

# The Dream and Sleep Emotions and Anxiety Questionnaire (DSEA): Reliability and structural validity using Confirmatory Factor Analysis

Mar Mediano, and Enrique G. Fernández-Abascal

Department of Basic Psychology II, Faculty of Psychology –  
Universidad Nacional de Educación a Distancia (UNED), Spain

**Summary.** The study of anxiety traits and their relationship with emotions in dreaming is gaining special relevance in recent times. One instrument that measures the level of sleep anxiety and emotional valence in dreams is the DSEA (Dream and Sleep Emotions and Anxiety) questionnaire. This questionnaire has two different scales, one for sleep anxiety (S) and one for dream anxiety (D), although reliability and validity analyzes have not yet been carried out in either of them. The aim of the current study was to obtain evidence of the two scales of DSEA reliability and internal structural validity. With a sample of 1058 participants, correlations between DSEA with other anxiety and emotional valence questionnaires have been calculated. Also, one confirmatory factor analysis (CFA) for each scale was performed. Results showed significant moderated and high correlations with other anxiety scales and adequate goodness of fit indices in CFA, which support the underlying constructs. Consequently, the results of DSEA validation were sufficient for its use in any study with deals with sleep and dreaming anxiety, and emotions. An English version of the DSEA questionnaire is included.

**Keywords:** Emotional dreaming experience, sleep anxiety, DSEA questionnaire, CFA

## 1. Introduction

Anxiety is an emotion, a threatening information processing system, which allows mobilizing preventive actions (Fernández-Abascal, 2003). It only becomes a disorder if the levels are excessive in intensity and over time, so it is also a question that affects the health of the general population. Many different factors can cause anxiety disorders (AD), which has led to various classifications based on different criteria over time. One of the most widely accepted classifications in recent years is that found in the DSM-5, which highlights the main groupings of fear-based disorders. These include specific phobias, social anxiety, and generalized anxiety disorder (Kogan & Ashbaugh, 2020). Likewise, depending on the origin, symptoms, and severity of AD can vary importantly.

On the other hand, trait anxiety is a relatively stable tendency or disposition to perceive a wide range of situations as threatening and to respond to these situations with increased anxiety. It is a personality construct that refers to an individual's general level of anxiety across time and situations, as opposed to state anxiety, which is a temporary emotional response to a specific situation (Spielberger & Reheiser, 2009). Trait anxiety is considered to be a risk factor for developing AD and other psychopathologies and is often measured using self-report questionnaires.

Additionally, anxiety is frequently involved in sleep disorders. This is because they lead to an increase in basal temperature, constricting the blood vessels and generating general motor restlessness, which hinders the restoration and/or maintenance of sleep (Palmero & Fernández-Abascal, 1998). Several studies analyze the two aspects together. For instance, the Spanish Ministry of Health (2022) statistics show there is a clear increase and similar, practically parallel, trend in the prevalence of anxiety and sleep disorders in the Spanish population between 2013 and 2019. This circumstance arises from the bidirectional relationship between sleep and anxiety and could have significant implications for overall health (Hamilton et al., 2021). Therefore, it could be asserted that there is a certain degree of trait anxiety present during sleep, which is related to the level of waking trait anxiety. Thus, sleep anxiety can be defined as a relatively stable, trait-like individual difference arising from emotional, physiological, and behavioral responses. These responses occur in anticipation of a negative evaluation of initiating, maintaining, or terminating the sleep process.

Conversely, some instruments measure different aspects related to sleep quality. For example, the Pittsburgh Sleep Quality Index (PSQI) (Buysse et al., 1989) is the most commonly used self-report questionnaire for assessing general sleep quality. However, it should be noted that PSQI is not a measure of anxiety levels. The Van Dream Anxiety Scale (VDAS) (Ağargün et al., 1999) is another instrument that includes a scale primarily focused on sleep anxiety, which is based on the frequency of nightmares and sleep difficulties. However, it is important to bear in mind that the VDAS is specifically designed for patients who experience frequent nightmares and is not appropriate for measuring trait anxiety or for use with the general population.

Other types of instruments are designed to detect sleep disorders listed in the Diagnostic and Statistical Manual of Mental Disorders, such as the Sleep 50 Questionnaire

Corresponding address:

Mar Mediano - C/ Pinar de Dona Consuelo, 11 28220 Majadahonda (Madrid). Spain.

Email: mar.mediano@uess.es

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(Spoomaker et al., 2005). In addition, several scales are aimed at evaluating sleep quality in children and other groups. For instance, the Pediatric Sleep Questionnaire (PSQ) aims to assess certain obstructive sleep-related breathing disorder symptom complexes, including snoring, daytime sleepiness, and related behavioral disturbances. Similarly, the Children's Sleep Habits Questionnaire (Owens et al., 2000) is an instrument designed to evaluate sleep, but it is aimed at behavior in young children.

Nevertheless, none of the identified instruments specifically evaluates the level of anxiety that manifests during sleep, nor do they provide a separate scale for each of the three phases of sleep. This is because each major part of sleep has its peculiar characteristics and they are not always generalizable to a single factor. Such is the case with insomnia due to is the most common sleep disorder, and a significant percentage of the adult population experiences attempting sleep onset (Montserrat & Puertas, 2015). Nonetheless, there are often people who do not have difficulty initiating sleep but wake up several times during the night without apparent cause, which itself generates anxiety due to the lack of rest. From another perspective, some individuals may have adequate sleep quality, but upon waking, they manifest a high level of distress and anxiety for various reasons. Therefore, and in the absence of conclusive research on the matter, it would be valuable to have an instrument capable of evaluating the overall level of anxiety during sleep in the general population and each of its three facets. Such an instrument would be useful both within and beyond the clinical setting.

Furthermore, once sleep has commenced, another important factor of anxiety can arise from the emotional responses that dream experiences can elicit. This is known as dream anxiety, which is the level of negative valence triggered by dreams. This level can be derived from nightmares, but not necessarily. Nightmares are considered frightening dreams involving threats to survival or security, from which the sleeper awakens (A argün et al., 1999). However, most dreams do not result in awakening and can still trigger emotions such as sadness, fear, or joy. Thus, the emotional valence of dreams, similar to that of wakefulness, as it increases in negative levels, generates a certain degree of anxiety. Recent studies, such as Rimsh (2021), have established significant connections between anxiety disorders and dreams. Moreover, negative emotional states are closely related to the emotional tone and anxiety levels, leading to the generation of negative emotions (Fernández-Abascal, 2003). Hence, it is essential to have instruments available to measure anxiety levels and emotional valence in both clinical and non-clinical settings. Furthermore, sleep and emotions share a privileged association. Sleep, in particular, is beneficial for consolidating intrinsically emotional memories (Deliens et al., 2014).

Regarding studies of anxiety and emotions in sleep and dreaming, several instruments can be found, many of which measure aspects related to dreaming content and emotions. A highly comprehensive instrument is the Mannheim Dream questionnaire (MADRE). This instrument has gained widespread use in dream-related studies. Originally developed in German (Schredl et al., 2014), it has since been translated and validated in several other languages including English (Dyck et al., 2017), French (Ghorayeb et al., 2019), and Spanish (Mediano et al., 2022; Mediano & Alvarado, 2022). MADRE is widely used in both clinical (Schredl et al., 2017)

and other types of research (Schredl and Basak, 2020). The questionnaire assesses dream recall frequency and characteristics such as attitudes toward dreaming and contains several questions about the tone and level of the emotional intensity of dreams. It also includes questions about nightmares, such as their frequency, recurrence, and childhood experiences. However, it does not measure specific emotions such as fear, joy, or sadness.

On the other hand, only a few questionnaires contain items related to the dream affect. An example is the Sleep and Dream Questionnaire (SDQ), which evaluates several extents of dream experiences, including nightmares, dream recall frequency, and lucid dreams (Brown & Donderi, 1986). Other instances are the Inventory of Dream Experiences and Attitudes (IDEA) (Beaulieu-Prévost et al., 2009) which evaluates dream-related beliefs and their relations to the waking state, or the Dream Intensity Inventory (Yu, 2008) which studies dream intensity as a trait variable. However, all of these questionnaires have some limitations when it comes to a comprehensive evaluation of the affect in dreaming. Firstly, dream emotion is often assessed with only one or very few items (e.g. Schredl et al., 2014). Secondly, in many cases, items are rated on extreme negative or positive valence scales, which do not allow for the assessment of the frequency of occurrence of each item (e.g. Ritchie & Skowronski, 2008). Thirdly, dream content items are sometimes mixed with intensity, nightmares, and factors of different natures on the same scale (e.g., Yu, 2008).

Furthermore, we have yet to come across any tool capable of exclusively measuring emotional scales in dreams. This lack of tool prevents the creation of sub-scales based on the positive and negative valence axis, as well as specific ratings of the frequency of occurrence of each basic emotion.

Therefore, the objective of this study was to develop a reliable and valid scale, using a single instrument that can differentiate between various aspects of anxiety during sleep and dreams. The instrument utilized for this purpose is the Dream and Sleep Emotions and Anxiety (DSEA) questionnaire, which was designed to provide both joint and separate scales of anxiety in sleep and dreams, as described in the following section.

## 2. DSEA Questionnaire

The DSEA questionnaire was developed in Spanish by Mediano (2021) and was designed to assess two independent blocks of emotional state in sleep: a sleep anxiety scale and an emotional scale in dreaming. It was settled on literature reviews and studies on anxiety, and sleep disorders.

The process of constructing the instrument was carried out in three phases: 1) an initial set of items that would make up the scale for each of the blocks was elaborated; 2) two experts in emotions were consulted for its revision and a new re-elaboration to perfect the scales, and 3) a pilot study was carried out to find difficulties in interpretation or possible misunderstandings by the participants and some terms were refined.

DSEA questionnaire consists of two subscales: A) DSEA-S (Sleep) which is a sleep anxiety scale with 12 items that measure the level of anxiety, through three factors: initiating sleep, maintaining sleep during the night, and waking up. Each factor is measured with four items whose questions must be answered using a score according to the frequency of occurrence among five response levels: 0=Never or rarely;

1=Few times; 2=Half of the times; 3=Often, and 4=Always or most of the times. 2. B) DSEA-D (Dreaming): the emotional scale of dreams, which evaluates the predominant emotional valence in dreams, through the memories of the emotions that have occurred. This is measured with 24 questions that include eight emotions (four of negative valence and four of positive valence) and the same score answers as DSEA-S. As of today, no reliability and validity studies have been carried out on the two scales of the DSEA questionnaire.

The importance of the DSEA questionnaire in both of its facets is that it allows for establishing relationships between anxiety levels in the three specific domains of sleep with emotional valence in dreams. This can be very useful for studies that combine these scales with others on anxiety levels during wakefulness. Therefore, the DSEA questionnaire responds to a model that evaluates trait anxiety in sleep from the perspective of being applicable both within the clinical context and in the general population. According to this model, anxiety in sleep is a construct that responds to two main factors: anxiety in sleeping and anxiety derived from the emotional valence axis in dreams. Regarding the factor of anxiety in sleeping, it can be derived from three parts of the sleep process: initiating it, maintaining it, and waking up. Regarding the second factor, the level of negative emotionality in dreams is also a generative factor of anxiety that must be evaluated. Thus, the DSEA contemplates a scale for each of the main emotions, determined with items that measure the frequency of appearance of each of them. This is evaluated through items that respond to common situations in dream content that trigger emotional processing. From the set of frequencies of all these emotions, a score is obtained on the average dream valence of a certain period of time.

The empirical evidence that emotional valence can be represented as a continuum whose extremes correspond to the maximums of negative and positive affect has been well-studied by authors such as Aguado (2019). Furthermore, according to this author, the simplest classification of emotions is the one based on valence.

Thus, the empirical basis of the model proposed by the DSEA as a whole is based on three types of studies:

- 1) Studies in which the level of anxiety is related to problems and disorders in sleep (Montserrat & Puertas, 2015).
- 2) Studies in which the main emotions establish the two major axes of human behavior (appetitive and aversive) (Fernández-Abascal, 2003), applied to the emotional processing of dream experiences (Hagemeyer et al., 2020).
- 3) Studies in which the unidimensional structure of emotional valence has been tested (Moral de la Rubia, 2011).

The item selection was carried out by keeping the criterion of three items per factor recommended as a minimum, in order to obtain more precise estimations, as well as stable and replicable solutions recommended by MacCallum et al., (2001).

Therefore, considering the relevance of the DSEA questionnaire and its potential usefulness in studies of anxiety and emotions in sleep and dreaming, the aim of the current study was to obtain evidence of its reliability and internal structural validity. Additionally, an English version of the DSEA questionnaire and the instructions for use can be found in the appendix.

### 3. Method

#### 3.1. Participants

The sample consisted of 1058 undergraduate psychology students at the Universidad Nacional de Educación a Distancia (UNED). This sample was selected by convenience, so a non-probability sampling method was applied. Mean age of 33.55 (SD = 11.79) years (762 women-72% and 296 men-28%). At the beginning of the questionnaire, all participants signed the informed consent form.

#### 3.2. Instruments

##### 3.2.1 PANAS Questionnaire

The Positive and Negative Affect Schedule questionnaire (PANAS) is an instrument whose objective is the evaluation of awakened emotions through a bifactorial structure of positive affect (PA) and negative affect (NA) (Watson, et al., 1988).

##### 3.2.2 STAI-T

The STAI (State-Trait Anxiety Inventory) is a self-report instrument that assesses anxiety (Spielberger & Reheiser, 2009), and has been used in research with different age intervals. It has two scales, State and Trait. In the trait subscale, anxiety is measured as a permanent and relatively stable characteristic in the person in relation to the propensity to anxiety (Spielberger, 1966).

##### 3.2.3 DSEA Questionnaire

The purpose of the Dream and Sleep Emotions and Anxiety questionnaire (DSEA) is to assess two independent blocks of emotional state in sleep: a sleep anxiety scale (DSEA-S) and a dream emotional scale (DSEA-D) (referred to Section 2).

#### 3.3. Procedure

The three questionnaires were recorded in the special Google Forms application and a unique access link was obtained and sent to each participant.

Lavaan package for the R program, 4.2.1 version, (Rosseel, 2012), and the polychoric correlation matrix were used as the input matrix. The estimation method was Diagonal Weighted Least Squares (DWLS) (Asún et al., 2016).

At all times, the current regulations on personal data protection and research ethics were complied with.

#### 3.4. Data analysis

Firstly, Cronbach's alpha was calculated to measure the reliability of each of the two scales, DSEA-S and DSEA-D. The Mardia test (Mardia, 1970) was performed to assess the multivariate normality of the data.

Next, correlations were calculated between STAI scores with each of the three anxiety facets of the DSEA-S (falling asleep, maintaining sleep, and waking up). Also, the correlation between the positive and negative valence DSEA-D scales with each of the two PANAS equivalent scales was calculated.

Finally, two CFA was performed. For DSEA-S a CFA was performed with a Bifactor model, under the premise of a



general sleep anxiety factor (ANX-S) which coexists with three factors specific to the subsequent aspects of entering sleep (FALL), maintaining sleep (KEEP), and waking up (WAKE).

For the DSEA-D, we conducted a CFA with the two factors of the positive and negative affect sub-scales to assess the structural validity of these constructs.

To examine model fit, the root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), comparative fit index (CFI), and Tucker-Lewis index (TLI) were used. The model was evaluated based on its adherence to recommended thresholds for each index, where values of RMSEA and SRMR < .08, and CFI and TLI > .95 indicate a good fit (Schumacker & Lomax, 2016). Model fit in this context can be expressed as a fundamental hypothesis, which proposes that if the model is correct and we know the parameters of the structural model, the population covariance matrix could be exactly reproduced from the combination of the model parameters (Ruiz et al., 2010). Therefore, if a good fit is found according to the aforementioned indices, it can be said that we are able to reproduce the population covariance matrix from the combination of the model parameters.

#### 4. Results

Firstly, Table 1 shows the means and standard deviations (SD) and the skewness (Sk) and kurtosis (Kr) indices of each variable under analysis.

The Mardia test indicated that the data do not meet multivariate normality.

According to Curran et al. (1996), when the Mardia test indicates a violation of multivariate normality, an alternative test is to evaluate the skewness and kurtosis indices. If the absolute value of the skewness index does not exceed 2 and the kurtosis index is below 7, it can be concluded that the deviation from normality is not severe, and therefore, it is safe to continue with the analysis.

In this study, the indices obtained for each variable do not exceed the limits of  $|Sk| \leq 2$  and  $|Kr| \leq 7$ , so, following Curran et al. (1996), we can say that there is no severe violation of normality.

The Cronbach's alpha coefficient was .77, for both DSEA-S and DSEA-D, which is a sufficiently high indicator to use the score from those scales as unidimensional.

The correlations between the STAI scores with each of the three facets (fall, keep, and wake up) were calculated, obtaining a significant result (Pearson's coefficient with a

Table 1. Descriptive statistics (N=1058).

Item	Scale	Mean	SD	Skewness	Kurtosis
ST	STAI Trait	26.02	12.33	0.18	-0.79
PN-P	PANAS-Positive	1.56	0.43	0.01	-0.63
PN-N	PANAS-Negative	1.28	0.45	0.36	-0.67
DF	DSEA-S Fall	4.85	3.52	0.62	-0.42
DK	DSEA-S Keep	5.46	3.68	0.51	-0.52
DW	DSEA-S Wake	6.83	3.37	0.15	-0.57
DD-P	DSEA-D Positive	27.85	8.17	-0.12	-0.11
DD-N	DSEA-D Negative	13.84	7.85	0.59	0.03

Table 2. DSEA-S-Estimated factor loadings for the Bifactor model.

Items	FALL	KEEP	WAKE	GANX-S
V1	.67			.64
V2		.76		.51
V3	.25			.72
V4			.56	.45
V5			-.24	.59
V6	.13			.60
V7			.31	.68
V8		.38		.64
V9		.38		.50
V10	.44			.73
V11			.70	.37
V12		.23		.76

confidence level of 95%,  $p < .001$ ) of .52, .40, and .69, respectively.

Regarding the first CFA on the DSEA-S, Figure 1 shows the model representation, and Table 2 the estimated factor loadings of the Bifactor model. However, it is also possible to use the three specific factors, which have also been corroborated, Therefore, it will depend on the objectives of the study. The goodness-of-fit indices are shown in Table 3.

On the other hand, correlations between the DSEA-D scales of each of the two valences with the PANAS equivalents (AN and AP) were significant. Pearson's coefficient, at a 95% confidence level ( $p < .001$ ) was .49 for negative valence and .35 for positive valence. Although the second correlation is moderate, it should be taken into account that the PANAS and the DSEA measure two different domains (wakefulness and night) so it seems reasonable that the scores do not correlate excessively.

In relation to the AFC of two factors specific to the DSEA-D, positive and negative valence, showed a good fit, whose main indices are shown in Table 3.

In both scales, the indices Mean Square Error of Approximation (RMSEA) and Standardized Root Mean Square Residual (SRMR), showed a good fit since they did not reach the maximum recommended values < .08 (Schumacker & Lomax, 2016), though in DSEA-S is in the limit. Likewise, the Comparative Fit Index (CFI), and the Tucker-Lewis Index indices were very close to unity, according to Schumacker and Lomax (2016) recommendations.

All of this indicates that the analyses performed offered sufficient evidence of reliability and structural validity to use the score obtained from the DSEA-D scale.

In terms of invariance analysis between genders, the results indicate that there is a significant difference between the female and male groups. This conclusion was reached through the examination of configural invariance, the most

Table 3. Goodness-of-fit indices.

Indices	$\chi^2(*)$	RMSEA	SRMR	CFI	TLI
DSEA-S Bifactor	436.30	0.08	0.06	.99	.98
DSEAD 2F	55.23	0.05	0.03	.99	.98

Note. \*( $p < .001$ )

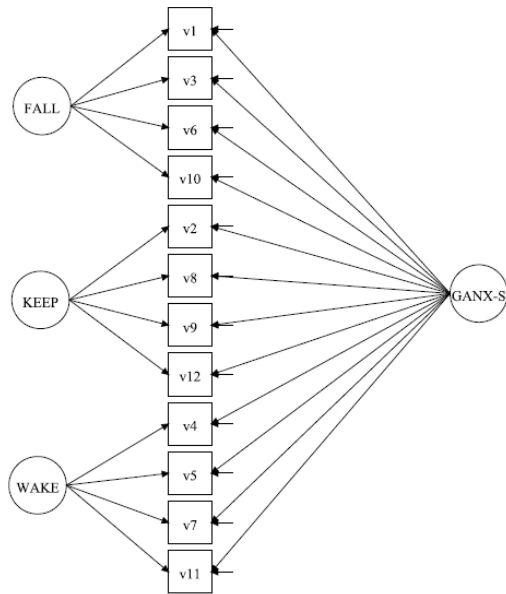


Figure 1. Path-diagram of the DSEA-S Bifactor Model representation.

Note. GANX-S: general sleep anxiety factor; specific factor: FALL: entering sleep, KEEP maintaining sleep, WAKE waking up.

fundamental type of invariance, which was found to not hold. This suggests that the latent variables are not configured in the same manner between the two groups. Given that the first level of invariance is not met, it is unnecessary to calculate higher-level types of invariance, which are more stringent and also unlikely to hold.

In addition, by comparing the means of each gender in certain variables using a Student's *t*-test, our results show that the mean differences are statistically significant in all seven variables examined. However, the most significant gender differences are observed in sleep anxiety, particularly in variables related to falling asleep and maintaining sleep, with higher scores reported for females. These findings suggest that the observed differences between genders are primarily due to anxiety-related factors, rather than emotional ones, where differences between genders are less pronounced.

These results are very consistent with those offered by the Spanish Ministry of Health, since according to their 2019 report, the prevalence of anxiety disorders in women is approximately twice that in men except in child groups where there are practically no gender differences.

## 5. Discussion and Conclusions

Despite the existence of previous questionnaires on anxiety and emotions in dreams, some of them, like the MADRE questionnaire (Schredl et al., 2014), do not contemplate the detail of the different emotions that can be felt in dreams or anxiety during sleep. Others, such as VDAS (Ağargün et al., 1999) or PSQI (Buysse et al., 1989), were designed for clinical situations of persons with sleep disorders, multiple nightmares, etc. However, the DSEA questionnaire, which was assessed in this study, was originally developed for application in research investigating anxiety levels in individuals both within and outside of a clinical environment. It is

therefore of interest to validate the two scales and facilitate their use in future studies.

In the present research results, DSEA's reliability was tested through a sufficiently high Cronbach's alpha value for each of the two scales. This means that each scale has a high level of internal consistency.

It has also been found that the different subscales have significant correlations with other questionnaires that measure anxiety as a trait (STAI-R by Spielberger, 1966) and emotional valence (PANAS by Watson, et al., 1988). This implies confirmation of the underlying constructs of the DSEA scales with respect to others that have been validated previously, but with the new contributions of the DSEA concepts. Likewise, all subscales have given significant correlations, although in some cases it has been moderate. Nevertheless, this is considered acceptable since both scales correspond to two physiologically different domains, wakefulness, and sleep.

Confirmatory factor analyses were also performed for the latent variables of the two sleep scales and dreams, obtaining good indicators of fit, which endorses the theory that has been subjected to analysis. On the one hand, the bifactor structure of sleep anxiety has been confirmed. This is because a general factor has emerged that affects the whole night's sleep. But, also the existence of three different specific factors depending on whether sleep is onset, maintenance, or awakening. This may be of particular relevance for the study of anxiety and sleep since it is usually considered a single condition throughout all sleep phases, as is the case in the study by Silva et al. (2020). However, with our results, it is evident that a more comprehensive analysis, according to the three fundamental stages, may be convenient. Thus, cases of people who can fall asleep without difficulty, but wake up often during the night will be analyzed more precisely than others with insomnia and difficulty falling asleep. These two problems may arise from different causes, as well as people who can sleep reasonably well but wake up with anxiety. Therefore, the DSEA questionnaire, which allows measuring the levels of these three facets, could help to a better finding and hence the usefulness of its content validation.

In relation to the analysis of the two scales of the DSEA-D, its use as a single unidimensional scale, on the hedonic valence axis with two positive and negative extremes, has been supported, according to the thesis of Fernández-Abascal (2003). However, it can also be used to measure each valence extreme separately if the characteristics of the studies so require, given that the two-factor CFA has shown a good fit.

With all this, the tests carried out on the reliability and internal structure validity of the DSEA-S and DSEA-D were sufficient for their use in any study with deals with sleep and dreaming anxiety, and emotions.

However, further validation studies and adaptations to other languages will be necessary to strengthen the overall validity of the DSEA questionnaire.

## 6. Limitations of the study and future developments

Although this article includes an English version, it is important to note that the DSEA questionnaire has only been developed and validated in Spanish. Therefore, it is crucial to approach the validation of the questionnaire in other lan-

guages or countries with careful consideration. Additionally, the study's results show an imbalance in the number of participants between genders and a lack of invariance in the outcomes. This highlights the need for further studies to verify whether the findings hold true for both genders and other social, age, or other characteristic groups.

It should also be noted that the results of this study were derived from a sample of psychology students from a Spanish university, and thus generalizing these findings to the wider population requires cautious consideration.

Given that there are known sex differences in sleep anxiety, it would be advisable for future studies to conduct an analysis of measurement invariance using multigroup CFA. Also, as this is the first validation study conducted on the DSEA questionnaire, thresholds between normality and pathology have not been established. For a more complete evaluation of the questionnaire, additional studies will be necessary, including external validation and its predictive capacity. This poses a challenge when it comes to future studies of symptoms of anxiety disorders, in relation to the DSEA scales.

#### Orcid-IDs

Mar Mediano:

<https://orcid.org/0000-0001-5326-6644>

Enrique G. Fernández-Abascal:

<https://orcid.org/0000-0002-4695-2571>

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# Appendix

## DSEA QUESTIONNAIRE (*Dreaming and Sleep Emotions and Anxiety Questionnaire*)

You are about to participate in a study on dreaming emotions. This questionnaire will only take a few minutes.

### DSEA-S SCALE

Please read each sentence and mark with an "X" the score that indicates what you remember about your routines in the last six months.

DSEA-S	0.Never or rarely	1.A few times	2.Half of the time	3.Often	4.Always or most of the time
1. I usually fall asleep quickly at night.					
2. I wake up several times a night because I am a very light sleeper.					
3. My worries usually cause me to take a long time to fall asleep, even though I am in bed.					
4. I often wake up in the morning cheerful and cheerful to start the day.					
5. I usually wake up before the alarm clock goes off because of stress or worries.					
6. I usually have to use relaxants or other methods to fall asleep.					
7. I usually wake up feeling quite restless because of day-to-day problems.					
8. I tend to sleep in one go despite my worries.					
9. I am easily awakened by any small noise or activity in my environment.					
10. When I go to bed at night, any distraction prevents me from falling asleep.					
11. I often find it very difficult to get out of bed in the morning.					
12. I often have a lot of worries that interrupt my sleep in the middle of the night.					



## DSEA-D SCALE

Please read each sentence and mark with an “X” the score that indicates what you remember about your dreams recalled in the last six months.

DSEA-D	0.Never or rarely	1.A few times	2.Half of the time	3.Often	4.Always or most of the time
1. I tend to have dreams in which strangers appear and frighten me.					
2. I often have dreams in which I am cheerful					
3. In my dreams I often protect weaker people					
4. I often dream of situations that make me physically disgusted.					
5. In my dreams, even if the situation starts badly, I always manage to solve it.					
6. I usually dream of pleasurable relationships					
7. In my dreams I usually show a lot of irritation about something that is going on.					
8. I often feel aversions in my dreams					
9. I often dream about situations that make me feel sorry for myself.					
10. In my dreams I often see people very close to me, such as family or friends.					
11. I often dream of situations in which I feel very happy.					
12. I often feel grief in my dreams for some reason.					
13. In my dreams I am often irritated by what has happened.					
14. I often find my dreams exciting and pleasant.					
15. When I feel fear in my dreams I usually wake up					
16. In general, I have a lot of fun in my dreams					
17. Usually in my dreams things go well.					
18. I usually dream about people who disgust me.					
19. In my dreams I am usually intimate with other people in a satisfactory way.					
20. I often dream that I help or solve other people's problems.					

## Instructions

### A) DSEA-S: Sleep Anxiety Scale

This consists of 12 items that collectively measure the level of sleep-related anxiety across three factors: initiating sleep, i.e., anxiety to fall asleep, maintaining it during the night, and anxiety upon awakening. Each factor is measured through four items, three of which have questions in the same direction and a fourth in the reverse direction. Thus, for each estimated factor, three questions have been included in which responding 0 implies low anxiety, and the fourth, responding 0 indicates high anxiety. The order of items in the questionnaire has been randomly arranged.

Each question must be answered with a score based on the frequency of each of the described events, choosing between five response levels: 0=Never or almost never; 1=Few times; 2=Half of the time; 3=Many times, and 4=Almost always or always. Generally, a score of 0 on an item will imply a low level of anxiety, except for the items with the inverse sign (inv.), where 0 will imply a high level and 4 a low level. This means that for data analysis, these items will need to be recorded.

The three evaluated factors are:

- Difficulty in initiating sleep (CO): items 1 (inv.), 3, 6, 10.
- Difficulty in maintaining sleep during the night (MA): 2, 8 (inv.), 9,12.
- Anxiety upon awakening (DE): 4 (Inv.), 5, 7,11.

The relationship of the corresponding items for each factor can be seen in Table A.

### B) DSEA-Dream: The Emotional Scale of Dreams

The task involves retrospectively evaluating the predominant emotional valence in dreams, through the memory of experienced emotions, using a 24-question questionnaire. Eight emotions have been selected, four of negative valence and four of positive valence. These emotions include: 1. Positive valence: joy (JO), engagement (CM), optimism (OP), and pleasure (PL); 2. Negative valence: disgust (DI), anger (AN), fear (FE), and sadness (SA). For each emotion, THREE questions or items have been created, as shown in Table B.

The responses of emotions with POSITIVE valence will be encoded in reverse, so that the final value on the scale indicates: 0=prevalence of positive emotion and 4=prevalence of negative emotion, such that the direction of the final score matches that of DSEA-S. This, together with the results of DSEA-S, implies that in general, 0 is associated with low levels of anxiety and emotional stress, and 4 with high levels.

Finally, participants will be asked to provide an estimated average level of activation for the last six months, in order to evaluate whether the results of the scales are related to the average level of activation.

Table A. DSEA-S scale items ordered by factor.

FACTOR	ITEMS
DF (inv.)	1. I usually fall asleep quickly at night
DF	3. My worries usually cause me to take a long time to fall asleep, even though I am in bed
DF	6. I usually have to use relaxants or other methods to fall asleep
DF	10. When I go to bed at night, any distraction prevents me from falling asleep
DW (inv.)	4. I often wake up in the morning cheerful and cheerful to start the day
DW	5. I usually wake up before the alarm clock goes off because of stress or worries
DW	7. I usually wake up feeling quite restless because of day-to-day problems
DW	11. I often find it very difficult to get out of bed in the morning.
DK	2. I wake up several times a night because I am a very light sleeper
DK (inv.)	8. I tend to sleep in one go despite my worries
DK	9. I am easily awakened by any small noise or activity in my environment
DK	12. I often have a lot of worries that interrupt my sleep in the middle of the night

DF: DSEA Falling; DK: DSEA Keeping; DW: DSEA Waking

Table B. Items of the DSEA-D scale arranged according to the corresponding emotion.

EMOTION	ITEM
JO	11. I often dream of situations in which I feel very happy
JO	16. In general, I have a lot of fun in my dreams
JO	2. I often have dreams in which I am cheerful
DI	18. I usually dream about people who disgust me
DI	4. I often dream of situations that make me physically disgusted
DI	8. I often feel aversions in my dreams
CM	10. In my dreams I often see people very close to me, such as family or friends.
CM	20. I often dream that I help or solve other people's problems
CM	3. In my dreams I often protect weaker people
AN	13. In my dreams I am often irritated by what has happened
AN	21. I often dream that I assault other people
AN	7. In my dreams I usually show a lot of irritation about something that is going on.
FE	1. I tend to have dreams in which strangers appear and frighten me
FE	15. When I feel fear in my dreams, I usually wake up
FE	22. My dreams often have very threatening situations that distress me
OP	17. Usually in my dreams things go well
OP	23. In my dreams, I always resolve adverse situations in a favorable way
OP	5. In my dreams, even if the situation starts badly, I always manage to solve it
PL	14. I often find my dreams exciting and pleasant
PL	19. In my dreams I am usually intimate with other people in a satisfactory way.
PL	6. I usually dream of pleasurable relationships
SA	12. I often feel grief in my dreams for some reason
SA	24. I often cry in my dreams
SA	9. I often dream about situations that make me feel sorry for myself

JO=Joy; DI=Disgust; CM=Commitment; AN=Anger; FE=Fear; OP=Optimism; PL=Pleasure; SA=Sadness