Increasing perception vividness during lucid dreams by imagining wakefulness

Michael Raduga, Zhanna Zhunusova, and Andrey Shashkov

Phase Research Center, Moscow, Russian Federation

Summary. Lucid dreams (LDs) are dreams in which people are aware that they are dreaming. Often, LD perception vividness is vague, which makes it difficult to perform research tasks or achieve personal goals. The goal of this research is to investigate whether imagining that the space of LDs is an actual physical space leads to better perception vividness. This technique is derived from the vividness of false awakenings (a similar to LD phenomena), which people usually cannot separate from wakefulness. In the present research, we asked volunteers to intentionally imagine that they were awake while in an LD. Using an online resource, we instructed 152 LD practitioners to complete a task during an LD in which they needed to imagine that the space around them was real. Then they needed to check the extent to which the quality of perceptions changed. Of the participants, 55% achieved increased vividness; for 23% of them, their perceptions exceeded the vividness of wakefulness. In comparison with a study of another technique for increasing LD vividness, we obtained sufficiently higher results, which proves that imagining that the LD space is real could have practical applications. The outcomes of this research might lead to a better understanding of the nature of subjective perceptions in LDs, which, in turn, might help in researching this phenomenon and its application.

Key words: lucid dreams, consciousness, REM sleep, imagining, phase state, perceptions, vividness, wakefulness

1. Introduction

Lucid dreams (LDs) refer to phenomena in which one becomes aware that one is dreaming while they are asleep (LaBerge, 1985). Intentional and rational ways of thinking are characteristics of LDs (Hunt, 1989). In most cases, LDs take place during REM sleep, although they can also happen during non-REM sleep (Stumbrys & Erlacher, 2012). LDs are differentiated from ordinary dreams by high activity in prefrontal zones in the 40-Hz band (Voss et al., 2009). Studies from 1966 to 2016 show that 55% of the human population has experienced at least one LD (Saunders et al., 2016). Although LDs typically occur naturally, the neurobiology of LDs is not fully understood (Baird, Mota-Rolimb, Dresler, 2019).

A few studies have indicated the practical applications of LD-based research. For instance, motor movements during LDs use sensory-motor cortex parts the same as actual movements (Dresler et al., 2011), which allows the dreamer to practice physical skills during an LD (Stumbrys, Erlacher, & Schredl, 2016). LDs could also be used to solve problems related to chronic pain (Zappaterra, Jim, & Pangarkar, 2013). Though there are some reports of LDs being used to solve problems related to persistent nightmares (Zadra & Pihl, 1997), this topic is controversial and requires more research (Macêdo et al., 2019). LD research allows us to confirm the correlation between the processes undertaken in LDs and psychophysiological processes. LDs also could be used to control PC functions (Mallett, 2020).

Corresponding address:
Michael Raduga, Phase Research Center. Moscow, Russian Federation
Email: obe4u@obe4u.com

Submitted for publication: February 2020
Accepted for publication: September 2020
DOI: 10.11588/ijodr.2020.2.71168

In addition to the problems related to inducing LDs (Saunders et al., 2016), low perception vividness occurs in most experiences (Raduga, 2014). As a result, low perception quality prevents people from achieving predetermined goals during LDs (Erlacher et al., 2013). To make perceptions more vivid, practitioners use deepening techniques (DTs). For example, LaBerge suggests that practitioners should spin during an LD to make the surrounding sensations clearer:

> *"Since the sensations of movement during the rotation of sleep are as vivid as during physical movements, it is likely that in both cases the same brain systems are activated to the same degree. An interesting possibility is that the spinning method, stimulating the brain system, which combines the vestibular activity found in the middle ear, facilitates the activity of neighboring components of the REM system" (LaBerge, 1995, p. 24).*

There are dozens of other DTs, most of which require the activation of tactile or visual perceptions (Raduga, 2014). By comparing them with each other, we can perhaps determine which DT is the most efficient.

The goal of the present research is to determine how intention and imagination influence perception vividness in LD. For this purpose, we chose a DT that consists of having practitioners imagine that the space around them in an LD is part of physical reality as opposed to a dream scene. In theory, this could cause an increase in perception vividness due to the tendency of the LD to model mental intentions and expectations (Raduga, 2014). The nature of this DT could be one reason why people sometimes cannot separate false awakenings from wakefulness—they perceive reality and the LD space to be very similar (Barrett, 1991). In other words, this study aimed to achieve more LD vividness by partially simulating false awakenings (i.e., practitioners were instructed to believe that they were is a state of wakefulness while in an LD).

The central hypothesis was that better perception vividness in LDs can be achieved by perceiving LDs as a state of

wakefulness—we refer to this as "imagining wakefulness as a DT" (IWDT). As LDs have not been studied extensively, we propose a secondary hypothesis. Specifically, we assumed that IWDT effectiveness could be correlated with practitioners' gender, experience, and induction methods.
Support for our ideas could improve our understanding of subjective perceptions in LDs and help to create new DTs that can be used to strengthen LD practices, research, and applications. At the same time, this study could make the false awakening phenomenon more understandable.

2. Methods

2.1. Research resource

The study took place from December 23, 2018 to August 3, 2019. It was held in the form of a field experiment, with the volunteers performing the task at home. Project Elijah, an online resource (www.pro.obe4u.com and www.pro.aing.ru), was the primary tool used for carrying out the study. LD practitioners from all over the world can register to participate in our research works. After they accomplish the required tasks, the project team verifies their reports. If the report is accepted, the practitioner gains access to the next experiment. Experiment participants do not have access to others' reports, as such access could compromise the results.

2.2. Volunteers

During registration, volunteers agreed to provide their personal data. They gave their full names, contact details, a social network profile, and a personal photo. Following ethical and legal standards, before receiving assignments, all volunteers gave their consent to participate in experiments and assume responsibility for any possible consequences from completing assignments.

2.3. Experimental task

According to the terms of the task, the volunteers had to (1) enter an LD and (2) imagine that the dream space was part of physical reality (i.e., they were to imagine reality with its physical laws and perceptions). Then, the practitioner was to (3) determine whether the LD space became more realistic or less realistic (or if there was no difference). Then, the volunteer was to (4) report the result through a specific online form.

The volunteers were allowed to try the task one or more times, though they were to report only the single experience for which they experienced the most significant outcomes. Volunteers could send their reports up to a few months after accepting the task, depending on their access to the task (i.e., whether it was granted after other previous tasks completed through Project Elijah). Participants had to describe their full experiences in detail; as part of this, each participant had to explain how they induced the LD, what they experienced while completing the task, and how the dream ended.

2.4. Statistical analysis

The final data file was analyzed using contingency tables and Chi-square tests in JASP (Version 0.11.0.3). It included all criteria (i.e., IWDT, IWDT forms, experience level, gender, LD induction method, and LD ending type) and their pairings. The significance level was set to alpha = .05. Bonferroni corrections were implemented as post-hoc tests. Non-applicable data (n/a) were excluded from the tables and were not taken into account in the analysis.

Volunteers were grouped based on the number of LDs experienced throughout their lives: <4, 4-10, 11-30, 31-100, 101-500, > 500, n/a (other or unclear options). Overall, IWDT efficiency was based on the following criteria: more vividness, failed, n/a (other or unclear options). Detailed IWDT outcomes were evaluated using the following criteria: decrease (decreased vividness of perception), foul (leads to awakening), hyper (perception vividness better than in reality), same-low (low initial vividness and no change), same-real (high initial vividness and no change), n/a (other or unclear options). LD entry methods were reported as one of the following: direct (LD without sleep, upon falling asleep, or immediately after falling asleep), indirect (LD upon awakening), ld (LD when becoming conscious in a dream plot), n/a (other or unclear options). LD endings were reported as one of the following: force (awakening against one's will), self (intentional awakening), dream (falling asleep), fake (false awakening), outer (awakening because of external sounds or other irritations), n/a (other or unclear options).

2.5. Terminology

LDs that are induced (either directly or indirectly) before falling asleep or upon awakening look and feel like out-of-body experiences (OBEs). Our practitioners often experience LD from their beds at home, which is why they might have used the term OBE in their reports. Some practitioners even call these LDs astral projections. Some studies have proposed that OBEs are a type of LD (Levitan et al., 1999) because both phenomena involve REM sleep and consciousness (LaBerge et al., 1988; Nelson et al., 2007). Also, LD and OBE practitioners tend to use the same methods (Raduga, 2014). Therefore, in our research, we used the term phase state (or simply phase) (Raduga, 2004) to refer to any state that has the characteristics mentioned above. In addition, LD is closely related to false awakenings (Barrett, 1991), sleep paralysis (Dresler et al., 2011; Terzaghi et al., 2012; Voss et al., 2009), and many other religious/mystical experiences. In this paper, we use the term LD as an umbrella term for all these types of experiences.

3. Results

We approved 152 reports (86 males, 66 females; one report per person), of which 139 contained defined IWDT outcomes. These 139 reports were used for the analysis. The reports reveal that 55% of practitioners succeeded in increasing their perception vividness by using IWDT. Meanwhile, 23% did not achieve any significant changes, and 28% of them experienced a decrease in perception vividness after IWDT. For 41%, vividness remained at a low level; for 31%, IWDT caused the LD to end. In 22% of the reports, perception vividness stayed the same but with high vividness. These data are depicted in Tables 1 and 2.
The chi^2-test analysis did not detect any statistically significant relationships between IWDT efficiency and gender, LD experience, and type of LD ending.

Table 1. Gender Distribution of IWDT Overall Efficiency Status

IWDT	Gender		
	Male (N = 80)	Female (N = 59)	Total (N = 139)
Same (real)	21 (26%)	9 (15%)	30 (22%)
Failed	21 (26%)	11 (19%)	32 (23%)
More vividness	38 (48%)	39 (66%)	77 (55%)

Note. Same (real) = vividness degree remained at a high level before and after IWDT; Failed = no increase of vividness degree; More vividness = increase of vividness.

Table 2. Gender Distribution of Detailed IWDT Efficiency Status

IWDT	Gender		
	Male (N = 80)	Female (N = 59)	Total (N = 139)
Foul	6 (8%)	4 (7%)	10 (7%)
Decrease	6 (8%)	3 (5%)	9 (6%)
Same (low)	9 (11%)	4 (7%)	13 (9%)
Same (real)	21 (26%)	9 (15%)	30 (22%)
Worked	30 (38%)	29 (49%)	59 (42%)
Hyper	8 (10%)	10 (17%)	18 (13%)

Note. Foul = LD ending; Decrease = decrease in vividness; Same (low) = vividness degree remained at a low level before and after IWDT; Same (real) = vividness degree remained at a high level before and after IWDT; Worked = increase occurred, but achieved vividness degree was not specified; Hyper = IWDT led to vividness which subjectively exceeded perceptions of wakefulness.

4. Discussion

The goal of this research was to determine whether intention and imagination influence perception vividness in LD. Our primary hypothesis predicted that a person's intention and mental expectations would increase their perception vividness in LDs when they pretended that the events of an LD were part of physical reality instead of part of a dream. To test this hypothesis, we had a group of volunteers attempt a task during an LD. The experiment showed that IWDT led to increased perception vividness in more than half of the cases.

Half of the practitioners succeeded in increasing perception vividness via IWDT. Though more studies on this topic are needed, the results largely confirm our primary hypothesis. This notion could be based on the brain's ability to simulate physical laws and stereotypes via the imagination and during LDs. This could be because LDs provide a very realistic simulation of waking conditions (Schädlich, 2017). However, this explanation requires more data and experimentation.

Our results can be compared with those of our previous study that employed a spinning method to increase LD perception vividness (Raduga, Shashkov, & Zhunusova, 2020). Although IWDT provided better results when spinning was employed (55% vs. 46%), this difference is statistically insignificant.

The hypothesis that IWDT depends on gender, participants' experience, and the type of LD ending was not confirmed in this study. However, perhaps they would have been confirmed if we had gathered more data.

Previous studies on DTs have indicated the efficiency of sensations, but the effectiveness of IWDT examined in the current study suggests that emotions and belief can also strongly influence LD phenomena, at least regarding its space properties. This means that LD-related neurobiology could be deeply connected to the parts of the brain that are responsible for emotions and cognition.

The outcome of the study improves the general understanding of false awakenings and partly explains why people often confuse them with wakefulness. IWDT shows how emotional beliefs can transform the LD space and increase its vividness (sometimes to the extent that the LD space is even more vivid than reality).

4.1. Limitations

The most problematic flaw of the current study is that the participants could have been influenced by the experimenter's demands and their motivation to succeed in the study's task. We have no way of knowing whether their reports are truthful and whether their dreams actually became more realistic. We acknowledge this problem and understand that it could be present in some reports. For now, the only way to solve this issue is to compare different DTs with each other through similar studies. In this way, we will be able to discern differences between them, even if some parts of the data are compromised. For this reason, in this study, we not only checked IWDT efficiency, but we also compared it with another similar study.

Most importantly, although this method of studying DTs is questionable, there are currently no other ways to assess and compare dozens of DTs. At the very least, the method used presently can serve as a basis for future studies.

4.2. Conclusions and Future Research

Most of the volunteers in this study were able to increase LD vividness by using IWDT. Our outcomes aid the general understanding of the nature of LDs and the mechanisms of their perception. Therefore, the outcomes allow us not only to observe changes in perception vividness, but they also allow us to obtain reliable LD data, thus enabling the discovery of more relevant applications. For now, it is not clear how IWDT works, but any LD practitioner can consider using this DT to achieve a full-fledged LD experience.

We have either planned or performed many other experiments at Project Elijah concerning increasing perception vividness during LDs. For example, we have been conducting studies on the effects of physical exercise, diving, and giving commands to LD spaces to increase vividness, palpation, scrutinizing, and other factors. In future work, we will assess almost all known DT techniques. The primary goal of this long-term research endeavor is to determine as precisely as possible the mechanisms of perceptions in LD and how they affect the LD space. Our secondary goal is to identify the most effective DTs.

Few studies are devoted to this topic, but this work will help to improve our understanding of the brain and develop new hypotheses about LD application and LD neurobiology. Understanding which DTs are better than others will lead to more effective LD experiences and more results related to LD applications and studies, which could improve humans' lives.

Acknowledgments

The authors would like to thank all volunteers of Project Elijah who helped us obtain enough reports to carry out this unusual research work.

References

Baird, Benjamin & Mota-Rolim, Sergio & Dresler, Martin. (2019). The cognitive neuroscience of lucid dreaming. Neuroscience & Biobehavioral Reviews. 100. 10.1016.

Barrett, Deirdre. (1991). Flying dreams and lucidity: An empirical study of their relationship. Dreaming. 1. 129-134.

Dresler, Martin & Koch, Stefan & Wehrle, Renate & I Spoormaker, Victor & Holsboer, Florian & Steiger, Axel & Sämann, Philipp & Obrig, Hellmuth & Czisch, Michael. (2011). Dreamed Movement Elicits Activation in the Sensorimotor Cortex. Current biology: CB. 21. 1833-7.

Erlacher, Daniel & Schädlich, Melanie & Stumbrys, Tadas & Schredl, Michael. (2013). Time for actions in lucid dreams: Effects of task modality, length, and complexity. Frontiers in psychology. 4. 1013.

Hunt, H. (1989). The Multiplicity of Dreams: Memory, Imagination and Consciousness. New Haven. CT: Yale Univ. Press.

LaBerge, S. (1985). Lucid dreaming. The power of being awake and aware in your dreams. Los Angeles, CA: Tarcher.

LaBerge, S. (1995). Prolonging lucid dreams. NightLight, 7(3–4), 22–27.

LaBerge S., Levitan L., Brylowski A., Dement W. (1988). "Out-of-body" experiences occurring during REM sleep. Sleep Research. 17.115.

Levitan, Lynne & LaBerge, S. & DeGracia, D.J. & Zimbardo, Phil. (1999). Out-of-body experiences, dreams, and REM sleep. Sleep Hypn. 1. 186-196.

de Macêdo, T., Ferreira, G. H., de Almondes, K. M., Kirov, R., & Mota-Rolim, S. A. (2019). My Dream, My Rules: Can Lucid Dreaming Treat Nightmares?. Frontiers in psychology, 10, 2618.

Mallett, Remington. (2020). A pilot investigation into brain-computer interface use during a lucid dream. International Journal of Dream Research. 13.

Nelson, Kevin & Mattingly, Michelle & Schmitt, Frederick. (2007). Out-of-body experience and arousal. Neurology. 68. 794-5.

Raduga, Michael. (2004). [Out-of-Body]. Moscow: Sputnik +. < http://www.ozon.ru/context/detail/id/20300586 >

Raduga, Michael & Shashkov, Andrey & Zhunusova, Zhanna. (2020). Increasing perception vividness during lucid dreaming by spinning. Manuscript submitted for publication.

Raduga, Michael. (2014). The Phase: Shattering the Illusion of Reality. CreateSpace Independent Publishing Platform. 449. 358. Part III.

Saunders, David & Roe, Chris & Smith, Graham & Clegg, Helen. (2016). Lucid dreaming incidence: A quality effects meta-analysis of 50 years of research. Consciousness and Cognition. 43. 197-215.

Schädlich, Melanie. (2017). Motor learning in lucid dreams – quantitative and qualitative investigations. Inauguraldissertation zur Erlangung des akademischen Doktorgrades. 30.

Stumbrys, Tadas & Erlacher, Daniel. (2012). Lucid dreaming during NREM sleep: Two case reports. International Journal of Dream Research. 5. 151-155.

Stumbrys, Tadas & Erlacher, Daniel & Schredl, Michael. (2016). Effectiveness of motor practice in lucid dreams: a comparison with physical and mental practice. Journal of Sports Sciences. 34. 27-34.

Terzaghi, M., Ratti, P. L., Manni, F. and Manni, R. (2012) Sleep paralysis in narcolepsy: more than just a motor dissociative phenomenon? Neurol. Sci. 33: 169–172.

Voss, Ursula & Holzmann, Romain & Tuin, Inka & Allan Hobson, J. (2009). Lucid Dreaming: A State of Consciousness with Features of Both Waking and Non-Lucid Dreaming. Sleep. 32. 1191-200.

Zadra, Antonio & Pihl, Robert. (1997). Lucid Dreaming as a Treatment for Recurrent Nightmares. Psychotherapy and psychosomatics. 66. 50-5.

Zappaterra, Mauro & Jim, Lysander & Pangarkar, Sanjog. (2013). Chronic Pain Resolution After a Lucid Dream: A Case for Neural Plasticity?. Medical Hypotheses. 82. 10.1016.