

Dreams in anxiety disorders and anxiety

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Summary. Anxiety disorders are one of the most common mental disorders nowadays. While anxiety disorders are a rather widely investigated group of mental disorders, study of dreams and dream content of people suffering from anxiety and anxiety disorders is relatively scant. Therefore, the present review serves to summarize and give a comprehensive and contemporary overview of the existing studies and research on the topic of relationship between dreams and anxiety and anxiety disorders. In addition, it might help to emphasize the necessity of broader and deeper research of this problem and further research and studies on the topic. It contains a survey of interrelations between dream content and dream disturbances and trait and state anxiety in non-clinical and clinical populations, between dream content and dream disturbances and anxiety disorders in clinical populations, and the relationships between nightmare distress and anxiety. It also provides a glimpse on the relationships between dreams and comorbid anxiety and depression and the influence of anxiety on dream recall frequency. In sum, the results show that due to the relatively low number of studies which deal with this topic and their relative inconsistency, the problem of these interrelations and connections is not extensively or comprehensively investigated and developed up to this day, while the findings on such relationships and associations still remain heterogeneous and diverse to a certain extent. Therefore, further deeper and more profound research and investigation of this particular topic is required and seems necessary.

Keywords: Anxiety, anxiety disorders, dreams, dream content, dream theories, nightmares, nightmare distress

1. Introduction

It is generally acknowledged and recognized that dreams, dream experiences and dream contents are connected with psychopathology and are affected by one's mental health and his or her affective experiences, emotionality, feelings and mood during waking life (Domhoff, 1996; Nielsen and Levin, 2007; Pesant & Zadra, 2004; Pesant & Zadra, 2006; Revonsuo, 2000; Schredl, 2003b). And, vice versa, there are also several indications that dreams and dream contents affect and influence waking-day emotionality, mood, affective experiences and well-being (Cartwright, 2010; Hartmann, 1996; Kramer, 1991; Malinowski & Horton, 2015; Perogamvros & Schwartz, 2012). With respect to anxiety and anxiety disorders, derived from the assumed continuity between waking-life experiences and dreams, as well as from clinical observations, it can be assumed that anxiety and anxiety disorders may be reflected in the dreams of the respective persons. However, there is little research on this topic and the results are contradictory. For example, studies on state and trait anxiety in non-clinical populations have to be regarded separately from studies on clinical manifestations of anxiety disorders. Thus, the present review served to summarize the studies on the relationship between state and trait anxiety and dreams as well as between dreams and anxiety disorders.

In the first section, a short overview on anxiety disorders, according to the Fifth Edition of the Diagnostic and Statisti-

cal Manual of Mental Disorders (DSM-5) (American Psychiatric Association, 2013) is given. This overview is restricted to those anxiety disorders, on which studies with relation to dreams have been made. In the second section, several theories on the possible aetiology and function of dreams and nightmares are outlined, which can serve as models for the understanding of the relationship between anxiety and dreams. In the third – and central – section, a systematic review of the relationship between anxiety, anxiety disorders and dream contents and dream disturbances (including nightmares), is given.

2. Anxiety Disorders

Anxiety disorders are one of the most prevalent mental disorders in the general population in the western countries (Kroenke, 2007; Remes, Brayne, Van der Linde, & Lafortune, 2016; Simpson, Neria, Lewis-Fernandez, & Schneier, 2010). In the U.S. their prevalence is about 18 % (Kessler, Berglund, Demler, Jin, Merikangas, & Walters, 2005; Remes, Brayne, Van der Linde, & Lafortune, 2016). They also persist to be the most prevalent mental disorders in the European Union and over 60 million European citizens suffer from various anxiety disorders every year (Wittchen, Jacobi, Rehm, Gustavsson, Svensson, Jönsson, & Fratiglioni, 2011). Anxiety disorders are affecting twice as many women as men, and different types of anxiety disorders often co-exist in one person. They typically begin during childhood or adolescence and early adulthood, while younger people have a 20 % higher risk to suffer from anxiety disorders than adults older than 55 years (Craske & Stein, 2016). Generally, individuals younger than 35 years suffer from anxieties more often than older people (Baxter, Scott, Vos, & Whiteford, 2013; Baxter, Scott, Ferrari, Norman, Vos, & Whiteford, 2014).

Anxiety disorders are a group of several various mental disorders which are characterized by feelings of anxiety, excessive worry, increased preoccupation and fear or phobia.

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According to the DSM-5 (American Psychiatric Association, 2013) anxiety disorders include disorders that share features of excessive fear and anxiety and related behavioural disturbances, where fear is defined as the emotional response to real or perceived imminent threat and anxiety as anticipation of future threat (American Psychiatric Association, 2013). This means that anxiety is future-oriented and helps to stimulate behaviour of a person in order to avoid anticipated dangers, whereas fear can be regarded as an expression of anxiety.

In accordance with the DSM-5, there exist several forms of anxiety disorders, which can be separated into phobias, anxiety disorders and selective mutism. Phobias include social phobia (social anxiety disorder), specific phobias and agoraphobia, while the anxiety disorders include generalized anxiety disorder, panic disorder, separation anxiety disorder, substance or medication-induced anxiety disorders and anxiety disorders due to another medical condition and other specified or unspecified anxiety disorders. It should be also noted that the classification of anxiety disorders has undergone significant changes since the publication of the DSM-5. Accordingly, stress-related disorders, though characterised by intense fear, such as the acute traumatic stress disorder and the posttraumatic stress disorder, are no longer subsumed under the anxiety disorders in the DSM-5, which have been there until the DSM-IV. Likewise, obsessive-compulsive disorder has been excluded from the list of anxiety disorders (DSM-5, American Psychiatric Association, 2013; Kupfer, 2015). Stress-related disorders and obsessive-compulsive disorders are thus no topic of the review.

It is also necessary to highlight that apart from anxiety disorders, anxiety as a general personality factor (trait anxiety) or as a normal response to harmful situations or expectations (state anxiety) does exist. This distinction was first introduced by Spielberger in 1966 and further developed by him (Spielberger, 1983; Spielberger, 1985). Trait anxiety is defined as individual's predisposition or tendency to respond to some stimulus, stressor or irritant, while state anxiety is a temporal emotion or affect distinguished by psychological and physiological arousal and feelings of fear, dread, tension and apprehension. The most convenient and popular worldwide measurement instrument to estimate levels of trait and state anxiety in subjects is the State-Trait Anxiety Inventory (STAI) developed by Spielberger (1983) which is available in 12 languages (Julian, 2011).

2.1. Types of anxiety disorders

2.1.1 Generalized anxiety disorder (GAD)

GAD is defined as an anxiety disorder characterized by an increased level of worry and apprehension, which is often irrational and one can hardly control such thoughts. It can manifest itself in anxious or grim expectations about future life: events, situations, activities, occurrences, circumstances (American Psychiatric Association, 2013). Such anxiety and worry can impair and influence everyday life and functioning as it is typically expressed in disaster or failure anticipation and apprehension. Typical concerns of GAD-sufferers may include: health issues, family problems, friendship problems, interpersonal relationship problems, work difficulties and other everyday matters (Torpy, Burke, & Golub, 2011). GAD is associated with the experience of uncontrollable anxiety and includes at least three of the six

symptoms - anxiety, fatigue, impaired concentration, irritability, muscle tension and sleep disorders. The disorder is twice as common in women as in men and has a high tendency of becoming chronic when not treated (Craske & Stein, 2016; Rickels & Schweizer, 1990).

2.1.2 Panic disorder

Panic disorder is an anxiety disorder characterized by emergence of recurrent, unexpected attacks of severe anxiety (panic), which are not restricted to any particular situation or set of circumstances (American Psychiatric Association, 2013). This usually leads to the avoidance of situations perceived by a person as frightening and potentially dangerous, which may provoke the onset of panic attacks. As mentioned above, panic disorder is often accompanied by agoraphobia. Panic attacks may include a wide variety of different psychological and physiological symptoms, such as: anxiety, fear of dying or losing control, persistent concern and worry about having subsequent attacks; palpitations and accelerated heart rate, chills or hot flashes, sweating, trembling and shaking, chest pain and discomfort, nausea and abdominal distress, derealisation and depersonalisation, feeling dizzy, and paraesthesia (American Psychiatric Association, 2013). The intensity of these symptoms usually increases rapidly during several minutes and typically reaches its peak within a 10-minute period of time. Certain causes of panic disorder are still unknown, yet there is some evidence that it may be associated with family background and genetics (National Institute for Health and Clinical Excellence: Guidance, 2013). The onset of panic attacks is normally preceded or triggered by some stressful events, distress, life transitions and transformations, etc., while women are affected more frequently than men.

One characteristic of panic disorder are sleep panic attacks (or nocturnal panic). One study indicated that 18% of all panic attacks of panic disorder sufferers happened during sleep (Taylor, Skeikh, Agras, Roth, Margraf, Ehlers, Maddock, & Gossard, 1986). According to several estimations and surveys, sleep panic attacks occur in 33 % to 71 % of panic disorder sufferers (Mellman & Uhde, 1989; Krystal, Woods, Hill, & Charney, 1991; Craske, Lang, Rowe, DeCola, Simmons, Mann, Yan-Go, & Bystritsky, 2002; Craske, Lang, Mystkowski, Zucker, Bystritsky, & Yan-Go, 2002; Shapiro & Sloan, 1998), and about one third of them experience nocturnal panic attacks as equal or even more often than panic attacks during wakefulness (Mellman & Uhde, 1989; Mellman & Uhde, 1990). Sleep panic attacks usually represent sudden awakening from sleep with an intense jolt or convulsions and include symptoms similar to panic attacks which occur during waking state (Mellman, 2006). Its relationship to nightmares is unclear.

2.1.3 Separation anxiety disorder

Separation anxiety disorder (SAD) is characterized by excessive intense fear or anxiety about separation from home or an attachment figure who might be usually the mother or both parents, siblings, family members, caregivers, significant other, etc., which involves fear or worry of a person that something bad might happen to an attachment figure (Silverman & Dick-Niederhauser, 2004). Symptoms of the disorder may also include distress and worry about leaving an attachment figure, worries about unexpected events that could lead to a separation from such figure, refusal to leave

him or her, fear of being alone, nightmares about separation and complaints in case when a separation is inevitable. In most severe cases it may even include physiological symptoms such as headaches or stomach-aches. Although in previous versions of the Diagnostic and Statistical Manual of Mental Disorders the disorder was attributed only to people under 18 years old, in the DSM-5 it is applicable to adults either. Separation anxiety disorder is regarded as a normal stage of the developmental process of every person, occurring during an infant period of life, from 6 months to 3-4 years, while it is considered a pathology if it manifests itself in older children (over 6 years old), adolescents or adults.

2.2. Types of phobias

A phobia is defined as a type of anxiety disorder characterized by permanent fear of an object or a situation (American Psychiatric Association, 2013). A phobia manifests itself in a persistent reaction of fear in response to specific objects or situations and exists for longer than six months. Phobias often lead to avoidance of specific objects or situations, or, when the avoidance behavior is not possible or available, it causes a significant level of distress to a person. Some types of phobias, particularly, agoraphobia, may lead to the onset of panic attacks (American Psychiatric Association, 2013). It is frequent to have phobias to more than one specific objects or situations of the similar category, class, type, character, etc. Phobias tend to begin in childhood or early adolescence and only agoraphobia usually begins in adulthood (Öst, 1987; Marks & Gelder, 1966; Lijster, Dierckx, Utens, Verhulst, Zieldorff, Dieleman, & Legerstee, 2017). Three types of phobias are differentiated, social phobia, agoraphobia and specific phobia. The last one will not be described here since no studies on specific phobias and dreaming are published at the present.

2.2.1 Social Phobia

Social Phobia (or Social Anxiety Disorder) is a disorder characterized by intense fear in social situations and fear of failure or a negative judgement of other people. This may lead to significant psychological distress and serious impairment of social functioning and communication during everyday life (National Institute for Health and Clinical Excellence: Guidance, 2013). According to DSM-5, social phobia is defined as a "marked and persistent fear of social or performance situations in which a person is exposed to unfamiliar people or to possible scrutiny by others". This condition also includes avoidance of being the focus of attention or such situations when a person faces the risk of feeling fear of acting in embarrassing or humiliating way (American Psychiatric Association, 2013). Typical social situations eliciting social phobia can include: speaking in public, talking to strangers, having conversations with others, attending public events, parties or social meetings, encountering new people, etc.

2.2.2 Agoraphobia

Agoraphobia is a type of phobia characterized by obsessive, persistent and intense fear of open places or situations where the person perceives the environment to be unsafe with no easy way to get away. Typical examples of such circumstances may include: large open spaces (parking lots, fields, etc.), public transport, closed-in accommodations

(stores, shopping malls, etc.), crowded places or being outside one's home (American Psychiatric Association, 2013). Fear of such environments causes a person to avoid these situations and places or, when they cannot be avoided, may result in significant distress and panic attacks. In the most severe cases such avoidance even may lead to a person refusing to leave his or her home. Agoraphobia is highly comorbid with panic disorder and often it develops after occurrence of several repeated panic attacks and as the result of the onset of panic disorder (Barlow, 2013), though it should be noted that in some cases agoraphobia can occur without panic attacks.

3. Theories on dreams and nightmares

In order to better understand the relationship between dreams and anxiety, theories on dreaming which seem to be relevant for this relationship will be shortly presented in the following. In addition, we tentatively try to suggest the impact of anxiety on dreams as suggested by each of these theories.

Nowadays several theories regarding dream occurrence, dreaming phenomena and dream processes exist. These theories can roughly be divided into two groups: theories explaining origins of dreams, and theories explaining possible functions of dreams, their significance in the adaption process and the human evolution. The first theories may be called structural and biological dreaming theories, while the second theories may be called functional theories.

3.1. Structural and biological dreaming theories

3.1.1 AIM-Model

The three-dimensional cognitive-neurophysiological model of dreaming called AIM-model (Activation level, Input-Output source and Mode of processing) suggested by Hobson and Pace-Shott (2002) reflects different brain states and their variations throughout waking and sleeping phases. It consists of three components: activation of different parts of the brain (A); input-output gating, or inhibition of external sensory input and motor output (I), and modulation (M), or level of activation of aminergic and cholinergic neuromodulators. These three processes are experienced by an individual during all conscious states and not only dreaming (Hobson, Pace-Schott, & Stickgold, 2000). In other words, this model represents how much information is being processed by the brain (A), what kind of information is being processed (I) and how it is processed (M) during sleep and waking states of consciousness. According to this model, higher levels of A, I, M and attention to the information from external environment are associated with the waking state, while lower levels of I and M are observed during sleep (Hobson, 2009). During NREM-sleep A is reduced, while M is in a middle position. On the other hand, REM-sleep, instigating dreaming and dream formation, is characterized by higher levels of A, low levels of M, increased attention to the information obtained from memory and decreased attention to the information from an external environment (I). This model, thus, provides an explanation why we are able to see dreams while sleeping and how these dreams are constructed. According to this theory, dreams during REM-sleep usually have rather small relations or associations with real-life events or experiences, though they are better recalled by a dreamer.

This theory provides a profound psycho-physiological model for dream formation, and it can be presumed that the higher activation of I during REM-sleep is associated with a pronounced processing of internal information, i.e., memories, which may result in the occurrence of high-order memories during REM-sleep related dreams. Thus, in anxiety patient or highly anxious persons, anxiety-related memories should be activated and processed in dreams. According to the AIM-model, it can be expected that people with different anxiety disorders may experience frightening or fearful dreams which contain specific images associated to their frightening situations or objects.

3.1.2 Protoconsciousness theory

This theory was also suggested by Hobson and involves a definition of proto-consciousness which is associated with REM sleep and serves as a basis ground for the formation of primary consciousness. The latter then forms a basis for the formation of second consciousness (Hobson, 2009). Protoconsciousness is understood as a primordial state of mental organization and is a foundation for the formation of true consciousness (primary and secondary). Primary consciousness includes simple awareness that one is conscious and it is typical not only for humans, but for most of the mammals. It is associated with the ability to perceive external environment and experience emotions. Secondary consciousness includes abstract thinking, self-cognition and meta-cognition, which, in other words, reflects awareness of being conscious and of one's state, knowledge, experience, etc., and not only of an outside world. This type of consciousness is specific only for humans and requires language and verbal thinking. Secondary consciousness is not experienced during sleep and only used in waking life, while primary consciousness is experienced during sleep. According to this theory, waking and dreaming states are seen as interconnected and operate together to provide mutual functioning during whole lifetime. Both states are considered to cooperate and play a crucial role in effective functioning of each other. Brain development is associated with consciousness development from protoconsciousness to the higher levels of consciousness which occurs through individual's life, especially during REM sleep, in utero and early life (Hobson, 2009). REM sleep is a protoconscious state, which implies that it prepares the brain to operate in the waking state, during the secondary consciousness. Brain activation during REM sleep causes occurrences of visual information and imagery, and this process might be compared to virtual reality. During REM sleep a virtual model of oneself, called „protoself“ is created, which acts in this virtual world (Libet, Gleason, Wright, & Pearl, 1993; Wegner, 2004). The main point of such process is to train a brain to function in the real world during this virtual reality, which is de facto a dream. This implies that REM-sleep, and especially dreams, play an integrative role between proto-consciousness and secondary consciousness and thus to have an adaptive function, as to prepare for the waking life (Hobson, 2009).

As for the dreams of anxiety sufferers, we may assume, according to this theory, that dreams of such individuals may contain negative emotions and anxiety, fearful, frightening, and dysphoric images, symbols, objects, states or situations. Thus, through these negative emotions and anxious states during dreaming enables, a rehearsal of them which allows the individual to cope with and adapt to a anxiety

or to anxious states during waking life. In other words, it can be assumed that presence of anxiety disorders might provoke occurrence of fearful dreams with corresponding dysphoric and negative emotions, feelings and situations in order to attempt to adapt to anxiety and lower its level.

3.1.3 Continuity and discontinuity hypotheses

The continuity hypothesis of dreaming was first suggested by Domhoff (1996). According to this theory an individual's dream content is highly continuous with waking experiences, thoughts, concepts or emotions and reflects previous waking life experiences during sleep. The continuity hypothesis postulates that one's thoughts, emotions or mental states experienced during waking life are transferred to dreams and bear resemblance with them. This implies that dream images and content constitute continuity with everyday life constructs and events, and, therefore, the dreaming personality possesses continuity with the waking personality either (Domhoff, 1999).

Although the continuity hypothesis of dreaming is supported by a plethora of observations and studies and gained a significant confirmation, acknowledgement and support within the framework of many other investigations, including even several earlier studies (Domhoff, 1996; Hall & Nordby, 1972; Schredl & Piel, 2005; Schredl, 2003a), there are some aspects that minimize its significance and meaningfulness. First, there is still other significant experimental data that contradicts it: it was clearly shown that children dreamed more about recreational activities than of their usual everyday life events or experiences (Foulkes, 1982). Second, recent studies showed that while some elements of everyday life, such as negative emotions or certain events, are highly represented in dream content, other usual everyday activities, especially cognitive processes, such as reading, writing or mentation, are rarely represented in dreams (Domhoff & Schneider, 2008; Hartmann, 2000; Schredl & Hofmann, 2003; Valli & Revonsuo, 2009). Third, while the dreamer's mood, emotional state, cognitions and personality traits can affect and alter dreams substantially (Erdelyi, 2017) it is not surprising that the dream is a continuation of waking life, since the person of the dreamer is the same person awake with all its memories, emotions needs and wishes. Forth, the theory can hardly be falsificated, since even the occurrence of only one element from waking life in a dream verifies the theory, which is thus of a very poor epistemological quality. That is why we assume that it would be too trivial and an oversimplification to assume that dream content is only a continuation of waking life.

Speculating according to the postulates of this theory, we can expect that dream content of anxiety disordered individuals will likely manifest, represent and reflect similar frightening objects, situations or themes which they experience in their every-day usual life experience. Generally speaking, we can presume, that their anxiety disorders may directly influence their dream contents and such dreams may resemble and reflect their waking life experience of fear and anxiety.

An opposing theory was formulated called discontinuity hypothesis (Stickgold, Hobson, Fosse, & Fosse, 2001). This theory postulates that dreams are based on completely different thoughts or emotions than that experienced during everyday life. It implies that dream content is structurally different from everyday life waking experience and is not correlated with it. In line with this theory we might assume

that dream contents of anxiety sufferers will have little or no resemblance and similarity with their everyday life experience, events, emotions, feelings or states. This implies that their dreams may contain no anxious feelings and emotions, or even positive ones, or completely different situations.

According to the latest data and observations, both theories seem plausible, legit and probable, and dreaming, therefore, involves simultaneous incorporation of both of these phenomena of continuity and discontinuity in terms of dream content and dreams (Blagrove, 2011; Hobson & Schredl, 2011). In line with this notion we must admit that actual dreams and dream contents show signs of the cooperative influence of both of these factors of continuity and discontinuity and contain such elements or experiences which clearly support and confirm the assertion of a combination and joint influence of these two processes during dreaming. Thus, it has been argued that an integration of these two theories is necessary (Voss, Tuin, Schermelleh-Engel, & Hobson, 2010), suggesting that thoughts or emotions during dreams and waking life are related somehow, but structurally independent.

3.2. Functional theories of dreaming

3.2.1 Sentinel Function Theory

Sentinel function theory was proposed by Snyder (1966) and suggests that sleeping and dreaming in REM sleep have an adaptive, preparatory and predictive function for the situations occurring in an environment. He observed animals, especially mammals, and proposed that dreaming during REM sleep prepares them for fight-or-flight reaction if the information from an environment is regarded dangerous, harmful or damaging (Snyder, 1966). If there is no such situation, dreaming with pleasant dreams continues. According to this theory, REM-sleep increases brain activity and performance thus preparing and allowing a human or an animal to awaken immediately and realize fight-or-flight reaction in case of an actual detected danger in an environment upon awakening (Valli & Revonsuo, 2009). Therefore, this theory emphasizes this particular „sentinel“ function of dreaming, which implies that it provides an individual's safety and security from external threats or hazards during sleeping and helps to differentiate various stimuli during sleep as actually hazardous or not and maintain sleep if they are not dangerous enough. Several empirical notions and evidence support this theory. It is yet confirmed that external stimuli, such as sound, words, smells or tactile sensations are registered and detected during sleep and may lead to increased activity in a human brain and to the incorporation of such stimuli into dream content (Schredl, 1999), while sleeping and dreaming is though maintained, when such stimuli are considered not dangerous. Considering the credibility of the theory, we can propose several assumptions on the subject of dream content of anxious individuals. We suppose that heightened level of anxiety or the presence of an anxiety disorder may increase the probability that external stimuli during sleep are considered as a signal of danger, indicating the presence of a dangerous situation in the environment. Therefore, it can be assumed that dreams of individuals suffering from anxiety disorders will contain more anxiety related aspects and these persons will have a higher frequency of bad dreams or even nightmares with nocturnal awakenings.

3.2.2 Problem solving and creativity function

An evolutionary function of dreams was proposed by Hartmann (1998), concerning the creative and problem solving function of dreams, which implies that dreams can help people to overcome traumatic experiences and previous harmful situations, whether they are recalled or not, and promote creativity. According to this theory, dreams provide dealing with a trauma in many different mental contexts within the “safe place” of sleep, where psychological “connections” can be made without any danger. These broader connections formed during dreaming provide new associations and linkages of information which can be useful during waking life. This theory implies that dreaming has two major functions: therapeutic function with regard to previous psychological traumas and a problem-solving function which develops and promotes creativity (Hartmann, 1998). It is also implied that one's creativity and dreaming are connected and dreams are associated with increased creativity and creative capabilities.

In line with this, Barrett (2007) showed that dreams have a problem-solving and adaptive function and help to find solutions for personal problems and concerns of waking life. According to the theory suggested by him such ability to resolve everyday problems during dreaming, in completely different from wakeful state conditions, allowed to improve survival, increase and promote adaptive capabilities and reproductive opportunities (Barrett, 2007). This assumption is supported by the results of a study by Barrett (1993), in which the dreams of college students contained at least partial solutions to their everyday problems.

According to these assumptions we can hypothesise that dreams of individuals suffering from anxiety disorders will involve anxiety-related stimuli which help to find means to overcome distressing anxiety and to cope with these stimuli in order to reduce anxiety. Such dreams may also contain specific solutions, ways or methods which will help to reduce distress from anxiety or clear off anxiety.

3.2.3 Psychological healing and stress-reduction theories

Several researchers suggested that dreaming helps to maintain and promote psychological well-being and emotional balance and has a psychotherapeutic effect on the dreamer (Breger, 1967; Cartwright, 1991; Garfield, 1991; Hartmann, 1996; Kramer, 2011). All of these theories are based on the idea that dreams possess problem-solving capabilities and thus allow to adjust to and cope with current waking life emotional problems. Breger (1967) claimed that dreams allow to solve emotional problems of a dreamer and, therefore, preserve psychological balance and emotional well-being during waking life. Similarly, Garfield (1991) discovered that dreaming helps to improve psychological health and recover from previous traumatic events, adjust to life stressors and cope with them. Cartwright (1991) proposed that dreams act as a “mood regulator” and highlighted their healing and stress-reduction function. She postulated that dreams can provide reduction of negative emotional charge related to real life experience and events which allows to change the dreamer's attitude toward these events to a more positive one. Kramer (2011) extended her ideas and asserted that dreams ensure “selective mood regulation”. He supposed that dreams protect sleep and provide containment of “surge of emotion” which occurs during REM-sleep. If such containment is not successful, this leads to an awakening of

a dreamer. On the other hand, when it is successful a dream attempts to solve a problem associated with existing emotions. Ultimately, this leads to positive changes in dreamer's mood, increases psychological well-being and improves the subjective emotional and affective state of a dreamer. Hartmann (1996) highlighted the idea that the main function of dreams is psychological healing of traumatic experience through emotional problem-solving and stressed the psychotherapeutic effect of dreaming (Hartmann, 1996). He assumed that dreaming helps in healing and reducing stress from previous real life traumatic events or incidents through cross-connections and occurrence of new connections within the neural network of a brain during dreaming. When a traumatic experience is resolved or integrated dreams change and become less intense which provides a relief from a trauma and increases emotional well-being. Nielsen and Levin (2007, 2009) also regarded psychological healing as one of the major functions of dreaming and viewed chronic posttraumatic nightmares as a defect of this function. According to their affective network dysfunction model (AND) persistent occurrence of post-traumatic nightmares indicates a failure in the integration of a traumatic events into neural memory networks. This integration normally occurs during dreaming and allows resolving of a trauma and emotional healing (Nielsen & Levin, 2007; Nielsen & Levin, 2009). However, it has to be noted, that, no psychological "healing" or "recovery" of a trauma due to dreams was actually confirmed (Valli & Revonsuo, 2009). Nevertheless, we might make several predictions in line with these theories: since dreams have a healing function on emotional problems, a higher dream frequency will be associated with a higher well-being, i.e., less anxiety related problems in the waking life. Accordingly, it may be expected that anxiety sufferers will experience "healing dreams" (bad dreams or nightmares) more frequently.

3.2.4 Theories of simulation functions of dreams

Theories of simulation functions of dreams are based on the idea that the main function of dreams is to simulate everyday life events and threats. These theories assert biological adaptation and evolution as the main function of dreams which promotes and facilitates survival and prosperity in the real world. They emphasize an evolutionary significance of dreaming.

The most prominent of these theories was proposed by Revonsuo (2000) and is called the Threat Simulation Theory. This theory posits that during dreaming an individual is allowed to rehearse avoidance behaviour and appropriate reactions to a threat in a virtual environment. According to this theory dreaming represents an offline model of the real world and dreams simulate dangerous and threatening real life events, such as assaults or open confrontation with other individuals. Thus they have a biological function of adaptation and preparation to dangers of the real life (Revonsuo, 2000). Dreaming, therefore, was essential for the human evolution and adaptation to an unsafe environment full of different threats. Dreaming thus leads to an efficient coping behaviour for real life dangerous situations and improves survival capabilities and skills (Revonsuo, 2000). This theory is supported by the observation that dreams often contain aversive or negative themes, such as aggression, negative emotionality or misfortune (Domhoff & Schneider, 2008). In line with the theory it can be assumed that anxiety disorders may increase the occurrence of threatening situations

in dreams in order to provide rehearsal of an efficient behaviour in real life dangerous situations. On the other hand, one can expect more dreams of successful coping with fearful or threatening situations according to these theories.

Franklin and Zyphur (2005) extended Revonsuo's (2000) theory and postulated that dreams provide rehearsal of not only dangerous or threatening events, but also of social situations and concomitant communications and interactions. According to their theory dreams simulate social interactions and therefore play a crucial role in the development of higher cognitive functions responsible for social skills and communication in the real world. Having performed content analysis of dreams, they found that dreams often include situations of social interactions and communication. In line with this theory, dreams help to provide successful "social mapping" for the everyday life social situations and also improve our ability to better understand intentions of other people and even anticipate them (Valli & Revonsuo, 2009). Although it is already known that dream contents often include social situations and interactions with familiar characters and known people, which might offer the opportunity to practice and simulate these interactions in dreams, there is still no certain and clear evidence that a useful simulation really occurs during these interactions in a dream, which provides learning and practicing for the real-life social situations. Moreover, it is still somehow unclear, whether there is any practical significance or point in such simulations, as it was not yet determined that such in-dream social simulations are "less costly", easier, more economical or beneficial for a sleeper than real life social simulations (Valli & Revonsuo, 2009). In line with this theory, we can propose that dreams of individuals with social anxiety will contain a higher rate of problematic social interactions and situations of social communication.

Taken together, from most of the theories on dreaming an increased probability of anxiety-related dream contents in the dreams of anxiety patients can be deduced. This holds for the simulation functions dream theories, sentinel function dream theory, problem-solving and adaptation dream theories, protoconsciousness dream theory and the continuity hypotheses of dreaming. Likewise, an increased occurrence of nightmares or bad dreams is suggested by the psychological healing and stress-reduction dream theories in the form of so-called "healing dreams", as well as the sentinel function theory of dreaming. In contrast, the discontinuity hypothesis of dreams formation suggests that the dream content and dreams of anxiety sufferers will involve little or no resemblance with their waking-life anxiety experience, feelings or thoughts, or, in other words, that there is a lesser probability of occurrence of anxiety-related themes, topics or images in dreams of anxiety patients. Although the current theories on origins and functions of dreaming allow a relatively clear prediction on the relationship between anxiety or anxiety disorders and dreams, a surprisingly low number of studies have done with these subjects. And the results of these studies are heterogeneous as will be shown in chapter three.

3.3. Nightmares and bad dreams

According to the DSM-5 and the International Classification of Sleep Disorders (ICSD-3) nightmares are defined as "vivid, highly emotionally dysphoric" dreams that "usually involve efforts to avoid threats to survival, security, or physical integrity". Fear is the dominant emotion which occur

during nightmares, though it is also not uncommon for other emotions, such as rage, anger, sadness or shame to occur during nightmares (Robert & Zadra, 2014; Zadra, Pilon, & Donderi, 2006). Like other dreams, nightmares normally occur during REM-sleep. Several authors suggest a distinction between nightmares and bad dreams: nightmare is a disturbing dream which includes awakening from sleeping, while bad dreams are defined as “negatively toned dreams” or disturbing dreams without awakenings (Levin & Nielsen, 2007; 2009; Robert & Zadra, 2014; Zadra et al., 2006; Zadra & Donderi, 2000). Additionally, nightmares are more emotionally intense, vivid and tense than bad dreams (Zadra et al., 2006). Two types of nightmares are also distinguished: idiopathic nightmares, which are not caused by another disorder or factor and posttraumatic nightmares which occur following a trauma and often are a symptom of the post-traumatic stress disorder (PTSD). There exist several assumptions on the aetiology of nightmares, which highlight that stressful events as well as a deficit in the habituation of cortical arousal to stressful or traumatic events may play a dominant role (Gieselmann, Aoudia, Carr, Germain, Gorzka, Holzinger, Kleim, Krakow, Kunze, Lancee, Nadorff, Nielsen, Riemann, Sandahl, Schlarb, Schmid, Schredl, Spoomaker, Steil, van Schagen, Wittmann, Zschoche, & Pietrowsky, 2019). Likewise, several helpful therapeutic approaches to the treatment of nightmare disorder have been developed in the past few years, which contain a confrontation with the nightmare content and a mastery of the nightmare content and distress as major elements (Gieselmann et al., 2019).

4. Dreams and Anxiety

In terms of relationships between anxiety and dreams it can be assumed that heightened anxiety of an individual may lead to more frequent and more intense fearful or harming dreams and may also induce bad dreams or nightmares. There is certain evidence that excessive anxiety or anxiety disorders instigate relevant feelings, thoughts, emotions and content in dreams. Though it is necessary to point out that, speaking of dream content, there is still relatively little research regarding interrelations of anxiety and dream content (Skancke, Holsen, & Schredl, 2014), though study of such relations is a developing field of investigation. We first want to overview the studies devoted to the relations between anxiety and anxiety disorders and dream content. Furthermore, there are some studies indicating associations between anxiety or anxiety disorders and disturbing dreams and nightmares (Haynes & Mooney, 1975; Hersen, 1971; Levin & Fireman, 2002; Nielsen, Laberge, Paquet, Tremblay, Vitaro, & Montplaisir, 2000; Wood & Bootzin, 1990; Zadra & Donderi, 2000). We would like to overview these studies further. First we will describe the literature on dreams in non-clinical population of persons with high anxiety as a personal disposition (trait or state anxiety) and then turn to dreams in persons with anxiety disorders.

4.1. Dream Content and Trait and State anxiety

According to Hartmann, dreams reflect emotions of waking life (Hartmann, 1996). Strong negative emotions, such as anxiety and fear, during waking day can induce relative negative emotions of anxiety and fear in dreams (Yu, 2007). There is certain evidence that anxiety can affect a person's dreams and different levels of anxiety may influence and alter dream content (Jones & DeCicco, 2009). High waking day

anxiety, whether it is trait or state anxiety, can elicit strong emotions, which, in turn, find their reflection in dreams as negative emotions or emotions of anxiety and fear in dream content (Wilkinson, 2006).

Regarding trait anxiety and dreams, it is clearly seen that higher levels of trait anxiety in waking life lead to a more negative emotional tone in dreams and generally to more negative, sad and depressive dream contents and overall higher negativity, higher number of threats and dangers and aggression in dreams. It is now evident that higher trait anxiety in waking life leads to the presence of higher number of aggressive unfriendly interactions, including such interactions directed toward a dreamer, failures and misfortunes in dreams, higher frequency of negative emotions and negative affect in dream content, is related to a more realistic dream content and the presence of higher number of realistic threats in dreams (Gentil & Lader, 1978; Pesant & Zadra, 2006; Schredl, Pallmer, & Montasser, 1996). Latest research also indicates that higher dreamed fear in frequent nightmare sufferers is instigated by the higher levels of trait anxiety of such individuals (Picard-Deland, Carr, Paquette, Saint-Onge, & Nielsen, 2018). Moreover, it was found that higher levels of specific trait anxiety (an anxiety and fear of particular topics, themes, objects or subjects) in combination with higher general trait anxiety can predict occurrence of related specific topics and themes in dreams. It is also obvious that elevated anxiety is related to recurrent, or repetitive, dreams. Higher frequency of recurrent dreams with a more negative emotional tone, affect and experience, dysphoric dream content, higher levels of dream anxiety, hostility, aggression or conflicts occurrence are found to be obviously related to the elevated levels of waking-day trait anxiety (Brown & Donderi, 1986; Zadra, O'Brien, & Donderi, 1998). Higher trait anxiety is also associated with longer dream reports, based on the word count in each dream report (Demacheva & Zadra, 2017).

On the other hand, there were some findings which diverged from the results of the other research and, nevertheless, found several discrepancies in terms of relations and associations between higher levels of trait anxiety and general negativity, higher aggression or overall higher negative emotional tone in dreams. For example, no significant associations were found between higher trait anxiety and occurrence of specific dream content, which included aggressive interactions, failures, misfortunes, significant positive or negative affect and emotions in the study by Demacheva and Zadra (2017) and trait anxiety thus did not influence dream content in healthy females significantly (Demacheva & Zadra, 2017).

With regard to state anxiety, it is almost evident that higher levels of state anxiety lead to a more negative emotional tone and affect in dreams, higher levels of aggression, aggressiveness and negativity, a more negative emotional tone and affect in dreams, presence of more violent emotions in dreams (e.g. sadness or anger) and a higher frequency of aggressive acts directed toward a dreamer (King & DeCicco, 2007). This is supported by some other data which indicates that higher rates of state anxiety increase number of dreams with negative and “harmful” emotional tone (Komasi, Soroush, Khazaie, Zakiei, & Saeidi, 2018). Dreams of anxious individuals also were shown to contain higher frequency of familiar human characters and limbs of a human body (King & DeCicco, 2007). Surprisingly, higher level of state anxiety were found to be associated with higher sexuality and high-

er numbers of sexual objects in dreams. (Robbins, Tanck, & Houshi, 1985).

Some interesting findings regarding both state and trait anxiety can also be mentioned, which implies that the joint and cooperative influence of these both "anxieties" also alters and transforms dreams and dream content in a peculiar and specific way, and, therefore, several distinct features can be outlined. It was clearly shown by Jones and DeCicco (2009) that higher levels of waking day state and trait anxiety are associated with animal imagery in dreams, which is confirmed by the earlier study by DeCicco (2007). They also found that state and trait anxiety increases location change frequency in dreams (Jones & DeCicco, 2009). In addition, it was revealed that both elevated trait and state anxiety during a stressful period increases frequency of recurrent and regular dreams (Duke & Davidson, 2002).

4.2. Dream Content in Anxiety Disorders

Addressing the topic of research of the interrelations between anxiety disorders and dreams and dream content we have to assert that such studies are rather scarce and scant, generally unsystematic and inconsistent and mostly bear individual, singular and non-longitudinal, segregate and separate character.

It was shown in general that dreams of anxiety-disordered females were distinguished by a higher frequency of aggressive interactions, especially, directed toward the dreamer, fewer friendly interactions and failures in social interactions, as well as a more negative and lower emotional tone and affect, sadness and gloom (Gentil & Lader, 1978). Anxiety disorders also increased number of failures and decreased number of successes in dreams of such individuals. Dreams of anxious patients are also distinguished by higher scene change frequency (DeCicco, Zanasi, Dale, Murkar, Longo, & Testoni, 2013; Miller, DeCicco, Dale, & Murkar, 2015).

With respect to specific anxiety disorders, we should also assert that there is still not so much empirical evidence regarding the relations between various kinds of anxiety disorders and specific dream content. It is almost obvious that generalized anxiety disorder is related to more negative affect, feelings and mood, lower emotional tone, higher overall aggression and higher frequency of aggressive interactions, lower number of friendly interactions, higher level of misfortune, lower level of success and low number of known characters in dreams (Kirschner, 1999; Sikka, Pesonen, & Revonsuo, 2018). Dreams of panic disorder patients are also distinguished by higher level of aggression, higher number of aggressive interactions and lesser frequency of friendly interactions, more negative emotional tone and affect, frequent misfortunes and lower success, and lesser known characters (Kirschner, 1999). Panic disorder is known to be related to the significantly higher degree of presence of separation anxiety in dreams (Free, Winget, & Whitman, 1993), as well as higher levels of "covert hostility directed outward", which assesses "remarks about others being hostile to others and denial of angry and hostile feelings of the self" (Free, Winget, & Whitman, 1993, p. 598). Generally, dreams of such patients are marked by intense anxiety and fear and higher frequency of more negative emotions (Free, Winget, & Whitman, 1993). Agoraphobia was shown to be related to the presence of wide open landscapes and areas with large spaces to walk or move around in dreams (Foss, 1994). Social anxiety disorder was associated with the occurrence of higher number of frightening and fearful

figures of people of an opposite sex (males, in this particular case) in dreams, as well as of common frightening situations or occurrences, such as falling down, encountering frightening animals or creatures, examinations and public speeches (Khodarahimi, 2009). Generally, we can conclude that such dreams include symbolical and associative depictions and reflections of traumatic or unpleasant events and experiences from the past, especially, childhood, which instigate, provoke and cause social anxiety. However, taking into consideration the character of the two studies, one related to the investigation of social anxiety disorder and dreams and the other one dealing with chronic agoraphobia and dreams, their methods, the way of their conducting, and the obtained data, it is necessary to note that their findings are rather limited, due to their case-study status. Therefore, we can hardly extrapolate their results and conclusions on all other patients with such disorders in light of the lack of research on larger samples.

4.3. Nightmare or Bad Dream Frequency and Trait and State anxiety

A considerably large number of studies found significant and strong relationships between nightmare and bad dream frequency and trait or state anxiety. Higher nightmare frequency was shown to be significantly associated with observed anxiety manifestations and symptomatic in children (Fisher & McGuire, 1990). Such correlation between higher rates of anxiety and a higher frequency of nightmares was also observed and established in healthy adult people (Cook, Caplan, & Wolowitz, 1990), though this particular study does not specify certain type of anxiety (state or trait). Several studies confirm that higher nightmare frequency is significantly related to the higher rates of death anxiety and heightened presence of concerns and worries about death or dying in frequent nightmare sufferers (Dunn & Barrett, 1988; Feldman & Hersen, 1967; Hersen, 1971; Levin, 1989). It was also asserted that such heightened nightmare frequency is associated with lower ego-strength and higher manifest anxiety and anxiety symptomatic (Hersen, 1971; Levin, 1989). Only one small and old study, on the other hand, revealed no significant correlation between fear of dying or death anxiety and concerns about death and nightmare frequency (Collet & Lester, 1969).

Significant associations between heightened levels of trait anxiety and higher nightmare frequency were indicated in a series of studies in children, school adolescents and adult populations which employed retrospective self-reports or prospective daily logs (Haynes & Mooney, 1975; Köthe & Pietrowsky, 2001; Levin, 1998; Mindell & Barrett, 2002; Roberts & Lennings, 2006; Zadra & Donderi, 2000). Several studies also indicate significant relations between heightened trait anxiety and the frequency of disturbing and bad dreams in both adult and children populations (Nielsen et al., 2000; Schredl, Pallmer, & Montasser, 1996; Zadra, Donderi, & Assad, 1991; Zadra & Donderi, 2000). Not only frequent disturbing and bad dreams were found to be related to higher levels of trait anxiety and its psychological symptoms such as heightened fear, dread, inner tension and anxiety, but also their recall rate and degree (Nielsen et al., 2000). In addition, it was shown that elevated levels of trait anxiety in adults led to an increase in number of negative affects in dreams and a decrease in number of positive dream affects (Zadra, Assaad, Nielsen, & Donderi, 1995).

Only one particular study (Wood & Bootzin, 1990) suggests no significant associations between heightened trait anxiety and the higher number of nightmares, and even this study confirms such correlation when the method of retrospective self-reports was used ($r=.13$). However, this influence was practically absent when daily logs method was used instead of self-reports ($r=.04$) (Wood & Bootzin, 1990).

A significant number of studies confirm that higher levels of state anxiety significantly correlate with increased nightmare frequency in adults (Cellucci & Lawrence, 1978a; Köthe & Pietrowsky, 2001; Schredl, 2003b; Roberts & Lennings, 2006; Zadra & Dondeni, 2000). We can assert, therefore, that the actual experience of anxiety or “anxious states” is significantly related to a higher nightmare frequency in dreams. There is also certain evidence that nightmare occurrence during the night may immediately provoke higher levels of manifested state anxiety the day after this nightmare (Köthe & Pietrowsky, 2001). Likewise, several of the frequent nightmare sufferers exhibited relatively higher state anxiety about their nightmares during the day (Hartmann, Russ, Van der Kolk, Falke, & Oldfield, 1981). None of them, however, was over-anxious and phobic, or possessed heightened neuroticism. Heightened frequency of bad and disturbing dreams was also found to be associated with higher level of state anxiety in adults and adolescents (Blagrove, Farmer, & Williams, 2004; Nielsen et al., 2000; Zadra & Dondeni, 2000).

The empirical data suggests that state anxiety may serve as a “mediator” variable between trait anxiety and nightmare frequency, directly influencing and affecting the frequency of nightmares (Köthe & Pietrowsky, 2001; Schredl, 2003b). Thus, we may conclude that state anxiety is related to nightmare frequency level in dreams even more directly and vividly than to trait anxiety. Though, we must admit, however, that nightmare frequency correlates with both trait and state anxiety levels, which is supported by an abundance of experimental evidence. The data from the study by Blagrove and Fisher (2009) especially reveal and highlight such “mediator” relationships between nightmare frequency and state and trait anxiety, as it was shown that heightened trait anxiety instigates and provokes nightmare occurrence as a response and reaction to the presence of heightened everyday state anxiety, which thus leads to a higher nightmare frequency (Blagrove & Fisher, 2009). It is clearly seen then that trait anxiety serves as a personal predisposition or tendency to experience more nightmares, while state anxiety is a direct trigger which initiates and instigates the occurrence of nightmares. Unexpectedly, one study found, nevertheless, no significant correlations between heightened nightmare frequency and higher levels of state and trait anxiety (Dunn & Barrett, 1988).

4.4. Nightmare or Bad Dream Frequency in Anxiety Disorders

Frequent nightmares are found to be associated with anxiety disorders in insomnia sufferers (Ohayon, Morselli, & Guilleminault, 1997). Desroches and Kaiman (1964) clearly indicate that anxiety disorder patients exhibit a higher frequency of frightening dreams than healthy subjects. Higher frequency of nightmares in children and adolescents with anxiety disorders (anxiety-affective disorder) was also confirmed (Simonds & Parraga, 1984). Similarly, significantly higher presence of nightmare disorder in patients with anxiety

disorders (15.6%) than in general population (2-5%) was noted (Swart et al., 2013).

A considerable number of studies confirm and indicate inherent and intrinsic relationships and associations between different types of anxiety disorders and nightmare or bad dream frequency. There is certain evidence that the presence of panic disorder correlates with increased nightmare frequency and, accordingly, frequency of related nocturnal panic attacks (Schredl, Kronenberg, Nonnell, & Heuser, 2001). On the other hand, nocturnal panic and nightly panic attacks, which are also often common in patients with obstructive sleep apnea, are found to predict and predispose later occurrence and development of panic disorder (Simon, Berki, Gettys, & Vedak, 2016). A strong evidence also exists that patients with social anxiety disorder are prone to and suffer from more frequent nightmares (Picard-Deland et al., 2018), and, vice versa, individuals suffering from frequent nightmares exhibit higher levels of social fear and social anxiety (Levin, 1998). A typical child anxiety disorder, separation anxiety disorder, is also shown to be related to nightmare disorder and a higher frequency of nightmares, especially, higher frequency of recurrent nightmares with several specific topics and themes, such as losing or destruction of a family, separation and detachment from a family or parents (Simon et al., 2016). Separation anxiety disorder then often manifests itself in children in sleep terrors with frightening and unusual experiences during sleeping and dreaming alone in a dark room. Significantly higher frequency of bad or disturbing dreams is also shown to be associated with the presence of generalized anxiety disorder in adults (Nadorff, Porter, Rhoades, Greisinger, Kunik, & Stanley, 2014). Individuals suffering from this disorder had significantly higher rate of disturbing dreams than healthy subjects (21.6 %), which is consistent with the previous data from the earlier research (Mallon, Broman, & Hetta, 2000; Nadorff et al., 2014).

Empirical evidence from the practical experience of clinical treatment of nightmares, especially from the field of Cognitive Behavioural Therapy, also supports the idea of intrinsic relationships between nightmares and their higher frequency and various kind of anxiety disorders. Several Cognitive-Behavioural studies aimed to reduce nightmare frequency, intensity and distress, all of which utilized and employed systematic desensitization method, not only reached improvement in nightmares, but also reduced daily symptoms of anxiety and anxiety disorders (Burgess, Gill, & Marks, 1998; Cellucci & Lawrence, 1978b; Miller & DiPilato, 1983). This is also confirmed in another study (Kellner, Singh, & Irigoyen-Rascon, 1991), which shows that implementation of imagining and rehearsing cognitive technique aimed to reduce frequent recurrent nightmares also reduces panic disorder intensity and the frequency of related nocturnal panic attacks. Mutually, it was demonstrated that Cognitive Behavioral Therapy for anxiety and generalized anxiety disorder, which contains sleep hygiene, helps to reduce frequency of bad and disturbing dreams in adults (Nadorff et al., 2014).

However, there is few experimental evidence which is discrepant with the data presented above and found no significant relationships between nightmare frequency and anxiety disorders. Two studies revealed no relationship between the frequency of nightmares and any type of psychopathology or mental disorders, including anxiety disorders

(Chivers & Blagrove, 1999; Spoomaker & Van den Bout, 2005). Though, however, such correlation with acute stress was found (Chivers & Blagrove, 1999).

4.5. Nightmare Distress and Anxiety

Nightmare distress is defined as “the waking suffering or distress associated with nightmares” (Belicki, 1992, p. 592) or “trait-like general level of distress in waking-life caused by having nightmares” (Blagrove et al., 2004; p. 129). A clear evidence of the inner relationships between nightmare distress and anxiety and anxiety disorders exists and such associations and influence were confirmed in a significant number of studies and investigations.

There is direct evidence suggesting that elevated levels of trait anxiety both in children and adults are related to the heightened level of nightmare distress in nightmare sufferers (Mindell & Barrett, 2002; Picard-Deland et al., 2018). For children it was found that those children who consider their nightmares more frightening possess higher levels of trait anxiety than those who don't perceive them as frightening (Mindell & Barrett, 2002), while the adults showed direct correlation between the trait anxiety levels and the nightmare distress experienced by the frequent nightmare sufferers (Picard-Deland et al., 2018).

An abundance of empirical data confirms that elevated nightmare distress in nightmare disordered individuals is highly associated and strongly correlated with the heightened levels of state anxiety. Furthermore, some of the studies suggest that state anxiety is related to and correlates with nightmare distress even more significantly and explicitly than with nightmare frequency (Blagrove et al., 2004; Levin & Fireman, 2002; Zadra, Germain, Fleury, Raymond, & Nielsen, 2000). Intensified emotional disturbance related to nightmares and nightmare distress in frequent nightmare sufferers was shown to be associated with an elevated state anxiety (Berquier & Ashton, 2002). Accordingly, it is almost evident that frequent nightmares negatively affect an individual well-being through the distress they provoke and, correspondingly, heighten state anxiety of an individual, as a component of one's well-being, which is implied by the observation that nightmare distress serves as a mediator between nightmare frequency and suicidal ideation and thoughts, and, thus, lower one's well-being (Lee & Suh, 2016). Likewise, series of other studies also support these ideas and evidently indicate that higher nightmare distress is associated with higher state anxiety and neuroticism due to the elevated levels of negative affect, acute stress or stress-related symptoms and lower well-being in waking life (Blagrove et al., 2004; Levin & Fireman, 2002; Zadra et al., 2000).

Both trait and state anxiety were shown to be related to the elevated levels of nightmare distress (Nielsen et al., 2000), while some of the evidence suggests that both of them are related to nightmare distress even more significantly and directly than to nightmare frequency (Belicki, 1992; Levin & Fireman, 2002). We may conclude, therefore, that higher nightmare distress is strongly and obviously related to elevated levels of trait and state anxiety, heightening their levels and, likewise, is affected and intensified by them.

4.6. Dreams and Comorbid Anxiety and Depression

Certain and significant evidence of the influence of not only anxiety as such, but also comorbid anxiety and de-

pression on dreams and dream content exists. In terms of dream content, dreams of anxious depressive patients are distinguished by a higher aggression and more frequent aggressive interactions in dreams rather than friendly ones, more negative affect and lower negative emotionality, higher number of dead, imaginable or unreal characters and figures (McNamara, Auerbach, Johnson, Harris, & Doros, 2010). They also tend to have a higher overall frequency of dreams with aggressive social interactions and aggressive acts (McNamara et al., 2010). In addition, relationships between anxiety and mood disorders and nightmares were observed. A high comorbidity of nightmares and anxiety and mood disorders, especially among women, is already known and confirmed (Ohayon et al., 1997). Furthermore, individuals suffering from major depression with comorbid frequent nightmares exhibited higher levels of state anxiety, suicidal ideations and tendency and an increased suicidal ideation, which was especially significant in women (Ağargün, Çilli, Kara, Tarhan, Kincir, & Öz, 1998). This is concordant with the fact that frequent nightmares considerably increase the risk of suicide in general population and may even predict such outcome in the most severe cases (Tanskanen, Tuomilehto, Viinamäki, Vartiainen, Lehtonen, & Puska, 2001). Accordingly, it is revealed that frequent nightmare sufferers possess poorer and lower well-being and therefore, are distinguished by significantly heightened level of state anxiety, as well as mood disorders, worse mood and heightened levels of depression and dysthymia (Klůzová Kráčmarová & Plháková, 2015). Additionally, trait factors, especially trait anxiety, can act as a predisposition for the occurrence of nightmares, and for the increase of their severity and nightmare distress intensity as a reaction to state anxiety and depression on a daily basis (Klůzová Kráčmarová & Plháková, 2015), which is consistent and concordant with the results obtained in the study by Blagrove and Fisher (2009).

4.7. Dream Recall and Anxiety

Presence of different anxiety disorders was shown to lead to the higher rate of dream recall in anxiety sufferers, especially, the rate of recall of frightening or disturbing and bad dreams (Desroches & Kaiman, 1964). Similarly, higher levels of anxiety instigate longer dream reports of the highly anxious subjects, based on a mean number of words in a dream report (Gentil & Lader, 1978). This implies that individuals with higher trait anxiety tend to give more detailed answers, and thus, remember dreams better (Gentil & Lader, 1978), exhibit an increase in dream recall rate and, particularly, the recall rate of repetitive dreams (Brown & Donderi, 1986; Zadra et al., 1998). Likewise, heightened state anxiety was found to be related to an increase of total dream recall and recurrent dreams recall rates (Duke & Davidson, 2002). A series of studies demonstrate that dream recall frequency increases when strong pre-sleep negative emotions, such as state anxiety and fear, are present (Yu, 2007). This increase also occurs due to the emotions of fear and anxiety directly during dreaming. Taken together, these studies suggest that various anxiety disorders and heightened levels of anxiety, both trait and state, increase dream recall rate, help to remember dreams better, improve dreams memorization, making it easier to remember different dream content, and instigate longer dream reports of dreamers. There is still some evidence from the more recent studies, however, which indicate that patients suffering from different anxiety disorders, on the contrary, exhibit significant decrease in the

level and rate of dream recall (DeCicco et al., 2013; Miller et al., 2015).

5. Conclusion

According to the existing publications on the problem of relationships between dreams and anxiety we can conclude that the question of associations between dreams, dream content and anxiety disorders and anxiety remains still relatively undeveloped and not very widely investigated. In addition, with the exclusion of posttraumatic stress disorder (PTSD) and Obsessive-compulsive disorder from the list of anxiety disorders in the DSM-5 (American Psychiatric Association, 2013), it should be noted that studies regarding this particular topic are even more scarce. It is not yet undoubtedly clear also how some particular anxiety disorders, for example, specific phobias or agoraphobia affect dream content. Several studies suggest that an association between trait and state anxiety and dream disturbances exists, which implies that heightened trait or state anxiety or presence of different kinds of anxiety disorders leads to a higher frequency of nightmares or bad dreams and higher level of nightmare distress. Though there were few studies which did not confirm this presupposition that higher trait or state anxiety or presence of anxiety disorders influences and affects dream content or specific features and traits of dreams, it still seems reasonable to assume that such associations exist. Although several dream theories, such as, the continuity hypotheses of dreaming or the sentinel function theory of dreaming, allow us to give unambiguous and clear predictions regarding the influence of anxiety and anxiety disorders on dreams and dream content, for example, lowering its emotional tone, increasing the frequency of nightmares or overall negativity, anxiety and aggressiveness in dreams, there is still some empirical data which contradicts such expectations and gives more support to the other theoretical views on dreams' formation reflected in the discontinuity hypothesis of dreaming. Considering the mentioned relative deficit of empirical evidence and studies on this particular topic, as well as certain heterogeneity in the results of existing studies, it seems necessary to conduct further research and study on dream contents and characteristics of anxious patients to obtain more conclusive, comprehensive and definitive data on the relationships and associations between anxiety and dreams.

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