

**The Relationship between Lucid Dreaming and Well-Being: A Systematic Literature  
Review**

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### Abstract

**Background:** Lucid dreaming (LD) has gained attention as a potential contributor to well-being. However, there currently exists no systematic literature review of this relationship which sets the basis for this study.

**Aim:** This systematic literature review aims to investigate the relationship between lucid dreaming and well-being, considering hedonic, subjective, eudaimonic and psychological well-being. It also explores potential moderating factors, underlying mechanisms, and possible applications of lucid dreaming in relation to well-being.

**Method:** A systematic literature search was conducted to identify studies that provided insight into the relationship between lucid dreaming and well-being that were published from 2003 onwards. Eight studies met the inclusion criteria and were included in the review. These included five cross-sectional studies, a randomised controlled trial, a pre-experimental study, and a mixed methods study. Information about the study characteristics, design, sample, outcome measures and results were collected in an extraction form.

**Results:** The findings indicate a positive relationship between lucid dreaming and hedonic/subjective well-being, including positive affect, mood, and life satisfaction. Qualitative insights revealed that lucid dreaming can contribute to self-exploration, creativity, empowerment, and spiritual experiences, which are integral to eudaimonic and psychological well-being. As possible moderators, life satisfaction, deliberacy of LD induction and LD operationalisation were identified. Moreover, LD application was identified as a possible underlying mechanism.

**Conclusion:** While there is evidence supporting a positive association between LD and hedonic well-being, future research should investigate the impact of LD on specifically eudaimonic and psychological well-being. Additionally, the exploration of moderating factors and underlying mechanisms such as LD applications is essential to unlocking the potential of LD as a therapeutic application and facilitator of positive mental health.

*Keywords:* lucid dreaming, well-being, hedonic well-being, subjective well-being, eudaimonic well-being, psychological well-being

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## 1. The Relationship Between Lucid Dreaming and Well-Being

Humans dream every night, some can remember, some cannot. However, regardless of remembering, we spend hours each night in this elusive world that seemingly opposes natural law. Curiously, we are almost always unconscious of the fact that we are dreaming when in a dream. This makes us vulnerable to nightmares in which we are facing seemingly life-threatening and terrifying situations. Especially, in post-traumatic stress disorder, this is a common phenomenon which causes much suffering for affected individuals (Weber et al., 2020). However, in 1980 LaBerge found evidence for the existence of a long debated and questioned phenomenon that promises a way out of the nightly terror - *lucid dreaming* (LaBerge, 1980). Lucid dreaming (LD) is a phenomenon where an individual is conscious of the fact that he or she is dreaming, while in a dream. Lucid dreamers, with training, can become able to alter the content of dreams and thus face nightmares in a substantially different way. This opened the way to a new area of dream research and consequently, lucid dreaming has been developed as an intervention for nightmares in PTSD (Holzinger et al., 2021). Additionally, research revealed significant effects of lucid dreaming over and above the treatment of PTSD (Stocks et al. 2020). As for healthy individuals, there is evidence that suggests lucid dreaming can have a positive impact on well-being and waking mood (Stocks et al., 2020; Saunders et al., 2016). However, research on these positive psychological correlates of lucid dreaming is still in its infancy and only little research has been conducted so far. Nonetheless, the recent years of scientific investigation on the well-being-promoting potential of lucid dreaming have seemed to produce a consensus that there is a positive effect of lucid dreaming on well-being (Aspy, 2020). Despite this, to the best of our knowledge, there is currently not a single systematic literature review that evaluates the effect of lucid dreaming on well-being, resulting in a research gap the present paper aims to fill. Therefore, the objective of this study is to conduct a systematic literature review on the relationship between lucid dreaming and well-being. The findings of the resulting articles will be analysed systematically and integrated into a coherent overview on the current state of research, possible applications and underlying mechanisms and moderators.

### 1.1. Lucid Dreaming

*Lucid dreaming* is defined as a state of dreaming in which the dreamer is conscious of the fact that he or she is dreaming (LaBerge et al. 1986). Additionally, many lucid dreams are characterised by the ability to control and change the content of the dream (Vallat & Ruby, 2019), however, according to most authors, this is not a necessary component of a lucid dream.

In terms of prevalence, a meta-analysis has shown that around 23% of the general population have experienced at least one lucid dream in their lifetime (Saunders et al., 2016). Moreover, an estimated 6.6% of the general population experience frequent lucid dreams, which is defined as at least once per month. It is also important to note that lucid dreaming can be operationalized in two dimensions, firstly, lucid dream frequency, which refers to how often an individual experiences lucid dreams and secondly, lucid dream intensity, which corresponds to how vivid, clear and controllable the lucid dream is for the individual (Aviram & Soffer-Dudek, 2018).

As lucid dreaming is experienced rarely, some researchers have questioned its reality and scientific relevance in the past. However, LaBerge (1980) found evidence for lucid dreams in a sleep laboratory study, in which self-proclaimed lucid dreamers were able to act out a specific sequence of predetermined eye movements in their dreams. Consequently, neurophysiological studies using electroencephalography (EEG) and functional magnetic resonance imaging (fMRI) have further validated the findings of LaBerge (1980) by revealing that lucid dreams show an increased activation of brain areas that are typically involved in waking consciousness (Dresler et al., 2012).

In fact, lucid dreaming is a learnable skill, and lucid dreams can be induced by a variety of techniques such as for example Reality Testing and Mnemonic Induction (Stumbrys et al., 2012). *Reality Testing* is a mindfulness-based technique that aims to establish a metacognition about the reality of experience, which can be tested by performing simple tasks in waking life, which are then habitually also performed in a dream (Adventure-Heart et al., 2017). Examples of a Reality Test would be pinching oneself, or reading text, which both will often be a distinctly different experience when performed in a dream and thus help to become lucid. Mnemonic induction on the other hand involves repeating a phrase before falling asleep such as “I will become lucid tonight” (Stumbrys et al. 2012). This should increase motivation and awareness of one’s dream state and thus induce lucidity.

The evidence for the existence and learnability of lucid dreams thus created an upsurge of scientific investigation into this topic. Especially relevant for clinical psychology, lucid dreaming bore a new possibility to the treatment of nightmares which are highly prevalent in posttraumatic stress disorder (PTSD). In fact, around 80% of PTSD sufferers have at least one nightmare in a given week (Pigeon & Carr, 2015), whereas in the general population only 5% experience a nightmare in a given week (Li et al., 2010).

Thus, in search of an effective treatment for nightmares in clinical populations, Lucid Dreaming Therapy was developed. *Lucid Dreaming Therapy* (LDT) is a cognitive behavioural

therapy that helps individuals to recognize when they are dreaming and aims to develop their abilities at changing dream content and consequently overcome nightmares (Hurd & Bulkeley, 2014). The evidence regarding LDT suggests that it can reduce nightmare frequency and enhance sleep quality in PTSD (Lancee et al., 2010; Spoormaker & van den Bout, 2006). Moreover, it can reduce nightmares in other disorders that are characterised by a higher nightmare frequency, such as depression and anxiety disorders (Stumbrys et al., 2012; Voss et al., 2013).

Even though many studies on lucid dreaming have investigated LDT in pathological samples, research has also been conducted on how lucid dreaming is applied by healthy individuals. In this regard, Schädlich and Erlacher (2012) have asked 301 lucid dreamers about what they do in their lucid dreams. They found that the most common application of lucid dreaming was to have fun (81%), turn bad dreams or nightmares into positive dreams (64%), solving problems (30%), getting creative ideas or insights (28%) and practising skills (21%). This shows that nightmare treatment is just one of the many possibilities of how lucid dreaming could be applied which thus opens the door for an application of lucid dreaming over and above the treatment of pathology. From the perspective of positive psychology, one promising potential effect of lucid dreaming is that it might enhance well-being (Aspy, 2020).

## **1.2. Well-Being and How it Relates to Lucid Dreaming**

*Well-being* as it is defined today in psychology, can be split into two sub-components: *hedonic* and *eudaimonic well-being* (Keyes et al., 2002). Hedonic well-being is derived from the ancient Greek word for pleasure - *hedone* and thus refers to an individual's subjectively felt life satisfaction, positive affect and the absence of negative affect (Kahneman et al. 1999). Hereby, it should be noted that hedonic well-being is often also operationalised with the term *subjective well-being* (SWB). Nonetheless, it has been argued that subjective well-being is a broader concept than hedonic well-being as it also takes an individual's cognitive appraisal of life circumstances and achievements into account (Ryan & Deci, 2001). Consequently, both hedonic well-being and SWB will be examined in relation to lucid dreaming in this literature review.

Eudaimonic well-being, on the other hand, refers to a person's sense of purpose, meaning and fulfilment in life (Ryan & Deci, 2001). In addition to this, Niemiec (2014) attributed the subcomponents of self-actualisation, personal expressiveness, vitality and meaning in life to eudaimonic well-being. Its name is derived from Aristotle's conception of the good life "eudaimonia" and thus, when translated from ancient Greek, means good "eu"

spirit “daimon” (Aristotle, 350 B.C.E./2003). In Aristotelian philosophy eudaimonia entails living in accordance with one's inner spirit (daimon), or what might be called conscience, which led to what he called the good life. Consequently, the concept of eudaimonic well-being sets an emphasis on intrinsic motivation, self-concordance of one's actions and a congruence between one's values and behaviours (Ryan & Deci, 2001). This is important when distinguishing between eudaimonic well-being and psychological well-being, as those concepts are often used interchangeably. *Psychological well-being* is made up of six dimensions: self-acceptance, personal growth, purpose in life, environmental mastery, autonomy, and positive relations with others (Ryff, 1989). Although many aspects are similar, psychological well-being does not have an emphasis on living in accordance with one's conscience. Nonetheless, both eudaimonic and psychological well-being will be included in the literature search.

Thus, it is important to look at how lucid dreaming might be connected to well-being. In this regard, it is reasonable to assume that the actual possibilities of what can be done in a lucid dream are limitless. During dreaming, the brain generates a simulated reality that may include elements of imagination, creativity, and perception (Carr et al., 2020). Now becoming lucid, means that one can consciously encounter the simulated reality and possibly change the way this reality is simulated. With this usually unconscious generative creative force under conscious control, it could be possible for the lucid dreamer to evoke experiences that facilitate well-being.

This additionally connects to the *Continuity Hypothesis of dreaming*, which posits that dreams are influenced by and connected to waking experiences, thoughts, and emotions, reflecting and processing aspects of a person's daily life during sleep (Schredl, 2012). In the context of lucid dreaming, where individuals are aware and can control their dreams, the continuity between waking life and dreaming may be more pronounced, allowing for intentional exploration and manipulation of waking experiences within the dream state (Lee, 2015). As a result, lucid dreaming may serve as a unique way for individuals to bridge the gap between their conscious and unconscious states, potentially influencing their well-being in novel ways. Moreover, this would support theoretical effect differing lucid dream applications would have on waking well-being levels (Stumbrys & Erlacher, 2016).

Nonetheless, the research on how lucid dreaming relates to well-being is still in its infancy. However, literature has already shown that lucid dreaming is related to positive mood the following day, which corresponds to hedonic and subjective well-being (Stocks et al. 2020). Other research by Erlacher et al. (2021) has shown that around 90% of lucid dreamers report some benefit of lucid dreams on mental or physical health. These are promising findings,

although it should be noted that certain lucid dream induction techniques can increase nightly awakenings (Aspy, 2020), which might indirectly impact well-being.

Summarizing the above, the currently available research has shown that lucid dreaming can have a positive impact on well-being, although a coherent overview of the existing research is missing. This opens the gap for the present systematic literature review, which will shed light on the present state of the research with the aim to stimulate and guide future research.

### **1.3. This Study**

The current study explores the relationship between lucid dreaming and well-being along with underlying mechanisms and moderators to this relationship. The objective of this study is thus to fill the gap in research on this intricate relationship and provide a systematic overview of the existing literature. Consequently, the following research questions will be addressed:

1. What is the relationship between lucid dreaming and well-being?
2. What are potential underlying mechanisms and moderators for the relationship between lucid dreaming and well-being?

## **2. Methods**

### **2.1. Study Design**

To answer the research questions a systematic literature review (SLR) was conducted. By using a systematic search strategy, a SLR can ensure that relevant literature is selected in a replicable and transparent manner, which limits the risk of selection bias (Sataloff et al., 2021). Moreover, by employing concrete and transparent inclusion and exclusion criteria, a SLR can ensure that high-quality, relevant literature is included in the final analysis. Additionally, with a standardised assessment of the methodological quality of the included studies, drawn inferences can be further differentiated and evaluated for their validity and reliability (Tod et al., 2021).

### **2.2. Search Strategy**

On April 3rd, 2023, a comprehensive search was conducted on the databases PubMed, Scopus, Web of Science, and PsycINFO. The filters of the databases were used to select articles that were published from 2003 onwards and that were available in English. Furthermore, to ensure that articles would be found that are relevant for answering the research questions, a search query was created. This was done by compiling terms closely related to, or synonymous to lucid dreaming and lucid dreaming therapy as well as terms relating to well-being. In this



regard, the different types of well-being were included as well as their subcomponents and synonyms. The exact terms were collected during the initial literature search. The following search query was created:

("lucid dreaming" OR "lucid dreaming therapy" OR "conscious dreaming" OR "lucid dream therapy" OR "lucid dream induction therapy" OR "dream lucidity" OR "lucid dreams" OR "consciousness in dreams" OR "lucid dream") AND ("well-being" OR "hedonic well-being" OR "subjective well-being" OR "life satisfaction" OR "positive affect" OR "negative affect" OR "eudaimonic well-being" OR "personal meaning" OR "purpose" OR "personal growth" OR "self-discovery" OR "self-development" OR "psychological well-being" OR "waking mood")

The search query was applied to the articles' titles, abstracts, and keywords. This was ensured by selecting the respective search fields on the databases. One exception was PubMed, where the search fields had to be integrated into the search query (see Appendix A).

### **2.3. Study Screening**

The study screening and deduplication process was conducted using Covidence (<https://covidence.org>), a platform specifically designed to facilitate transparent and systematic article screening. Titles and abstracts of retrieved articles were initially screened to assess their relevance to the research question and their alignment with the predefined inclusion criteria. This screening process was guided by the PICO (Population, Intervention, Comparison, Outcome) framework, ensuring a structured and comprehensive evaluation of the articles (Eriksen & Frandsen, 2018).

Articles were thus selected if they included a population of individuals with prior lucid dreaming experience or individuals that underwent lucid dreaming induction training as part of the study. Moreover, both healthy populations and populations with mental illness were included. With the inclusion of all research methodologies, articles with and without lucid dream induction interventions were included as for example in cross-sectional studies there is no intervention besides prior lucid dreaming experience.

For the inclusion criteria concerning the comparison aspect of the PICO framework, articles were included if they provided any insight into the relationship between lucid dreaming and well-being. This included studies with within or between group comparisons with lucid dreaming as the independent variable and well-being (or a subconstruct) as the dependent

variable. However, this also included qualitative studies that just asked for participants' self-perceived effects of lucid dreaming on their well-being.

Lastly, pertaining the outcome aspect of the PICO framework, articles were included if they investigated the relationship between lucid dreaming and hedonic, subjective, eudaimonic or psychological well-being. This also included articles that did not directly investigate these types of well-being but provided insights on the relationship between lucid dreaming and subcomponents of the aforementioned types of well-being.

Following the initial screening, the full text of the selected articles was thoroughly assessed to determine their relevance and eligibility for inclusion in the final analysis. This process was also guided by the PICO guidelines. The screening process was performed by a single researcher.

#### **2.4. Data Extraction**

To systematically extract the data from the final selection of articles, a data extraction form was created (see Appendix B), which was used to collect and organise the relevant information from the selected studies. Data was extracted concerning the study characteristics, which include the reference, study design, sample characteristics, outcome measures and main results. Each of these characteristics was included in separate columns (see Table 1). In terms of sample characteristics, information on the mental health status and the level of prior lucid dreaming experience was collected. For the outcome measures, columns were included for lucid dreaming constructs, such as lucid dreaming frequency or lucid dreaming intensity and well-being constructs. The well-being constructs were further divided into two categories, hedonic/subjective well-being, and eudaimonic/psychological well-being. Here, the well-being operationalisations or well-being subconstructs that were investigated in the articles were collected.

#### **2.5. Quality Assessment of Included studies**

For the quality assessment of the included articles, the JBI critical appraisal tools were used (Joanna Briggs Institute, 2020). The JBI critical appraisal tools are a comprehensive set of questions for assessing the quality and validity of published research articles. Covering a wide range of study designs the JBI critical appraisal tools serve the purpose of evaluating the risk of bias of the included studies which contributes to determining their internal validity and reliability. For the present study, the checklists for cross-sectional studies, randomised controlled trials, qualitative research and quasi-experimental studies were used.

Among all JBI checklists, each item can be answered with “Yes”, “No”, “Unclear” or “Not applicable”. The total number of items answered with “Yes” in relation to the number of items for a specific checklist will determine the qualitative rating of the studies. Thus, for example, a checklist with eight items, such as the checklist for cross-sectional studies can maximally get a scoring of eight.

To make generalisable statements about the quality of the articles, the number of items rated with “Yes” was divided by the total number of items which resulted in a percentage score depicting the quality of each article. Articles with a rating between 100% to 80% of items being sufficient were rated to be of “good” quality, articles with a rating between 80% to 60% were considered to be of “moderate” quality and articles rated with a score of below 60% were considered to be of “poor” quality.

The qualitative assessment of the individual articles with the ratings for the items was collected in Table 2.

## **2.6. Data Synthesis**

The raw data collected in Table 1 was clustered into four subgroups. Firstly, this entailed collecting all study findings that could provide insight into associations between lucid dreaming and hedonic and subjective well-being. Secondly, in the same way, information was collected that could provide insight into associations between lucid dreaming and eudaimonic and psychological well-being. The third category related to study findings on participants’ self-perceived effect of lucid dreaming on well-being, where well-being was measured by a single item and could not be attributed to either hedonic/subjective or eudaimonic/psychological well-being. Lastly, the fourth category of information entailed information on possible underlying mechanisms and moderators to the relationship between LD and well-being.

The next step was to further differentiate the well-being constructs that were included in the articles. These, when applicable included either the well-being constructs themselves or a corresponding subcomponent that was included in the study, for example, if a study measured positive affect, it was put in the hedonic/subjective well-being category. In addition to this, the lucid dreaming operationalization was considered to further differentiate the findings. Based on the data synthesis, the included studies could be categorized into three groups: those that provided evidence for a relationship between lucid dreaming and a specific type of well-being, those that found no evidence for a relationship, and those that reported conflicting evidence.

Moreover, the fourth category of information drawn from the articles related to the second research question about underlying mechanisms and moderators of the relationship between lucid dreaming and well-being. These were either directly reported in the articles, or they were inferred from the available data, in the case of which the inference and interpretation process was further elaborated. In addition to this, the identified underlying mechanisms and moderators were connected to a specific type of well-being.

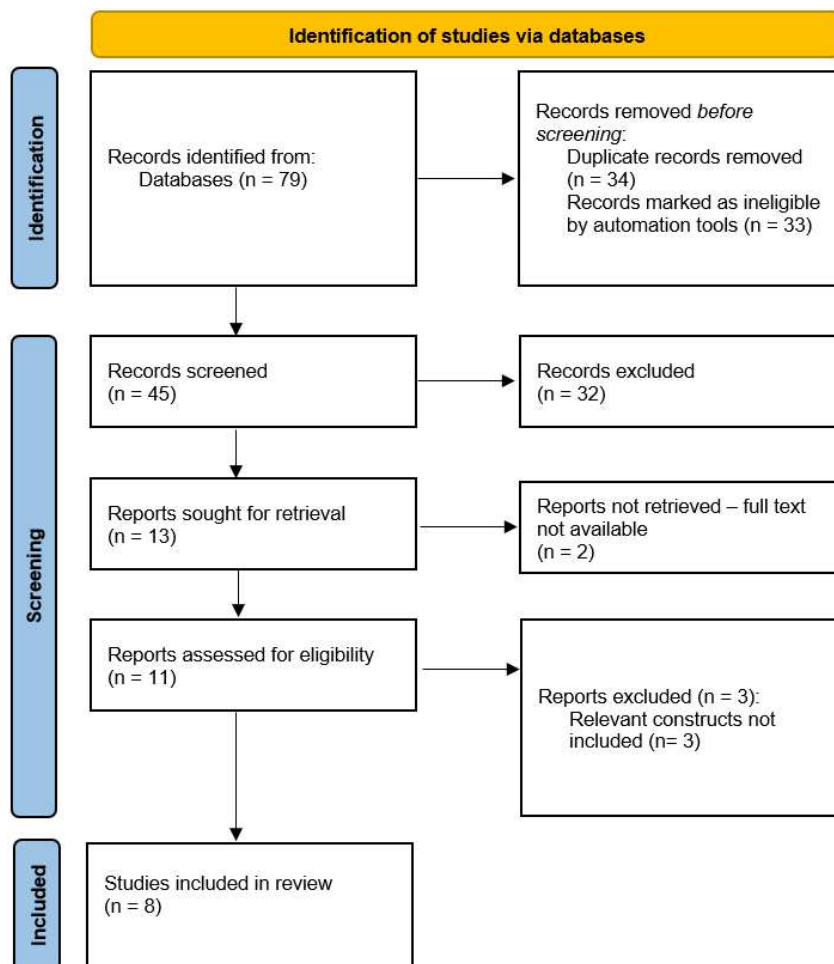
### **3. Results**

#### **3.1. Literature Search and Excluded Studies**

The comprehensive literature search resulted in 79 initial articles, which after deduplication were reduced to 45 articles for screening of titles and abstracts. During the review process, a total of 32 articles were excluded as they did not meet the inclusion criteria.

This left 13 articles that were sought for retrieval, of which two articles were excluded because they were not obtainable as full text. The full texts of the resulting 11 articles were then screened. Here, three articles did not meet the inclusion criteria as they did not investigate the relationship between lucid dreaming and well-being as defined.

A comprehensive overview of the selection process can be found in Figure 1.

**Figure 1***Flow chart for the identification of studies*

### 3.2. Characteristics of the Included Studies

Consequently, eight articles were left for the final analysis. These were five cross-sectional online surveys and one randomised controlled trial. Moreover, one article was a pre-experimental study, which is a research design lacking randomization or control groups (Thyer, 2012). Lastly, one article employed an explanatory sequential mixed methods design, which combines both quantitative and qualitative methods with the quantitative data collection preceding a qualitative investigation for further insight (Toyon, 2021).

The sample sizes ranged from 20 to 528 participants and sum up to a total of 1,877 participants. The mental health condition of the sample was not specified in seven articles (see Table 1), whereas in one article the sample consisted of both healthy individuals and individuals who had experienced depression. In terms of the sample's prior LD experience, five articles reported LD experiences among 75% (lowest) to 94% (highest) of the sample. One

study reported all participants to have had LD experience and two studies reported mixed LD experience among the sample but did not specify.

Coming to the measured constructs pertaining to lucid dreaming, six studies exclusively measured LD frequency, one study additionally measured LD intensity and one study measured LD frequency and LD intensity in a combined construct. For LD frequency, five of the articles used an eight-point scale developed by Stumbrys et al. (2013), one asked for LDs daily, and one measured it along with LD intensity with the Frequency and Intensity of Lucid Dreams scale (FILD; Aviram & Soffer-Dudek, 2018).

Regarding the well-being constructs, seven articles in the review measured hedonic or subjective well-being either directly or indirectly. For the articles that measured hedonic or subjective well-being directly, two cross-sectional studies were identified, which both employed the Short Warwick-Edinburgh Mental Well-being Scale (SWEMWBS) (Stumbrys & Jones, 2014; Stumbrys, 2023). This scale is designed to measure a combined well-being construct that includes both hedonic and eudaimonic well-being. Five of seven articles measuring hedonic or subjective well-being looked at an indirect relationship by investigating a relationship between lucid dreaming and affect. These include Sackwild and Stumbrys (2021), who investigated depression severity with lucid dreaming frequency; Aviram and Soffer-Dudek (2018) investigating depression, anxiety and stress scores with lucid dream frequency and intensity, and two studies investigating a relationship between lucid dreaming and mood. Of these, Stocks et al. (2020) investigated mood in relation to a combined construct of lucid dream intensity and frequency and Stumbrys and Erlacher (2016) measured mood upon awakening in relationship to specific lucid dream applications. Lastly, Konkoly and Burke (2019) in a randomised controlled trial investigated the relationship between lucid dreaming frequency and stress, and additionally life satisfaction.

Regarding eudaimonic and psychological well-being, four studies were identified that provide insight into this relationship: Both Stumbrys (2023) and Stumbrys and Jones (2014) involved eudaimonic well-being by employing the SWEMWBS. However, Stumbrys and Jones (2014) additionally investigated psychological well-being with Ryff's Scale of Psychological Well-being (Ryff, 1989). The other two studies providing insight into the relationship between lucid dreaming and eudaimonic or psychological well-being include Sackwild and Stumbrys (2021), who investigated participants' perceived impact of lucid dreaming on depression and Stumbrys and Erlacher (2016) who investigated possible lucid dreaming applications.

Besides hedonic/subjective and eudaimonic/psychological well-being, Erlacher et al. (2020) included a single-item question asking for the participants' perceived impact of lucid dreaming on their mental well-being. This operationalization did not fit the predefined well-being definition but still provided insight into perceived effects wherefore it was still included.

Additionally, it is important to note that four researchers were involved in more than one of the included articles. In this regard, Stumbrys was involved in five of the eight included articles and Erlacher, Schredl and Konkoly were involved in two articles. For a comprehensive overview of the individual studies' designs, samples, constructs, main results, and quality see Table 1.

**Table 1**

*Characteristics and findings of the Included studies*

Reference	Study design	Sample Mental health (LD experience)	LD constructs (measure)	Well-being construct (measure)		Main results (effect sizes)	Quality (%)
				HWB & SWB	EWB & PWB		
Aviram and Soffer-Dudek (2018)	Cross-sectional design: online questionnaire	N = 187 Mental health not specified (84% had LD experience)	LD frequency & intensity (FILD*)	<u>Negative affect:</u> Depression (BDI), anxiety (BAI), stress (PSS)		<u>LD frequency</u> <ul style="list-style-type: none"> <li>- Non-significant relationship with depression scores</li> <li>- Non-significant relationship with anxiety scores</li> <li>- Non-significant relationship with stress scores</li> </ul> <u>LD intensity</u> <ul style="list-style-type: none"> <li>- Significant negative relationship with depression scores (r = -0.18, p &lt; 0.05)</li> <li>- Significant negative relationship with anxiety scores (r = -0.24, p &lt; 0.01)</li> <li>- Significant negative relationship with stress scores (r = -0.22, p &lt; 0.01)</li> </ul>	8/8 (100%) good
Erlacher et al. (2020)	Cross-sectional design: Online questionnaire	N = 386 Mental health not specified (all had LD experience)	LD frequency (8-point scale*)	Perceived mental well-being* (one item*)	Perceived mental well-being* (one item*)	<ul style="list-style-type: none"> <li>- Perceived positive relationship between LD frequency and mental well-being                             <ul style="list-style-type: none"> <li>- Item: I believe that LDs have contributed to my mental well-being                                     <ul style="list-style-type: none"> <li>- Strongly agree: 38.8%</li> <li>- Partly agree: 42.5%</li> <li>- Partly disagree: 12.3%</li> <li>- Strongly disagree: 6.4%</li> </ul> </li> </ul> </li> </ul>	5/8 (62,5%) moderate



Konkoly and Burke (2019)	Randomised controlled trial (4 weeks) (three groups): LD training group (MILD), journaling and mindfulness group and control group 5 weeks between pre and post measures	N = 32 Mental health not specified (mixed LD experience, not specified)	LD frequency (reporting LDs daily)	<u>Negative affect:</u> Perceived stress (PSS-4)  Life satisfaction (SWLS)	<u>Between groups</u> - No differences between groups from pre- to post-test for satisfaction with life & perceived stress  <u>Within group (LD training):</u> - Non-significant relationship between LD frequency and distress - Significant positive relationship between LD frequency and life satisfaction (b = 0.16, p < .001) <ul style="list-style-type: none"> <li>- relationship moderated by baseline life satisfaction                             <ul style="list-style-type: none"> <li>- Higher baseline life satisfaction strengthened the effect of LD on life satisfaction (b = 0.26, p &lt; .005)</li> <li>- Non-significant relationship between LD frequency and life satisfaction for low baseline life satisfaction</li> </ul> </li> </ul>	6/12 (50%) poor
Sackwild and Stumbrys (2021)	explanatory sequential mixed methods design: Quantitative data from survey Qualitative data from interview	<u>Quantitative:</u> N = 163 Mixed mental health (93.9% had LD before)  <u>Qualitative:</u> N= 6 Past experience with depression (All had LD experience)	LD frequency (8-point scale)	<u>Negative affect:</u> Depression severity (PHQ-8), Perceived impact of LD on depression (open ended questions)	<u>Survey:</u> - Non-significant relationship between LD frequency and depression severity - Perceived negative relationship between LD frequency and depression severity (measured participants' perception) <ul style="list-style-type: none"> <li>- 65% agreed or strongly agreed that lucid dreaming helped with feelings of depression</li> </ul> <u>Interviews:</u> - Three themes how participants perceived LD helped with depression: <ul style="list-style-type: none"> <li>- Self- exploration                             <ul style="list-style-type: none"> <li>- Experiencing new emotions</li> <li>- Speaking with conscious dream characters and parts of the self</li> <li>- Re-writing depressive thought patterns</li> </ul> </li> <li>- Creativity &amp; empowerment                             <ul style="list-style-type: none"> <li>- Fun and Freedom (pleasurable experiences)</li> <li>- Problem solving techniques</li> <li>- Goals and Achievements</li> <li>- Inspiration and Integration</li> </ul> </li> <li>- Spiritual &amp; transpersonal                             <ul style="list-style-type: none"> <li>- Mindfulness and Meditation                                     <ul style="list-style-type: none"> <li>- Deepening of spiritual and meditation practices</li> </ul> </li> <li>- Mantras, messages &amp; magic</li> <li>- Healing and transformation</li> </ul> </li> </ul>	8/10 (80%) good

Stocks et al. (2020)	Pre-experimental study: LD induction training Online dream diary for one week Lucidity questionnaire	N = 20 Mental health not specified (Mixed LD experience pre intervention, After intervention participants with no LD were excluded)	LD frequency & intensity combined into one construct called lucidity (composite of DLQ & LUSK)	<u>Negative affect:</u> Waking mood (PANAS)  <u>Positive affect:</u> Waking mood (PANAS)	<u>Between groups (high vs low lucidity groups):</u> - Significant positive relationship between lucidity and positive waking mood ( $r = 0.65, p < 0.05$ )  <u>Within subjects' comparison (high lucidity night vs low lucidity night)</u> - Significant positive relationship between high night lucidity and positive waking mood ( $r = 0.68, p < 0.05$ )	7/9 (77,78%) moderate
Stumbrys (2023)	Cross-sectional design: Online questionnaire Open ended questions (perceived negative consequences on waking life)	N = 489 Mental health not specified (93.9% had LD experience)	LD frequency (8-point scale)	Mental well-being (SWEMBS)	- Significant positive relationship between LD frequency and mental well-being (eudaimonic + hedonic) (Spearman's rho = 0.19, $p < 0.05$ ) - LDs that were induced deliberately (as opposed to spontaneous LDs) were positively associated with mental well-being (Spearman's rho = 0.144, $p < 0.05$ ) - 78.6% of participants have not observed or reported negative effects of LD on waking life - Of reported adverse events: more prominent ones: tiredness/sleep quality, addictiveness of the experience, blurring dreaming/waking boundaries, persistent emotional influence	4/8 (50%) poor
Stumbrys and Erlacher (2016)	Cross-sectional design: Online questionnaire	N = 528 Mental health not specified (73.1% had LD experience)	LD frequency( 8 point scale), LD application (choosing from 7 categories)	<u>Negative Affect</u> Perceived mood upon awakening as consequence of type of LD application (5- point scale)  <u>Positive affect</u> Perceived mood upon	<u>Lucid dream applications and corresponding mood upon awakening on Likert scale (1 very positive to 5 very negative)</u> - 42.8% of lucid dreams were used for wish fulfilment - Mood upon awakening: M = 1.8, SD = 0.8 - 14.5% of lucid dreams were used for solving waking problems - Mood upon awakening: M = 1.9, SD = 0.8 - 10.8% of lucid dreams were used for overcoming fears/nightmares - Mood upon awakening: M = 2.2, SD = 0.9 - 8.1% of lucid dreams were used for spiritual experiences - Mood upon awakening: M = 2.1, SD = 0.9 - 6.5% of lucid dreams were used for physical/mental healing	4/8 (50%) poor

				awakening as consequence of LD application (5-point scale)		<ul style="list-style-type: none"> <li>- Mood upon awakening: M = 2.2, SD = 0.9</li> <li>- 4.2% of lucid dreams were used for training motor skills                             <ul style="list-style-type: none"> <li>- Mood upon awakening: M = 2.3, SD = 0.7</li> </ul> </li> <li>- 1.3% of lucid dreams were used for meditation                             <ul style="list-style-type: none"> <li>- Mood upon awakening: M = 2.3, SD = 1.1</li> </ul> </li> </ul>	
Stumbrys and Jones (2014)	Cross-sectional design: Online questionnaire	N = 72 Mental health not specified (75% had LD experience)	LD frequency (8-point scale)	Mental well- being (SWEMBS)	Mental well- being (SWEMBS)	<ul style="list-style-type: none"> <li>- Non-significant relationship between LD frequency and psychological well-being</li> <li>- Non-significant relationship between LD frequency and mental well-being (eudaimonic + hedonic)</li> </ul>	5/8 (62,5%) moderate
					Psychological well-being (RPWB)		

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Note. \*HWB (Hedonic well-being), \*SWB (Subjective well-being), \*EWB (Eudaimonic well-being), \*PWB (Psychological well-being) \*FILD (Frequency and Intensity of Lucid Dreams Questionnaire), \*BDI (Becks Depression Inventory), \*BAI (Becks Anxiety Inventory), \*PSS (Perceived Stress Scale), \*8-point scale “How often do you experience lucid dreams?” (0 = never, 1 = less than once a year, 2 = about once a year, 3 = about 2-4 times a year, 4 = about once a month, 5 = 2-3 times a month, 6 = about once a week and 7 = several times a week), \*one item (“I believe that my lucid dreams have contributed to my mental well-being.”), \*PSS-4 (Four-item Short Form of the Perceived Stress Scale), \*SWLS (Satisfaction with Life Scale), \*PHQ-8 (depression module of Patient Health Questionnaire), \*PANAS (Positive and Negative Affect Schedule), \*DLQ (Dream Lucidity Questionnaire), \*LUSK (Lucid Skills Questionnaire).

### **3.3. Methodological Quality**

In sum, the included articles fulfilled the methodological quality as assessed by the JBI critical appraisal tools for 66,2% of the items which correspond to a moderate overall quality of the articles. The individual scores on the JBI critical appraisal tools alongside the scoring on the individual items can be found in Table 2. In this regard, the lowest rating of an article was 50% and the highest rating was 100%. Overall, there were two articles with good methodological quality, three with moderate quality and three with poor quality (see Table 2).

Most of the articles were cross-sectional studies which have inherent limitations of controlling for confounding factors, this is also reflected in the scorings for item 5 about the identification of confounding factors of the JBI critical appraisal tool for cross-sectional studies, as three out of five articles were considered insufficient on this item (see Table 2). As for the rating of the cross-sectional studies, one had a good rating, two had a moderate rating and two had a poor rating.

On the other hand, only one article was a randomised controlled trial, which is seen as the gold standard for effectiveness research. However, this article was rated to be of poor methodological quality, as it showed risk for bias related to administration of the intervention, potential bias related to group allocation, high dropout, and lack of clarity in the statistical analysis.

The quasi-experimental study that was included was rated to be of moderate quality with 77.78% of the items rated as sufficient and lastly, the qualitative article had a good rating overall with 80% of items rated as sufficient.

**Table 2***Qualitative appraisal of the included studies*

Reference	Checklist used	Item number of the selected checklist												Total score (%) rating	
		1	2	3	4	5	6	7	8	9	10	11	12		
Aviram & Soffer-Dudek (2018)	Cross-sectional studies*	Y*	Y	Y	Y	Y	Y	Y	Y	Y					8/8 (100%) good
Erlacher et al. (2020)	Cross-sectional studies	Y	Y	U*	N*	Y	Y	N	Y						5/8 (62,5%) moderate
Konkoly and Burke (2019)	Randomised controlled trials*	Y	U	Y	U	N	Y	U	Y	Y	N	Y	U		6/12 (50%) poor
Sackwild and Stumbrys (2021)	Qualitative Research*	Y	Y	Y	Y	Y	N	U	Y	Y	Y				8/10 (80%) good
Stocks et al. (2020)	Quasi-Experimental studies*	Y	Y	Y	N	Y	N.a*	Y	Y	Y					7/9 (77,78%) moderate
Stumbrys (2023)	Cross-sectional studies	Y	Y	Y	N	N	N.a	N	N						4/8 (50%) poor
Stumbrys and Erlacher (2016)	Cross-sectional studies	Y	Y	U	Y	N	N.a	U	Y						4/8 (50%) poor
Stumbrys & Jones (2014)	Cross-sectional studies	Y	Y	U	Y	N	N.a	Y	Y						5/8 (62,5%) moderate

*Note.* All checklists used were designed by the Joanna Briggs Institute. \*Cross-sectional studies (8 items), \*Randomised controlled trials (12 items),

\*Qualitative Research (10 items), \*Quasi-Experimental studies (9 items). \*Y = Yes, \*N = No, \*U = Unclear, \*N.a = Not applicable

### **3.4. Results Lucid Dreaming and Hedonic and Subjective Well-Being**

Seven of the included studies provided insight into the relationship between LD and hedonic and subjective well-being. In this regard, three articles exclusively found evidence for a positive relationship between LD and subjective/hedonic well-being, three articles found mixed evidence, and one study exclusively found no relationship between LD and subjective well-being.

Of the three articles that found evidence for a relationship between LD and hedonic/subjective well-being, Stumbrys (2023), in a cross-sectional study found a positive relationship between LD frequency and scores on the SWEMBS, which combines hedonic with eudaimonic well-being. Additionally, they found that this effect was moderated by the deliberacy of the LD induction. This indicates that LDs that were induced with active intention brought about a more positive change in well-being as opposed to lucid dreams that happened spontaneously with no intention. Besides, Stocks et al. (2020) found in a pre-experimental study with LD induction training that between groups, individuals with higher LD frequency and intensity showed more positive waking mood. In addition to this, for the within-group comparison, they found that higher lucidity nights had a more positive impact on positive waking mood the following morning than lower lucidity nights. Here, lucidity relates to a construct combining both LD frequency and intensity.

Lastly, Stumbrys and Erlacher (2016) found that specific lucid dreaming applications are especially beneficial to mood upon awakening, with wish fulfilment being the most beneficial application.

Three of the seven articles providing insight into the relationship between LD and hedonic and subjective well-being found mixed evidence. "Mixed evidence" refers to findings that are not consistently supportive or contradictory regarding the relationship between LD and well-being. In this regard, Aviram and Soffer-Dudek (2018), showed in a cross-sectional study that LD frequency does not significantly correlate with depression, anxiety, and stress. However, they found that LD intensity significantly negatively correlates with depression, anxiety, and stress. Then, Konkoly and Burke (2019) in a randomised controlled trial found no differences in life satisfaction and perceived stress between individuals undergoing LD induction training and a control group. Moreover, for the within-group analysis of the LD induction group, they found a non-significant relationship between LD frequency and distress but a significant positive relationship between LD frequency and life satisfaction with baseline life satisfaction as a moderator. Thus individuals who started with higher life satisfaction experienced a more positive impact on their life satisfaction than individuals with lower

baseline life satisfaction. The last study providing mixed evidence was a mixed methods study by Sackwild and Stumbrys (2021). They found a non-significant relationship between LD frequency and depression severity, which is contrasted by the finding that 65% of participants agreed that LD helped with feelings of depression.

Only one study investigating the relationship between LD and hedonic well-being exclusively revealed a non-significant relationship. In this regard, Stumbrys and Jones (2014) in a cross-sectional study found a non-significant relationship between LD frequency and scores on the SWEMBS. This again measures hedonic alongside eudaimonic well-being.

Overall, it can be concluded that the evidence for a positive relationship between LD and well-being outweighs the evidence that suggests there is no relationship. Nonetheless, most of these findings are based on an aspect of affect, which limits the generalizability of the findings on hedonic or subjective well-being as whole constructs.

### **3.5. Results Lucid Dreaming and Eudaimonic and Psychological Well-Being**

Four articles were identified that provided insights into the relationship between lucid dreaming and eudaimonic and psychological well-being. For this, two studies delivered quantitative data by employing the SWEMWBS, which includes a combined construct of hedonic and eudaimonic well-being. Thus, Stumbrys (2023) in a cross-sectional study found a significant positive relationship between LD frequency and scores on the SWEMWBS. Stumbrys and Jones (2014) on the other hand found a non-significant relationship between LD frequency and scores on the SWEMWBS. Furthermore, they also found a non-significant relationship between LD frequency and psychological well-being. Consequently, there is conflicting evidence for the quantitative data on the relationship between LD and eudaimonic/psychological well-being.

However, two studies provided qualitative insight that supports a relationship between LD and eudaimonic well-being. Here, Sackwild and Stumbrys (2021) asked participants who had experienced depression how LD helped, and they revealed that LD among others (see Table 1) helped by providing a ground for self-exploration and creativity & empowerment. This is relatable to personal growth, autonomy and self-development which are basic components of both eudaimonic and psychological well-being. Another study by Stumbrys and Erlacher (2016), asked for LD applications and found among others that LDs were used for solving waking problems & spiritual experiences, which both can be attributed to both eudaimonic and psychological well-being.

### 3.6. Results Lucid Dreaming and Perceived Well-being

Erlacher et al. (2020) measured perceived impact of LD on mental well-being, employing a single item: “I believe that LDs have contributed to my mental well-being”. This does not fit either the definition of hedonic/subjective well-being or eudaimonic/psychological well-being. Nonetheless, 38.8% of participants strongly agreed with the statement, 42.5% partly agreed, 12.3% partly disagreed and 6.4% strongly disagreed. Therefore, it provides evidence that participants themselves perceive LD to contribute to mental well-being in their own estimation.

### 3.7. Possible Moderators and Underlying Mechanisms

In answer to the second research question, three possible moderators of the relationship between lucid dreaming and well-being have been identified: life satisfaction, the deliberacy of LD induction, LD operationalisation. Additionally, one possible mediator was identified that related to the themes of LD applications.

For the first moderator, Konkoly and Burke (2019) in a randomised controlled trial found baseline life satisfaction to moderate the relationship between LD and life satisfaction. Lucid dream induction training only increased participants’ life satisfaction when they had higher levels of life satisfaction at baseline.

Concerning the second possible moderator, Stumbrys (2023) found in a cross-sectional study that LD frequency correlated with mental well-being (measured by the SWEMBS) when the LDs occurred deliberately as opposed to spontaneously. However, it should be acknowledged that this study did not run any moderation analyses. Instead, this finding resulted from a group comparison between individuals that scored low on a five-point- Likert scale measuring deliberacy of lucid dreams (ranging from spontaneous to deliberate) and individuals that scored high on this scale.

The third possible moderator refers to the operationalisation of LD. In this regard, Aviram and Soffer-Dudek (2018) in a cross-sectional study found LD intensity to negatively correlate with depression, anxiety, and stress, however, they did not find this effect for LD frequency. Although, not based on a moderation analysis, this hints at a possible moderation effect of the LD operationalisation on the effect of LD on depression, anxiety and stress, or thus negative affect.

Lastly, the specific ways in which lucid dreaming is applied (LD application) has been recognized as a potential factor that can influence the impact of lucid dreaming on well-being. Stumbrys and Erlacher (2016) investigated various applications of lucid dreaming and their effects on mood upon awakening. The findings revealed that the application of lucid dreaming



had a notable influence on mood, indicating that different lucid dreaming practices can yield different outcomes in terms of well-being. Wish fulfilment was thus shown to be the most beneficial to mood upon awakening whereas meditation was associated with the lowest scores for mood upon awakening. However, it should be noted that specifics to the LD applications were not mentioned in the study, wherefore in this case, what the participants understood as meditation for example is unclear. Stumbrys and Erlacher (2016) also found gender differences in regard to the application of LDs, as men tend to use LDs for wish fulfilment and meditation, and women for overcoming fear and nightmares and healing. Thus, this gender difference in LD application, might also bring about gender differences for the effect of LD on well-being.

In addition to the identified moderators, there is evidence suggesting a potential mediation effect of the themes of lucid dreaming applications on the relationship between lucid dreaming and well-being. The qualitative analysis conducted by Sackwild and Stumbrys (2021) explored lucid dreamers' accounts of how lucid dreaming helped them overcome depression. The findings indicated certain themes of lucid dreaming applications, namely self-exploration, creativity and empowerment, and spiritual and transpersonal experiences, which thus may play a mediating role in influencing the impact of lucid dreaming on well-being (see Table 1 for more detail). This suggests that lucid dreaming might be connected to well-being through these self-explorative, creative, or spiritual/ transpersonal experiences. However, these findings are based on a sample that has experienced depression.

## **4. Discussion**

### **4.1. Main Findings**

The aim of this systematic literature review was to fill the gap for a comprehensive overview of the current state of research concerning the relationship between lucid dreaming and well-being. Pertaining the first research question, the findings provide evidence for a positive relationship between lucid dreaming and hedonic and subjective well-being as lucid dreaming has been shown to increase positive emotion and mood. Besides, for eudaimonic and psychological well-being, the articles included provided limited quantitative evidence. However, qualitative findings on this relationship revealed self-exploration, creativity, and spiritual experiences as possible pathways through which lucid dreaming might enhance eudaimonic and psychological well-being.

Thus, regarding hedonic and subjective well-being the results indicate a positive association with lucid dreaming. Especially, the findings suggest that engaging in lucid dreaming experiences may contribute to positive affect and improved mood, enhancing one's overall well-being and emotional state. This has implications for individuals seeking to enhance

their subjective well-being and cultivate positive emotions. Moreover, the link between lucid dreaming and hedonic and subjective well-being aligns with the broader literature and scientific consensus on the potential benefits of lucid dreaming for mental health (Stocks et al. 2020). It supports the idea that lucid dreaming can be a valuable tool for individuals looking to improve their emotional well-being and enhance their overall life satisfaction. These findings also highlight the potential therapeutic applications of lucid dreaming in promoting positive affect and mood regulation. Lucid dreaming techniques could be integrated into interventions targeting individuals experiencing emotional distress, such as those with mood disorders or anxiety. Nonetheless, future research is needed to test these theoretical connections. However, by harnessing the positive affect associated with lucid dreaming, it may be possible to develop innovative therapeutic approaches to improve subjective well-being and enhance mental health outcomes. In the context of the continuity hypothesis, this suggests that the positive affect and improved mood experienced in lucid dreams might extend beyond the dream state and contribute to individuals' overall well-being and emotional functioning in daily life (Schredl, 2012). It underscores the potential for lucid dreaming to serve as a pathway for individuals seeking to improve their subjective well-being, cultivate positive emotions, and enhance their overall life satisfaction.

In terms of the relationship between lucid dreaming and eudaimonic and psychological well-being, there was limited, mixed evidence. Of the two quantitative studies on this relationship, one study did not find a significant relationship and one found a significant relationship between the variables. Thus, with these mixed findings and the low number of articles quantitatively investigating this relationship, no concrete statement on the relationship between lucid dreaming and eudaimonic and psychological well-being can be inferred. Nonetheless, the qualitative evidence suggested that lucid dreaming can act as a platform for self-explorative, creative, spiritual, and transcendental experiences. These themes of lucid dream applications, thus might mediate the effect of lucid dreaming on eudaimonic and psychological well-being. Self-exploration through lucid dreaming might enable individuals to delve into their inner selves, explore emotions, beliefs, and values, and gain a deeper understanding of their identity and personal growth, which aligns with the subconstruct of eudaimonic well-being. This connects to the framework of Jungian Analytical Psychology, with its emphasis on harmonizing and unifying various aspects of the self to achieve a sense of wholeness (Jung, 1958). This process called psychological integration, could be facilitated by certain applications of lucid dreaming. In this regard, Sackwild and Stumbrys (2021) have found that one application of using lucid dreaming for self-exploration entails talking to dream

characters. From the perspective of Jungian Psychology and considering the view that dreaming is an encounter with the unconscious, the process of speaking to dream characters in lucid dreams could be seen as a means of engaging with different aspects of the self and thus facilitating the process of psychological integration. Moreover, besides self-exploration, lucid dreaming enables individuals to engage in imaginative and creative experiences which in turn have been related to eudaimonic well-being (Acar et al., 2020). Lastly, lucid dreaming creates a space for spiritual and transpersonal experiences, which before were shown to correlate with psychological well-being (Božek et al., 2020).

In answer to the second research question, this review identified potential moderators of the relationship between lucid dreaming and well-being: life satisfaction, deliberacy of LD induction and LD operationalisation. Furthermore, the single potential underlying mechanism that has been identified relates to the LD application. Life satisfaction thus has been shown to moderate the effect lucid dreaming has on life satisfaction and consequently hedonic and subjective well-being (Konkoly & Burke, 2019). This means individuals with higher baseline levels of life satisfaction might be able to increase their life satisfaction through lucid dreaming even more than individuals who have lower levels of life satisfaction at baseline. Secondly, identified as a possible moderator was the deliberacy of LD induction. Consequently, lucid dreaming might bring greater increases in well-being if lucid dreams are experienced as a consequence of deliberate induction as opposed to spontaneously occurring lucid dreams which did not show a positive effect on well-being (Stumbrys, 2023). Deliberacy of LD induction specifically, might thus be an important moderator that could potentially explain the notion that lucid dreams can have adverse effects on individuals suffering from dissociative disorders as here lucid dreams mostly occur spontaneously (Voss et al., 2018). LD operationalisation has been identified as the third possible moderator, which is based on the finding that LD intensity negatively correlates with negative affect but not LD frequency (Aviram & Soffer-Dudek, 2018). This suggests that the way lucid dreaming is operationalised and measured might change the effect that is observed in a given study. Moreover, this also indicates that the intensity of lucid dreams might play a role in explaining the effect lucid dreams have on well-being. Lastly, LD application was identified as a possible underlying mechanism to the effect lucid dreams have on well-being. This means that the specific way in which a lucid dream is applied, or the action that is undertaken in a lucid dream might determine the effect the lucid dream has on both eudaimonic/psychological and hedonic/subjective well-being (Stumbrys & Erlacher, 2016). Pertaining this, themes were identified that might further explain the pathway through which LD application might mediate the effect of lucid dreaming on well-being,

namely, self-exploration, creativity & empowerment and spiritual & transpersonal (Sackwild & Stumbrys (2021).

Taken together, the findings support the existing theory that lucid dreaming holds the potential to positively impact firstly hedonic and subjective well-being and secondly eudaimonic and psychological well-being. Furthermore, this systematic literature review brings implications for lucid dreaming in various domains. For clinical populations, lucid dreaming therapy has shown promise in reducing nightmare frequency and enhancing sleep quality (Mallett et al., 2022). However, the potential therapeutic benefits of lucid dreaming extend beyond nightmare treatment and may have implications for other psychological disorders such as depression and anxiety. Additionally, lucid dreaming offers opportunities for self-exploration, creative problem-solving, and personal growth (Sackwild & Stumbrys, 2021; Stumbrys & Erlacher, 2016). Within the two-dimensional model of well-being, this elicits the potential of lucid dreams to benefit both the treatment of psychopathology and the facilitation of positive mental health and flourishing (Keyes, 2002). An understanding of the practical applications of lucid dreams can guide the development of targeted interventions and inform therapeutic practices. Overall, the findings underscore the complexity and nuances in the relationship between lucid dreaming and well-being. More research is needed to understand the effectiveness and nature of treatment protocols utilising lucid dreaming.

#### **4.2. Limitations**

Several limitations to this study that are to be acknowledged.

Firstly, this review found a lack of research specifically investigating the relationship between lucid dreaming and eudaimonic well-being. Only two studies examined eudaimonic well-being and only did so in a combined construct with hedonic well-being. Although this is an important finding, it limits the interpretations of the relationship between LD and eudaimonic well-being to the qualitative findings.

Secondly, the included studies strongly varied in terms of their study design, sample characteristics, and outcome measures. This methodological heterogeneity introduces potential variability in the results and limits the ability to defer any meta-analytic effect sizes.

The third limitation pertains to a limited specificity of well-being measures as many of the included studies used measures relating to subcomponents of well-being as opposed to the types of well-being in themselves. While these measures still provide insights into the relationship between LD and well-being, they do not capture the multidimensional nature of well-being.

Next, a potential bias in the included studies must be addressed. Firstly, a potential publication bias and secondly a bias concerning the interpretation of the individual findings. Both biases could impact the overall findings and may overestimate the relationship between lucid dreaming and well-being. Moreover, it is important to acknowledge that one researcher was involved in most of the included studies. This is problematic as it might skew the results of this literature review, due to potential bias through personal interest. Additionally, a potential conflict of interest might also lead to bias in these studies wherefore, the generalizability of these articles must be questioned. Moreover, four of the studies were included in the *International Journal of Dream Research*, which further increases risk of bias due to potential publication bias.

Lastly, as this research was conducted as a master's thesis there was just a single researcher involved in the screening of the articles and the data extraction. This goes against the standard procedure of SLRs of having at least two independent reviewers for the screening process (Mahtani et al., 2019). Having a single researcher limits the validity of the review in that certain studies might have been missed that could have changed the conclusions of the SLR. Moreover, with a single researcher, the risk of bias in study selection and data extraction is higher. There is also a higher risk of bias for the quality appraisal process. Additionally, reliability may also be compromised, as there is no compensation for errors in screening and data extraction. In terms of generalisability, it is to be said that with a single researcher, studies and information might have been missed that would have strengthened the generalisability of the findings.

#### **4.3. Future Research Recommendations**

Based on the findings and limitations of this review, recommendations for future research can be proposed that would further advance the understanding of the relationship between lucid dreaming and well-being.

Firstly, future research should investigate the impact of lucid dreaming on eudaimonic well-being. Although, this review found evidence supporting a positive relationship between lucid dreaming and well-being, there is a research gap concerning the specific impact of lucid dreaming on eudaimonic well-being as an independent construct. Additionally, it is also recommended to investigate the effects of lucid dreaming on subcomponents of eudaimonic well-being such as personal growth, self-concordance, purpose in life and autonomy. This would provide a more comprehensive understanding of how lucid dreaming contributes to eudaimonic well-being and its potential as a tool for self-discovery and personal fulfilment.

The second research recommendation relates to the role different lucid dream applications play for the relationship between lucid dreaming and well-being. Stumbrys and Erlacher (2016) have identified various popular lucid dreaming applications, such as wish fulfilment, overcoming nightmares, healing, and meditation. Future research should look deeper into how these applications impact well-being, expand on this, and include other possible lucid dreaming applications as well as study how differing lucid dream applications might benefit certain mental health disorders, over and above the treatment of nightmares. Thus, in line with the two-dimensional model of mental health, future research should also investigate routes of how lucid dreaming could be integrated to promote various markers of positive mental health and flourishing. Understanding the diverse applications of lucid dreaming could inform the development of targeted interventions and expand on the therapeutic potential of lucid dreaming.

Thirdly, future research should conduct moderation analyses to establish concrete effect sizes for the identified moderators on the relationship between lucid dreaming and well-being. Understanding how LD intensity, baseline life satisfaction, and deliberacy of LD induction influence the effects of lucid dreaming would provide valuable insights into how individual differences and contexts could impact the outcomes of lucid dreaming experiences.

Moreover, diverse populations with differing mental health conditions should be examined as most studies do not specify the mental health of the sample. This would contribute to the development of targeted interventions and provide valuable insight into the therapeutic potential of lucid dreaming in clinical populations.

An additionally important thing to consider in future research is the impact different LD induction techniques can have on well-being. Exploring the relationship between lucid dream induction methods, sleep quality, and well-being could provide insights into optimising the benefits of lucid dreaming for individuals' overall psychological health and well-being.

Lastly, as most of the studies on this relationship are cross-sectional studies, it is recommended to employ longitudinal designs to examine the effects of lucid dreaming over time and to run experimental studies such as randomised controlled trials. Moreover, studies that systematically evaluate the effects of lucid dreaming interventions on well-being would provide more robust evidence for potential therapeutic benefits.

#### **4.4. Conclusion**

To conclude, this systematic literature review provides a comprehensive overview of the relationship between lucid dreaming and well-being, highlighting the positive associations between lucid dreaming and hedonic and subjective well-being. The findings suggest that lucid

dreaming holds promise for promoting positive emotion, personal growth, self-exploration, creativity, and spiritual experiences. However, several research gaps and limitations were identified, calling for further investigation into the impact of lucid dreaming on eudaimonic well-being, the role of different lucid dream applications, the moderating factors, and the inclusion of diverse populations and longitudinal/experimental designs. By addressing these gaps, future research can advance understanding of the implications of lucid dreaming for well-being and uncover its full potential as a therapeutic tool and means of enhancing well-being.

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### Appendix A

#### Changed Search Query used for PubMed

("lucid dreaming"[Title/Abstract] OR "lucid dreaming therapy"[Title/Abstract] OR "conscious dreaming"[Title/Abstract] OR "lucid dream therapy"[Title/Abstract] OR "lucid dream induction therapy"[Title/Abstract] OR "dream lucidity"[Title/Abstract] OR "lucid dreams"[Title/Abstract] OR "consciousness in dreams"[Title/Abstract] OR "lucid dream"[Title/Abstract]) AND ("well-being"[Title/Abstract] OR "hedonic well-being"[Title/Abstract] OR "subjective well-being"[Title/Abstract] OR "life satisfaction"[Title/Abstract] OR "positive affect"[Title/Abstract] OR "negative affect"[Title/Abstract] OR "eudaimonic well-being"[Title/Abstract] OR "personal meaning"[Title/Abstract] OR "purpose"[Title/Abstract] OR "personal growth"[Title/Abstract] OR "self-discovery"[Title/Abstract] OR "self-development"[Title/Abstract] OR "psychological well-being"[Title/Abstract] OR "waking mood"[Title/Abstract])

### Appendix B

#### Empty Data Extraction Form

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Reference	Study design	Sample	LD constructs	Well-being construct (measure)	Main results (effect sizes)	Quality (%)
		Mental health  (LD experience)	(measure)			

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