

Topics of Our Dreams

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Extended Abstract

Introduction Dreaming is a fundamental human experience, and one that is yet not fully understood. While people tried to make sense of dreaming since the prehistorical ages, key open questions remain for today's study of dreams (oneirology), such as what are the physiological and psychological purposes of dreams; i.e., why we dream.

One popular method in study of dreams is content analysis [Sch10]. By investigating elements and topics in dreams, some specific questions can be tackled, such as whether depressed people experience more rejection in dreams [BW61], whether there is a shift in dream content from teenage to adult age [FMAQ20], or whether in the times of big crises there is a collective shift in the medical symptoms dreamt of [ŠABQ22]. In turn, answering such specific questions, bring us a step closer to answering the profound question of why we dream. The importance of content analysis for the study of dreams is witnessed by the fact that there are more than 130 scales and rating systems for dream content analysis published [WK79]. Arguably, the most famous among those scales is the one by Hall and Van de Castle, in which the key elements (i.e., characters, interactions, and emotions) of dreams are mapped. Another important approach to content analysis is to look at dream topics (e.g., life events, supernatural entities, or work).

There is no straightforward procedure how to construct a valid dream content scale [Sch10], and researchers in the past had to read many dream reports to gain understanding into the variety of dream topics [HdCRL66]. As a result, to the best of our knowledge, previous research focused on a small number of pre-selected topics, and did so using small-scale or non-representative dream samples.

Data and Methods To bridge this research gap, we relied on two recent advancements: i) the availability of large crowd-sourced datasets of dream self-reports (i.e., /r/Dreams subreddit on Reddit), and ii) the state-of-the-art AI methods for natural language processing (NLP). We collated over 44K dream reports published by over 34K Reddit users during 5 years (2016-2022).

To uncover the topics from the cleaned dream self-reports, we used BERTopic [Gro22], a neural topic modelling technique, which leverages embeddings (preferably sentence transformers) to uncover a list of latent topics from a list of documents, and help us understand the underlying “themes” in an unstructured text dataset.

Results BERTopic discovered 222 topics present across dreams. By then applying large language model embeddings to measure semantic similarity among topics, we grouped them into 22 higher-level groups, creating the most comprehensive taxonomy of dream topics to date (Table 1). Using complex analysis methods on the co-occurrence network of topics in dreams we found which groups of topics are more (e.g., *People & Relationships*) or less (e.g., *Space*) central to the collective dreams, and how they relate to each other (e.g., we found that *People & Relationships* and *Life Events* topics co-occur frequently, while *Space* and *Indoor Locations* appear rarely together).

We then focused on specific types of dreams, i.e., nightmares, recurring, vivid, and lucid, and found that there are particular topics that are more prevalent in each of those, effectively characterising these types of dreams in terms of their topics. **Nightmares specific topics:** Not unexpectedly, the top topics specific for nightmares included *scary*, *shadows*, *sexual-assault*, *demons*, and *blood*. When looking at the whole groups, *Human body*, *especially teeth and blood* is the most prominent in nightmares, followed by *Supernatural entities*, and *Feelings*, while the least prominent ones were *Space* and *School*. **Recurring dreams specific topics:** The top topics specific for recurring dreams included *house & apartment*, *school & college*, and *ex dating*. When looking at the groups, it is *School*, and *Other topics* that characterise recurring dreams. **Lucid dreams specific topics:** The top topics specific for lucid dreams included *new job*, *girl-dream*, and *house & mansion*, and *lights & sun*. When considering groups, *Work*, *Time*, *time travel*, and *timelines*, *Feelings* and *Mental reflections and interactions* are the most prominent. **Vivid dreams specific topics:** The top topics specific for vivid dreams included *nuclear war*, *baby birth & pregnancy*, and *lights & sun*, and *garden & hills*. Not unexpectedly, from groups, it is the one on *Feelings* that characterises vivid dreams.

Finally, we studied the evolution of each of the topics during the 5 years finding that soon after COVID-19 started, there is a gradual collective shift in the content of our dreams. Specifically, people gradually dreamt less of other *People & relationships*, *Feelings*, *Sight & vision*, *Outdoor locations*, and *Movement & action*, while they dreamt more of *Human body*, *especially teeth and blood*, *Violence & death*, *Religious & spiritual*, and *Indoor location topics*. Another event that had an effect on the collective dreams was the start of the war in Ukraine, when the individual topics *soliders*, *world-war* and *nuke war* peaked.

References

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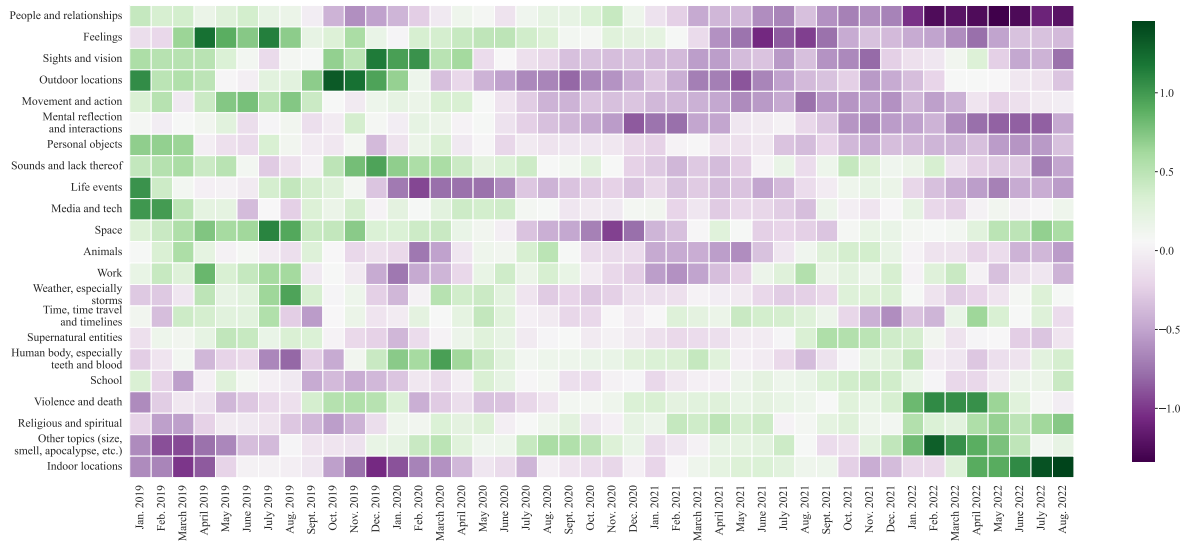


Figure 1: The temporal evolution of topic clusters.

Table 1: Dream Topic clusters

| Cluster no. | Cluster name | Top-3 Topics | # topics | # dreams | # dreamers |
|-------------|---------------------------------|---|----------|----------|------------|
| 0 | People and relationships | 0 lady, face, looked, head 2 dream, girl-dream, dreamt, ve 8 ex, years, dating, talk | 17 | 20786 | 17798 |
| 1 | Indoor locations | 5 mall, restaurant, eating, ice-cream 7 bus, driving, cars, train-station 13 doors, house, rooms, mansion | 16 | 13890 | 11868 |
| 2 | Violence and death | 14 death, died-dream, going-die, death-dream 43 pistol, shooting, shot-head, shotgun 44 police, officer, officers, kidnapped | 15 | 8203 | 7523 |
| 3 | Mental reflections | 26 know-make, sure-don, know-think, know-sure 40 yeah, like-wtf, hell, like-fuck 52 asked-doing, tell, help, begged | 18 | 6808 | 6157 |
| 4 | Feelings | 20 felt-real, dream-felt, real-dream, real-like 39 woke-crying, started-crying, woke-tears, crying-dream 64 feel-pain, painful, pain-dream, felt-pain | 16 | 6351 | 5907 |
| 5 | Sights and vision | 4 lights, sun, pitch-black, wearing 87 reflection, looked-mirror, looking-mirror, mirrors 140 blinded, vision-blurry, blur, recite | 11 | 6185 | 5548 |
| 6 | Animals | 10 kitten, lion, birds, owl 48 spider, maggots, batman, thanos 88 snakes, alligator, turtle, bite | 13 | 5546 | 5048 |
| 7 | Other topics | 25 dream-ends, story, endings, recurring-theme 86 huge, inches, like-size, big-small 99 pov, 3rd-person, person-perspective, person-view | 21 | 5475 | 5018 |
| 8 | Outdoor locations | 12 beach, ocean, swim, river 29 path, garden, hills, plants 105 cave, tunnels, underground, tower | 6 | 5020 | 4539 |
| 9 | Personal objects | 33 dressed, mask, naked, clothing 56 phones, ringing, check-phone, battery 74 pages, pen, ink, letters | 17 | 4639 | 4135 |
| 10 | School | 15 classroom, teachers, principal, student 27 school-dream, dream-school, college, dream-high 269 tests, failed, exam, professor | 3 | 3639 | 3352 |
| 11 | Movement and action | 67 left, wanted-leave, time-leave, wanted-home 85 continued-walking, continue, street, walk-home 95 run, started-running, run-like, sprinting | 12 | 3457 | 3208 |
| 13 | Sounds and lack thereof | 41 singing, songs, lyrics, stage 77 voices, heard-voice, hear-voice, voice-head 89 footsteps, ghost, noises, ringing | 7 | 3125 | 2892 |
| 14 | Media and tech | 31 theater, anime, movie-like, tv 57 minecraft, games, vr, game-like 90 game-dream, dream-playing, vr, video-games | 6 | 2970 | 2677 |
| 15 | Religious and spiritual | 66 demons, devil, monster, demonic 68 church, cult, lot-people, dream-god 70 demon, devil, demons, angel | 7 | 2859 | 2697 |
| 16 | Life events | 59 birth, babies, pregnancy, newborn 72 party, invited, having-party, brother 78 giving-birth, dreamt, dream, twins | 6 | 2230 | 2134 |
| 17 | Human body, esp. teeth, blood | 35 blood, skin, humanoid, arms 108 teeth, falling, tongue, pain 130 teeth, tooth, falling, gums | 5 | 2163 | 2055 |
| 18 | Work | 47 new-job, boss, jobs, shift | 1 | 1077 | 1024 |
| 19 | Weather, especially storms | 79 rain, tornado, hurricane, started-raining 104 snow, snowing, cold, winter 271 tornado, storms, april, category | 3 | 1037 | 985 |
| 20 | Time, time travel and timelines | 102 timeline, time-travel, time-skip, like-time 165 time-travel, dream-world, universes, dream-time 187 noon, 00am, early-morning, evening | 3 | 777 | 739 |
| 21 | Space | 159 sun, earth, eclipse, phases 221 space, space-ship, nasa, oxygen 251 meteors, earth, asteroid, coming | 3 | 448 | 438 |