

**Investigating the Relationship between Lucid Dreaming, Mental Health and  
Psychopathology: A Systematic Literature Review**

Master Thesis by

Bogdan Filip Popovic

University of Twente

Positive Clinical Psychology & Technology (PCPT)

Faculty of Behavioural, Management and Social Sciences (BMS)

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First Supervisor: Dr. Marlon Nieuwenhuis

Second Supervisor: Dr. Ed de Bruin

## Abstract

**Background:** The majority of academic studies have found positive associations between lucid dreaming (LD) and mental health (MH). However, there have also been a number of studies that found a positive relationship between LD and psychopathology. The explanations that have been provided for the equivocal outcomes around LD practice are scarce.

**Aim:** The aim of this Systematic Literature Review (SLR) is to fill the research gap by investigating LD and its different components and its relation to outcomes in psychopathology and MH. The second focus is the investigation of how moderators affect the relationship between LD and MH and psychopathology.

**Methods:** For this SLR, PsycINFO, Scopus and PubMed were searched for articles that investigated the relationship between LD and MH or LD and psychopathology, were not older than 10 years and had a sample size of at least 30 participants. Four studies were Randomized-Controlled Trials (RCTs), six were Cross-Sectional Studies (CSS), two were Quasi-Experimental Studies (QES) and one was a Sequential Explanatory Mixed-Method Design. The extracted data was categorised as: Lucidity Intensity and Lucidity Control, Lucidity Frequency, Lucid Dreaming Training and potential moderators affecting the relationship.

**Results:** Results revealed positive associations between LD and facets of MH, specifically the aspect of spirituality, resilience, social skills and basic cognitive skills. In regards to psychopathology, results indicated that amongst other factors high control and high intensity LDs were related to reductions in depressive scores, nightmare distress and PTSD symptomatology. A positive association was also found between LD control and psychotic symptoms. Life satisfaction, nightmare frequency, dispositional mindfulness, spirituality, gender and personality dispositions were identified as potential moderating variables.

**Conclusion:** The equivocal role of LD in relation to MH and psychopathology could be partially explained by dream awareness. Beyond dream awareness, dream content control, LDI and positive emotional valence during an LD appear to be significant factors in explaining the inverse relationship between LD and psychopathology. Regarding LD and MH, particularly high frequency LDers seem to achieve benefits like spiritual growth, social skills, cognitive skills, flexibility to cope with life events and higher life satisfaction.

*Keywords:* lucid dreaming, mental health, dream control, psychopathology, lucidity intensity

**Table of Contents**

Introduction .....	3
Lucid Dreaming .....	4
Mental Health and Psychopathology .....	5
Lucid Dreaming, Mental Health and Moderating Variables .....	6
Methods .....	9
Search Strategy and Information Sources .....	9
Eligibility Criteria .....	9
Data Extraction .....	10
Quality Assessment .....	10
Data Synthesis .....	11
Results .....	11
Study Characteristics of the Included Studies .....	12
Lucidity Intensity and Lucidity Control .....	13
Lucidity Frequency .....	14
Lucid Dreaming Training .....	15
Moderators influencing the Relationship between Lucid Dreaming and Mental Health .....	17
Quality Assessment .....	20
Discussion .....	22
Limitations .....	27
Future Recommendations .....	28
Conclusion .....	28
References .....	30
Appendix .....	38

## Introduction

One-third of an individual's life is spent asleep. This means that the average person will approximately dream for almost six years of their life. According to the scientific literature, people enter dream states almost every night, though they might forget that they were dreaming shortly after waking up (Izawa et al., 2019). Thus, dreams remain a mysterious phenomenon that until this day have not been explored in their entirety. But what research knows about dreams is that we recall and recreate the sensorial information that we gather through our sense faculties during wakefulness. Based on that, our brains weave together myriad different stories about our diurnal experiences in order to consolidate memories, process emotions and amongst other aspects express our deepest desires (Gujar et al., 2011; Rasch & Born, 2013; Zhang, 2016). This phenomenon is explained by the continuity hypothesis which states that our waking life experiences and our dream experiences are not to be seen as separate from each other, but rather as interconnected with each other (Schredl & Hofmann, 2002). This is supported by research evidence which illustrates strong connections between the frequency of nightmares and general waking psychopathology, heightened stress levels and dispositional traits (Berquier & Ashton, 1992; Blagrove, Farmer, & Williams, 2004; Levin & Nielsen, 2007; Nielsen & Levin, 2009). Further existing evidence suggests that there is a bidirectional relation between anxiety, depression and insomnia which are all to a lower or higher degree interwoven with the occurrence of nightmares (Alvaro et al., 2013; Ohayon & Guilleminault, 1997). To tackle the diverse distressful experiences individuals might undergo during their nocturnal hours, the practice of lucid dreaming (LD) emerged as a potential remedy for the nightly sufferings (Schredl, 1999). As proposed by LaBerge (1985), lucid dreaming is a phenomenon wherein individuals extend their awareness into their dream state, making them conscious of their dreaming process. This opens up the possibility for the lucid dreamer to deliberately alter the outcomes of their dream for instance through controlling the dream content and one's own actions in it. Such a conscious shift might potentially facilitate one's ability to transform anxious and depressive states into wholesome states that are more conducive to elevated levels of mental health. However, while the practice of LD poses a unique opportunity for therapeutic transformation, there is also conflicting evidence that displays connections between the occurrence of LD and psychopathologies like PTSD, the strengthening of psychotic symptoms and an increase in dissociative and schizotypy symptoms (Aviram & Soffer-Dudek, 2018; Harb et al., 2016; Mota et al., 2016). Thus, the aim

of this paper is to inquire more deeply into the positive as well as negative associations that the practice of LD illustrates in relation to mental health and psychopathological outcomes.

### Lucid Dreaming

Due to the newness of the phenomenon of LD in the sphere of dream research, there have been inconsistencies regarding the exact definition of LD. A large part of the studies of LD have focused on investigating the mere occurrences of LD, limiting the definition of LD to the mere awareness of the dream (Alvarado & Zingrone, 2007; Green & McCreery, 1994; LaBerge et al., 1981; Schredl & Erlacher, 2004). But as scientific inquiry into the subject matter deepened, the complexity of the phenomenon became increasingly evident. Consequently, different researchers began to regard LD rather as a two-dimensional phenomenon, dividing it into LD awareness and LD control (Aviram & Soffer-Dudek, 2018; Harb et al., 2016; Voss et al., 2012). The sheer fact that one is aware of the dream, does not necessarily imply that an individual feels capable of influencing the dream environment either through alteration of one's behaviour or through manipulation of the „external environment“ in the dream scape (Voss et al., 2013). Yet, dream awareness seems to be a necessary precondition in order for control to be exerted in an LD (Stewart & Koulack, 1989). The study by Harb et al. (2016) further supports the finding that LD awareness and LD control are two distinct phenomena as they observed higher levels of dream awareness in post-traumatic veterans, while the ability to control the dream content remained low. On top of that, they found evidence for reduced nightmare distress in relation to increased content control of the dream.

Other researchers even deem LD to be multi-faceted which is why they subclassified LD into *lucidity frequency* (LDF) and *lucidity intensity* (LDI) (Aviram and Dudek, 2018). LDF examines how often an LD occurs, whether the LD was spontaneous or deliberately induced, the amount of attempts, the consequent successes, and the duration of the LD (momentary vs. prolonged). LDI illustrates whether individuals had control over dream events or not, the activity of the dreamer, the perceived certainty regarding the fact that they are dreaming, the self-approximated LD length and the emotional tone preceding and succeeding the phase of lucidity. The rationale behind the sub-classification of LD is the inconsistent nature of the associations that LD has in relation to psychopathological – and mental health variables. Hence, the subclassification aims to illuminate different components of LD that might affect MH or psychopathological variables in different ways. This refined notion of lucid dreaming also exemplifies „depths“ and shades to the lucid dreaming experience as

opposed to a simple „black-and-white“ definition of LD (Saunders, Roe, Smith & Clegg, 2016).

### Mental Health and Psychopathology

In this paper, the definition of MH will be based on the explanation made by Galderisi et al. (2015). They proposed that „mental health is a dynamic state of internal equilibrium which enables individuals to use their abilities in harmony with universal values of society. Basic cognitive and social skills, ability to recognize, express and modulate one’s own emotions, as well as empathize with others; flexibility and ability to cope with adverse life events and function in social roles; [...] which contribute, to varying degrees, to the state of internal equilibrium.“ In the following, the different facets of MH will be explained in more detail.

The *internal equilibrium* is said to be achieved when the individual learns to adapt according to constantly changing life circumstances. For example moving to a new city is a shift in one’s life that requires an adaptation to the new circumstances (finding new friends, finding a new job) which are filled with uncertainties and potentially also fear (Thomasma et al., 2021). According to the conceptualisation, a mentally healthy person could experience this fear and other „negative“ emotions too. What distinguishes the mentally healthy person from the mentally unhealthy person is that the former is sufficiently resilient to constructively deal with the experienced fear and return to the state of inner equilibrium.

Another important component of the definition are *basic cognitive skills* which include the capacity for attentional regulation, the capacity to recall and make sense of the information that has been received from the environment, problem-solving skills, and decision-making abilities. A further component are *social skills* which „involve the ability to use one’s own repertoire of verbal/non-verbal abilities to communicate and interact with others.“ They can be impaired to some degree without necessarily leading to mental illness as long as the impairment is mild and is eventually compensated by another component.

Besides, the capacity for adequate *emotional regulation*, which relates to the ability to accurately identify one’s internal emotional state and to use particular strategies to respond to the emotions that one feels, represents another important pillar of the MH conceptualisation. To underline the importance of *emotional regulation*, research has illustrated alexithymic tendencies in an individual, namely the inability to properly label one’s emotions and feel them, to be associated with a variety of psychopathological states like depression, dissociation, anxiety disorders etc. (Grabe, Spitzer, & Freyberger, 2004).

This can in turn impact upon another relevant component of mental health, which is *empathy*. The essence of *empathy* lies in recognizing and comprehending what the other person feels, the causes of their feelings and the willful participation in this mutual emotional experience while remaining in an observant stance at the same time (Ioannidou & Konstantikaki, 2008). A deficiency in emotional regulatory abilities will negatively impact the capacity to empathise with another, as the „blindness“ towards one’s own emotions obstructs in recognizing the emotions of another living being. Hence, *empathy* is an important contributing factor to fruitful interactions with other human beings on the social plane.

Lastly, flexibility and the ability to cope with adverse life events form another pillar of mental health. This includes being cognitively flexible by for instance changing one’s own perspective and not rigidly holding onto specific beliefs about the world, but also to accept change in particular life situations that might be challenging. If an individual is lacking cognitive flexibility, he/she might experience distress which is for instance also associated with OCD or delusional disorder (Galderisi et al., 2015). The term resilience can be used synonymously with cognitive flexibility for it characterizes the same mechanism in a living being, which is the „successful adaptation and swift recovery after experiencing severe adversity during life.“ (Rutten et al., 2013).

### **Lucid Dreaming, Mental Health and Moderating Variables**

Regarding the relationship with LD, there are studies that strengthen the hypothesis that not LD awareness, but rather volitional control of the dream content is the element that is responsible for improved MH outcomes. For instance, Harb et al. (2016) in a sample of veterans who have been diagnosed with PTSD and who are characterised by an LD profile with high dream awareness and low content control pre-treatment, demonstrated a decrease in nightmare distress as a consequence of following Cognitive-Behavioural Therapy in conjunction with Imagery Rehearsal. Although the levels of lucidity did not change from pre- to post-treatment in the population, the control of dream content did and simultaneously led to a decrease in nightmare distress. This possibly hints at dream content control as a factor that leads to the alleviation of psychopathological symptoms like nightmare distress.

Moreover, there is evidence that in addition to LD control, there are more aspects that might play a role in the relationship between MH and LD like how the LD is interpreted and the intensity of the LD experience as covered by the construct LDI. For example, Soffer-Dudek (2017) proposed that interpreting sleep arousal through LD as an intrusion instead of an opportunity in which volitional control can be exerted in the dream plot, might explain the

variability in MH outcomes that have been observed in the area of LD research. Not merely high dream control seems to be connected to fewer symptoms of psychopathology, but overall *lucidity intensity* (LDI) which LD control is an important part of according to Aviram and Soffer-Dudek (2018). They provided evidence that lucidity in the context of high LDI and positive affect were inversely related to distress in the target population. Moreover, they illustrated that high-intensity LDers were significantly more resilient than the low-intensity LD group, strengthening the evidential basis that a sense of control and confidence in the LD are decisive factors in enhancing MH levels, rather than the mere occurrence of an LD.

While there are studies that did not find significant relationships between LDF and psychopathology, there is also evidence that illustrates a link between LDF and LD control and LDF and improved MH outcomes. In regards to that, Voss et al. (2012) demonstrated a connection between dream control and LD frequency, stating that individuals with higher frequency of LD are often more proficient in controlling their dreams which appears to be concordant with the concept of LDI (Stumbrys & Erlacher, 2017). The student sample reported the ability to control the plot in connection to mostly aggressive and violent circumstances, which then enabled them to gain a sense of control over their emotions in the heat of the moment and resolving the dream conflict they found themselves in. Moreover, Konkoly and Burke (2019) in an experimental study, recorded higher life satisfaction and self-esteem in participants who reported more LDs compared to those who experienced LDs less frequently. More frequent LDers also tended to perceive less stress, better coping-self efficacy and higher levels of creativity, although these associations were non-significant. Equivalently, Doll et al. (2009) were able to illustrate heightened levels of MH especially in individuals who displayed frequent occurrences of LD experiences. More specifically, the frequent LDers were higher in assertiveness and autonomy, expressing greater independence and self-responsibility, which also translated into their waking life. Additionally, they exhibited higher acceptance of oneself and others and more calmness and balance compared to rare LDers and non-LDers. Their ability to love, manifesting as a desire for the well-being of others, the ability to empathise and to be helpful was higher compared to rare LDers, but not significantly higher than in non-LDers.

It is crucial to point out that the associations between LD and MH are not always positive in nature. Contrary to the positive consequences that the experiencing of LD might have on the MH of individuals, there is also existing evidence that reflects adverse outcomes on MH. A study which illustrates that the occurrence of LD does not necessarily engender a



positive MH outcome was conducted by Miller, Ross and Harb (2021). They assessed the incidences and characteristics of lucid nightmares in a sample of military veterans with PTSD. The majority of the sample experienced an LD, while almost all of them reported having a nightmare simultaneous to their LD. Notably, they reported their levels of dream awareness to be high, while the levels of LD control remained low. They also reported feeling anxious and stuck, attempting to escape from their negatively toned experience of the LD. This study further amplifies the evidential basis that LD awareness itself does not necessarily lead to therapeutic benefits. Moreover, it leaves room for the interpretation that LD control and LDI might be the critical elements that attenuate psychopathological states and empower positive MH outcomes.

Paradoxically, there is scientific evidence that is not in alignment with the hypothesis that LD control and LDI are necessarily linked to improved MH outcomes. To oppose, Mota et al. (2016) found, contrary to their hypothesis, that individuals suffering from psychotic symptoms had significantly higher LD control compared to healthy participants. They regard LD as a counterproductive practice in psychotic individuals, for it potentially strengthens negative psychotic symptoms like hallucinations and deliria, increasing the focus on internal reality over external reality. In the same study of psychotic individuals, they also illustrated that the LD sample in their study was not healthier in terms of psychological symptomatology compared to non-lucid dreamers. On top of that, Watson (2001) views LD as nocturnal representations along a continuum characterised by unusual cognitive and perceptual experiences, that are connected to schizotypy and dissociation during wakefulness which are in turn linked to MH disturbances (Aviram & Soffer-Dudek, 2018; Kisiel & Lyons, 2001). Clear explanations for the connection between sleep-related experiences like LD and schizotypy, dissociative symptoms and psychotic symptoms remain unclear, but it has been put forward that such individuals have „thinner boundaries“ which eases the shift between „reality-based and fantasy-based states of consciousness.“ This observation illustrates that not merely LD awareness, but also LD control can be linked to psychopathological symptoms, which further underlines the significance of illuminating the relationship between LD and psychopathology more clearly as it contradicts previously held assumptions.

In light of the current state of knowledge regarding LD, it becomes clear that a positive relation to MH exists. However, there is also research that links the practice of LD to antagonistic effects on MH. Since the effects of LD or its relationship to MH remains equivocal, the need to investigate the exact components of LD that lead to elevated levels of

MH in an individual becomes evident for LD research. A proper identification of underlying components of LD and their relation to MH can more accurately inform therapeutic work by firstly identifying risk factors of LD practice potentially leading to psychopathological outcomes and by secondly pointing out beneficial factors conducive to heightened levels of MH. Thus, this study's objective is to review the association between dream lucidity and increased levels of MH and how dream lucidity is connected to subclinical / clinical psychopathological variables. The second relevant objective focusses on the investigation of moderating variables that might be affecting the strength of the relationship between LD and MH and psychopathology.

## **Methods**

To investigate the set research objectives, a Systematic Literature Review (SLR) was performed utilising the PRISMA guidelines as a blueprint to adequately structure the various elements that constitute a complete SLR (Page et al., 2021).

### **Search Strategy and Information Sources**

The literature search was conducted utilizing the databases PsycINFO, PubMed and Scopus with search strings containing variations of the facets that define MH, lucid dreaming, psychopathology and possible moderating variables. The entire search strings for the different databases can be found in Appendix 1.

### **Eligibility Criteria**

The eligibility criteria were established on the basis of the widely utilized PICO framework, standing for Population, Intervention, Comparison(s) and Outcome. In addition, the tool Covidence was used to screen the articles and extract data from the included studies.

Consequently, articles were included if they investigated participants who reported about their levels of MH, specifically considering the facets that make up the MH definition. Furthermore, the SLR includes healthy as well as mentally unhealthy populations that have an official diagnosis of a mental illness or exhibit the psychopathological symptom of nightmare distress. The range of psychopathologies was limited to depression, PTSD and psychoses.

Moreover, the participants in the study needed to have prior LD experience (one LD or more throughout their lifetime). The definition of LD should comprise mere dream awareness, LDF, dream content control or LDI. Another inclusion criterion was the investigation of potential moderators, namely personality dispositions of an individual or trait mindfulness.

Regarding research designs, the study included RCTs with experimental conditions

paired with inactive control interventions as well as active control interventions (between-group), mixed-method designs and cross-sectional correlational studies (within-subjects design). The studies should not be older than 10 years. Furthermore, language of the included articles were limited to english and german and the sample size was required to have a minimum of 30 participants to ensure higher statistical validity (Mascha & Vetter, 2018).

## **Data Extraction**

After the articles were selected that matched the eligibility criteria, information regarding sample characteristics, study design characteristics and main results of the study were extracted.

In terms of sample characteristics, amount of participants and amount of participants who had a LD experience were determined. The study characteristics comprise the levels of LD experience, which can entail the LDF, the LDI and/or the induction method that was used. Additionally, the quantitative levels of MH and psychopathology were determined. Then, study design characteristics were inspected to assess whether the included studies are experimental or observational in nature, providing insight into the explanatory power of the outcomes of the studies. Lastly, the main results of the studies were extracted in consistency with the different LD components: Lucidity Intensity and Lucidity Control, Lucidity Frequency, Lucid Dream Training and moderating variables in the relationship between LD and MH and psychopathology.

## **Quality Assessment**

In order to methodologically evaluate the quality and validity of the included studies, the JBI Critical Appraisal Tool was used. It proves useful, for it provides different checklists that are tailored to the study design that has been used. Therefore, three different checklists were used focussing on Cross Sectional Studies (CSS), Randomized-Controlled Trials (RCT) and Quasi-Experimental Studies (QES).

In regards to the checklists, first the study design for the selected articles were determined in order to fit the right checklist to each study. Then the items from the checklist were carefully considered while scanning the respective articles. There was no precise qualitative indication in the checklist of whether the quality of the articles is adequate or not, which is why this step was undertaken subjectively by the author of this paper. The qualitative indications and their corresponding categories with their cut-off scores have been illustrated in Table 2 in the Results below.

## **Data Synthesis**

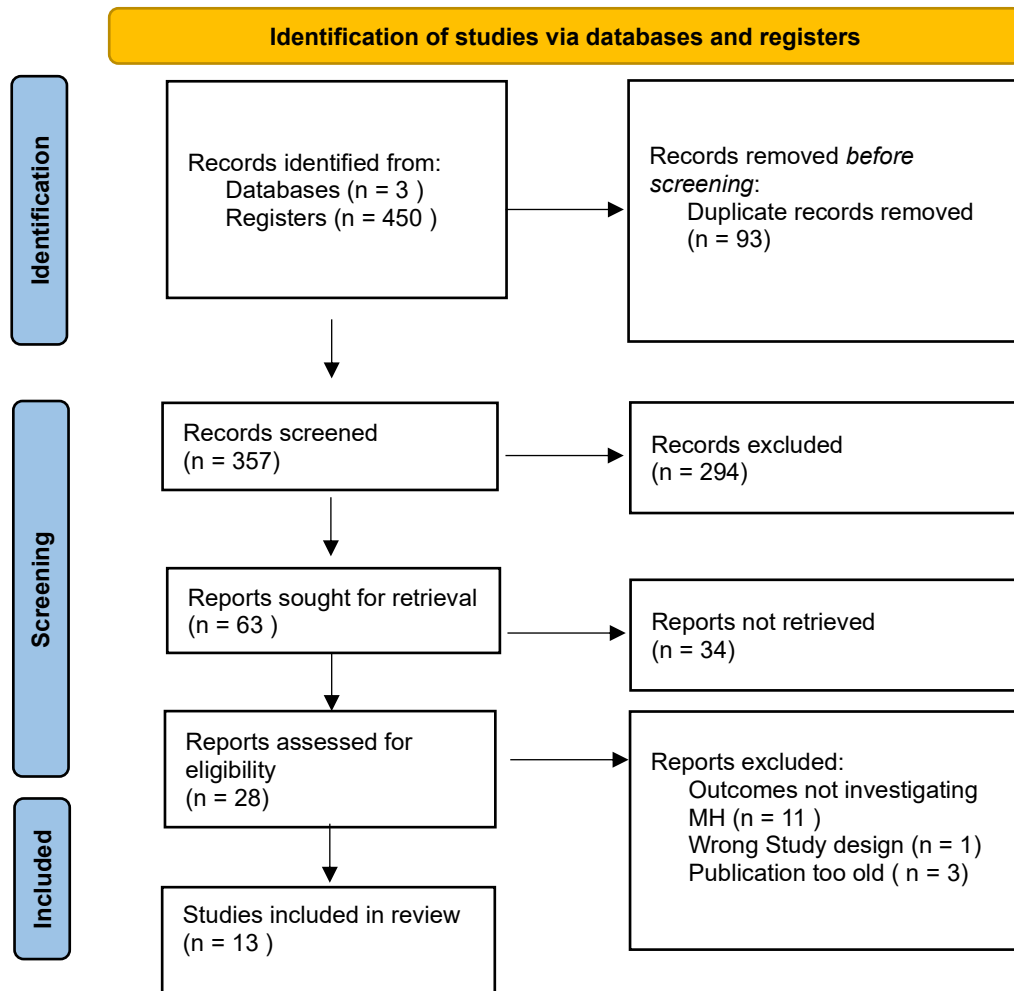
Due to the broadness of the research questions, it is more transparent to group the results into different categories. The first category comprises data about the study characteristics. The second category presents data about Lucidity Intensity and Lucidity Control. Due to varying conceptualisations of MH that exist across different studies, a substantiation will be provided that about how the definition of MH in the respective studies is concordant with the definition of MH that has been provided in this SLR. The next category will put forward results regarding Lucidity Frequency. The last two categories will lay out evidence on Lucid Dreaming Training and moderating variables that influence the strength of the relationship between LD and MH and LD and psychopathology.

## **Results**

After application of the search string in the respective databases (PubMed, Scopus, PsycINFO), a total of 450 articles were found which were automatically deduplicated by Covidence, resulting in 357 articles to be screened for their title and abstract. Out of those, 294 articles were deemed irrelevant for fulfilling this study's objectives. This resulted in 63 studies out of which 49 were excluded as can be seen in Figure 1 below. Consequently, 13 studies were included in this review. The selection process was visualised in the form of a flow chart as depicted below.

**Figure 1**

*Flow chart for the identification of studies*



**Study Characteristics of the Included Studies**

Taking all of the 13 analysed studies into account, four were Randomized-Controlled Trials (RCTs), six were Cross Sectional Studies (CSS), two Quasi-Experimental Studies and the last one a Sequential Explanatory Mixed Methods Study Design combining quantitative as well as qualitative elements which were published between the years 2015 and 2023.

Considering the totality of the studies at hand, the percentages of LDers range from 12.5% to 100% experiencing at least one LD. In the studies in which it was specifically measured, the percentage of frequent LDers, which entails every individual experiencing more than one LD in their lifetime, ranges from 30.6% to 68.6%. Some studies gave information on the amount of participants who were able to volitionally control their dream which ranges from 6% to

45% of research participants. These numbers might be higher, but not every study measured LD control in their sample. There are no concrete percentages for occurrence of psychopathologies in the samples, but PTSD, nightmare sufferings, self-perceived mental health, self-perceived as well as diagnosed depression and diagnosed psychoses were examined by studies as can be seen in Table 2 below.

### **Lucidity Intensity and Lucidity Control**

The first study to investigate LDI, is a cross-sectional study conducted by Aviram and Soffer-Dudek (2018) who found evidence for the link between LD and resilience, in which high intensity LDers were more resilient compared to low-intensity LDers. However, no significant difference in resilience was found between LDers and non-LDers. On top of that, they suggested that high intensity LDs with a sense of control and confidence in their lucidity accompanied by positive affect are related to fewer psychopathological conditions such as depression as opposed to LDs in which the dreamer has no control, is uncertain of their lucidity and experiences negative affect.

Next, the RCT by Harb et al. (2016) did not find significant associations between LD constructs including awareness, content control and purposeful waking, with nightmare distress and PTSD severity at pre- and post-treatment measures. The participants were put into either the cCBT-I group (components of Cognitive Behavioural Therapy for Insomnia) or into the IR (Imagery Rehearsal) + cCBT-I group. No meaningful interaction effects were observed when comparing baseline with post-treatment between treatment condition by time on awareness, content control or purposeful waking. However, follow-up comparisons illustrated significantly greater change in content control in the IR + cCBT-I group as opposed to only the cCBT-I group. Moreover, the main effect of treatment on heightened content control during lucidity was significant too. The heightened levels of content control showed strong and significant reductions in nightmare distress in the IR + cCBT-I group. Regarding all groups, the heightened content control as a result of treatment revealed medium to large associations in nightmare frequency as well as nightmare distress.

As can be seen in Table 1, another RCT was conducted by Holzinger, Klösch and Saletu (2015) where they examined the effect that LD training has when used as an add-on in Gestalt therapy in veterans with an LD profile characterized by low content control and high LD awareness and suffering from nightmare distress. Participants were randomly assigned to either the group that merely received a Gestalt group therapy program (GTG) or to the group that received LD instructions on top of the Gestalt group therapy program (LDG). The results

indicated that the nightmare distress as measured through a nightmare frequency questionnaire and dream diaries, continuously declined throughout the treatment in the LDG, while the decline in the GTG was more discontinuous, but still proven to be significant in both of the groups. The self-perceived effects of the therapy were rated as „strong“ to „very strong“ in the GTG and „moderate“ to „very strong“ in the LDG.

Lastly, in a cross-sectional study, Mota et al. (2016) analysed a group of 73 individuals of which 45 were diagnosed with either schizophrenia (S) or bipolar disorder type I (B) and 28 individuals having been assigned to a control group as they exhibited no psychotic symptoms. Half of the psychotic group had LD experience at least once with no statistically significant difference among the different groups regarding the amount of LD episodes. However, when comparing the two groups in terms of the ability to control the dream, psychotic individuals were shown to experience higher content control during their LDs (67% of S and 73% of B). While the psychotic patients were able to gain insight during dreaming, they could not gain more insight about their psychotic reality compared to patients who were less aware.

### **Lucidity Frequency**

Regarding LDF, one cross-sectional study that illustrated a meaningful association between LD and mental health was conducted by Stumbrys (2021). He provided evidence of a significant positive association between LDF and spiritual transcendence. More specifically, the correlation was found in frequent lucid dreamers as they scored higher on the Spiritual Transcendence Scale (STS) and on two of its subscales compared to infrequent or non-lucid dreamers (Table 1). After controlling for demographics and dream recall frequency, LDF remained a significant predictor variable of higher Spirituality scores. Therefore, according to the results, the frequent recurrence of LDs seems to play an important role in promoting spiritual growth which covers the facet of MH pertaining to a sense of interconnectedness.

Another cross-sectional study inquired into the self-perceived effects of lucid dreaming on mental and physical health (Erlacher, Schredl and Stumbrys, 2020). They revealed a meaningful association between LD and mental well-being and physical well-being in waking life. Interestingly, men, older respondents, more frequent LDers and those with higher trait mindfulness and higher spirituality scores as measured by the Transpersonal Trust Scale (TPV) tended to report positive effects of LD on MH more often (Table 1). Next, Jones and Stumbrys (2014) were not able to demonstrate a significant association between LDF and the Warwick-Edinburgh Mental Well-Being Scale (WEBWBS) nor with Ryff's Psychological

Well-Being Questionnaire (RPWB). Thus, this study does not support the perspective that LD is related to MH.

In a more recent cross-sectional study, Stumbrys (2023) arrived at different conclusions. He investigated the relationship between LD and MH and its potential adverse effects by considering dissociation, sleep quality, LD experience and mental well-being as measurements. Contrary to his previous study, he found that LDF seems to be a predictor of mental well-being as measured by the SWEMWBS. In addition to that he observed a negative association between LDF and loneliness. Thus, a connection can be established between LD and MH. Firstly, because the SWEMWBS includes items that refer to a feeling of closeness to other people, the ability to think clearly, which can be related to basic cognitive skills, cognitive flexibility and resiliency, namely the ability to deal with problems well. A few examples of items from the SWEMWBS are „I’ve been dealing with problems well.“, „I’ve been thinking clearly.“ and „I’ve been able to make up my own mind about things.“ All of these aspects are relevant components of the MH definition provided by Galderisi et al. (2015).

The significant reductions in depression scores could be partially replicated in the study by Sackwild and Stumbrys (2021) who utilised a sequential explanatory mixed-method design. They did not find an association between LDF and depression scores in the entire sample on a quantitative level. However, a sub-sample of six participants gave qualitative reports about their LD experience. Four of them experienced one LD per month, while the remaining two participants experienced two LDs per week. They reported a lessening of depressive symptoms and were able to take charge of their depression through reframing the depressive thought patterns as a result of their LD experiences. Moreover, they reported experiencing new emotions through which they were able to transform their waking lives where they „regain[ed] a happy and beautiful experience... it will stay with me for days after [...]“. In regards to spiritual and transpersonal development, some participants reported LDs to have been particularly beneficial in deepening their spiritual and meditative practice, influencing the way they connect to self and other and healing themselves by shaking their identity and how they relate to the world. All the participants agreed to the transformative and healing properties of LDs regarding physical and MH and specifically pointing out its benefits regarding the treatment of depression.

### **Lucid Dreaming Training**

As some studies in the previous section, this section also encompasses experimental



studies with LD training, but the following articles did not differentiate between LDI, LD control or LDF which is why they are analysed separately.

The RCT conducted by Konkoly and Burke (2019), investigated the relationship between LD and MH. In the context of an LD training they measured amongst other constructs life satisfaction, coping self-efficacy, emotional reappraisal and emotional suppression. They divided the sample into three groups, an LD group, a Mindfulness group and a control group and compared the outcomes between groups and within groups. They did not find differences between groups from pre- to post-test for life satisfaction, coping self-efficacy, emotional suppression or emotional reappraisal. Within the LD group, the authors were able to show that frequent LDers reported significantly higher life satisfaction at the end of study in contrast to those who experienced less LDs.

Next, the clinical trial by Holzinger et al. (2020) investigated nightmare distress and the effect of lucid dreaming therapy (LDT) on depression and changes in PTSD-profile more closely. Participants were again randomly assigned to LDT or an active comparison condition for the treatment of nightmares. On the one hand, no significant decrease in nightmare frequency and no significant change in PTSD-profile could be observed. On the other hand, the depression scores in the experimental group showed a significant reduction after comparing depression levels pre and post-therapy. However, there was no direct confirmation of the hypothesis that the decreased depression scores can be attributed to the effectiveness of the LDT. Moreover, Ellis, De Koninck and Bastien (2021) in their Quasi-Experimental Study, did not find support for a meaningful difference in depressive scores between the group who reported being able to LD and the group unable to LD. However, overall reductions in depressive scores in the sample were observed at follow-up (Table 1)

Beside Holzinger et al. (2020), Yount et al. (2023) in their Quasi-Experimental study also inquired into PTSD symptoms and found no significant differences in PTSD Symptom Severity scores between individuals with LD experience and those without experience. Regarding the three different groups that were compared, namely those who experienced healing lucid dreams, those with normal lucid dreams and those with no lucidity at all, there was no significant difference found regarding PTSD Symptom Severity. Contrary to that, the study revealed significant improvements for all participants over the three time-points in PTSD Symptom Severity. On top of that, NexS scores, which indicate the frequency of distressing nightmares, illustrated significant improvements considering pre-, post- and follow-up measures for all participants of the intervention. Additionally, they provided

evidence for a connection between LD training and MH as they found significant improvements in overall well-being and the lessening of negative emotions in the study sample. In addition to that, 25 of 37 participants (68%) reported having experienced a healing lucid dream.

### **Moderators influencing the Relationship between Lucid Dreaming and Mental Health**

To delve into the secondary objective of this study, potential moderators were explored that could have played an important role in affecting the relationship between LD and MH and psychopathology.

The first study to find potential moderators was conducted by Erlacher et al. (2020) who found evidence that men, as well as older participants, those with higher LDF, those with higher trait mindfulness and those with higher TPV scores (levels of spirituality) tended to report beneficial effects of their LD experiences on their subjective evaluation of MH more often than participants who did not have those individual characteristics. In connection to that, Stumbrys (2023) found that significant predictors of a negative LD experience characterised by a negative emotional valence is gender (female), whether the LD was induced spontaneously or deliberately, higher baseline nightmare frequency of the LDers and a predisposition of certain personality dimensions including thin boundaries or transliminality.

Lastly, Konkoly and Burke (2019) identified that higher baseline life satisfaction as an important indication of personal growth, correlated with a higher benefit derived from the LD. This effect could not be replicated for individuals who exhibited low baseline life satisfaction.

# Investigating the Relationship between Lucid Dreaming, Mental Health and Psychopathology

**Table 1**

*Characteristics of the included studies*

Study name	Sample size & Study Design	Characteristics of the sample	Lucid Dreaming experience	Potential Moderator	Measurements of Mental Health / Facets of Mental Health and Psychopathology	Findings of the study
Posttraumatic nightmares and imagery rehearsal: The possible role of lucid dreaming. (Harb et al., 2016)	N = 33 Randomized-Controlled Trial (RCT)	PTSD, other anxiety disorders, substance abuse and depression	73% experienced dream awareness 45% experienced dream control		PTSD symptomatology	Strong and significant relationship between decreased nightmare distress and increase in dream content control in the experimental IR + cCBT-I group
The Luminous Night of the Soul: The Relationship between Lucid Dreaming and Spirituality (Stumbrys, 2021)	N = 471 Cross-Sectional Study	Not specified	94.9% experienced an LD once or more		Universal values including recognition of connectedness to other people	Lucid dream frequency significantly predicted higher scores on STS (Spiritual Transcendence Scale) and its Universality subscale
Cognitions in Sleep: Lucid Dreaming as an Intervention for Nightmares in Patients with PTSD (Holzinger, Saletu & Klösch, 2020)	N = 31 Randomized-Controlled Trial (RCT)	Nightmare sufferings, substance use	6% of the participants experienced LDs and could control the dream		Depressive symptomatology, nightmare distress, PTSD symptomatology	Significant decrease of levels of anxiety and depression in the course of therapy.
Mental health, physical self and lucid dreaming: A correlational study in sport students (Jones & Stumbrys, 2014)	N = 72 Cross-Sectional Study	Sports students, psychopathology or mental health not specified	75% experienced LD once during life 30.6% were frequent LDers (more than once a month)		Social skills, emotional regulation, Flexibility to cope with life events	No significant association between LDF and WEBWBS (Warwick-Edinburgh Mental Well-Being Scale) nor the RPWB (Ryff's Psychological Well-Being Scale).
The healing and transformative potential of lucid dreaming for treating clinical depression (Sackwild & Stumbrys, 2021)	N = 163 Sequential explanatory mixed-methods design	39.9% (n = 61) use antidepressants or are currently diagnosed with depression and 64.7% (n = 99) diagnosed with depression before	93.9% reported having LD experience (n = 153) 68.6% frequent LDers (more than once)		Depressive symptomatology	No significant association between LD frequency and depression scores.
Decrease PTSD Symptoms following LD Healing Workshop (Yount et al., 2023)	N = 49 Quasi-Experimental Study	Not specified	76% experienced at least one LD during workshop		PTSD symptoms, nightmare distress, Subjective sense of well-being (including: mental, emotional, social and spiritual condition)	Significant differences in PCL-5 (PTSD Checklist for DSM-5) scores at baseline and post workshop. No significant differences between LD groups. Significant improvements in overall well-being and lessening of negative emotions.

# Investigating the Relationship between Lucid Dreaming, Mental Health and Psychopathology

Can Learning to Lucid Dream Promote Personal growth? (Konkoly & Burke, 2019)	N = 32 Randomized-Controlled Trial (RCT)	Not specified	Not specified	Baseline life satisfaction as moderator: Higher LS pre-test predicted increased LS post-test.	Emotional regulation (Emotional reappraisal, emotional suppression), Flexibility to cope with life events (coping self-efficacy)	No difference between groups from pre- to posttest for emotional suppression, emotional reappraisal or coping self-efficacy.  No significant change within LD group for coping self-efficacy.
Dispelling the shadows of the lucid night: An exploration of potential adverse effects of lucid dreaming (Stumbrys, 2023)	N = 489 Cross-Sectional Study	Not specified	93.9% had LD experience.	Gender, Deliberacy of LD, baseline nightmare frequency, personality disposition	Social skills (loneliness and social isolation), Well-being (social skills, flexibility to cope with life events, basic cognitive skills)	The frequency of LDs was positively associated with mental well-being and negatively associated with loneliness.
Psychosis and the control of LD (Mota et al., 2016)	N = 73 Cross-Sectional Study	Psychotic subjects	Approx. 50% of psychotic subjects had at least one LD & 46% of Control group		Psychotic symptomatology	Association between LD and psychosis, but no milder psychotic symptoms for patients able to experience LD.
Lucid Dreaming: Intensity, but not frequency, is inversely related to psychopathology (Aviram & Soffer-Dudek, 2018)	N = 187 Cross-Sectional Study	Mental health not specified	84% had at least one LD experience	High-intensity lucid dreaming & emotional valence	Depressive symptomatology, Resilience (flexibility to cope with life events)	High-intensity LDers were more resilient compared to low-intensity LDers Deliberate LD induction associated with dissociative symptoms. Lucidity intensity was significantly inversely correlated with depression scores.
Managing Insomnia using lucid dreaming training: A Pilot study (Ellis, De Koninck, Bastien, 2021)	N = 48 Quasi-Experimental Study	Clinical diagnosis of Insomnia Disorder	Not specified		Depressive symptomatology	No significant difference in pre-post change scores for depressive symptomatology.
Self-perceived effects of lucid dreaming on mental and physical health (Erlacher et al., 2020)	N = 386 Cross-Sectional Study	No specification	All of the participants experienced at least one LD	Trait Mindfulness, Spirituality (TPV), LD intensity	Universal values including respect and care for oneself and other living beings and the recognition of connectedness between people	More frequent LDers, higher dispositional mindfulness and higher transpersonal trust scores tended to report positive effects of LD on mental health and physical well-being.
Studies with lucid dreaming as add-on therapy to gestalt therapy (Holzinger, Klösch & Saletu, 2015)	N = 40 (n = 32 after dropout) Randomized-Controlled Trial (RCT)	Nightmare sufferers (ICD-10: F51.5)	75% of the LDG (lucid dream training group) & 12.5% of the Gestalt group		Nightmare distress (termed nightmare suffering in the study)	Significant reduction in nightmare suffering in both treatment groups at the end of treatment independent from LDT.

**Quality Assessment**

First of all, the quality of the six CSS will be taken into consideration. The two CSS by Mota et al. (2016) and by Aviram and Soffer-Dudek (2018) proved to have a „good“ methodological quality. The articles by Stumbrys (2021), Jones and Stumbrys (2014), Sackwild and Stumbrys (2021) demonstrated „medium“ methodological quality. Although the study by Sackwild and Stumbrys (2021) is a Mixed-Methods Design, the checklist for CSS was used because the first part of the study constitutes a cross sectional design. The remaining two CSS by Stumbrys (2021) and Erlacher et al. (2020) proved to have „insufficient“ methodological quality and can thus not be considered fully valid and reliable.

Out of the four RCTs, three have „medium“ methodological quality and one was rated „insufficient“. Out of the two QES, the article by Ellis et al. (2020) demonstrated „good“ methodological quality and the article by Yount et al. (2023) showed „medium“ methodological quality, respectively.

**Table 2**

*Quality of the included studies*

Reference	Checklist	Qualitative score
Posttraumatic nightmares and imagery rehearsal: The possible role of lucid dreaming. (Harb et al., 2016)	Checklist for Randomised-Controlled Trials	7 / 12 (58.3%) Medium
The Luminous Night of the Soul: The Relationship between Lucid Dreaming and Spirituality (Stumbrys, 2021)	Checklist for Cross-Sectional Studies	4 / 8 (50%) Insufficient
Cognitions in Sleep: Lucid Dreaming as an Intervention for Nightmares in Patients with PTSD (Holzinger, Saletu & Klösch, 2020)	Checklist for Randomised-Controlled Trials	7 / 12 (58.3%) Medium

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Mental health, physical self and lucid dreaming: A correlational study in sport students (Jones & Stumbrys, 2014)	Checklist for Cross-Sectional Studies	5 / 8 (62.5%) Medium
The healing and transformative potential of lucid dreaming for treating clinical depression (Sackwild & Stumbrys, 2021)	Checklist for Cross-Sectional Studies	6 / 8 (75%) Medium
Decrease PTSD Symptoms following LD Healing Workshop (Yount et al., 2023)	Checklist for Quasi-Experimental Studies	6 / 9 (66.7%) Medium
Can Learning to Lucid Dream Promote Personal Growth? (Konkoly & Burke, 2019)	Checklist for Randomised-Controlled Trials	6 / 12 (50%) Insufficient
Dispelling the shadows of the lucid night: An exploration of potential adverse effects of lucid dreaming (Stumbrys, 2021)	Checklist for Cross-Sectional Studies	5 / 8 (62.5%) Medium
Psychosis and the control of LD (Mota et al., 2016)	Checklist for Cross-Sectional Studies	8 / 8 (100%) Good
Lucid Dreaming: Intensity, but not frequency is inversely related to psychopathology (Aviram & Soffer-Dudek, 2018)	Checklist for Cross-Sectional Studies	8 / 8 (100%) Good
Managing Insomnia using lucid dreaming training: A Pilot study (Ellis, De Koninck, Bastien, 2021)	Checklist for Quasi-Experimental Studies	7 / 9 (77.8%) Good
Self-perceived effects of lucid dreaming on mental and physical health (Erlacher et al., 2020)	Checklist for Cross-Sectional Studies	4 / 8 (50%) Insufficient

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Studies with lucid dreaming as add-on therapy to gestalt therapy (Holzinger, Klösch & Saletu, 2015)	Checklist for Randomised-Controlled Trials	8 / 12 (66.7%) Medium
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*Note.* Categories for the quality of Cross-Sectional Studies: 87.5% or higher (7-8 fulfilled items) = good quality; 62.5% - 75% (5-6 fulfilled items) = medium quality; 50% or less (<5 fulfilled items) = insufficient quality. Categories for the quality of Randomised-Controlled Trials: 75% or higher (9-12 fulfilled items) = good quality; 58% - 66.6% (7-8 fulfilled items) = medium quality; 50% or lower (<6 fulfilled items) = insufficient quality. Categories for Quasi-Experimental Studies: 77.7% or higher (7-9 fulfilled items) = good quality; 55.5% - 66.6% (5-6 fulfilled items); 44.4% or lower (<4 fulfilled items) = insufficient quality.

## Discussion

The main objective of this study was to systematically review the literature for the association between LD, MH, psychopathology and its potential moderators. Ideally, this will shed more clarity on sub-components of LD that are responsible for either beneficial clinical outcomes and / or adverse clinical outcomes. Considering the results, there seem to be indications of a positive relationship between LD and different MH facets, namely aspects of spirituality, social skills, emotional regulation, basic cognitive skills and the flexibility to cope with life events / resilience. Besides, evidence for the relation between LD and symptoms of psychopathology seems inconclusive, e.g. indicating positive correlations between LD and psychotic symptoms and significant as well as non-significant inverse associations between LD and depressive symptomatology. Moreover, some studies found support for a reduction in PTSD symptomatology in relation to LD practice, potentially influenced by dream content control. At last, several studies found a significant association between nightmare distress and LD or aspects pertaining to LDI like LD control and LD confidence. In response to the secondary research question, some evidence was provided on moderating variables that affect the relationship between LD and MH, namely trait mindfulness, gender, baseline levels of nightmare frequency, deliberacy of LD, levels of spirituality and high levels of baseline life satisfaction. However, the studies in which possible moderators might be at play have not investigated moderating variables explicitly, they were rather hypothetically deduced from the literature rather than rigorously tested.

Firstly, looking at the connection between LD and MH, the results reveal that there are significant associations between LD and facets of MH. More specifically, one study found the association between spirituality as a component of MH to be particularly pronounced in

individuals who experience frequent LDs. This connection between frequent LD experience and a positive influence on the spiritual component was also observed in another study. There are different possible explanations that can be put forth. The first interpretation is that higher LDF leads to increased levels of spirituality in an individual thus affecting an integral part of the MH construct. According to Stumbrys (2018) and Stumbrys (2021) the experiences of LD can in themselves be viewed as potentially transpersonal and spiritual experiences. Seen from that angle, the spontaneous experience of an LD or the continuous induction of LD through techniques might enhance spiritual growth through mystical experiences in the dream of an individual and thus positively impact upon their MH. Considering this explication, LD would carry the main influence over onto MH.

However, another possible interpretation might be that individuals who experience frequent LDs are generally more spiritually inclined. Based on that inclination, they might utilise the practice of LD more proactively to enhance their spiritual growth. For instance, individuals who regard themselves as spiritual practitioners of religious traditions such as Buddhism or Hinduism, might deliberately practice Yoga Nidra or Dream Yoga, which are both practices that can possibly induce the state of LD in an individual and eventually precipitate a more refined understanding of the nature of reality or self-realization through spiritual experiences during their LD (Mota-Rolim et al., 2020). Taking this explanation, LD would not be the main factor promoting MH. Instead, previous spiritual development would be the factor that would have an impact on MH whereas LD would merely act as an indirect variable. It could also be that the levels of MH of frequent LDers in the study were already high at baseline and thus LD would not be the factor leading to increased levels of MH.

The results also illustrated a positive association between mental well-being (measured by SWEMWBS) and LDF and a negative association between LDF and loneliness. Regarding the former, other factors could impact the association like high baseline levels of spirituality which are characterised by a recognition of connectedness between people and respect and care for oneself and other living beings. Through this mechanism, the levels of social isolation and loneliness could be significantly impacted upon. Feeling more connected could in turn enhance *social skills* and one's ability to empathise with other individuals.

Another study illustrated a connection between „Satisfaction with life“ and the facets „flexibility and ability to cope with adverse life events“ and „emotional regulation“. While the construct „Satisfaction with life“ is not directly equivalent to the MH definition, a connection can be established. Hence, considering the „Satisfaction with life“ scale, the items could be



interpreted as an acceptance of how one's life is right now in terms of how the individual relates to their own emotional dimension and how they deal with the external circumstances they live in. Based on this argumentation, it could be postulated that there is an indication of improved MH in frequent LDers as compared to participants who reported fewer LDs as their measure of life satisfaction was significantly higher.

Regarding the second objective of this study, pertaining to the investigation of the relationship between LD and psychopathology, the results are inconclusive. To start with, there is evidence for a correlation between psychotic symptoms and the ability to exert control in an LD. In the study by Mota et al. (2016), psychotic individuals were experiencing higher content control during LD compared to the non-psychotic control group. Moreover, there was no clinical advantage for the psychotic LD group and the authors suggested that LD practice might further empower deliria and hallucinations in psychotic individuals. This stands in contrast to the finding made by Harb et al. (2016), where the reduction in nightmare distress was linked to an increase in dream content control. This suggests that the evaluation of the LD experience is influential in how the actual LD relates to psychopathology.

A possible explanation is that psychotic patients „suffer from altered perception [..], processing of reality and impaired self-reflectiveness...“ and the boundaries between internal and external reality tend to merge in individuals with psychotic symptoms so that they are not able to differentiate internal cues from external cues in their waking life (Bora et al., 2007; Voss et al., 2018). This merging of internal and external reality is shared with the characteristics of non-lucid dreams where self-generated images are interpreted to be coming from the external environment as the dreamer is not aware of the dream and thinks it is real (Feinberg, 2010). However, during an LD there is no external environment for the dreamer because the dreamer knows they are dreaming and the senses are not interacting with the external environment. LD control might be related to psychotic symptoms and not to a decrease in psychopathological symptoms because psychotic individuals might not be able to maintain a state of detachment to internally self-generated images (deliria and hallucinations) in their waking life. On top of that, they might carry their delusional way of thinking and hallucinatory experiences into their dreams, influencing the dream scape that they experience, thus empowering deliria and hallucinations further.

On another note, there is evidence regarding the relationship between LD and depression, PTSD and nightmare distress. Two studies, one RCT (LD Therapy) and one CSS found quantitative evidence for a significant reduction in depression scores in relation to LD,

while two other studies did not find a significant association between the variables (Aviram & Soffer-Dudek, 2018; Ellis, De Koninck, Bastien, 2021; Holzinger et al., 2020; Sackwild & Stumbrys, 2021). It could be possible that other variables impacted upon the relationship between LD and depression like for example practicing LD in a therapeutic context or having the opportunity to share one's dreams in a group as part of the Lucid Dream Therapy Sessions in the study of Holzinger et al. (2020). A further explanation for a non-significant association could be that the LD experiences in the studies were limited to mere lucidity in the dream and not necessarily accompanied by intentional acting to alter the dream plot. This explanation would be in line with the findings of Aviram and Soffer-Dudek (2018) who were able to demonstrate a significant inverse association between LDI and depression scores. They suggest that control and confidence during the lucid dreaming phase are the decisive factors predicting a decrease in depression scores and not mere dream awareness. This implies amongst other elements the attitude of taking an active stance toward the dream content and confronting frightening dream images as opposed to passively observing what happens in the dream without acting upon it.

The insight that taking an active stance in controlling the dream accounts for positive therapeutic outcomes is in line with what Harb et al. (2016) found in a large RCT. They provided evidence that not LD awareness, but that content control was decisive in reducing nightmare distress in PTSD patients. This might explain why individuals diagnosed with PTSD and individuals experiencing severe nightmare distress show a LD profile, that is characterised by awareness of the dream, but a lack of control over the dream plot. This lack of control is similar to the „passive observant stance“ that Aviram and Soffer-Dudek (2018) postulated where individuals feel like a victim to their dream surroundings. The evidential support that there are significant differences between LD awareness and LDI in relation to psychopathology seems solid and might explain the equivocality in the associations between LD and psychopathology (Aviram & Soffer-Dudek, 2018).

Research into the neuroscience of PTSD further strengthens this elaboration by stating that traumatized individuals fail to organize an effective response to threat which often results in immobilization which is exactly what happens in PTSD in which the sufferers experience a lack of control during their LD (Van der Kolk, 2006). Thus, if people affected by PTSD in conjunction with LD learn to self-regulate and become self-aware of their behavioural tendencies and bodily sensations during the mental re-experiencing of their past, they might be able to rewire their automatic reactions to certain situations and transform their sense of

immobilisation into a sense of control over the dream plot and / or real-life situation, potentially leading to a decrease in PTSD symptoms. The study findings by Holzinger et al. (2015) and Harb et al. (2016) support the notion that an increased sense of control and the re-experiencing of the dream through conscious confrontation leads to a decrease in PTSD symptoms such as nightmare distress.

To provide an answer to the last research objective of this study, there are indications that higher trait mindfulness, higher levels of spirituality, gender, spontaneous or deliberate LDs, the baseline nightmare frequency and a predisposition for certain personality characteristics act as moderating variables in the relationship between LD and MH and LD and psychopathology.

In the study conducted by Erlacher et al. (2020), positive effects between LDF and MH were found, but the participants illustrated heightened levels of dispositional mindfulness and spirituality. Thus the variables might have acted as potential moderators in the relationship between LD and MH. There is evidence backing this up as mindfulness meditation contributes amongst other things to regulative capacities by reducing self-focus and rumination and leading to a calming effect on the organism which constitutes an important aspect of MH (Baird et al., 2019; Stumbrys, Erlacher, & Malinowski, 2015).

On another note, Stumbrys (2023) pointed out that being predisposed to the personality facets transliminality or thin boundaries increases the chances of experiencing sleep-related experiences such as nightmare frequency, LD nightmare frequency etc. Besides, they found that negatively toned LDs were more attributed to women than to men and were rather present in individuals who had spontaneous LDs and a greater nightmare frequency. An explanation regarding the gender is that women are generally more likely to experience nightmares as opposed to men. Considering the other two moderating variables, Levin and Nielsen (2009) suggested that individuals experiencing frequent nightmares are generally exhibiting a personality style that is prone to reactive emotional distress. They view dreams as having a fear-extinction function, which ascertains the adequate utilisation of attentional resources in order to down-regulate their negative emotional arousal. According to that explanation, the negatively toned experiences accumulated throughout the individual's waking life are being processed during the dream. So a potential explanation for the occurrence of negatively toned LDs could be that individuals might spontaneously become lucid during their dream as an automatic coping mechanism. The organism might need to attend to the emotionally challenging contents in order to down-regulate the arousal that is

associated with it, so that they can survive the threatening situation they find themselves in.

Lastly, regarding high baseline life satisfaction which supposedly predicts beneficial LDs, it can be argued that individuals who are more satisfied with their life and feel that the conditions of their life are excellent might extend this satisfaction into their lucid state in the night. Also, life satisfaction in this study is seen as an important component of personal growth. Hence, individuals high in measures such as life satisfaction might benefit from LDs as they widen their experiential scope in which they can experience personal growth.

### **Limitations**

One limiting factor of the evidence in this review is that many of the included studies mainly focussed on LDF, which leaves out important other components that might affect the association between LD, MH and the different psychopathologies that were analysed. Other relevant components to consider in the research of LD are LDI and LD control. Besides, a large part of the studies were CSS, through which it is not possible to make causal statements about the true effectiveness of LD and its various components like LDF, LDI and LD control. Therefore, prospective studies could utilise experimental designs to firstly increase the validity of the findings and secondly to clarify the direction of the relationship to be investigated.

On top of that, some of the studies also scored quite low after checking for their methodological quality which opens up space for various kinds of biases that compromise the validity and reliability of the study's findings. This includes for instance the absence of operationalised scales for measurements of depression or other psychopathologies, which in some studies were only qualitatively reported. Establishing more robust research designs by controlling for systematic biases could be a potential starting point.

Another limitation of this study, as was observed in the process of writing the SLR, was to adjust the pre-defined definition of MH to the actual studies that were investigated more thoroughly in the end. Many studies included separate facets of the MH conceptualisation, but there was no study investigating the construct as a whole. Although the included studies indicated relations between LD, MH and psychopathology, there also remained contradictory and inconclusive results. Future studies could attempt to include more extensive conceptualisations of MH in their research and delve deeper into LDI and LD control in relation to MH and psychopathology to potentially account for the inconclusive study findings.

The stringent selection of the eligibility criterion for publication year was another

factor that potentially led to an omission of relevant studies. In regards to that, the scope of psychopathologies to be inquired was also quite narrow which limits the meaningfulness of conclusive statements about the relationship between LD and psychopathologies in general.

### **Future Recommendations**

Firstly, it can be said that future studies should put the focus on LDI instead of merely regarding the frequency of LD as an important influence on MH. This SLR demonstrates that specific characteristics of the LD are particularly relevant when looking at clinical outcomes. LD experiences in which the individuals made use of gestalt techniques like conscious confrontation, skills like mindfulness, or where an active intentional stance was taken toward changing the dream content, the relationship between LD and MH appeared to be positively impacted upon. Thus, LDI and additional therapeutic components rather than mere LD occurrence seem to lead to a meaningful improvement in positive MH outcomes.

Connected to that, future studies should be more robust in the establishment of their study design. The predominance of observational studies in the investigation of LD on MH severely limits the explanatory power of the research findings. While these observational studies were helpful in illustrating correlations, more RCTs should be utilised in the future in order to experimentally manipulate LD frequency and LD control specifically – so that more meaningful evidence can be gathered of its true effect on MH and psychopathologies. This in turn could inform clinical practice more directly in how LDs can be utilised to achieve clinically relevant outcomes for patients suffering from mental illness. This experimental orientation in the inquiry of effects of LD on other variables can also be complemented by considering possible moderating variables that were observed in the outcomes of this study like the degree of spirituality, practices of mindfulness or therapeutic techniques utilised during a LD experience.

### **Conclusion**

To sum up, this SLR displays substantial evidence of a positive relation between LD and MH. In particular, increases in levels of spirituality, social skills, resilience and emotional regulation were observed. The analyses also revealed indications of improvements in regards to psychopathological symptoms like a decrease in PTSD symptoms, nightmare distress and depression scores. While there was equivocal evidence regarding the association between LD, MH and psychopathology, this study was able to show that mere awareness of the dream only partially explains these relations. The different characteristics, like the context of the LD, whether the LD is regarded as an intrusion or not, whether the dreamer views him/herself as a

passive bystander in the dream or as someone that claims self-responsibility for controlling the dream and the emotional valence of the LD experience, appear to be more relevant in influencing clinical outcomes in individuals compared to the mere experience of lucidity.

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**Appendix**

Search string

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("lucid dreaming"[Title/Abstract] OR "dream lucidity"[Title/Abstract] OR "lucid dream induction"[Title/Abstract] OR "dream lucidity"[Title/Abstract] OR "lucid dream"[Title/Abstract] OR "dream awareness"[Title/Abstract] OR "dream control"[Title/Abstract] OR "lucid dreaming therapy"[Title/Abstract] OR "lucid dream frequency"[Title/Abstract] OR "lucid dreaming frequency"[Title/Abstract] OR "induction technique"[Title/Abstract]) AND ("psychopathology"[Title/Abstract] OR "depression"[Title/Abstract] OR "psychosis"[Title/Abstract] OR "psychotic"[Title/Abstract] OR "mood"[Title/Abstract] OR "nightmare"[Title/Abstract] OR "trauma"[Title/Abstract] OR "PTSD"[Title/Abstract] OR "positive emotions"[Title/Abstract] OR "resilience"[Title/Abstract] OR "self-confidence"[Title/Abstract] OR "self-esteem"[Title/Abstract] OR "self-reflectiveness"[Title/Abstract] OR "distress"[Title/Abstract] OR "mental illness"[Title/Abstract] OR "well-being"[Title/Abstract] OR "mental health"[Title/Abstract] OR "contentment"[Title/Abstract] OR "happiness"[Title/Abstract] OR "affect"[Title/Abstract] OR "spirituality"[Title/Abstract] OR "empathy"[Title/Abstract] OR "emotional regulation"[Title/Abstract] OR "flexibility"[Title/Abstract] OR "cognitive flexibility"[Title/Abstract] OR "personality"[Title/Abstract] OR "personal growth"[Title/Abstract] OR "value"[Title/Abstract] OR "meta-awareness"[Title/Abstract] OR "locus of control"[Title/Abstract] OR "love"[Title/Abstract] OR "respect"[Title/Abstract] OR "interconnectedness"[Title/Abstract] OR "relationship"[Title/Abstract] OR "connectedness"[Title/Abstract] OR "acceptance"[Title/Abstract] OR "dissociation"[Title/Abstract] OR "perspective taking" OR "schizophrenia"[Title/Abstract] OR "schizotypy"[Title/Abstract] OR "mental disorders"[Title/Abstract] OR "mental"[Title/Abstract] OR "psychiatric disorders"[Title/Abstract] OR "mindfulness"[Title/Abstract] OR "meditation"[Title/Abstract] OR "mindful acceptance"[Title/Abstract])

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## Investigating the Relationship between Lucid Dreaming, Mental Health and Psychopathology

39

TITLE-ABS-KEY("lucid dreaming" OR "dream lucidity" OR "lucid dream induction" OR "dream lucidity" OR "lucid dream" OR "dream awareness" OR "dream control" OR "lucid dreaming therapy" OR "lucid dream frequency" OR "lucid dreaming frequency") AND ("psychopathology" OR "depression" OR "psychosis" OR "psychotic" OR "mood" OR "nightmare" OR "trauma" OR "PTSD" OR "positive emotions" OR "resilience" OR "self-confidence" OR "self-esteem" OR "self-reflectiveness" OR "distress" OR "mental illness" OR "well-being" OR "mental health" OR "contentment" OR "happiness" OR "affect" OR "spirituality" OR "empathy" OR "emotional regulation" OR "flexibility" OR "cognitive flexibility" OR "personality" OR "personal growth" OR "value" OR "meta-awareness" OR "locus of control" OR "love" OR "respect" OR "interconnectedness" OR "relationship" OR "connectedness" OR "clinical implications" OR "acceptance" OR "dissociation" OR "perspective taking" OR "schizophrenia" OR "schizotypy" OR "mental disorders" OR "mental" OR "psychiatric disorders" OR "mindfulness" OR "meditation" OR "mindful acceptance")

PsycINFO:

Abstract: ("lucid dreaming" OR "dream lucidity" OR "lucid dream induction" OR "dream lucidity" OR "lucid dream" OR "dream awareness" OR "dream control" OR "lucid dreaming therapy" OR "lucid dream frequency" OR "lucid dreaming frequency") AND ("psychopathology" OR "depression" OR "anxiety" OR "psychosis" OR "psychotic" OR "mood" OR "nightmare" OR "trauma" OR "PTSD" OR "positive emotions" OR "resilience" OR "self-confidence" OR "self-esteem" OR "self-reflectiveness" OR "distress" OR "mental illness" OR "well-being" OR "mental health" OR "contentment" OR "happiness" OR "affect" OR "spirituality" OR "empathy" OR "emotional regulation" OR "flexibility" OR "cognitive flexibility" OR "personality" OR "personal growth" OR "value" OR "meta-awareness" OR "locus of control" OR "love" OR "respect" OR "interconnectedness" OR "relationship" OR "connectedness" OR "clinical implications" OR "acceptance" OR "dissociation" OR "perspective taking" OR "obsessive compulsive disorder" OR "schizophrenia" OR "schizotypy" OR "mental disorders" OR "mental" OR "psychiatric disorders" OR "mindfulness" OR "meditation" OR "mindful acceptance")



**Investigating the Relationship between Lucid Dreaming, Mental Health and Psychopathology**

Study name	Participants & Study Design	Psychopathology / Mental Health	Lucid Dreaming construct & experience	Potential Moderator	Measurements	Findings of the study