Chapter 2
Considerations for Assessment

Abstract Before we consider complex issues such as the relation between sleep and anxiety, the sleep-related features of anxiety disorders, and the way sleep problems with co-existing anxiety are treated, it is imperative to consider diagnostic and assessment issues. Thus, this chapter provides an overview of assessment and measurement. While a comprehensive review of assessment techniques across all sleep and anxiety disorders is beyond the scope of this book, we focus on commonly used and supported measures and techniques for assessment, including physiologic, clinical, and structured interviews, and self-reported measures of sleep and anxiety.

This book focuses on the relation between sleep and anxiety, the sleep-related features of anxiety disorders, and the way the sleep problems are treated when there is coexisting anxiety. Before we consider these diagnostic features and treatment issues, it may be prudent to begin with an overview of assessment and measurement. A thorough review of assessment techniques across all sleep and anxiety disorders is beyond the scope of this book, but we provide information on commonly used measures and techniques for assessment.

Assessment of Sleep

When thinking about the assessment of sleep, many people conjure an image of a patient sleeping in a laboratory with various wires coming out of his or her head. Indeed, a polysomnogram (PSG) involves sleeping overnight in a laboratory, while electroencephalogram (EEG), electrocardiogram (EKG), pulse oximetry, air flow and electromyogram (EMG) equipment monitor brain, heart, respiration, and muscle activity, respectively. While it is often assumed that overnight PSG studies are used to assess insomnia, the measurement of insomnia most typically involves structured or unstructured interviews and self-report instrumentation. In fact, the standards in the field dictate that polysomnography (PSG) should not be used in routine assessment for insomnia (American Sleep Disorders Association, 1995).
Among the reasons for not using PSG is the fact that many people with insomnia will simply sleep very little – which is expensive verification for what they have already reported (i.e., they have difficulty sleeping). Alternatively, the opposite can occur as well. That is, some people experience what is called the “first-night effect,” and they sleep considerably better than usual. The presumed mechanism of the first-night effect is conditioning. Those with psychophysiological insomnia frequently evidence conditioned arousal in their bed/bedroom, and the change in setting no longer elicits arousal during the sleep period. Thus, traditional PSG, clinically speaking, often tells us little about the person with insomnia. The exception to this is that some people with insomnia actually have another occult sleep disorder, such as sleep apnea, that would better account for their symptoms, and this could only be detected by the PSG.

In contrast to clinical practice, research using the PSG has revealed much about the sleep of those with insomnia. PSG data is used to visually score and classify 30 s periods called epochs into various stages of sleep or wakefulness, as well as to denote whether there was a significant event (e.g., a period in which the brain roused out of sleep). This is done according to accepted scoring criteria (Rechtshaffen & Kales, 1968). In insomnia, not all insomnia sufferers have disturbed sleep according to these scoring principles. In fact, there can be a discrepancy of minutes to hours between the sleep reported by people with insomnia and what is seen on the PSG. This is generally the exception to the rule and in some cases may be a subtype of insomnia called paradoxical insomnia. In paradoxical insomnia there is a large discrepancy between objective recordings of sleep and the subjective report of little to no sleep. In addition, the daytime impairment is far less than you would expect given their dramatic reports of sleep loss. Setting those with paradoxical insomnia aside, there can be some discrepancy between objective and subjective sleep. Some of this may have to do more with our measurement than with an insomnia sufferer necessarily making a perceptual error. The visual scoring method can obscure relative range and amplitudes of each band of electrical brain activity during sleep stages, as well as brief, frequent sleep stage transitions. Thus, it seems reasonable to assume that subjectively important sleep information is not captured by the traditional PSG scoring approach. In contrast, sleep EEG spectral analysis provides a microarchitectural picture of brain wave activity across sleep stages. Applications of such analyses to the study of insomnia have been promising and suggested that spectral measures effectively discriminate psychophysiological insomnia sufferers from normal sleepers and other insomnia subtypes (Freedman, 1986; Lamarche & Ogilvie, 1997; Nofzinger et al., 1999; Perlis, Smith, Andrew, Orff, & Giles, 2001). Perlis et al. (2001) have shown that the degree of relative power in the Beta (14–35 Hz) range negatively correlates with subjective–objective discrepancy measures for sleep time and sleep onset latency. This finding seems particularly intriguing since it implies that EEG spectral indices may relate to subjective insomnia sufferers’ complaints. It should be noted that little has been done with spectral analysis and anxiety disorders, so much of what we will report will be nonspectral polysomnographic findings only. As such, mixed or absent findings using visually scored methods may not necessarily imply that the sleep disturbance is only subjective.
Actigraphic Measurement of Sleep

The most commonly known objective measure of sleep is the polysomnogram, but a less expensive and commonly used measure is actigraphy. An actigraph is a small, wrist-watch-like instrument that detects movement using an accelerometer. Scoring algorithms can then determine whether the activity is indicative of sleep or wakefulness. Measures of movements during sleep provide a relatively inexpensive, objective assessment of several sleep parameters, as well as objective corroboration of the subjective, self-report sleep evaluations obtained from sleep logs. Actigraphic monitoring is widely used as an objective estimate of sleep variables in insomnia research given that sleep parameters derived from actigraphs correlate well with PSG derived variables.

Subjective Assessment of Sleep

When someone with insomnia presents for treatment, she/he usually has ready answers for the clinically important questions such as:

“What time do you go to bed?”
“What time do you get up in the morning?”
“How long does it take you to fall asleep?”
“How long are you awake during the night?”

Whereas some people are able to provide reasonably accurate answers to these questions, a substantial proportion of insomnia sufferers provide answers that do not provide an accurate portrayal of their general sleep difficulty and usual sleep practices. This is usually not due to an intention to exaggerate the sleep difficulty or otherwise provide any misleading information. Moreover, it results from a natural tendency to remember the more difficult nights that led to seeking professional consultation. Moreover, sleep habits and sleep patterns are notoriously variable from one night to the next among insomnia sufferers, so the summary retrospective appraisals required by the questions shown are likely to overlook this variability, and thus conceal important treatment targets. For this reason, the evaluation of insomnia usually benefits by prospective assessment techniques fashioned to capture the sleep and associated behavioral variability that defines the insomnia disorder. The tool most commonly used for this purpose is the sleep diary. Rather than asking if particular sleep behaviors are a problem, sleep logs generally inquire about how long it took to fall asleep and the time spent awake in the middle of the night (see Fig. 2.1). We discuss face-valid retrospective measures of symptom severity later in the chapter.

In its usual format, the sleep diary is a paper and pencil instrument designed to allow the collection of information about sleep patterns prospectively over a period of several weeks. The typical sleep diary includes questions about
<table>
<thead>
<tr>
<th>DAY OF THE WEEK</th>
<th>Monday</th>
</tr>
</thead>
<tbody>
<tr>
<td>CALENDAR DATE</td>
<td>3/24/08</td>
</tr>
<tr>
<td>1. Yesterday I napped from ___ to ___ (note time of all naps).</td>
<td>2:30-3:15 PM</td>
</tr>
<tr>
<td>2. Last night I took ___ mg. of ____ or ____ of alcohol as a sleep aid</td>
<td>Ambien 5 mg.</td>
</tr>
<tr>
<td>3. Last night I got in my bed at ____</td>
<td>11:00 PM</td>
</tr>
<tr>
<td>4. Last night I turned off the lights and attempted to fall asleep at ____</td>
<td>11:30 PM</td>
</tr>
<tr>
<td>5. After turning off the lights it took me about ___ minutes to fall sleep.</td>
<td>40 Min.</td>
</tr>
<tr>
<td>6. I woke from sleep ___ times. (Do not count your final awakening)</td>
<td>2 Times</td>
</tr>
<tr>
<td>7. My awakenings lasted ____ minutes. (List each awakening separately)</td>
<td>25 Min. 40 Min.</td>
</tr>
<tr>
<td>8. Today I woke up at ____ NOTE this is your final awakening.</td>
<td>6:30 AM</td>
</tr>
<tr>
<td>9. Today I got out of bed for the day at _____.</td>
<td>7:15 AM</td>
</tr>
<tr>
<td>10. I would rate the quality of last night’s sleep as:</td>
<td>3</td>
</tr>
<tr>
<td>1 = very poor 4 = good</td>
<td>2 = poor 5 = excellent</td>
</tr>
<tr>
<td>11. How well rested did you feel upon rising today?</td>
<td>2</td>
</tr>
<tr>
<td>1 = not at all rested 4 = rested</td>
<td>2 = slightly rested 5 = well rested</td>
</tr>
</tbody>
</table>
nightly bed time and rising time, the perceived time it takes to fall asleep each night, the amount of time being awake during the night, and the time of the final morning awakening. Also, often included are questions about the quality of each night’s sleep, daytime napping patterns, and usage of substances (caffeine, alcohol, sleep medications) that might influence sleep each night. Sleep diaries are useful for quantifying insomnia severity, aiding in diagnostic discriminations and case conceptualization, guiding the implementation of behavioral interventions, and measuring treatment outcomes (Buysse, Ancoli-Israel, Edinger, Lichstein, & Morin, 2006). Indeed, the sleep diary is such a mainstay of behavioral insomnia treatment that it is difficult to envision implementing treatment strategies such as those described later in this chapter without this invaluable tool.

A variety of paper and pencil sleep diaries are available, and these differ slightly in the type or amount of information obtained (Edinger & Carney, 2008; Espie, 2000; Monk et al., 1994; Morin, 1993; Sateia, 2002; Wohlgemuth & Edinger, 2000). Figure 2.1 shows one version commonly used in insomnia treatment studies and in clinical venues. Through the daily entries this type of diary elicits, daily bedtimes, rise times and napping patterns can be ascertained, and estimates of nightly sleep and wake time can be derived. Whereas this type of diary adapts well to the assessment of many types of insomnia problems, alternate versions may better suit the needs of certain populations or certain types of sleep difficulties. For example, The National Sleep Foundation has developed three sleep diary versions geared toward adults, teenagers, and children (NSF, 2007). The American Academy of Sleep Medicine [www.aasm.org] offers a diary that is structured in an analogue design (AASM, 2008) that instructs respondents to “color in” the blocks of time slept. This type of diary may provide a richer picture of sleep patterns for individuals who have difficulty accurately completing the traditional diary or among those who have erratic sleep patterns (e.g., shift workers). Nonetheless, the format shown in Fig. 2.1 is used in this chapter since it is well suited for initial assessment and tracking response to the types of treatment discussed later.

Thus, with sleep diaries, the clinician can determine whether particular sleep indices like sleep onset latency is a problem based on norms. For example, if someone complains that they cannot sleep on a fairly consistent basis, and their logs support this complaint, they are viewed as having subjectively disturbed sleep. How well do people estimate their sleep? This is a tricky proposition as it begs the questions, what should be the gold standard for comparison? If insomnia is a subjective disorder, should not subjective report be the gold standard? Generally speaking, people do fairly well in estimating their sleep when compared to an objective measure such as polysomnography. The most common errors when compared with PSG are the overestimation of time spent awake and the underestimation of the time spent sleeping (Coates & Thoresen, 1979; Means, Edinger, Glenn, & Fins, 2003). Nonetheless, sleep logs are considered quintessential to insomnia assessment (Buysse et al., 2006; Sateia, 2002).
Clinical Interview

Both structured and semi-structured clinical interviews are commonly used in clinical and research practice. To arrive at a diagnosis and to develop a case formulation for treatment, the interview focuses on the etiologic (i.e., cognitive and behavioral perpetuating) factors in the insomnia. Thus, the interview will elicit the details and history of the complaint as well as the history of any possible cooccurring medical or mental health issue. It is often helpful to attempt to develop a timeline of each condition to attempt to understand the degree to which the sleep and comorbid conditions are independent, interactive, or dependent. Interviews tend to cover these major areas: the nature and history of the sleep complaint, current stressors (including relationship discord, financial strain, or environmental factors such as a loud or unsafe sleeping environment), presence of any cardinal symptoms of another sleep disorder (e.g., loud snoring, a tendency to fall asleep involuntarily, leg twitching, restless leg symptoms), medical and psychiatric history (including medication use, surgeries, allergies, exposure to toxins, or any recent change in reproductive status), current sleep habits (including the presence of shift work or frequent time zone travel, use of sleep-interfering substances such as caffeine, cigarettes, alcohol), and treatment history. Information about or from their current bed partner also can be helpful. For example, the bed partner may exhibit loud snoring, which may be disruptive to the patient’s sleep. The bed partner may also be helpful in unexpected ways. For example, a patient was complaining of rather spectacular sleep deprivation (e.g., she complained that she had not slept in the past 4 years) but she lacked any appearance of sleepiness and was quite functional during the day. When the husband was asked about his wife’s sleep problem he said that the problem was her snoring. The wife had not reported that they were sleeping in separate rooms because of his complaints about her snoring. Her history of complaints led to an overnight study that revealed moderate sleep apnea. She also had insomnia and a focus in cognitive therapy was to examine the anxiety-producing consequence of her belief that she did not sleep at all (when in actuality she was sleeping, as evidenced by her snoring). She modified this belief to a more accurate and helpful realization that her sleep was lightened by the breathing disruptions, and she did indeed sleep.

In addition to an unstructured clinical interview, there are several site-specific sleep disorder interviews or published semi-structured interviews for insomnia (Savard & Morin, 2002; Spielman & Anderson, 1999) useful for guiding the practitioner through diagnostic criteria for sleep disorders including insomnia.

Self-report Measurement

Global Sleep Symptom Questionnaires

Arguably, the two most common self-report symptom questionnaires are the Insomnia Severity Index (ISI) (Morin, 1993) and the Pittsburgh Sleep Quality Index – PSQI (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). The ISI is a 7-item
questionnaire of subjective insomnia symptom severity. Daytime and nighttime insomnia symptoms are rated using a 5-point (0–4) Likert scale. These symptoms include: difficulties falling asleep and/or staying asleep, waking too early in the morning; sleep dissatisfaction; degree of impairment with daytime functioning; degree to which impairments are noticeable; and distress or concern about insomnia. Morin and colleagues suggest the following ranges for interpretation of clinical significance: 0–7 (no clinical insomnia), 8–14 (sub-threshold insomnia), 15–21 (insomnia of moderate severity), and 22–28 (severe insomnia). There is good reliability and validity (using both sleep logs and electronic sleep recordings) (Bastien, Vallières, & Morin, 2001). It is a recommended assessment tool for insomnia research (Buysse et al., 2006), and its quick administration time makes it useful for clinical use too.

Another recommended measure for standard insomnia assessment (Buysse et al., 2006) is the Pittsburgh Sleep Quality Index – PSQI (Buysse et al., 1989). While the ISI is insomnia-specific, the PSQI is a more global measure of sleep disturbance across sleep disorders. It is a retrospective measure (over the past month) of sleep onset latency, sleep duration, sleep efficiency (i.e., the proportion of time in bed that is actually spent asleep), sleep quality, disturbances to sleep, medication use, and daytime dysfunction. Out of a possible total score that ranges from 0 to 21, a PSQI score of >5 appears to discriminate those with insomnia from good sleepers (Buysse et al., 1989). As such, a post-treatment PSQI score <5 has been used in some studies as indicating insomnia remission. While it is widely used and has good psychometrics, we have reported that elevated levels of anxiety may contribute to PSQI score elevations in those with comorbid disorders (Carney, Edinger, Krystal, Stepanski & Kirby, 2006). Thus, it may be prudent to interpret PSQI scores with caution in the presence of significant anxiety.

**Cognitive Insomnia Questionnaires**

The Dysfunctional Beliefs and Attitudes about Sleep Questionnaire – DBAS (Morin, 1993) is a cognitive measure to assess problematic levels of unhelpful beliefs about sleep. The most current version is 16 items (Morin) wherein respondents rate the degree to which they believe particular statements about sleep. Both the original 30-item version and DBAS-16 have acceptable levels of internal consistency (Cronbach’s alpha values >0.80) (Morin, 1993; Morin, Vallières, & Ivers, 2007). The DBAS discriminates between good and poor sleepers and is responsive to changes in beliefs resulting from cognitive-behavioral therapy for insomnia (Carney & Edinger, 2006). Responses on specific DBAS items can also be used in therapy to orient patients to particular unhelpful beliefs and to modify the veracity of belief in them.

The Sleep Self-Efficacy Scale (SES) (Lacks, 1987) is a 9-item measure of one’s level of confidence in carrying out particular sleep-related behaviors. Insomnia is often characterized by thoughts of helplessness (Morin, 1993), so it can be a worthwhile clinical enterprise to determine the level of self-efficacy/agency one has with
regards to sleep. The SES has been used in several insomnia trials and has been shown to improve (i.e., one becomes more confident in the ability to engage in effective sleep behaviors) with sleep-related improvements (Carney & Edinger, 2006) and to predict response to CBT for insomnia (Edinger et al., 2009). Another potentially useful measure is the Glasgow Sleep Effort Scale (Broomfield & Espie, 2005). This scale is a measure of sleep-related effort with promising initial psychometric support (Broomfield & Espie, 2005). While further studies are needed, the concept of sleep effort is a useful one, as it purportedly underlies maladaptive sleep beliefs (Espie, Broomfield, MacMahon, Macphee, & Taylor, 2006).

**Behavioral Insomnia Questionnaires**

The Sleep Hygiene Practice Scale (SHAPS) (Lacks, 1987) is a widely used measure for the presence of sleep-disruptive behaviors such as taking naps, or exercising strenuously within 2 h of bedtime. While it enjoys frequent usage, the SHAPS does not appear to have particularly strong internal consistency (Lacks, 1987) and studies establishing its validity are currently lacking. A lesser known but initially psychometrically promising tool may be the Sleep Hygiene Index (Mastin, Bryson, & Corwyn, 2006).

In addition to sleep hygiene behaviors, it may also be important to assess the presence of safety behaviors. Safety behaviors are those behaviors that are used to avoid an unwanted experience. In insomnia, an example of a safety behavior would be consuming alcohol when having difficulty sleeping. One helpful tool in this regard (i.e., to assess unhelpful safety-related sleep behaviors) is the Sleep-Related Behaviors Questionnaire (SBRQ) (Ree & Harvey, 2004). This measure was derived from Harvey’s Cognitive Model (2002) that asserts the safety behaviors that perpetuate sleep problems – an observation that has been shown experimentally too (Harvey, 2002).

**Daytime Insomnia Symptom Questionnaires**

One final issue to consider in the assessment of sleep is the measurement of daytime impairment. The ISI is useful in that one of the items specifically queries daytime insomnia symptoms across the range of cognitive, mood, functioning domains. Additionally, one of the most frequently assessed daytime areas is fatigue. People with insomnia often complain of fatigue. The Fatigue Severity Scale (FSS) (Krupp, LaRocca, Muir-Nash, & Sternberg, 1989) is a measure of the severity of fatigue symptoms. Like the DBAS the total FSS score is a mean-item score of the responses on the 9 items; a score above 3 is indicative of significant fatigue. While there are many more comprehensive measures of fatigue available (e.g., the
Multidimensional Fatigue Inventory), the FSS is brief and has many studies that establish its strong psychometric properties in those with sleep problems (Krupp et al., 1989; Krupp, Jandorf, Coyle, & Mendelson, 1993; Lichstein, Means, Noeb, & Aguillard, 1997).

When dealing with sleep disorders, it is useful to distinguish fatigue from clinically significant sleepiness. This is because sleepiness is often associated with disorders other than insomnia such as sleep apnea, narcolepsy, or periodic limb movement disorder. Whereas people with insomnia feel very tired (e.g., fatigued); they usually do not have clinical levels of sleepiness. Sleepiness is characterized by the propensity to fall asleep unintentionally, quickly and frequently when given the opportunity. The widely used Epworth Sleepiness Scale (ESS) (Johns, 1991), is an 8-item self-report questionnaire designed to assess the propensity to fall asleep in situations such as while driving, watching TV, or sitting and talking to someone. Respondents rate how likely they would be to fall asleep in these situations using a 4-point rating scale (0 = “would never doze” to 3 = “high chance of dozing”). A score of 10 or greater is considered to indicate clinically significant daytime sleepiness. The ESS is a common tool in sleep assessment with good reliability (Johns, 1991) and validity (i.e., strong correlation with objective tests of daytime sleepiness (Johns, 1991). The most common objective test of sleepiness is the Multiple Sleep Latency Test (MSLT). The MSLT is conducted at a sleep laboratory and involves PSG data collection during five 20-min nap opportunities spaced 2 h apart throughout the day. The sleep onset latency is averaged over the course of the 5 naps to determine sleepiness. If someone falls asleep within 10 min or less, the person is regarded as objectively sleepy. In addition to the assessment of sleep and medical history, it is important to assess for psychiatric factors as well.

**Assessment of Anxiety**

Those who work with people with sleep disorders assess for a range of psychopathology in addition to the sleep disorder. The diagnosis of insomnia requires that another disorder cannot better account for the insomnia symptoms, thus it is important to understand what other conditions could be causing or affecting the insomnia. This information is also important in the treatment of insomnia as specific anxiety-related strategies may need to be added or emphasized in the CBT insomnia treatment package. There are a variety of tools available to assess for general psychopathology, including semi-structured interviews that assess the range of possible Axis I disorders (e.g., the Structured Clinical Interview for DSM Axis I Disorders) (Spitzer, Williams, Gibbons, & First, 1996) and Axis II disorders (e.g., the Structured Clinical Interview for DSM Axis II Disorders) (First, Gibbon, Spitzer, Williams, & Benjamin, 1997). There are also self-report questionnaires to assess for specific symptoms such as the Beck Depression Inventory to assess for depression symptoms (Beck, Steer, & Brown, 1996). Given the breadth of the area, we focus solely on anxiety disorder-specific tools.
Structured Interviews for Anxiety

Clinician-Administered Interviews for Anxiety

The Anxiety Disorders Interview Schedule for DSM-IV (ADIS-IV) (Brown, Black, & Uhde, 1994) is a commonly used semi-structured interview for DSM-IV anxiety disorders. Within each disorder, users can collect information on specific symptoms, the intensity of fear and avoidance, the age of onset, and possible causes of the disorder. There are versions that can be used to collect information on lifetime anxiety disorders – ADIS-IV-L (Di Nardo, Brown, & Barlow, 1994), children (ADIS-IV-C) and parental report of their child’s anxiety issues (Silverman & Albano, 1996). The ADIS-IV is considered a reliable and valid measure for anxiety disorder assessment (Brown, Di Nardo, Lehman, & Campbell, 2001) with the possible exception of reliability estimates for GAD. Lowered reliability for GAD may reflect nosologic issues with the diagnosis itself (i.e., there is high symptom overlap with a number of other disorders) (Brown et al., 2001). Although the ADIS-IV is a very useful tool in assessing anxiety and related disorders it can take a few hours to administer.

Clinician-Administered Interviews for Specific Anxiety Disorders

OCD: The Yale-Brown Obsessive Compulsive Scale (Goodman et al., 1989) is a 10-item, clinician-administered interview. For a variety of reasons, including strong psychometric performance (Goodman et al., 1989), the Y-BOCS is one of the most widely used rating scales for OCD. The Y-BOCS is used primary to assess symptom severity across five domains: (1) time spent or occupied; (2) interference with functioning or relationships; (3) degree of distress; resistance; and control. The Y-BOCS has been used in those with delayed sleep phase syndrome (Turner et al., 2007), and was used in an investigation of sleep disturbances among those with OCD (Kluge, Schussler, Dresler, Yassouridis, & Steiger, 2007).

PTSD: The Clinician-Administered PTSD Scale (CAPS) (Blake et al., 1990) is a widely used structured interview for the assessment of PTSD. The CAPS assesses for the presence of DSM-IV-TR criteria for PTSD. Each symptom is rated on the basis of frequency and intensity. There is one insomnia item in the interview that was used to evaluate residual insomnia after the completion of CBT in those who had PTSD (Zayfert & DeViva, 2004). Zayfert and colleagues employed a >30 min sleep difficulty cutoff for insomnia and a >90 min cutoff for severe insomnia.

Panic Disorder: The Panic Disorder Severity Scale (PDSS) (Shear et al., 1992) is a brief, clinician-administered interview for the assessment of panic attack and associated avoidance frequency, severity, and distress. It is not a diagnostic measure, but provides a quick assessment of panic disorder symptoms consistent with DSM-IV criteria. There are good demonstrated psychometric properties in those with anxiety...
Structured Interviews for Anxiety disorders (Shear et al., 1992); although we are unaware of any use in those with insomnia.

**Self-Report Measures for Anxiety Symptoms**

Sleep centers may be most likely to use a general psychiatric symptom instrument like the Profile of Mood States (POMS) (McNair, Lorr, & Droppleman, 1971), Brief Symptom Inventory (BSI) (Derogatis & Melisaratos, 1983), or the Symptom Checklist – SCL-90 (Derogatis, 1992). Such instruments contain a variety of symptoms, including anxiety symptom scales. However, there are specific measures that can be used for anxiety as well as specialized scales to assess specific anxiety problems.

**General Measures for Self-Reported Anxiety**

The Beck Anxiety Inventory (BAI) (Beck, Epstein, Brown, & Steer, 1988) is a 21-item screening test designed to distinguish anxiety symptoms from depressive symptoms based on symptoms experienced during the past week. Although the BAI may be helpful in assessing anxiety symptoms, it has been criticized for its overlap with panic attack symptoms (Cox, Cohen, Direnfeld, & Swinson, 1996). Because many individuals with GAD do not experience the range or severity of autonomic symptoms associated with panic attacks, the BAI may be less appropriate as a measure of anxiety symptomatology in individuals with GAD. People with breathing related disorders tend to score in the moderate range on the BAI, which appears to reflect the increased prevalence of anxiety disorders in those with sleep disordered breathing (Sharafkhaneh, Giray, Richardson, Young, & Hirshkowitz, 2005) rather than psychometric shortcomings of the instrument (Sanford, Bush, Stone, Lichstein, & Aguillard, 2008). The State-Trait Anxiety Inventory (STAI) (Spielberger, Gorsuch, & Lushene, 1970) is a widely used measure to assess general levels of anxiety. The STAI has been used across many insomnia studies. However, we are not aware of any specific psychometric evaluations of the properties of the STAI in those with insomnia or other sleep disorders.

The Anxiety Sensitivity Index (ASI) (Peterson & Reiss, 1993) is a 16-item scale measuring fear of anxiety-related symptoms. Endorsement of each item is rated on a 5-point scale ranging from 0 (very little) to 4 (very much) indicating the strength of one’s beliefs about the consequences of anxiety, such as fear of embarrassment, illness, and loss of control. Anxiety sensitivity has been identified as an important construct in the onset and exacerbation of anxiety disorders (Peterson & Reiss, 1993; Schmidt, Zvolensky, & Maner, 2006) and has recently been identified as a predictor of sleep-related impairment, but not actual sleep disturbance, in those with insomnia (Vincent & Walker, 2001).


**Anxiety Disorder-Specific Self-Report Questionnaires**

**GAD:** The Penn State Worry Questionnaire (PSWQ) (Meyer, Miller, Metzger, & Borkovec, 1990) is one of the most common tools used to assess pathological worry. It is a 16-item inventory intended to measure the generality, excessiveness, and uncontrollability of pathological worry. The PSWQ focuses on the more cognitive concept of worry, as opposed to the BAI, and does not explicitly address sleep symptoms. Total scores range from 0 to 90. The PSWQ has good internal consistency and test–retest reliability over 8–10 weeks (Meyer et al., 1990). Behar, Alcaine, Zuellig, and Borkovec (2003) report that ROC cut-off of 45 gives sensitivity of 99% and specificity of 98% in separating GAD from non anxious controls (the diagnosis was made by self-report). The same authors looked at a sample of undergrads and derived a cut-off of 62 (86% sensitivity and 75% specificity). Fresco, Mennin, Heimberg, and Turk (2003) looked at social phobia vs. GAD and found a cut-off of 65 to be optimal. The PSWQ has been used in sleep populations, including primary insomnia (Buysse et al., 2008; Harvey & Greenall, 2003); however, no psychometric properties of the PSWQ among individuals with sleep disorders were found.

**OCD:** The Obsessive Compulsive Inventory-Revised (OCI-R) (Foa et al., 2002) is an 18-item self-report questionnaire that assesses the degree of distress related to OCD symptoms in the past month. The OCI-R discriminates OCD from other anxiety disorders (Abramowitz & Deacon, 2006) and has sound psychometric properties (Foa et al., 2002), but its properties in sleep disordered groups are unknown.

**PTSD:** The Impact of Events Scale (IES) (Horowitz, Wilner, & Alvarex, 1979) is a widely used 22-item questionnaire to assess responses to traumatic events. A Likert rating scale is used to assess the degree of distress produced by each symptom. The PTSD Diagnostic Scale – PDS (Foa, Cashman, Jaycox, & Perry, 1997) is used to inquire about the presence and severity of the DSM-IV PTSD symptoms. The measure asks about the frequency of each of the 49 items in the past month, which are rated on a 4-point scale. The PSQI Addendum for PTSD – PSQI-A (Germain, Hall, Krakow, Shear, & Buysse, 2005) is a 7-item scale measuring the frequency of disruptive nocturnal behaviors such as: hot flashes, general nervousness, memories or nightmares of traumatic experiences, severe anxiety or panic not related to traumatic memories, bad dreams not related to traumatic memories, episodes of terror of screaming, and episodes or acting out dreams. There are also frequency and timing ratings of nocturnal anxiety and anger and timing of these events. Preliminary studies have suggested that this addendum has good internal consistency ($\alpha=0.85$), good convergent validity with measures of PTSD and the PSQI, and good sensitivity and specificity for distinguishing those with PTSD from those without.

**Social Phobia:** The Social Phobia Inventory (SPIN) (Connor et al., 2000) is a 17-item self-report measure that assesses multiple facets of social anxiety including the following: (1) avoidance of feared social situations, (2) feelings of embarrassment, (3) physiological changes (e.g., blushing), and (4) fear of being the center of attention. The SPIN has good reported psychometric properties and may be useful
as a brief screen for Social Phobia (Connor et al., 2000). The Social Phobia Scale (SPS) (Mattick & Clarke, 1998) is a 20-item questionnaire to assess the fear of scrutiny/evaluation in performances situations. Internal consistency reliability for the SPS has been shown to be high, with alpha values of 0.94. The Social Interaction Anxiety Scale (SIAS) (Mattick & Clarke, 1998) is a 19-item questionnaire to assess fears of specific social interaction situations (e.g., dating and attending parties). As with the SPS, the internal consistency reliability for the SIAS is excellent (α=0.94). Internal consistency was also high in a study of social anxiety, depression, and insomnia (Buckner, Bernert, Cromer, Joiner, & Schmidt, 2008). This study showed that 18.2% of socially anxious participants had elevations on the ISI suggestive of clinically significant insomnia.

The Social Phobia and Anxiety Inventory (SPAI) (Turner, Beidel, Dancu, & Stanley, 1989) is a 45-item self-report questionnaire of the frequency of social phobia or agoraphobia experiences across a range of social contexts. There is good internal consistency reliability (Turner et al., 1989) and validity (Peters, 2000). A literature search using the PSYCInfo database did not yield any results for the searches “Social Phobia and Anxiety Inventory AND sleep disorder,” “SPAI AND sleep disorder,” “Social Phobia and Anxiety Inventory AND insomnia,” or “SPAI AND insomnia.”

Panic Disorder and Agoraphobia: The Agoraphobic Cognitions Questionnaire (ACG) (Chambless, Caputo, Bright, & Gallagher, 1984) is a 15-item measure of “fear of fear” in those with panic disorder or agoraphobia. The frequency of specific catastrophic thoughts about the consequences of experiencing anxiety is rated on a 5-point scale (1 = the thought never occurs, and 5 = the thought always occurs). The ACQ has demonstrated adequate psychometric properties for the full scale, as well as two subscales reflecting the loss of control and the consequences of physical symptoms, and is able to discriminate anxiety disordered from non-clinical samples (Chambless & Gracely, 1989). Although some analyses suggest that the two factor structure lacks validity, the ACQ remains one of the most widely used instruments in research and clinical practice for patients with agoraphobia. To date, no research has reviewed the ACQ for use with sleep disordered population; however, evidence indicates that the catastrophic cognitions measured by the ACQ are specific to the experience of diurnal panic attacks and relatively unrelated to nocturnal panic attacks (O’Mahony & Ward, 2003). The ACQ is most typically administered along with the Body Sensations Questionnaire (BSQ) (Chambless et al., 1984); a measure of the intensity of fear of the physical sensations of anxious arousal. Each of the 17 physical symptom/panic sensation items are rated on a scale of 1–5 that corresponds to the degree to which the sensation is frightening. Although the BSQ has not been examined in the context of insomnia, there appears to be no relationship between the fear of interoceptive cues as measured on the BSQ and sleep disturbances related to nocturnal panic attacks relative to those whose panic attacks occur exclusively during daytime (Craske, Lang, Tsao, Mystkowski, & Rowe, 2001).

The Panic Attack Symptoms Questionnaire (PASQ) and Panic Attack Cognitions Questionnaire (PACQ) (Clum, Broyles, Borden, & Watkins, 1990) can be used to
26

assess the severity of panic attacks and the degree to which patients are preoccupied with catastrophic cognitions respectively, during a panic episode. Preliminary data on the PACQ and PASQ suggest good internal consistency and utility in discriminating those with panic disorder from those with other anxiety disorders not associated with panic attacks (Clum et al., 1990). There are no known studies using these scales in those with insomnia or nocturnal panic attacks.

The Mobility Inventory for Agoraphobia – MI (Chambless, Caputo, Jasen, Gracely, & Williams, 1985) is a 27-item inventory of agoraphobic avoidance and panic attack frequency. For each of the listed situations commonly avoided by people with agoraphobia, the degree of avoidance when alone versus when accompanied by another person are rated on 5-point scales (1 = never avoid; 5 = always avoid). There are demonstrated sound psychometric properties and utility in discriminating between clinical and nonclinical samples (Chambless et al., 1985). We were not able to find psychometric evaluations of the MI in sleep-disordered population.

Regardless of the measures employed, it is important to generate a formulation of the problem and a plan of action for treatment. Below are two abbreviated examples of assessment in those with insomnia and their related case formulations.

Case Example 1: Generalized Anxiety Disorder and Insomnia

Ms. H is a 36-year-old female with a complaint of sleep onset and maintenance insomnia. She is unsure what caused the insomnia, but believes that her problem is currently maintained by her anxiety about sleep. Based on a questionnaire of insomnia symptom severity, her insomnia is in the moderately severe range (Insomnia Severity Index = 21). She reports that it is taking several hours for her to fall asleep, as well as 3–12 awakenings per night. A review of her sleep logs revealed that she tends to go to bed around 11 p.m. and rise around 7:30 a.m. (mean total time in bed = 8.7 h). Her average sleep onset latency is 172 min; her average time being awake after sleep onset is 66 min. Her estimated mean sleep efficiency for 2 weeks of sleep diaries is very poor (54%). She denied napping. She denied daytime sleepiness (Epworth Sleepiness Score = 4) but reported significant daytime fatigue (Fatigue Severity Score = 5.6).

On a scale assessing maladaptive sleep behaviors, she reported reading in bed each night and remaining in bed when she cannot sleep. She denied any other poor sleep habits, and denied regular use of caffeine, alcohol, or tobacco products. She stated that before bed she can “barely keep her eyes open,” but when she gets into bed she feels “instantaneously awake and irritated.” She begins to have thoughts such as, “I can’t sleep.” She acknowledged loud snoring, but denied observed apneas, or symptoms of cataplexy, hypnogogic hallucinations, restless legs, or periodic leg movements during sleep. A previous overnight sleep study conducted 4 months ago was unremarkable. She reported past diagnoses of Post-Traumatic Stress Disorder and Generalized Anxiety Disorder. She was in psychotherapy for about 1 year for PTSD, and denies it is a problem any longer. She regarded the
psychotherapy as very helpful. Based on her report it appeared to be an exposure-based psychotherapy. She denied symptoms of re-experiencing the trauma via flashbacks, intrusive thought or nightmares, and no longer avoids her family home (the site of the trauma). She denied any numbing of responsiveness. She currently takes Celexa (40 mg per day) for anxiety. She reported that her anxiety is much better currently; however, her responses on a measure of clinically significant worry would suggest that the current level of worry is in the clinical range (Penn State Worry Questionnaire = 64). She acknowledged that she is currently worrying quite a lot about her sleep problem, and when pressed, she acknowledged worries in other domains, including being late for appointments, work, family, finances, and global affairs. She also reported having difficulties with depression in the past, but denied current symptoms. Her responses on a depression symptom measure would corroborate her report of no depression (Beck Depression Inventory = 10).

**Formulation:** Ms. H appears to have developed a psychophysiologic insomnia. She also meets the criteria for GAD. She has good insight into her sleep problem, but is less willing to acknowledge a more pervasive worry problem. Ms. H may benefit from augmenting her pharmacologic treatment of anxiety with psychotherapy to address worry. It is unknown as to whether her medication is contributing to her sleep problem, but the sleep problem predated the medication and did not appear to worsen when she began taking the medication. Sleep focused treatment should target the belief that she cannot cope with her sleep problem and the conditioned hyperarousal (i.e., the abrupt switch into alertness when she gets into her bed). Going to bed only when she is sleepy and getting out of bed during prolonged awakenings (stimulus control) should reduce the conditioned arousal she is currently experiencing. Ms. H would also likely benefit from a relaxation practice and worry control training.

**Case Example 2: Sleep-Specific Worry**

Ms. T is a 28-year-old woman attending graduate school with a complaint of sleep maintenance insomnia. For the past 2 months, Ms. T has been waking after about 4–5 h of sleep and is unable to return to sleep. Occasionally, during these awakenings, she reports that her heart is beating fast and she feels anxious. Her family physician apparently told Ms. T that she was depressed and prescribed Prozac. She stated that she did not “feel” depressed (i.e., she did not have sad mood or depressive thoughts), but the Prozac was helpful in eliminating her “blah mood” and her social avoidance. She indicated that the Prozac was not helpful in reducing her awakenings or daytime fatigue.

Her score on a measure of insomnia symptom severity (Insomnia Severity Index = 17) would suggest that the insomnia is of moderate severity. A review of her sleep logs revealed several nights of excessive time in bed (up to 9 h). She appeared to obtain 6–8 h of sleep. On a measure of sleep-interfering behaviors, she denied using alcohol, caffeine, or any form of tobacco products. She reported that she read
in bed 7 nights per week for 10 min – she denied any other sleep disruptive behavior. Her responses to a questionnaire would not suggest significant daytime sleepiness (Epworth Sleepiness Scale=6), but her score on the Fatigue Severity Scale would corroborate her report of significant fatigue (Fatigue Severity Scale=6.1). During the clinical interview, she denied loud snoring, restless legs, observed apneas, periodic leg movements during sleep, cataplexy, sleep paralysis, hypnagogic hallucinations, nightmares, or any form of parasomnia.

Her report of daytime worry about her sleep and the possible consequences it has on her health and her performance at school was corroborated by a high score on a scale assessing unhelpful beliefs about sleep, including sleep worries (Dysfunctional Beliefs and Attitudes about Sleep Scale=4.9). Her score on a measure of general worry (Penn State Worry Questionnaire=39) was suggestive of a tendency toward worry and anxiety, although this score was well below the clinical cutoff for pathological worry or GAD. Her responses on a questionnaire that assesses depression symptoms was below the suggested cutoff for moderate, clinically significant depression (Beck Depression Inventory score=11). During the clinical interview, she denied depressed mood or anhedonia, but acknowledged fatigue, difficulty concentrating, and insomnia.

**Formulation:** Although a mood episode may have precipitated the insomnia complaint, the mood episode appears to have resolved, and the insomnia remains. It is clear that she has considerable worry about her ability to sleep and the possible consequences that the insomnia will have on her health. She endorsed some unrealistic expectations and beliefs about sleep. It appears that the anxiety generated by her unrealistic beliefs, as well as some excessive time in bed in the morning may be currently maintaining her insomnia. She has been taking the Prozac for only 4 weeks, thus it remains a possibility that her awakenings will resolve after some more time on the antidepressant. In the meantime, I have instructed her to: (1) limit her time in bed to 6.5 h; (2) get out of bed each morning by 7 a.m.; (3) eliminate “resting” periods in the morning and throughout the day, so that she will avoid the possibility of an unintended nap; (4) focus on ways to cope with fatigue symptoms (e.g., engage in activating activities, take breaks during mundane tasks and fresh air); (5) complete Thought Records so that we can challenge her catastrophic thinking about sleep loss; and (6) if she awakens in the morning and cannot return to sleep within 20 min, she is to leave the bedroom and start her day.

**References**


References


Considerations for Assessment


References


Insomnia and Anxiety
Carney, C.E.; Edinger, J.D.
2010, XI, 300 p., Hardcover
ISBN: 978-1-4419-1433-0