Is dream text length a proxy for dream length?

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Summary. This is the result of a 34-month long longitudinal study of the author's dreams. The author has an unusually high dream recall frequency (average 45/month for 32 years), and during the period studied, from late June 2021 through April 2024, this increased to an average of over 75/month, for a total of 2,765 dreams over the course of 1,110 nights. With some observed exceptions, the analysis showed that the percentage of nights with dream texts being consistently longer over the course of the night hovered around 70%, depending upon which measure was being used. Two mitigating factors which offset this trend are discussed. This tends to confirm findings from dream lab studies with much smaller N that suggest that dream text length does correlate – albeit loosely – with dream length. To test the integrity of this data set, two random 1% samples of the ca. 16,000 dreams in the author's dream database which were dreamt prior to the inception of the project were taken – before the author had formulated the idea that dream text length might be related to dream position and might be a proxy for dream length. The results were slightly less definitive than for the dreams from the study period, but once the mitigating factors were taken into account, the majority of dreams in the random sample did follow the pattern, suggesting that it is valid, at least for the author's dreaming.

Keywords: Dream length, dream report

1. Introduction

Before I begin to discuss this topic, I wish to make a few personal observations. First, as Figure 1 below shows, over the past 32 years of dream recording I have had a very high dream recall frequency, over 1.5 per night. The trend line is generally on the increase, with the average for the second half of this period being 1.5 times that of the first half. The annual total for every year since 2009 has been higher than the average of 579. The anomalously high totals of 997 and 935 dreams from 2021-2023 were clearly related to my work on the Musical Dream Tarot (Hoffman 2024), which I will mention later.

Second, in terms of dream theory I remain a determined oneiroskeptic. That is, on the basis of my observations of my own dreaming and that of others, I do not believe that any of the various global theories about the nature and function of dreams (e.g. Freud 1913, Jung 1969, Perls 1970, Hobson and McCarley 1977, Taylor 1983, Schredl 2003, Hartmann 2010, Revonsuo et al. 2015,) does, or perhaps can ever, account for all dreams. Every one of them is likely to be true of *some* dreams, or some *parts* of dreams, *some* of the time – but *none* of them is true *all* of the time. This is in a way analogous to the Goedel paradox in mathematical systems (Hofstader 1979). My skepticism also applies to the global statement about dreams I have just made! It is also my ultimate answer to the question posed by the title of this article. In addition, I am skeptical of dream studies whose conclusions rest on very small samples, as I expressed in my article on this subject in *Dreaming* (Hoffman 2013). Throughout my career I have always preferred large sample sizes as being more likely representative of the totality of whatever is under study – whether it be Mesopotamian cylinder seals (Hoffman 1974), pre-European stone tools from southern New England sites (Hoffman 2021), indigenous people's stone prayers (Hoffman 2019), or, in this case, dreams.

Third, my method of recording dreams is to write down what I recall longhand in a journal, as many times I awaken in the middle of the night, or in the morning. I then transcribe the texts into an Access© database program, which allows me to pull out key elements and to track them over any desired span of time. This has been very useful in examining persistent motifs and images, but the content of my dreams is not the subject of this article, with one notable exception. I should emphasize that none of the more than 19,000 dreams currently in my database was dreamt in a sleep lab – I tend not to dream in sleep labs – so I do not have any empirical evidence on the actual length of my REM periods. Nor have I employed any of the various electronic devices available for calculating dream states, e.g. the Nightcap© (Stickgold et al, 1994), so I cannot specify which of my dreams derived from REM or NREM states. It is because absolute dream time data is lacking that I became interested in the question of dream text length as a possible proxy for dream length. For the purposes of this article, I am positing that "dream length" is equivalent to REM period length (sensu Stickgold et al. 1994), though I acknowledge that it is possible that any particular REM period dream may not occupy the entirety of a REM period, or even that more than one dream might occupy the same REM period. As Michael Schredl has observed, "the length of a REM period is only very loosely correlated with dream length, as you can have a lot of dreams in one REM period." (Schredl 2024a).

2. Project Inception

From June 24, 2021 through January 25, 2023, I was engaged in a major creative project, which was to write music based upon my dreams for each of the 78 Keys of the Tarot.

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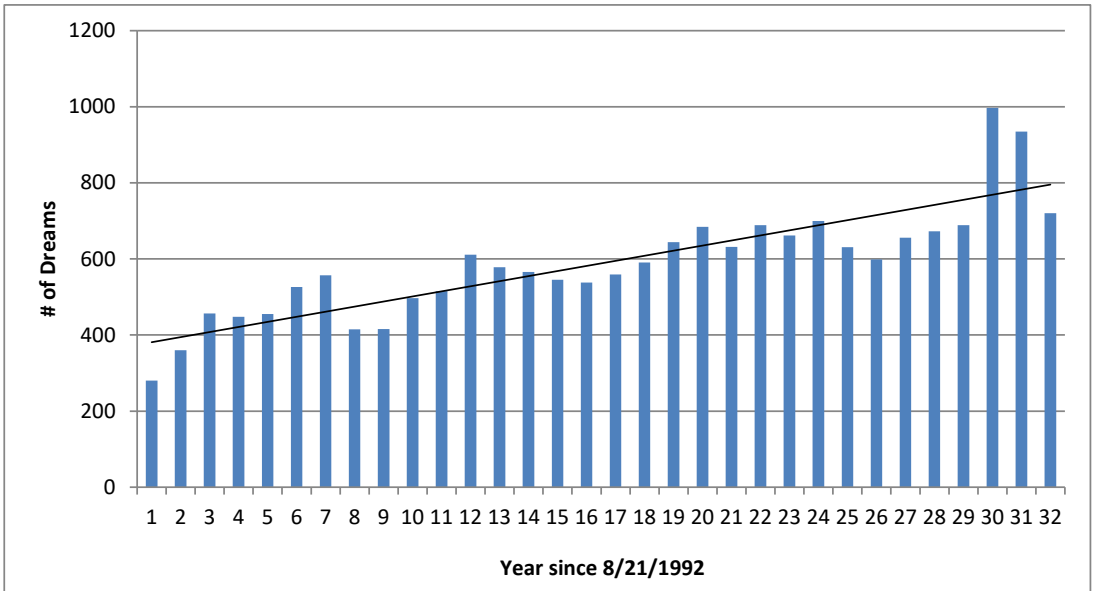

Figure 1. Number of Dreams per Year from 8/21/1992 – 4/30/2024.

This resulted in a total of 778 dreams containing musical fragments or instructions for their use over the course of this 19-month period. The completed compositions can be accessed on my website, www.musicaldreamtarot.com, and I have provided written descriptions of my process and of each musical composition in a published companion volume (Hoffman 2024). These musical dreams constituted slightly more than half of the 1,585 dreams I recorded during this period. I kept fairly careful records of the dreams using the database, and though I did not think to record the time at which I awakened to record any of the dreams, at least I can specify in what order they occurred during the night, with as many as six dreams on some nights. The technique of deriving useful information from the order in which events occurred is not foreign to me, as it is a standard methodology in my home field of archaeology, where it is referred to as "relative dating" or "sequence dating" (Renfrew and Bahn 2004: 122-128). It was in the course of this recording project that I began to notice that many of the longer dream texts tended to appear in the later dreams of any particular night, and this formed the inductive basis for my exploration of dream text length.

In the months following the completion of the Tarot project, I continued to record dream text lengths, both those of the dreams containing tunes for nine new musical compositions I was receiving and of those dreams which lacked new music. I closed the data set at the end of May, 2024 – though I have continued to record dreams and dream text lengths since that time. Combined with the earlier set, the dreams from this 34-month period constitute a robust sample of 2,765 dreams over the course of 1,110 nights. Of these, 2,067 contained new music, and an additional 499 featured previously existing music – a total of 92.9% of my dreams had music in them. This is a much higher ratio of musical dreams than that recently reported in a study of the dreams of another musically involved subject (Markert and Schredl 2024). On only three of those nights did I recall no dreams, and on only 108 of them (13.5%) did I recall only one dream. Obviously, for the latter there was no way to record ex post facto at what time in the night it occurred, but that leaves a total of 2,649 dreams in which the order is known, over 899 nights. As Figure 2 below shows, on the majority of these nights I recalled either two or three dreams.

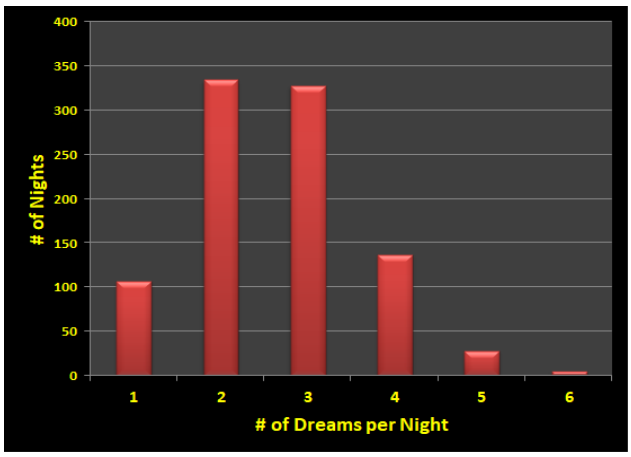

Figure 2. Number of Dreams per Night during the Study Period.

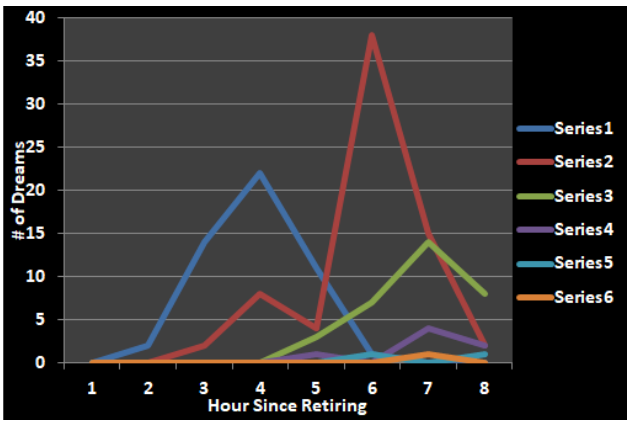

Figure 3. Sequencing of Dreams by Hour since Retiring, March/April 2024 (In this figure, "Series" is the order of dreams in the night: first, second, third, etc.).

# dreams/ night	last>first	% last/first	average ratio
2	245	66.7%	4.56
3	272	78.6%	6.65
4	104	67.1%	7.06
5	23	74.2%	9.33
6	4	66.7%	3.72
Total	648	70.7%	

Figure 4. Relationship of Text Length of Last Dreams to First Dreams per Night.

Starting in March of 2024, due to my involvement in a dream experiment (Lindberg 2024), I systematically recorded the times from which I was awakened from dreams, and I continued this for a period of two months. Figure 3 below shows the results. Though very few dreams were recorded during the first two hours of the sleep period, the succession of recalled dreams shows satisfyingly spiky distributions thereafter. I was informed by Michelle Carr (2024) that this lack of early night dream recall is not atypical of sleep lab studies.

3. Results

The first set of results from this study, shown in Figure 4 above, compare the text length of the last recorded dream of the night with that of the first recorded dream. In the case of nights with only two recorded dreams, in 67.7% of cases the last dream text was longer than the first. The average ratio was 4.56. The mean word count for first dreams was 85.6±71.5; for last dreams it was 156.4±98.4. For nights with three recorded dreams, the average ratio was 6.65, and in 78.6% of these cases the last dream text was longer than the first. The mean word count for first dreams was 66.0±51.7; for last dreams it was 155.2±174.0. For nights with four recorded dreams, the average ratio was 7.06, and in 67.1% of these cases the last dream text was longer than the first. The mean word count for first dreams was 64.5±25.1; for last dreams it was 130.8±163.9. For nights with five recorded dreams, the average ratio was 9.33, and in 74.2% of these cases the last dream text was longer than the first. The mean word count for first dreams was 58.4±13.0; for last dreams it was 128.2±164.7. For nights with six recorded dreams, the average ratio was significantly lower, 3.72; however, there were only six cases of six-dream nights. In 66.7% of these cases the last dream text was longer than the first. The mean word count for first dreams was 49.2±2.5; for last dreams it was 270.4±222.3.

While these results are certainly suggestive of the trend observed in the original study, for nights where there were more than two recorded dreams we shall have to look somewhat deeper into the data, as shown in Figure 5.

For nights with three dreams, the number in which the text length increased progressively through the night was 145, or 40.1%. For nights with four dreams, it was 18 nights, 11.6%. For nights with five dreams, it was only one night, 3.2%; and for nights with six dreams there were no cases in which dream text length increased progressively over the course of the night. Clearly, as the number of dreams recorded per night increased, the orderliness of the text length data decreased markedly.

4. Mitigating Factors

To try to explain this discrepancy with the original hypothesis, I explored two factors resulting in potentially shorter dream texts. The first was originally noticed during the period when I was composing the Gilgamesh Cantata from dreams in 2012-2013 (Hoffman 2024:13-17). At that time, I observed that there were four types of dream texts related to the composition effort: those in which a dream tune was embedded within the plotline of the dream; those in which a dream tune appeared at the tail end of the dream content, when I was in a hypnopompic state; those which conveyed no tunes but only referential information about how to arrange or promote them; and those in which the sole content of the dream was my hearing the tune itself, or viewing it on a musical staff. The relative frequencies of these types from the period when I was composing the cantata are shown in Figure 6.

# dreams/ night	all successive	%
2	245	66.7%
3	145	40.1%
4	18	11.6%
5	1	3.2%
6	0	0.0%

Figure 5. "Orderly" Dream Nights (All Text Lengths Successively Greater).

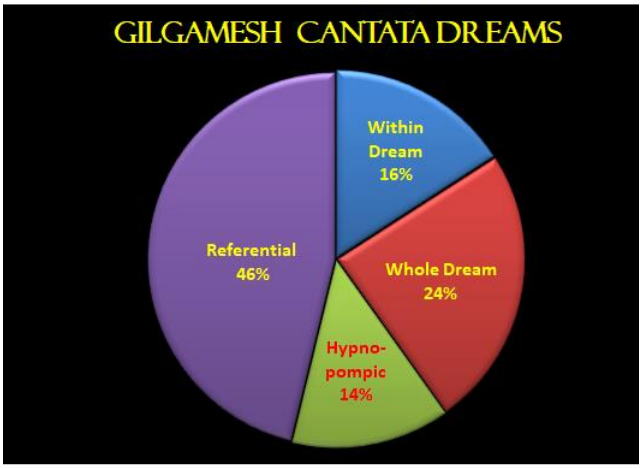

Figure 6. Musical Dream Types from the Gilgamesh Cantata, 2012-2013.

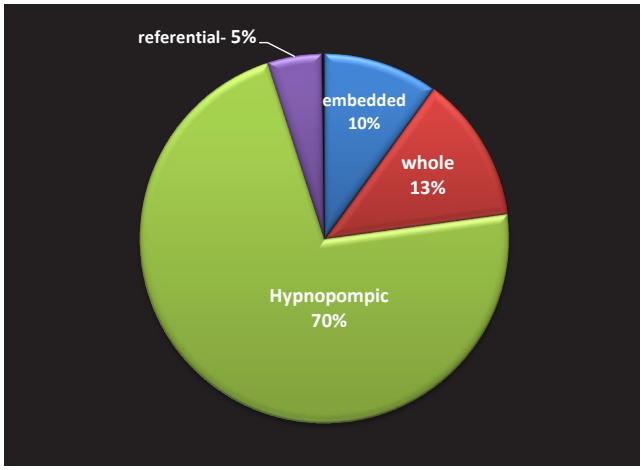

Figure 7. Musical Dream Types from the Musical Dream Tarot and Later (2021-2024).

It is certainly possible that in some of the dreams from the latter case there was additional content to the dream which I simply wasn't able to retrieve, but some of them at least were unambiguously nothing more than the music itself. I referred to these as "Whole Dream" tunes.

This phenomenon recurred during the composition of the Musical Dream Tarot, and also during the composition of the more recent pieces, though with different emphasis among the four types, as shown in Figure 7. Hypnopompic dreams predominated, with far fewer referential dreams; the frequency of the other two types was correspondingly halved, but their ratio to one another remained about the same.

The texts of the "Whole Dreams" were ordinarily very short, the shortest being simply "I hear a tune", or four words. This is the one example of dream content to which I referred earlier. Their average length was 6.2 words, substantially less than the total average of 109.2 words. As shown in Figure 8, in a majority of cases, 59.3%, Whole Dream tunes occurred in the first dream of the night, which confirms the prediction that early dreams will be shorter. However, these short texts also appeared in later dreams of the night, in 77 cases, and in 63 of these cases they accounted for the later dream texts being shorter than those of earlier dreams. This could mitigate the presence of shorter dream texts later in the night, and if so it may increase the average percentage of orderly dream texts to 79.1%.

The second factor was the incidence of Dream Reentries. This is a fairly frequent phenomenon in my dreaming, occurring on 328 of the nights in the study (36.5%). These are not necessarily reentries of the dream immediately preceding them, though in 86.6% of cases they were. In a small number of cases, a Dream Reentry was noted in the first dream of the night, with reference to a dream on a preceding night (eleven cases, 3.4%). However, as shown in Figure 9, the vast majority occurred later in the night, with reference to an earlier dream of the same night. These dream texts also tended to be shorter than the dream texts to which they referred. Their average length was 72.7 words, still less than the total average of 109.2 words. In 95 cases (10.6%) they, too could be said to mitigate the presence of shorter dream texts later in the night, and if so, they may increase the average percentage of "orderly" dreams to 89.6%.

5. Hyper-Lengthy Dreams

I made one further discovery in the course of this research. According to many sleep lab studies (e.g. Aserinsky and Kleitman 1953, Van deCastle 1994, Carr and Solomonova 2019), REM periods not only increase in length over the course of a night, but the amount of increase is more or less regular, with the earliest REM stage lasting only about 5 minutes while the latest may last as long as 45 minutes, and the intermediate stages becoming progressively longer. This gives a hypothetical maximal ratio of 9 to 1 between the lengths of the first REM period and the last REM period, though as Schredl (2024b) has also observed, "the sleep-wake-regulation is not working like a Swiss clock." In most cases in my dreaming (shown in Figure 10 below in blue, red, green, purple, and teal for two-dream, three-dream, four-dream, five-dream, and six-dream nights), there are satisfactory spikes in the ratio between last dream texts and first dream texts, around the average of 6.0.

However, the ratios of text lengths were not infrequently much larger than that. While this did not occur on any of the six nights on which there were six recorded dreams, there were a total of 154 nights with two to five recorded dreams in which the average text length ratio exceeded 9.0, in some cases being as much as 127 times as long. The average ra-

# dreams/night	1	2	3	4	5	6	
total whole dreams	44	80	54	10	1	189	
1st position whole dreams	33	49	25	5	0	112	59.3%
mitigations	11	28	20	4	0	63	

Figure 8. Whole Dreams as a Mitigating Factor in Dream Text Length.

# dreams/night	2	3	4	5	6	Total
Reentries	58	138	90	30	12	328
1st position reentries	5	4	1	0	1	11
Mitigations	34	18	32	9	2	95

Figure 9. Dream Reentries as a Mitigating Factor in Dream Text Length.

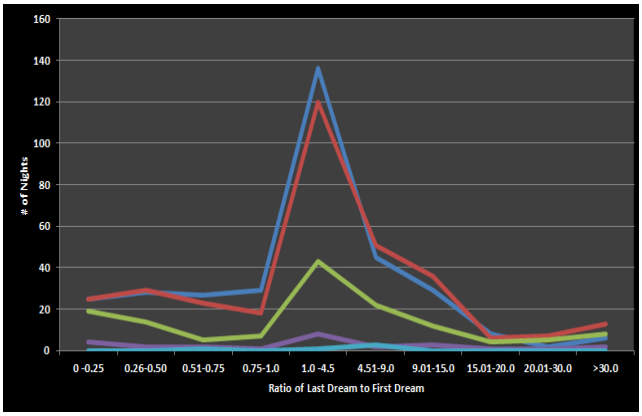

Figure 10. Relationship of Text Length in First Dreams/Last Dreams per Night.

tio between the text lengths of the first and last dreams was 26.3, almost triple the expected maximal value and more than four times the mean. More than half (53.2%) of these hyper-lengthy final dream texts were compared with short "Whole Dream" type dream texts from earlier in the night, but there were also many cases in which the first dreams were of other types.

One suggestion which has been made to account for this is that dreamers are closer to the awakened state near the end of the night and may as a result remember more details, resulting in a longer text (Carr 2024). But as I stated above, it has become my practice to get out of bed from remembered dreams no matter when in the night they occur to record them and, if music is present, to transcribe it. In addition, in eighteen cases of hyper-lengthy texts from three- to five-dream nights, the last dream text also exceeded the middle dream text just preceding it by a ratio greater than 9.0 (16.9%). By contrast, there were 35 nights in which the first dream's text length exceeded that of the last dream by more than 9.0, with all but eight of these being cases in which the last dream was of the "Whole Dream" type. The average ratio for these cases was similar to that of the hyper-lengthy last dream texts, 25.6, while the highest ratio was 107.3. However, these were much less common that the hyper-long last dreams, by a factor of 4.4.

# dreams/ night	l/f ratio >9	l/m ratio >9	%
3	69	12	17.4%
4	30	5	16.7%
5	6	1	16.7%
average			16.9%

Figure 11. Hyper-Lengthy Dreams: Ratios of Last-to-First and Last-to-Middle Dreams.

Of course, the calculation based on a 9.0 ratio assumes that the first recalled dream of the night occurred during the earliest REM period. My investigation of awakening times in March and April of 2024 demonstrates that this was rarely the case. As shown in Figure 11, the length ratios between last REM and later REM periods are considerably smaller than 9.0, which increases the probability that some of these later dream texts may also be hyper-lengthy.

To examine this, I divided the normal 7.5 hours of my sleep cycle into five quintiles of 90-minute length. I made the assumption that each of these segments contained a REM period of increasing length, positing regular ten minute increments for each stage. I then examined the ratios between the text lengths of the 149 paired dreams in that subsample which occurred on the same night, comparing each dream with the one preceding it. For nights with only two recorded dreams, this was only one pair; for nights with six dreams, it was fifteen pairs.

As shown in Figure 12 below, eleven of these pairs were from the same quintile, and were not considered. Of the remainder, 50.0% gave results less than the expected value, indicating that the later dream text was shorter than the earlier one. However, the remainder all had ratios above the expected value, and in 25.4% cases had more than double the expected value, with a maximum of 56 times the expected value. In 68% of all 88 possible pairs from the same night, the second dream of the pair was either from the same quintile or the next one. These dreams should also be considered to be hyper-lengthy.

As noted above, since I first prepared this paper for presentation at the 41st Annual Conference of the International

expected ratios by quintile			
2:1	3:1	4:1	5:1
3.0	5.0	7.0	9.0
	3:2	4:2	5:2
	1.7	2.3	3.0
		4:3	5:3
		1.4	1.8
			5:4
			1.3

	#	%
same quintile	11	n/a
< expected ratio	69	50.0%
~ expected ratio	34	24.6%
2x expected ratio	18	13.0%
3x expected ratio	6	4.3%
4x expected ratio	1	0.7%
>4x expected ratio	10	7.2%
Total	149	

Figure 12. Hyper-Lengthy Dreams from Measured Time Quintiles

# Dreams/Night	1	2	3	4	5	6	Total
# Nights	14	65	52	18	3	1	153
# Dreams	14	130	156	72	15	6	393
Total # Combinations		65	165	96	33	19	378
ratio >1.0		32	114	62	18	12	238
%		49.2%	69.1%	64.6%	54.5%	63.2%	60.1%
ratio ≤1.0		23	53	34	15	7	132
%		35.4%	32.1%	35.4%	45.5%	36.8%	37.0%
Re-entries		9	34	13	3	5	64
Whole Dreams		1	7	5	5	0	18
Unmitigated		13	12	16	7	2	50
%		20.0%	7.3%	16.7%	21.2%	10.5%	15.1%
Hyper-lengthy ratios (≥9)		2	15	11	8	6	42

Figure 13. Dream Text Lengths Subsequent to the Study.

Association for Dreams at Rolduc Abbey in June of 2024 (which I was unable to attend due to a bout with COVID), I have continued to record dream lengths. Over the past five months, I have recorded 393 dreams. While I have not subjected these dream texts to as detailed analysis as above, Figure 13 shows that the trends observed in the earlier sample have largely continued.

In all cases where the ratio between any dream text length and that of its predecessor(s) was averaged for the number of dreams per night, the ratios were larger (>1.0) more often than smaller (< 1.0), averaging 60.1% for the entire sample. When the two mitigating factors (reentries, Whole Dreams) were taken into account, this average increased to 84.9%. In addition, there were 42 hyper-lengthy dream texts in the sample, in which the ratios exceeded 9.0, and in two cases exceeded 100.0 (both compared with Whole Dreams). This tends to confirm the findings of the earlier study.

6. Tests of Sample Integrity

Finally, it may be legitimately argued that, having inductively discovered the existence of a possible relationship between dream text length and dream length, I have subjectively programmed my dreaming to produce these results. I am willing to grant this as a possibility. However, there is a way to test it objectively. To do this, I selected a random sample of dream nights with two or more recorded dreams from the time before I began working on the Musical Dream Tarot in June of 2021. This was not difficult to accomplish, since in my database each dream has an independent sequential index number, starting with Dream One on August 21st of 1992. A total of 16,058 dreams were recorded from that date until the inception of the Tarot music on June 24th, 2021. I used the computer's random number generator to select the index numbers of 250 dreams from that time span. From this sample, I eliminated all entries from nights on which only one dream was recorded, as well a few cases where multiple index numbers were randomly selected from the same night, to produce a 1% random sample of nights from this period (161 nights) with multiple dreams. I then applied the same quantitative measures to this sample as I did for the preceding sample of more recent dreams. Two of these nights had five recorded dreams; 13 had four dreams; 48 had three dreams; and 98 had two dreams, for a total of 402 dreams.

The results are shown in Figure 14, below. For nights with two recorded dreams, the results were similar to those from the study sample. A total of 61 nights had last dream texts longer than first dream texts.

In six cases where first dream text lengths exceeded last dream text lengths, the last dream text was a Reentry. This may mitigate the presence of shorter dream texts later in the night, and this may increase the average percentage of "orderly" dreams to 68.4%. For nights with three recorded dreams, the results were considerably less promising: only on eleven nights, or 22.9%, were there dream texts where

	2 dreams	3 dreams	4 dreams	5 dreams	Total
orderly	61	11	1	0	73
mitigated	6	8	3	0	17
not orderly	32	29	9	2	72
total	98	48	13	2	161

	2 dreams	3 dreams	4 dreams	5 dreams	Total
orderly	62.2%	22.9%	7.7%	0.0%	45.3%
mitigated	6.1%	16.7%	23.1%	0.0%	10.6%
not orderly	32.7%	60.4%	69.2%	100.0%	44.7%

Figure 14. Results of the First Random Sample.

	2 dreams	3 dreams	4 dreams	5 dreams	Total
orderly	62	10	1	0	73
mitigated	8	9	3	1	21
not orderly	27	29	7	4	67
total	97	48	11	5	161

	2 dreams	3 dreams	4 dreams	5 dreams	Total
orderly	63.9%	20.8%	9.1%	0.0%	45.3%
mitigated	8.2%	18.8%	27.3%	20.0%	13.0%
not orderly	27.8%	60.4%	63.6%	80.0%	41.6%

Figure 15. Results of the Second Random Sample

the last text was greater than the first. There were two dreams of the Whole Dream type, from the period of the composition of the Gilgamesh Cantata, and one of these was a last dream, which could increase the percentage of orderly dreams to 25.0%. This would further mitigate the presence of shorter dreams later in the night, bringing the total percentage up to 39.6%, a substantial percentage but much lower than that for the later sample. For nights with four recorded dreams, the results were even less comparable, with only one night, 7.7%, having its dream text lengths in successive order. There were eight Dream Reentries, one of them in the earliest position, and three of these were in positions which could mitigate the presence of dreams with shorter texts, bringing the total percentage up to 30.8% -- again, lower than for the later sample. Neither of the two nights with five recorded dreams had text lengths in successive order, and while there were Dream Reentries in both of them, neither of them mitigated the less orderly sequence of dream text lengths. In total, nights in which dream text lengths were in orderly succession occurred in 45.3% of cases, and those in which the two mitigating factors were present brought the percentage up to 55.9%. Thus, the random sample showed some of the same tendencies as the collected sample, but less clearly pronounced.

To test the representativeness of this sample, I took a second random sample of the same size, using the same method of selection. The results, shown in Figure 15, were very similar, again with text lengths in orderly succession in 45.3% of cases, and those in which mitigating factors (two Whole Dreams; nineteen Reentries) were present brought the total up to 58.3%, slightly better than in the first sample. This suggests that the correlation observed between dream text length and position within the night's dreaming was at least present, if not predominant.

7. Conclusion

In conclusion, this study tends to confirm the initial hypothesis concerning a positive correlation between the successive lengths of dream texts and the lengths of REM periods -- but not universally. There are numerous examples in my dream accounts of early dreams whose text length far exceeds that of later dreams. Of course, this sample, large as it is, represents only one dreamer, myself, and should be tested against other long dream sequences to determine whether it is merely idiosyncratic of my dreaming or constitutes a general pattern. But even in my dreaming, the best that can be said in answer to the original question of whether dream text length is a proxy for dream length, is – as anticipated in the introduction of this article – at least some of the time, or, more optimistically, more often than not.

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