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The Application of the "Banchenko's Mnemonic Dream Synchronization Method" for the Joint Synchronization of Dream Elements (Including Lucid Dreams), within the Framework of "Blokhin's Dreaming Cell Concept," and the Analysis of the Obtained Results Using the "Kapustin's AI Dream Matching Model."

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Abstract

Purpose: *The research is aimed at studying the potential for dream synchronization, including lucid dreams, among a group of participants using the concepts of "memes" and "tag-memes" within the framework of the "Banchenko Algorithm" and the "Mnemonic Dream Synchronization Technique of Banchenko." Additionally, it aims to assess the effectiveness of a new artificial intelligence model built and trained by Mykhailo Kapustin for identifying correlations in the dreams of the participants [1].*

Methods: *In the study, eight participants from different countries kept dream journals for a month. Afterward, the artificial intelligence model developed by Kapustin was trained to analyze these dreams. Following this, over the course of 16 days, synchronization among the group of participants was conducted using the "Mnemonic Dream Synchronization Technique of Banchenko," which included activities like collectively watching the TV series "The OA. Synchronization took into account the difference in time zones. Additionally, synchronous discussions of the viewing were carried out on the Telegram messenger, along with additional discussions related to key concepts and "tag-memes." Data analysis covered 30 days before synchronization and 30 days after the start of synchronization, using Kapustin's model with subsequent manual verification [2].*

Results: *The data obtained for two periods confirm the influence of synchronization during wakefulness on dreams and highlight the emergence of "memes" and "tag-memes" in dream content, as well as objects and scenes unrelated to the elements of discussion or collective viewings. In-depth discussions during wakefulness contribute to the development of unique "tag-memes" within the group. The novelty of the research is based on the fact that it's suggested that electromagnetic fields may serve as mediators in intercellular communication, facilitating the exchange of information between cells. The systematic keeping of dream journals may influence the content of dreams. The frequency of lucid dreams remained stable, which may indicate the limited effectiveness of isolated methods of joint tuning without additional methods for inducing lucid dreams.*

Conclusions: *The research highlights the impact of wakeful-state synchronization on dream content. "Memes" and "tag-memes" play their roles, but systematic dream journaling is also important for improving dream recall. The frequency of lucid dreams suggests the need for further investigation into isolated practices. A computational model excels at identifying common dream objects, but human evaluation remains integral during algorithm refinement.*

Keywords: Lucid Dreaming (LD), Synchronization, Synchronizing, Banchenko Algorithm (BA), Kapustin Model, Artificial Intelligence (AI).

Statement of Significance

This research holds significant value as it explores the innovative possibility of dream synchronization using novel theoretical frameworks and advanced technology. Understanding the potential for synchronized dreams and their impact on cognitive processes offers insights into human consciousness and interconnectivity. The study bridges disciplines to unravel the brain's complex mechanisms during sleep, potentially leading to advancements in cognitive science, neurology, and artificial intelligence. The findings could reshape our understanding of human experiences and contribute to therapeutic interventions, paving the way for collaborative research across various scientific domains.

1. Introduction

The objective of the current research is to explore the hypothetical possibility of dream synchronization (including lucid dreams) among a group of participants using the theory of memes and tag-memes within the framework of the "Banchenko Algorithm" [3]. Banchenko's algorithm is a methodology for inducing lucid dreams in the rapid eye movement (REM) phase, which has been developed and researched by Denis Yurievich Banchenko for twenty years. The algorithm is based on a unique methodological approach that has been shown to be effective in inducing lucid dreaming while promoting health. The algorithm includes certain methods and mechanisms developed by Lev Konstantinovich Shishkin together with Banchenko, leading to a significant increase in the subjective duration and depth of lucid dreams.

This algorithm involves the use of certain techniques and practices that improve the conditions for the induction of lucid dreams. All of them must be performed in a specific sequence and at a predetermined time. The components of the algorithm are as follows: a special diet, a daily regimen, breathing practices, special motor activity, hand exercises, visual practices, keeping a dream diary and the repetition of 10 short actions with a certain time interval.

Special diet. Includes avoiding sugar and consuming spirulina and cocoa. Scientific studies have shown that spirulina provides various health benefits.

Daily routine. To achieve this goal, the algorithm includes a mandatory condition for compliance with the work and rest regimen, which directly affects the quality of sleep.

Breathing practices. This algorithm uses the Wim Hof method. This is hyperventilation followed by deep inhalation, exhalation, and breath retention. This breathing technique provides conscious access to control of the autonomic (sympathetic and parasympathetic) nervous system, activates the adrenal medulla, and promotes the release of catecholamines.

Physical activity. One of the elements of preparation for achieving the state of "Lucid Dreaming" according to the method of Denis Banchenko is the practice of walking backwards

Arm exercises. One of the exercises is to sequentially twist and open the fingers of the crossed hands. The purpose of this kind of technique is to improve fine motor skills, as well as coordination and communication between the left and right hemispheres. The practice is aimed at optimizing the integration of brain functions, creating synergistic connections between various cognitive processes.

Visual practices. Visual practices can stimulate the activity of the occipital lobe, thereby contributing to the achievement of lucid dreaming. Here are a few ways in which visual practices can stimulate occipital lobe activity and contribute to the achievement of this kind of dreaming:

1. Visualization of dreams. Practicing dream visualization while awake can activate the occipital region of the brain. LaBerge and Nagel conducted a study that demonstrated increased activation of the occipital cortex and associated areas during dream visualization, which promoted self-awareness in dreams. Visualization of dreams

can be facilitated by keeping a journal or setting an intention to be in a lucid dream before going to sleep.

2. Reconstruction of visual residual images of static and dynamic images. Image retention refers to the brain's ability to retain and reproduce an image after the stimulus has ceased.
Dream Diary. According to the Banchenko Algorithm, keeping a dream diary regularly is necessary to achieve lucid dreaming. Journaling serves as a valuable tool for developing memory and awareness. It's important to write dreams by hand rather than typing on a keyboard, as different areas of the brain are activated during handwriting. Here are some ways in which keeping a dream journal helps develop memory:

1. Improved Dream Memory: After waking up, dreams quickly fade from memory. However, documenting dreams in writing can help strengthen their retention. Keeping a dream journal trains the ability to remember details and visualize what happened in the dream, increasing the ability to recall and recall information, which has a positive effect on memory in general.

2. Abstract and visual imagination training. Dreams are often vivid and unusual images. Writing improves the ability to visualize these images and detail them in detail. Such training improves memory and helps in memorizing and recalling various visual materials such as photographs, charts, and graphs.

3. Dream Symbol Recognition. Certain symbols and images may recur during sleep. Keeping a dream journal helps to recognize these symbols and subsequently use them as dream markers for clarity. This contributes to the development of analytical and critical thinking, the ability to find connections, which is useful not only in the context of dreams, but also in everyday life.

4. Increase mindfulness. Keeping a dream journal requires paying attention to the details of the dream and analyzing them. It helps in developing self-awareness and improving memory. The more conscious and attentive a person becomes, the easier it is for them to reach a lucid dreaming state.

10 short actions. One of the key practices used in Banchenko's algorithm is to perform a reality check on a regular basis throughout the day. This practice involves sequentially performing ten specific actions triggered by an alarm clock that form the habit of checking if a person is in a dream state. After repeated repetition of these actions, the habit manifests itself in sleep.

The use of the "Banchenko Algorithm" contributes to the expansion of the field of scientific research in the field of lucid dreams, allowing to quickly prepare both small and large groups of participants without a tendency to lucid dreams, without a natural special frequency of their occurrence and without preliminary preparation. The personal experience and result of the application of this algorithm, described by one of the participants in the study of lucid dream induction, confirms the possibility of using this algorithm without interrupting work and daily duties [3].

Additionally, the research aims to assess the effectiveness of a novel computer model for identifying dream correspondences based on artificial intelligence, developed by Mikhail Kapustin [4]. "Arcanum12th" is a model developed by Mikhail Kapustin under the direction of Denis Banchenko. Dream interpretation as art is the past. "Arcanum12th" is the future. This unique algorithm combines tens of thousands of dream interpretations, but its real magic begins where others stop. "Arcanum12th" is an artificial intelligence with amazing abilities of analysis and interpretation.

This entire breakthrough in dream interpretation has been made possible by advanced technology and scientific research. "Arcanum12th" is the result of many years of research and work by an international team of scientists. The ASRP team developed, trained, and tested the software model as part of a scientific study on a technique for stimulating lucid dream frequency known as the Banchenko Algorithm [4].

Social interactions are an integral part of every individual's life, giving rise to culture, art, and science. The question of social organization within society and the role of the individual in it is one of the pertinent issues in psychology [5]. Interactions among individuals are closely connected to the phenomenon of social thinking or social consciousness, which is rooted in complex psychological and cognitive processes.

These processes include attention, memory, action planning, and the perception of external and internal signals, enabling interacting subjects to understand, predict each other's actions, and exchange information. The ability to coordinate one's actions with those of others, referred to as "shared intentionality," pertains to interactions in which individuals have a common goal and allocate roles to achieve it [5-8].

The study of the neurophysiological basis of social interactions is becoming increasingly relevant. The advancement of neurosociology and the integration of cutting-edge technologies into science have opened new avenues for investigating the neural mechanisms of not only individual social behavior but also psycho-physiological intersubjective relationships.

The electromagnetic hypothesis of synchronization in lucid dreams posits that during dreaming, the brain may generate electromagnetic fields capable of interacting with external signals, aiding in synchronizing internal perception with external stimuli. The electromagnetic fields produced by the brain during lucid dreaming can alter an individual's perception. For instance, the brain is capable of generating electromagnetic fields that enhance or diminish the perception of colors or sounds. Thus, the brain can

exert control over dream content and synchronize it with external stimuli.

According to this hypothesis, during a lucid dream, the brain enters a state where its electrochemical activity resembles that of wakefulness.

The application of the "Banchenko's Mnemonic Dream Synchronization Method" for the joint synchronization of dream elements (including lucid dreams), within the framework of "Blokhin's Dreaming Cell Concept," and the analysis of the obtained results using the "Kapustin's AI Dream Matching Model" is the goal of this research.

1.1 Literature Review

Duane and Behrendt were the first to simultaneously record electroencephalograms (EEGs) and identified correlations between EEG characteristics of two individuals during sleep while engaged in joint activities [9]. This multi-subject technique remained dormant for some time but was revived by Montague et al. [10]. They employed functional magnetic resonance imaging (fMRI) to capture brain activity simultaneously from two subjects in different laboratories with synchronized setups. Since then, advancements in intricate instrumental recording methods and data processing algorithms have led to a growing number of studies analyzing interrelationships in brain region activity and somatovegetative indicators in people during collaborative activities [11,12].

Through years of dream research conducted at the Innovative Research Center "RADESS," involving numerous practitioners of lucid dreaming, I.S. Blokhin and G.V. Tsesarsky developed over 100 exercises and practices designed for more than 3 months of continuous work. Dreaming serves as the key to doors holding answers about health and personal effectiveness, life and death, parallel worlds, ancient civilizations, mechanisms of consciousness, and perception [13].

Various research methods for analyzing neurophysiological indicators involve detecting brain areas undergoing significant individual changes in neurophysiological signals during social interactions, followed by the application of mathematical techniques to detect interconnections between participants. The following approaches are utilized:

1) correlation analysis across different frequency ranges, multivariate component analysis [5,14];
2) assessing measures of connectivity between two periodic processes (degree of phase synchronization phase coherence and phase lag index, coherence of wavelet transforms of two signals [15,16,6];
3) graph theory measures (modularity, directionality, network characteristics reflecting properties of interneuronal networks [17];
4) assessment of causal relationships (Granger causality) [18];
5) nonlinear methods for signal synchronization analysis [18].

Another method for verifying the authenticity of brain activity synchronization is decomposition (random permutations of the blocks of source signals), which helps eliminate false correlations caused by signal frequency characteristics. Decomposition can be applied separately or pairwise for synchronously recorded points in time series [19].

The investigation of social interactions is often conducted using models of joint activities that require behavioral synchronization of varying complexity. This ranges from simple motor actions to coordinated tasks of higher complexity: musician ensemble performance or spontaneous imitation of hand movements [20].

During synchronized button pressing, participants exhibit activation in the prefrontal regions and the left middle frontal cortex, and the synchronization in this area correlates with the degree of subjects' prosocial behavior [1,22]. The coordination of rhythmic finger movements is accompanied by phase synchronization in the beta range in frontal and central areas and synchronization in the theta and beta ranges in the lower frontal gyrus, anterior cingulate cortex, and ventromedial prefrontal cortex [11,23]. Transitioning from uncoordinated to coordinated rhythmic actions reveals alpha-mu activity synchronization in the right central temporal area. It has been suggested that the synchronization of the high-frequency component of the alpha-mu rhythm depends on the task type and manifests differently in the left and right hemispheres. In the left hemisphere, the upper mu range is associated with action imitation, while synchronization in the right hemisphere is linked to discriminating between partner's motor activity and visual perception of their actions, thus modulating subsequent motor coordination. During collaborative musical instrument playing, an increase in phase synchronization is observed in the delta and theta ranges [20].

The question of the asymmetry of neural response and the involvement of different EEG rhythms in behavioral synchronization remains open. Bilateral activation and phase synchronization in the theta and beta ranges have been demonstrated during finger movement coordination [27]. In another study, significant right-sided asymmetry in high-frequency mu-range synchronization was observed [17].

Results of brain activity analysis during observing partner actions have highlighted the leading role of the mirror neuron system and alpha-mu activity in establishing a link between representation and action, as well as in supporting joint attention and integrating information about one's own actions and the behavior of others [9].

During decision-making in gaming interactions, activation is observed in the medial prefrontal and anterior cingulate cortex, superior temporal sulcus, and temporo-parietal junction [25]. Increased activation of the temporo-parietal junction during card games is characteristic of subjects deceiving partners, while unintentional deception is associated with superior temporal sulcus

activation [26]. It has been found that social context (cooperation or competition) and participants' familiarity with each other [20] are critical factors influencing brain activity synchronization. Cooperation triggers activation of the anterior insular cortex and insular motor zone, which are part of the reward system [8,30]. Activation of the dorsal part of the anterior insular cortex has been demonstrated, as well as the role of the cingulate and paracingulate zones in modulating responses to different social contexts [28].

Synchronization of EEG activity in theta/alpha ranges among individuals during cooperation in the "Prisoner's Dilemma" and high-frequency activity in central frontal cortex regions in the "Ultimatum" game has been shown [29].

Studying the neurophysiological basis of cooperative behavior is crucial for professions where collaboration is essential for achieving task success. A combined approach for assessing effective inter-subject connectivity has been proposed to identify "brain correlates of cooperation" among members of professional flight crews [26]. It has been demonstrated that inter-brain synchronization measures among pilots are more informative for evaluating cooperation effectiveness than their individual EEG characteristics.

The study shows that the synchronization of brain activity in the prefrontal and upper temporal cortex between a teacher and a student depends on the context of the educational process and can serve as a predictive criterion for learning outcomes [15]. It's demonstrated that synchronization of alpha EEG activity between a teacher and students allows predicting the success of information memorization by students [30].

Thus, understanding the neurophysiological mechanisms of social behavior can contribute to the development of ways to enhance the effectiveness of group learning and teamwork in various professional fields.

Inter-brain synchronization occurring without physical co-presence during joint online gaming was investigated by V. Wikström [16]. Multiplayer games have become a widely adopted form of social interaction: according to estimates, in the USA, 77% of all gamers, or about 53% of the total population, play video games together with others (Entertainment Software Association, 2021) [31]. Meanwhile, virtual worlds, where users are represented as spatial avatars, are attracting increasing attention and market share, partly due to recent efforts and investments by the social media giant Meta, formerly Facebook, in creating a virtual social world named the Metaverse [32]. Virtual environments can provide entirely different types of experience from the physical world, and users do not have to be represented in a format resembling their physical "self," which necessitates the investigation of the types of information required for interpersonal and inter-brain synchronization. This question becomes even more important as professional and personal online interactions, as well as online gaming, become more common due to the COVID-19 pandemic, and this trend may well persist after the pandemic ends.

Bio-signal synchronization among groups of people engaged in social interaction can be observed in heart rate variability, respiratory rate, skin conductance, as well as in hemodynamic and oscillatory brain activity. In inter-brain synchronization studies, inter-brain synchrony is determined by the similarity in the pattern of concurrent measurements obtained from participants using neurovisualization methods such as EEG, magnetoencephalography (MEG), functional magnetic resonance imaging (fMRI), and functional near-infrared spectroscopy [30]. Inter-brain synchronization depends on such signals, with face-to-face interaction providing high synchronization [14]. In one study, synchronization of brain hemodynamic signal in communication-related regions was observed when participants were in different rooms [26]. However, this study used a step-by-step task without real-time interaction. Additionally, there were no studies conducted on phase synchronization of oscillatory activity with interacting individuals in separate rooms. Therefore, it remains unclear whether inter-brain phase synchronization of oscillatory activity depends on physical co-presence.

The results obtained in Ursula Voss's study (2014) link frontal-temporal gamma electroencephalographic activity (EEG) to lucid dreaming, but a causal relationship has not yet been established [23]. We found that stimulation of the lower gamma range during rapid eye movement (REM) sleep affects ongoing brain activity and induces self-reflective awareness within dreams. Other frequencies of stimulation were ineffective, suggesting that higher-order consciousness is indeed associated with synchronous oscillations around 25 and 40 Hz.

Such a technology of intervention is referred to as PEMF (Pulsed Electromagnetic Field). Pulsed Electromagnetic Field Therapy (PEMFT), also known as Low-Field Magnetic Stimulation (LFMS), involves the use of electromagnetic fields in an attempt to treat nonunion fractures and depression.

Pulsed electromagnetic fields contribute to the synthesis of the skeletal extracellular matrix. The physiological response of skeletal cells to PEMF involves the synthesis of structural and signaling molecules in the extracellular matrix at the site of injury. The outcome of these signaling processes is the instruction to skeletal cells to synthesize structural extracellular matrix and signaling molecules, enhancing the ability of skeletal tissues to respond to changes in the physicochemical environment and biomechanical demands, as well as promoting healing. Reports have indicated a reduction in the time to union and an increase in the percentage of healing fractures in patients stimulated with PEMF compared to a control group, particularly in cases of fresh fractures of the tibia and femoral neck fractures.

The research conducted by I. Blokhin and M. Kasymbayev (2015)

suggests that the cell nucleus requires separate investigation of its optical properties [5]. The main component of the nucleus is chromatin. Chromatin is composed of DNA molecules in two phases: euchromatin and heterochromatin. Euchromatin represents the active phase of DNA, where the DNA molecule is in an unfolded state for transcription. Heterochromatin, on the other hand, represents the condensed phase of DNA.

Experimental research has demonstrated that the DNA molecule can serve as a source of coherent laser emission. Luminescence of DNA molecules was experimentally enhanced by exposing them to two-photon laser radiation within the visible spectrum range. As a result, the luminescence spectrum of DNA molecules shifted towards the blue and near-ultraviolet regions. Additionally, chemiluminescence of DNA is possible under the influence of steroid hormones and ATP reactions. The luminescence of the DNA molecule is accompanied by its spatial conformation, leading to the generation of acoustic waves in the medium.

An interesting hypothesis suggests that the condensed phase of the DNA molecule (heterochromatin) resembles a holographic plate that can be revealed by the coherent emission emitted by the active phase of DNA.

2. Materials and Methods

For the continuous functioning of biomolecules within living cells, a constant supply of energy is required, one that can be absorbed. The most natural way of energy transfer to an atom or molecule is through the absorption of electromagnetic radiation.

The experiments described above indicate the existence of a biological medium within which the following processes occur:
1. Non-material data transmission from one individual to another, presumably with a wave-like nature, contributing to collective consciousness.
2. Synchronization of brain activity emission among individuals engaged in joint or synchronous activities.

It is possible to hypothesize that these processes find their reflection in the social activities of groups of people and can be detected without the use of hyper-scanning methods.
Based on this, the following hypotheses can be formulated:
1. Alteration and synchronization of brain activity emission among participants during collaborative wakefulness may influence the brain emissions generated during sleep, potentially leading to changes in sleep quality and dream characteristics.
2. Mutual tuning of individuals in a collective through synchronized activities such as reading, watching movies, chat discussions, forming tag-memes, etc., can be detected through changes in dream content among participants, possibly contributing to the emergence of shared dreams or dreams with common elements.

2.1 Research Methodology

The following terms and definitions are used to describe the research methodology:

- **Meme:** A unit of culturally significant information. A meme can be any idea, symbol, manner, situation, or action that is consciously or unconsciously transmitted from person to person through speech, writing, videos, rituals, gestures, etc.
- **Tag-Meme:** A meme described with the minimum amount of information necessary for its perception and interpretation by each participant within the group in which it is being transmitted.
- **Synchronization:** In the context of this study, it refers to the process of participants simultaneously engaging in the same action, specifically involving the simultaneous viewing of the same video material to impact visual centers.
- **Formation of Tag-Memes:** The process in which a group of individuals discuss previous joint activities, accessible to all group members, including information, video material, images, etc. Through this process, key ideas and images (tag-memes) are identified, supplemented with interpretations available only to the members of the group.

- The terms "team," "group," "participants," "dreamers," and "research participants" are considered synonymous, collectively referring to the group of dreamers participating in the synchronization research.

The research was conducted with the participation of a team of 8 participants. According to the hypothesis, a certain data transmission model is assumed to contribute to the formation of collective consciousness, which can be described as a "hive" (Figure 1). For the formation of this "hive," a minimum of 7 individuals (6+1) is required [13]. This implies that for effective consciousness synchronization, a collective of 7 or more individuals is necessary. Larger collectives are likely to synchronize in groups of 7 individuals, though this hypothesis requires further research.

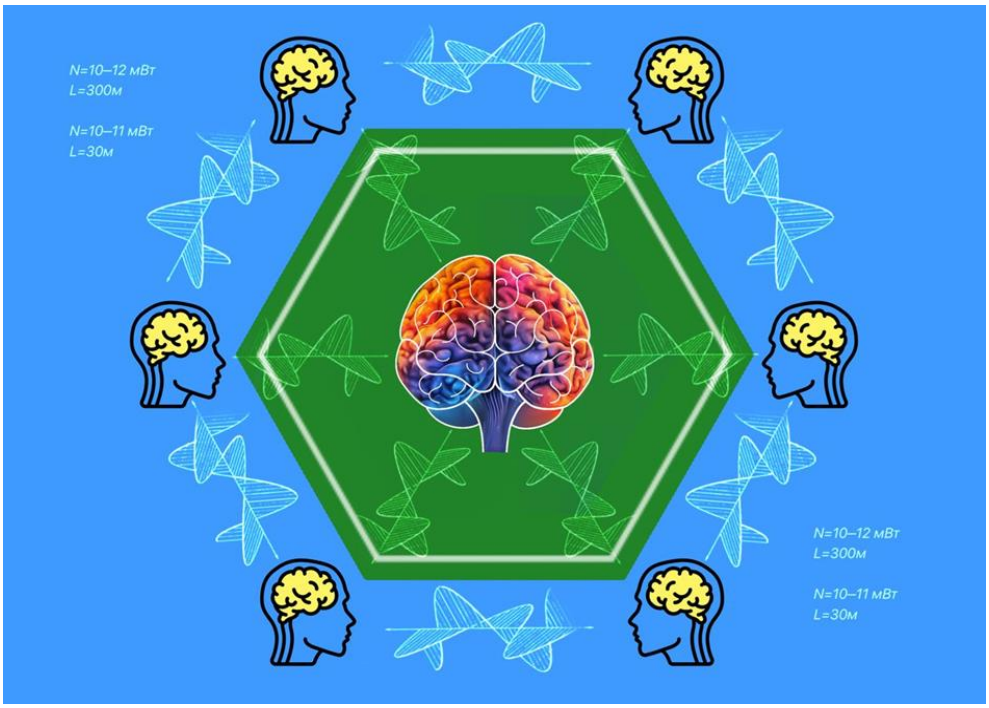


Figure 1: Characteristics of the Research Group

- Total number of individuals: Males -2, Females - 6.
- Age of participants 22-56 years.
- Countries of residence of participants: Russia, Germany, Switzerland, Mexico, United Kingdom, Cyprus.
- Number of participants regularly attending synchronous viewings and actively participating in discussions: 5.
- Number of participants occasionally missing viewings: 3.
- Number of participants regularly keeping dream journals: 4.
- Number of participants irregularly keeping dream journals: 4.

The group was chosen to be diverse in terms of gender and from different countries and continents, in order to minimize the influence of external events and factors on the synchronization process and to prevent the grouping of individuals based on other criteria: territorial, cultural, climatic, political, which could distort the results.

The results of the study will help answer the following questions:
1. Can the synchronization of individuals within a group through synchronous activities like reading text, watching films, chat discussions, creating tag-memes, etc., be reflected in changes in the dream content of the participants?
2. Can the tag-memes formed within the group manifest themselves in dreams?
3. Does synchronization contribute to an increase in lucid dreaming within the group?
4. Does group synchronization and the formation of tag-memes lead to the occurrence of shared dreams characterized by partial or complete coincidence of objects, people, locations, content, etc.?

2.2 Stages of the Research

1. Dream diaries kept by the members of the research group using the Telegram messenger during the following periods:
1.1. Period No.1 — 30 days before the start of Synchronization.
1.2. Period No.2 — from the 1st to the 30th day after the start of Synchronization.
2. Preparation:
2.1. Compilation of dream database (Table No.1) from the dream diaries of research participants during Period No.1 for further training of an AI-based analytical model.
2.2. Preparation and training of the AI-based analytical model using the dream database from Period No.1.
3. Synchronization (Figure 2):
3.1. Synchronous viewing of the TV series "The OA" [36] over a period of 16 days, one episode per day, at the same time each day (accounting for time zone differences).
3.2. Synchronous discussion in the Telegram chat for 15-20 minutes after watching each episode, highlighting the main ideas and images—memes and tag-memes, which were then elaborated and commented on by all group participants.
4. Analysis and comparison of the dream database obtained during Period No.1 and Period No.2.

2.3 Characteristics of the Dream Database:

Analysis period: from May 5 2023 to July 30 2023
Synchronized viewing of the series: from June 4 2023 to June 24 2023
Total number of analyzed dreams: 366

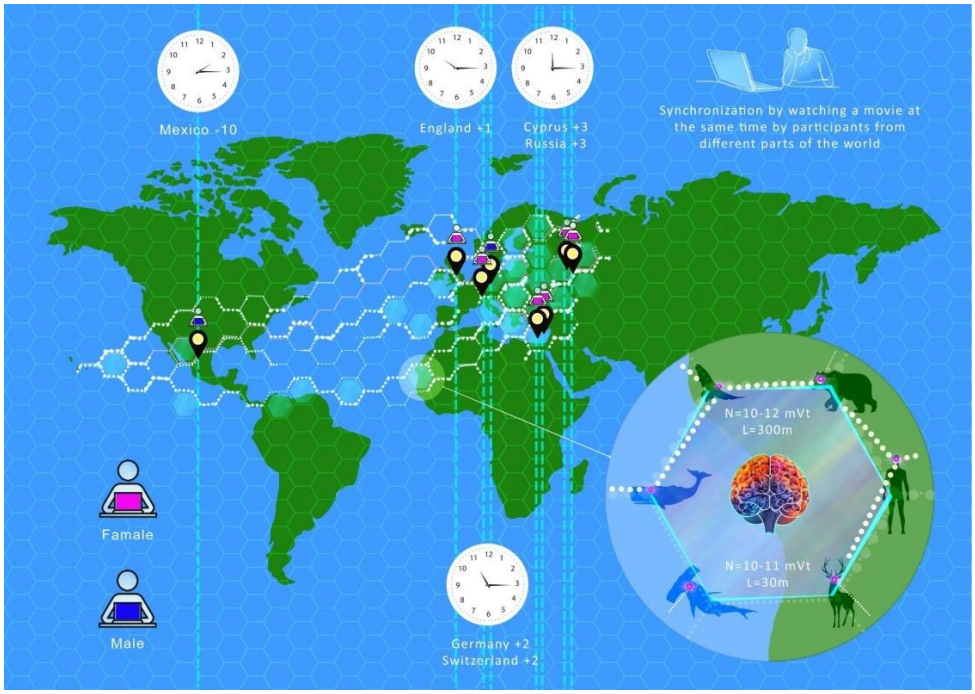


Figure: 2

Processing procedure for dream databases from dream journals published in a Telegram chat:

1. Automated Data Processing: Initial data processing is conducted utilizing newly developed computational algorithms based on artificial intelligence, created by Mikhail Kapustin.
2. Manual Verification by Specialists: The processed data undergoes manual scrutiny by experts specializing in IT, neurophysiology, mathematics, and neurology.
3. Generation of Graphs and Comparative Tables: Graphs and comparative tables are created using the obtained data for interpretations and conclusions.

This approach has helped prevent program interpretation errors and handle extensive data volumes effectively.

Parameters Used for Dream Analysis:

1. Number of Dreams: The quantity of recorded dreams.
2. Number of Lucid Dreams: The count of dreams in which the dreamer was aware of the dreaming state.
3. Team Members' Presence in Dreams: Whether other members of the team were present in the dreams.
4. Group Activities in Dreams: The occurrence of collaborative group activities within dreams.
5. Tag-Memes Appearance in Dreams: The presence of tagged themes, ideas, or concepts within dreams.
6. Dream Detailing: The level of detail and vividness in dream descriptions.
7. Dream Synchronization: The emergence of similar descriptions among different dreams, including objects, locations, emotions, and individuals.

2.4 Development of the "Kapustin Markers Algorithm" for Dream Coincidence Analysis

The "Kapustin markers Algorithm" represents a significant breakthrough in the field of dream analysis. The algorithm seeks to identify and catalog these dream markers to facilitate a more streamlined and efficient process of dream analysis. At the core of the algorithm lies the sophisticated technique of dream marker extraction. Utilizing cutting-edge machine learning, natural language processing, artificial intelligence technologies the algorithm scans and analyzes dream reports provided by users. Through this analysis, it identifies recurring elements, such as specific locations, objects, characters, emotions, and events, which serve as the fundamental building blocks of dreams. Once the dream markers are extracted and organized, the Kapustin Algorithm harnesses them to artificially attract dreams with matching markers. By creating an environment where dreams with similar themes are more likely to occur in proximity to one another, the algorithm aims to map out connections and patterns within dream content. This not only enhances the efficiency of dream analysis but also opens up new possibilities for understanding the human subconscious.

The Kapustin Algorithm offers several advantages over traditional methods of dream analysis:

- Enhanced Search Speed: With dream markers acting as guiding beacons, the algorithm drastically reduces the time and effort required to identify relevant dream data for analysis.
- Improved Efficiency: By clustering dreams based on their shared markers, researchers can focus on specific themes and conduct more targeted investigations.

● Quality Control of Markers: The algorithm employs advanced validation techniques to ensure the accuracy and reliability of the extracted dream markers, minimizing potential biases.
● Tracking New Markers: The Kapustin Algorithm's adaptability allows it to track and incorporate emerging dream markers, accommodating the evolving nature of dreams and human experiences.

Furthermore, the Kapustin Algorithm opens doors to pioneering research directions, including the establishment of collaborative databases for cross-population comparison of dream markers and exploration of potential therapeutic applications. By decoding the enigmatic aspects of the human subconscious, this paradigm-shifting tool marks a significant advancement in dream research. Its potency makes it an invaluable asset for researchers aiming to delve deeper into the analysis of dreams and the complexities of the human mind.

3. Results

The analysis of the acquired data on the quantity and content of dreams over two periods confirms the influence of wakefulness synchronization on dreams. The memes and tag-memes formed during synchronization manifested in the dreams. It can be hypothesized that the need for maximum detailing of what was seen during discussions of viewed episodes contributed to this, thereby forming a distinct set of intra-group tag-memes. However, the potential impact of dream recall training and an increase in discipline towards dream journaling over time should not be ruled out.

It's worth noting that the number of lucid dreams did not increase. This might suggest that, in isolation from other practices, methods such as the stimulation of lucid dream induction or co-tuning might be relatively ineffective or require a longer period of investigation. During the verification of data using both the Kapustin Algorithm and manual methods, the following conclusions were drawn:
1. The developed computational model specifically designed for this research demonstrated high efficacy in detecting and tallying physical objects within dreams.
2. As of now, tasks involving the qualitative and quantitative assessment of emotions and actions are better handled by humans. Further refinement and testing of the programmatic algorithms are needed for these tasks.
Analysis of the Number of Dreams and Lucid Dreams (LDs) Before and After Synchronization:
1. Total number of dreams for all participants is 164 in the period №1 and 202 in the period №2. Conclusions: The number of recorded dreams increased by 23%.
2. Total number of lucid dreams (LDs) for all team members is 62 in the period №1 and 48 in the period №2. Conclusions: The number of lucid dreams (LDs) decreased by 33%.
3. Number of LDs per dream is 0,378 in the period №1 and 0,238 in the period №2. Conclusions: The ratio of LDs to the total number of dreams dropped by 37%.
Influence of the members within the studied group of dreamers on each other, as manifested within their dreams:
1. Dreams involving the studied group as a whole or its individual members: 21 (20 LDs) in period №1, 55 (10 LDs) in period №2. Conclusions: Dreams involving the studied group as a whole or its individual members increased by 2.5 times. Synchronization does not increase the number of lucid dreams.
2. Number of dreamers in whom the entire research group appeared in their dreams / total number of dreams: 1/6 in period №1, 8/30 in period №2. Conclusions: The number of dreamers within the group who experience dreams involving the entire team has risen to 100%. Synchronization does not increase the number of lucid dreams.
3. Number of dreamers in whom the entire research group appeared in their dreams / Number of lucid dreams in which the entire research group appeared: 1/5 in period №1, 1/5 in period №2. Conclusions: The number of lucid dreams with the presence of all team members remained unchanged. Synchronization does not increase the number of lucid dreams.

The influence of the plot of the watched TV series on dream narratives and lucid dreams.

№	Category of dream elements	Dream elements	Periods: All dreams (dreamers) / lucid dreams (dreamers)		Conclusions:
			№1	№2	
1	Teg-mems	Visual representation of energy flows. (The plot frequently involved energetic practices, energy streams, gusts of wind symbolizing connections, and cosmic currents.)	9(3)/7(3)	15(4)/12(1)	As a result of collective viewing and subsequent development of tag-memes during discussions, the number of dreams featuring tag-meme imagery increased within the group, along with a rise in the count of dreamers who perceived these tag-memes in their dreams.

2		Door. (The imagery of a door is a pivotal element in the storyline.)	5(3)/2(2)	10(4)/1(1)	
3		Basement. (According to the series' plot, a group of people was held captive in a basement.)			
4		Slave. (One of the narrative arcs portrays the forced confinement of individuals and their coerced labor.)	0/0	2(2)/0	
5		Trees. (One of the vivid allegorical motifs within the series.)	4(3)/2(2)	8(3)/6(2)	
		Train (active discussed experience of one member)	1(1)/0	7(4)/0	
	Devices and technology	Phone	4(2)/1(1)	4(2)/1(1)	Phones and computers, which are used during the synchronization process, have started to appear more frequently in dreams.
		Television	0/0	0/0	
		Computer	0/0	2(2)/1(1)	
	Locations (graphe 1)	City	5(4)/1(1)	10 (2)/0	The description of uniform locations increased on average by two times, with a slight increase in the number of dreamers recording them.
		Street	8(4)/3(3)	13(4)/2(1)	
		Building	14(4)/5(3)	27(4)/3(2)	
		Apartment	5(3)/2(2)	10(3)/1(1)	
		Room	11(3)/4(2)	16(4)/3(2)	
		Store	2(1)/0	4(3)/1(1)	
		Swimming Pool	3(1)/1(1)	5(3)/0	
	Nature (graph 1)	Trees	3(3)/2(2)	8(3)/3(2)	The landscapes in dreams have not undergone significant changes, except for trees and the sea, both of which have experienced a notable increase in occurrence. Interestingly, trees were discussed in relation to the TV series as one of the tag-memes. On the other hand, the sea was not among the discussed tag-memes, but it was located near the research participants.
		Stones	7(3)/5(3)	8(4)/1(1)	
		Sea	1(1)/0	4(4)/0	
		Water	17(3)/5(3)	17(5)/6(3)	
		Mountains	6(3)/3(1)	5(4)/0	
		Light	8(2)/8(2)	10(3)/5(1)	
		Darkness	13(3)/11(2)	13(3)/2(1)	

	Spaces & rooms (graph 2)	Passage	6(3)/5(3)	9(4)/3(2)	The number of dreams featuring descriptions of: corridors, halls, basements, mazes, significantly increased, concurrently with a rise in the number of dreamers mentioning them. These spaces were present in the film and discussions. However, the mention of other spaces decreased or remained unchanged.
		Hall	5(3)/3(2)	11(4)/1(1)	
		Kitchen	6(3)/5(2)	3(3)/1(1)	
		Bathroom	4(3)/2(1)	4(3)/1(1)	
		Toilet	4(2)/4(2)	3(2)/0	
		Balcony	4(3)/2(1)	4(4)/0	
		Basement	0/0	3(2)/0	
		Labyrinth	2(2)/1(1)	5(2)/1(1)	
		Space of Unclear Typology	6(3)/5(3)	10(4)/5(2)	
	Interior objects (graph 2)	Table	2(1)/1(1)	7(3)/1(1)	Additionally, the level of interior detailing in the dreams of all dreamers has increased
		Wardrobe	0/0	6(3)/1(1)	
		Door	5(3)/2(2)	10(4)/1(1)	
		Wall	9(2)/8(2)	10(4)/5(3)	
		Window	7(2)/4(2)	9(4)/0	
		Bed	12(2)/10(2)	6(3)/4(2)	
		Floor	13(2)/8(2)	13(4)/5(2)	
	Transport (graph 3)	Car	8(4)/2(2)	4(3)/1(1)	Trains were not present in the lives of the participants during synchronization or in the TV series, but they began to appear more frequently in the dreams of a larger number of participants afterward. Interestingly, shortly before the commencement of synchronization, one of the group members had a vivid experience related to a train. This suggests that trains, in a way, also became a form of tag-meme.
		Bus	3(3)/0	3(3)/1(1)	
		Train	1(1)/0	7(4)/0	
	Other objects (graph 3)	Book	2(1)/1(1)	6(4)/1(1)	After synchronization, similar items began to appear more frequently in the dreams of a larger number of participants.

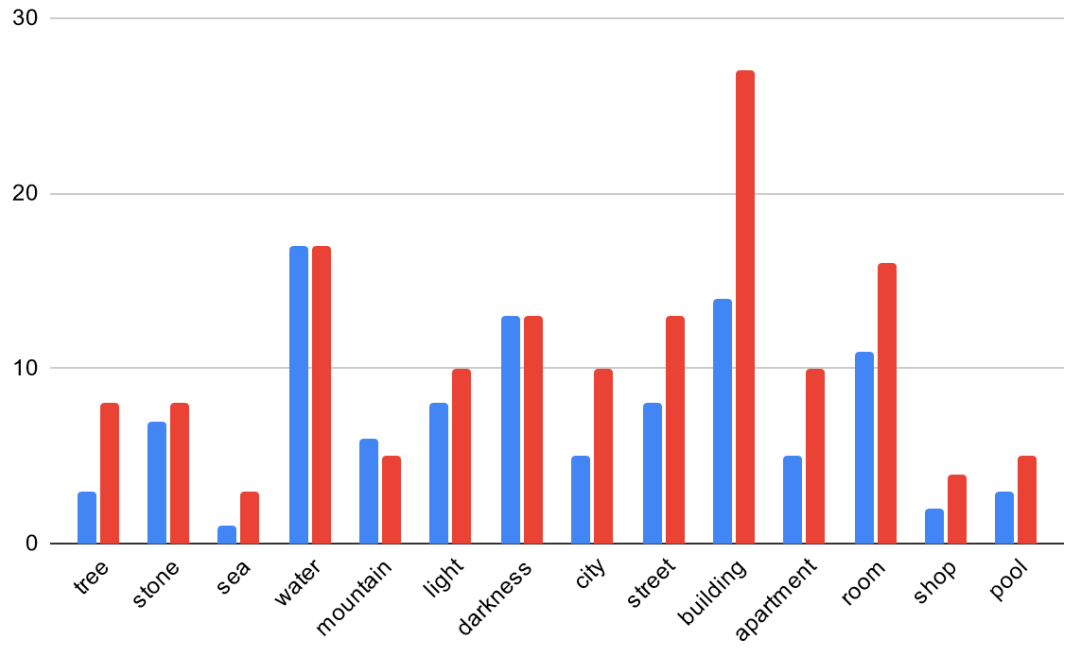
		Paper	4(2)/3(2)	6(2)/1(1)	
		Shoes	3(2)/0	5(3)/0	
		Plastic	0/0	4(2)/2(2)	
	Body Parts (graph 4)	Head	17(3)/14(3)	15(4)/5(3)	The number of dreams in which dreamers focus on specific body parts slightly increased, but when normalized per unit of recorded dreams, it remained nearly unchanged. The number of dreamers noting these details, on average, practically did not change.
		Chest	6(2)/5(1)	3(2)/0	
		Abdomen	2(2)/1(1)	5(3)/3(2)	
		Back	4(2)/3(2)	8(4)/1(1)	
		Hands	23(4)/14(2)	31(4)/11(2)	
		Fingers	2(2)/0	6(3)/3(2)	
		Legs	9(4)/4(1)	7(3)/0	
		Eyes	12(4)/7(3)	15(3)/3(2)	
		Ears	1(1)/0	2(2)/1(1)	
		Mouth	1(1)/0	3(2)/1(1)	
		Nose	3(1)/1(1)	1(1)/0	
		Skin	4(3)/2(2)	1(1)/0	
		Hair	2(2)/1(1)	5(3)/0	
	People	Crowd	1(1)/1(1)	3(2)/0	The number of dreamers seeing groups and people of different ages increased. This included the appearance of children in the dreams of participants without children.
		Children	22(2)/8(2)	23(4)/4(2)	
	Emotions (graph 5)	Joy	10(2) /2 (2)	1(1)/1(1)	On average, research participants started paying less attention to describing emotions. For two participants, negative dreams increased in frequency, which might be related to personal experiences.
		Surprise	10(3)/4(2)	6(3)/2(1)	
		Anger and Irritation	0/0	5(2)/1(1)	
		Regret	0/0	2(2)/0	
		Fear	10(3)/6(2)	4(3)/1(1)	
		Sadness, Tears	6(2)/2(1)	5(2)/0	

	Physical Activity (graph 5)	Work	8(3)/4(3)	12(3)/0	There is a lot of movement in dreams regardless of synchronization. Dreamers are more often active than static in their dreams. There hasn't been a significant increase in dream activity before or after synchronization.
		Talking	46(4)/24(3)	59(5)/16(3)	
		Flying	18(3)/8(2)	16(3)/10(2)	
		Learning	12(3)/8(1)	9(4)/2(1)	
		Reading	3(2)/0	8(4)/2(1)	
		Running	18(4)/8(3)	17(4)/3(1)	
		Lying down	7(3)/3(2)	9(2)/5(2)	
		Sitting	7(3)/2(1)	7(1)/0	
		Jumping	8(3)/6(2)	4(3)/0	

Table No: 1

Chart of the Dream Locations and Natural Phenomena

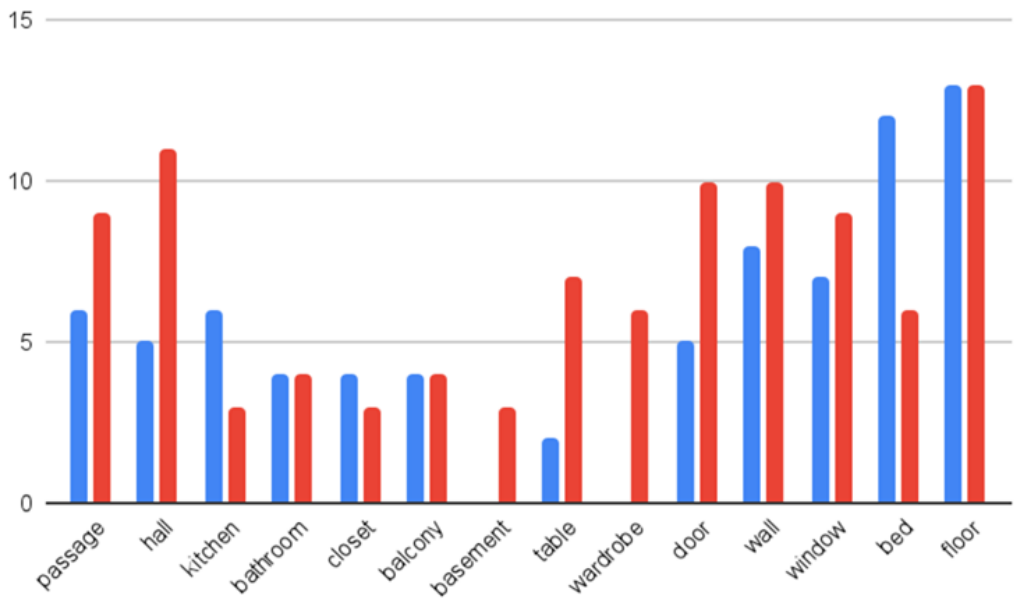
Period 1 - blue, Period 2 - red.



Graph 1

Graph depicting the frequency of appearance of various rooms and interior elements in dreams.

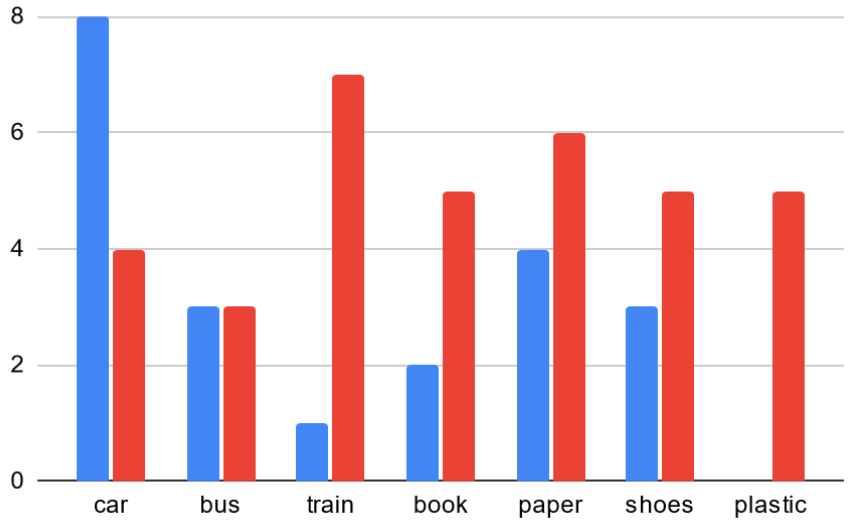
Period 1 - blue, Period 2 - red.



Graph 2

Graph depicting the frequency of appearance of various modes of transportation and various items in dreams.

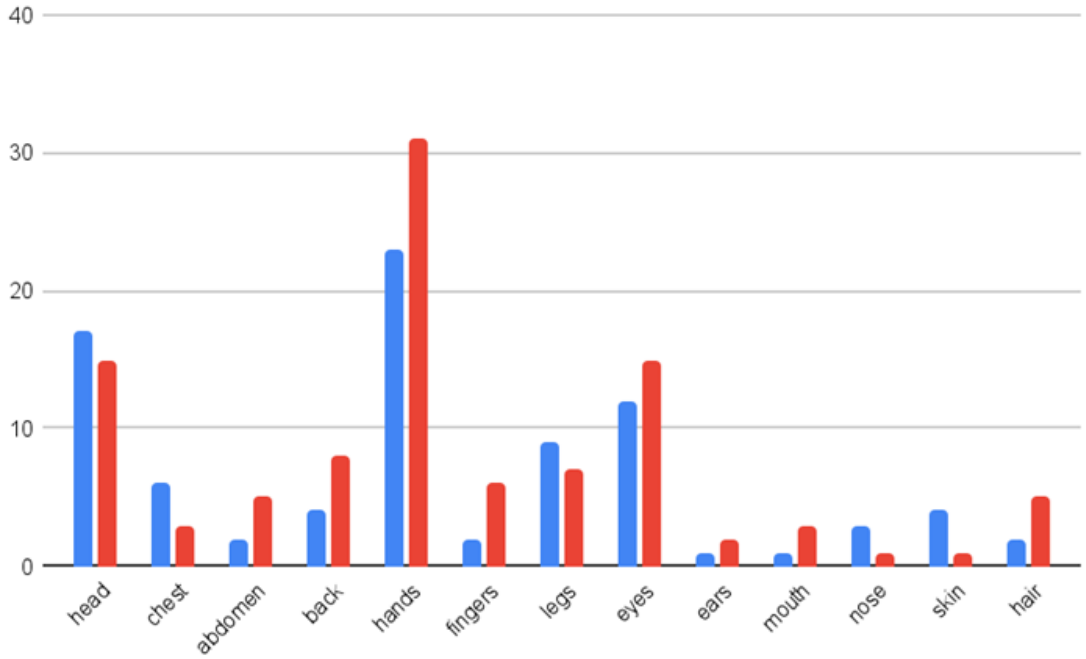
Period 1 - blue, Period 2 - red.



Graph 3

Graph depicting the frequency of appearance of various body parts in dreams.

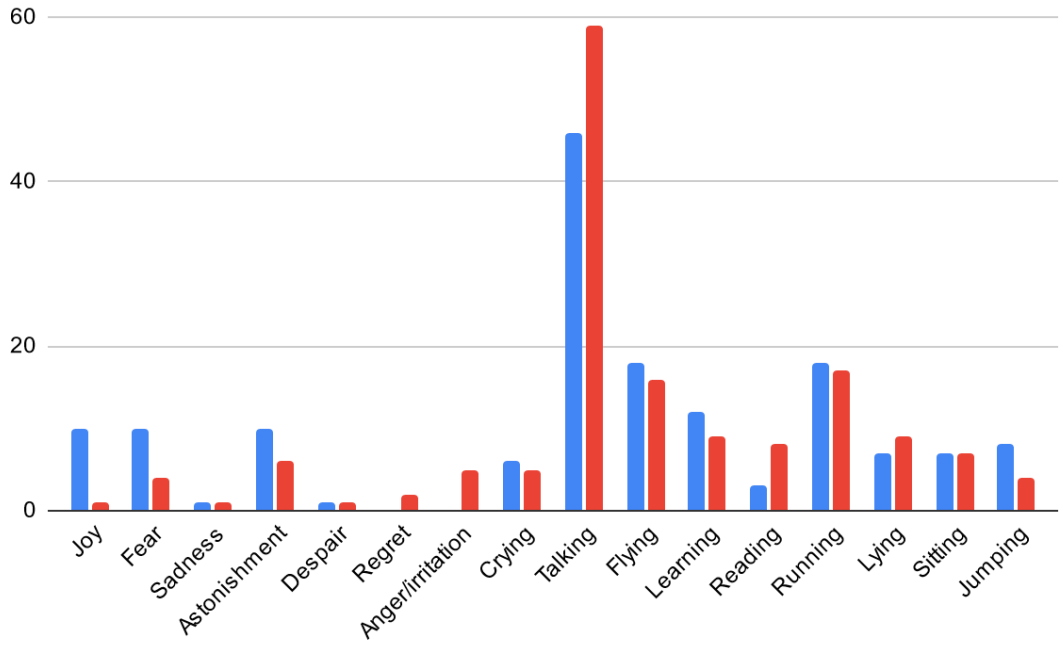
Period 1 - blue, Period 2 - red.



Graph 4

Graph of Emotions and Physical activity in Dreams.

Period 1 - blue, Period 2 - red.



Graph 5

The obtained data indirectly indicate:
1. Increased engagement of each team member in collective activities, manifested in their dreams
2. Enhanced dream detail in descriptions, indicative of participants paying more attention to dream reporting. This increase in dream detail can be reflective of heightened participant involvement.
3. Circulation of shared tag-memes as images in the group's dreams. Notably, not only the frequency of their appearance increased, but also the number of dreamers in whose dreams these images were present. Meanwhile, the frequency and number of dream images unrelated to synchronization remained largely unchanged or decreased.

It can be hypothesized that this methodology could be effective in enhancing team cohesion and fostering a stronger sense of unity, especially within large organizations. However, it should be noted that the influence of team members on each other could also have negative implications.

4. Discussion

This research explores the hypothesis of an informational function of optical signals in the context of intercellular communication. In comparison to "traditional" methods of information transmission between biomolecules, which rely on chemical reactions and molecular messengers, the optical communication channel offers several significant advantages. These include a wide signal bandwidth, high spectral density of channels, minimal signal attenuation, low noise levels, and high resilience to external influences. Additionally, the optical nature of intracellular communication facilitates precise targeted delivery of energy and information to various biomolecules.

Investigating the arbitrary activation of the sympathetic and parasympathetic nervous systems, their interconnections, and their impact on organs and systems is a pertinent task within the field of neurophysiology. Empirical results provided by Wim Hof confirm that specific methods can stimulate the parasympathetic nervous system and influence internal biological processes of the organism. It's important to note that such activation is possible only in specific contexts, involving the use of particular breathing techniques and exposure to low temperatures.

The research "Voluntary activation of the sympathetic nervous system and attenuation of the innate immune response in humans" deeply analyzes the relationship between voluntary activation of the sympathetic nervous system and alterations in the innate immune response. [23]. The obtained results of this work underscore that the effects of such activation could be attributed not only to the impact on the sympathetic and parasympathetic nervous systems but also through inflammation neurotransmitters at the intercellular level. This reaffirms the significance of intercellular communications both at the nervous system level and at a finer level through specific signaling molecules.

An essential aspect of this research involves the necessity to develop potential mechanisms for optical regulation of intracellular processes, as well as investigating the mechanisms of electromagnetic radiation penetration into cells and the conditions conducive to its generation. The significance of this area is underscored by the fact that DNA molecules have the ability to generate coherent emission in response to external radiation in the visible and short-wave spectrum. This process is facilitated through the mechanism of two-photon absorption, as identified in the study by A.M. Agaltsov and P.P. Garyaev in 1996 [33]. By traversing cell layers and intercellular interactions, there is potential for effective intercellular communication, where all living biological structures metaphorically can "emit light."

Electromagnetic fields also play a crucial role in biological systems. In the work of N.V. Krasnogorskaya, "Electromagnetic Fields in the Biosphere" (1984), researchers emphasize that these fields should not be simply regarded as background noise [6]. It's important to note that all living organisms, including plants, fungi, unicellular and multicellular animals, as well as humans, generate electromagnetic fields with their unique frequency characteristics.

A separate mention is due for the "Cubbit Theory" (Blokhin, Tsesarsky), which focuses on aspects of quantum information and quantum computing, with an emphasis on qubits as key elements [13]. This theory describes the concept of forming "dreaming cells," consisting of seven members, six of whom are always in a state of ordinary sleep (slow or rapid), while one is in a state of lucid dreaming. In this context, the presence of a substrate facilitating physical connection, of known or unknown nature, is assumed. For instance, if one considers the hypothesis of electromagnetic linkage among clairvoyants, reference can be made to Krasnogorskaya's work on "Electromagnetic Fields in the Biosphere [6]."If an alternative nature of communication is assumed, recent discoveries made by American physicists regarding the interaction of "dark" particles constituting dark matter could be relevant. Despite the fact that the direct link of this theoretical concept to biological processes in the organism might not be immediately evident, its fundamental principles are connected to questions of quantum interactions, information states, and possibly previously unknown physical fields capable of transmitting information akin to electromagnetic fields in modern radio-electronic devices.

In this context, it is prudent to emphasize the optical nature of intracellular communication, as presented above, and its potential interpretation within the framework of quantum information theory. Specifically, the mechanisms of optical regulation of intracellular processes can be reinterpreted from the standpoint of quantum states and interactions, supporting the role of qubits as informational units in quantum systems.

Considering this perspective, it is plausible to hypothesize that biological organisms, including structures capable of generating

electromagnetic fields, could also be subject to the influence of quantum interactions. Thus, the convergence of physiological processes with the fundamentals of quantum information could offer a novel approach to understanding and studying biological mechanisms with a deeper quantum perspective.

The interconnection between the neural system, biological processes, and quantum states implies that the synchronization of dreams might be linked to the coordination of the subjects' brain biological rhythms in the presence of external stimuli, such as the Schumann resonance. In this context, the mechanism of signal encoding remains presently uncertain. It's possible that synchronization is akin to a strobe pulse in microelectronics, with the primary data stream being transmitted through a different channel. Further research on this matter is of importance to elucidate the underlying mechanisms of such interconnection and its potential practical applications.

Of significance in this context is the further development of the computational model devised by Mikhail Kapustin in collaboration with Denis Banchenko. This model significantly aids in easing the analysis of obtained data and serves as a valuable tool for investigating this matter. The application of the "Banchenko's Mnemonic Dream Synchronization Method" for the joint synchronization of dream elements (including lucid dreams), within the framework of "Blokhin's Dreaming Cell Concept," and the analysis of the obtained results using the "Kapustin's AI Dream Matching Model" is conducted in the research.

Limitations

There is a limitation of the study due to the number of subjects.

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Conflict of Interest

Author Denis Yurievich Banchenko, Author Mykhailo Mykhailovich Kapustin, Author Irina Nikolaevna Bukach, Author Anna Sergeevna Budanova, Author Tatiana Viktorovna Burilova, Author Olena Davletkhanovna Mutsalkhanova-Yushchenko, Author Ilya Sergeevich Blohin declare that they have no conflict of interest.

All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

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