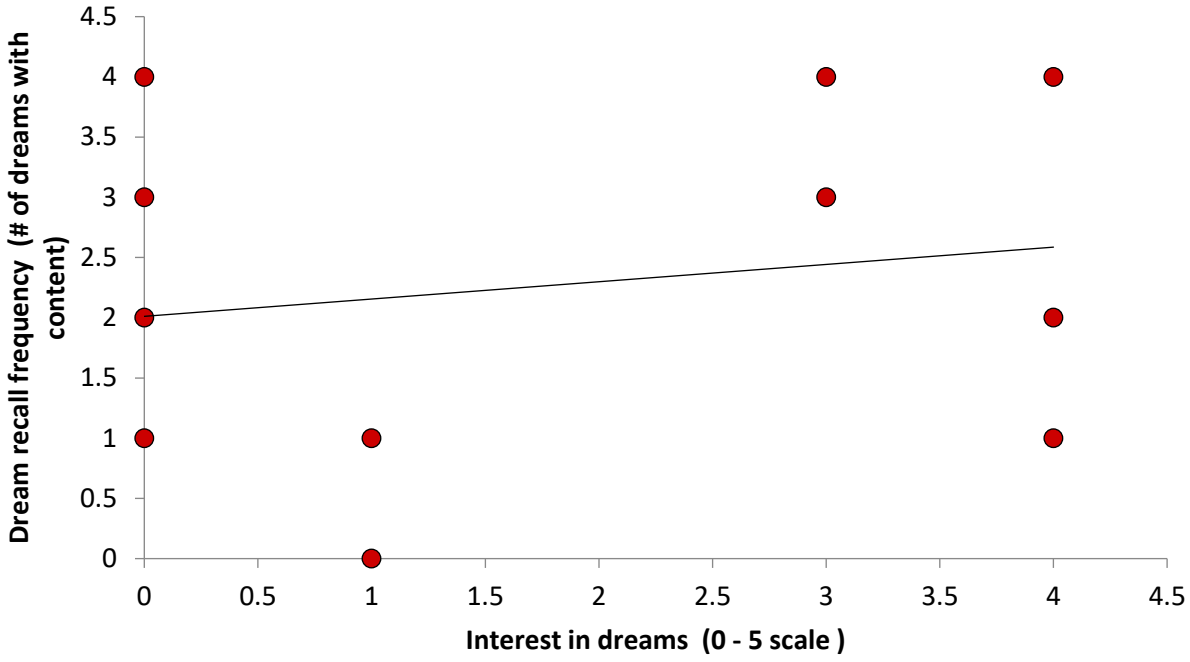
Association Between Sleep Awakenings and Dream Recall Frequency Using All Dreams



Notes. Some data might not be visible in the figure due to overlapping markers.

Figure 10

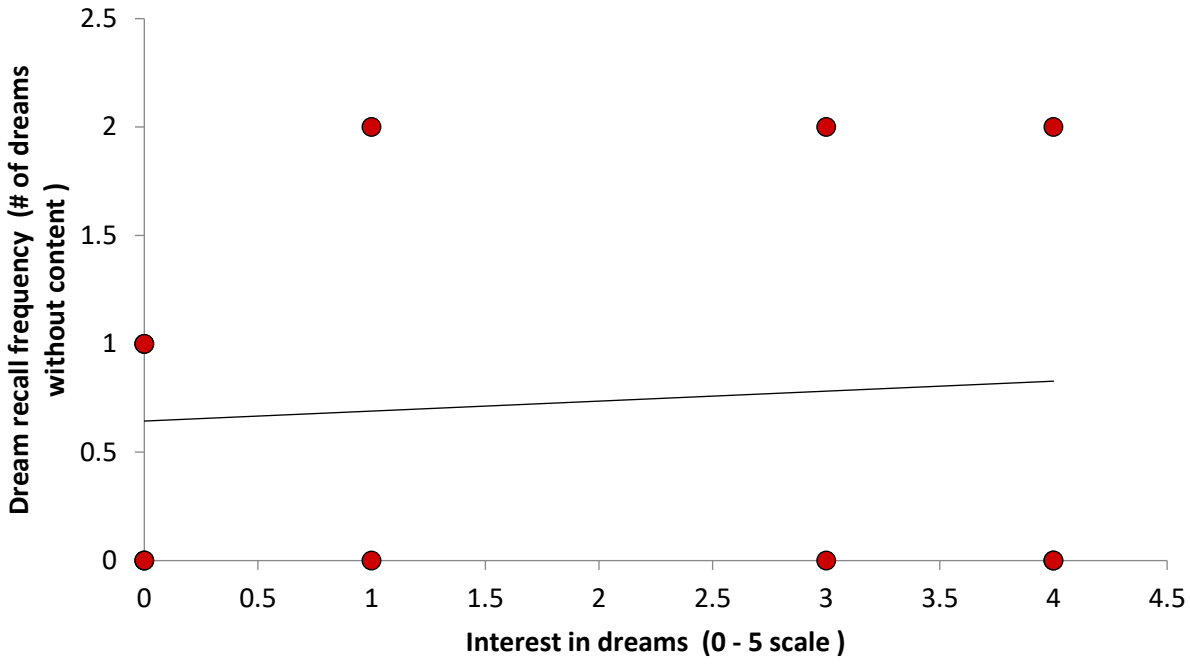
Association Between Interest in Dreams and Dream Recall Frequency Using Dreams Just with Content



Notes. Some data might not be visible in the figure due to overlapping markers.

Figure 11

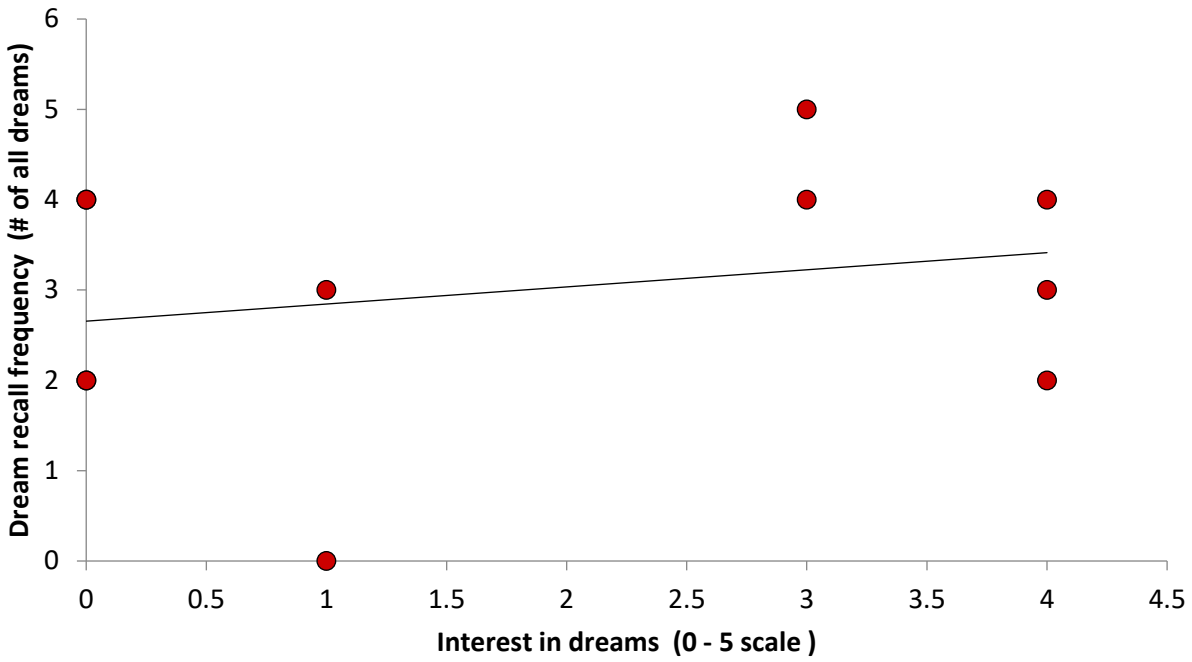
Association Between Interest in Dreams and Dream Recall Frequency Using Dreams Just Without Content



Notes. Some data might not be visible in the figure due to overlapping markers.

Figure 12

Association Between Interest in Dreams and Dream Recall Frequency Using All Dreams



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