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Anxiety

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Overview

Anxiety is a mental and physical experience common to all human beings that initiates protective and defensive behavior. The anxiety response can be triggered acutely by external events (e.g., expected failure of an exam) or by internal events (e.g., thoughts, memories, beliefs, or sensations). On a spectrum of intensity, common symptoms include rapid heart-beat, trembling, shallow rapid breathing, a “knot” in the stomach, dread, repetitive negative anticipatory thoughts, heightened sensory awareness, and an urgent desire to escape. Anxiety can be distinguished from fear in that fear is expressed as a mobilising response to an actual and imminent threat, whereas anxiety is defined as a reaction to a projected, but not necessarily actual, future threat (Fanselow & Lester, 1988; Quinn & Fanselow, 2006). Anxiety may have evolutionary survival value by helping us to notice and therefore avoid or escape potential dangers. In contrast, excessive anxiety can impair our ability to accurately evaluate a perceived threat or choose the best strategy for dealing with it (Nardi, Fontenelle, & Crippa, 2012). A distinction is made between *state anxiety*, anxiety that relates to a particular perceived threat and *trait anxiety*, which is associated with a generally anxious personality. Trait anxiety may trigger a chronic physiological cascade that over time has deleterious consequences for health. Longer and more frequently triggered anxiety responses can increase the intensity of the anxiety and the magnitude of the perceived threat. As anxiety becomes more maladaptive it may reach a level of clinical significance that meets the criteria for an anxiety disorder. The status of disorder is defined as “excessive and uncontrollable...and manifests with a wide range of physical and affective symptoms as well as changes in behaviour

and cognition”; at this level it significantly impairs functioning at work or in school and/or in social relationships (Rowney, Hermida, & Malone, 2010).

In 2007, the World Mental Health Survey Initiative reported that one in four individuals was likely to have (or previously have had) an anxiety disorder.

Although epidemiological studies report considerable variation in prevalence across different societies, anxiety disorders and depression are the prevailing global mental health problems with an estimated 10% of the world’s population exhibiting a twelve-month prevalence of one or both (World Health Organization, 2016). In 2007, the World Mental Health Survey Initiative reported that one in four individuals was likely to have (or previously have had) an anxiety disorder (Kessler et al., 2007).

Diagnostics of anxiety spectrum disorders

According to the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) (American Psychiatric Association, 2013), anxiety spectrum disorders share similar symptoms and traits such as distress, sleep disturbance, poor concentration, and compromised social and occupational functioning. The seven anxiety spectrum disorders are separation anxiety, selective mutism, specific phobia, social phobia, panic disorder (PD), agoraphobia, and generalized anxiety disorder (GAD). Previously, anxiety spectrum disorders included posttraumatic stress disorder (PTSD) and obsessive compulsive disorder (OCD), but these have been reclassified as belonging to other diagnostic categories, trauma and stress-related disorders and obsessive compulsive related disorders, respectively. Recent research shows that PTSD included an array of

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emotions (guilt, shame, and anger) that did not correlate with anxiety spectrum disorders (Pai, Suris, & North, 2017). However, many previously conducted anxiety disorder studies included PTSD and (to a lesser degree) OCD in their analyses; therefore data must be qualified with the proviso that it may not correspond to the current iteration of the diagnostic categories.

Social anxiety disorder (or social phobia) is one of the most intractable anxiety disorders, with a lifetime prevalence of 12% (National Institute for Health and Care Excellence, 2013). It is characterized by a persistent fear of social situations, in particular a dread of possible humiliation or embarrassment that is out of proportion to the actual threat posed. Selective mutism is a rare disorder usually witnessed in children and most often resolved in childhood; it is diagnosed when a person capable of speaking is consistently speechless for more than one month.

GAD is defined by excessive and persistent worry that is hard to control, causing significant distress or impairment. Data from the United States and Europe reveal a lifetime prevalence of between 4% and 5% with low levels of remission.

Agoraphobia, the fear of open public spaces and a perceived inability to escape from them, is a severe anxiety disorder that often renders a person housebound and unable to work. Agoraphobia is often a response to the panic that emerges when an individual leaves home, explaining the high co-occurrence between agoraphobia and PD.

PD presents with persistent panic attacks and often a debilitating fear of future attacks. American and European data shows a twelve-month prevalence of agoraphobia at 1% with 1.8% lifetime prevalence. For PD, there is a US lifetime prevalence of 4.7% with a twelve-month prevalence of just under 2%:

this suggests that people do remit from PD, but to a lesser extent from agoraphobia. (Kessler et al., 2010; Goodwin, Faravelli, & Rosi, 2005).

A diagnosis of separation anxiety disorder is assigned to individuals who exhibit an inappropriate and excessive fear or anxiety concerning separation from those to whom they are attached. The diagnosis is applied when the distress is unusual for an individual's developmental level or is prolonged and severe. For adults to receive this diagnosis, the anxiety must exceed a six-month period; for children the anxiety must exceed a four-month period. Lifetime prevalence estimates for children and adults are 4.1% and 6.6%, respectively, with a twelve-month prevalence of 1.9% (Shear, 2006).

Specific phobia is defined by a clinically significant fear of a particular object, animal, or situation that typically leads to avoidance behavior. Common phobias include fear of heights, snakes, and closed spaces. The prevalence within specific phobias is highly variable depending upon the etiology of the condition. United States statistics report specific phobia at 9.1%, with 12.2% for women and 5.8% for men (National Institute of Mental Health, 2017).

Neurophysiology and anxiety spectrum disorders

There is a high incidence of co-occurrence among anxiety spectrum disorders. For example, GAD, social phobia, and agoraphobia often present together (Bystritsky, Khalsa, Cameron, & Schiffman, 2013). One hypothesis based on this co-occurrence proposes that people with clinical levels of anxiety may share risk factors as well as an underlying propensity for an expansion of fear-based neural pathways, whereby an increasing array of stimuli is deemed as threatening (Hettema, Prescott, Myers, Neale, & Kendler, 2005). This theory of elaboration is consistent with the onset of most anxiety disorders in childhood or adolescence

and with the increasing severity of symptoms over time, often reaching disorder status in early adulthood (Lijster et al., 2017). A host of interrelated factors such as genetic predisposition, early life adversity, and temperamental susceptibilities constitute vulnerabilities for the development of an anxiety disorder. Research has found that people whose parents had an anxiety or mood disorder are two to four times more likely to develop one themselves (Lieb, Isensee, Höfler, Pfister, & Wittchen, 2002). It is notable that some of these hereditary predispositions can be elicited or exacerbated by the environment provided by caregivers, including nutrition, neglect, abuse, low emotion regulation modeling, a proclivity to focus on negative ideation, cognitive framing of stressful events with excess attention to threat at the expense of other considerations, and low uncertainty tolerance. Childhood experiences associated with increased risk include an inconsistent attachment to a primary caregiver, parental divorce, financial strain, family illness, few peer relationships, and overly involved, critical parenting (Craske et al., 2017). Personality traits that may indicate predisposition to an anxiety disorder, particularly in the presence of the aforementioned risks, include low extroversion, neuroticism, and avoidance (Brandes & Bienvenu, 2006). Gender is also an influential factor in adulthood: women are one-and-a-half to two times more likely than men to present with an anxiety disorder, particularly GAD or PD (McLean et al., 2011).

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As a complex mental and physical phenomenon, anxiety influences the cardiovascular, respiratory, gastrointestinal, immune, and endocrine systems, each of which is modulated by interactive feedback loops within the nervous and circulatory systems.

Although some studies report minor heterogeneity among anxiety disorders, their neural correlates show a high level of similarity (Martin, Ressler, Binder, & Nemeroff, 2009). Studies of anxiety disorders reveal dysfunctions in the central nervous system (CNS), autonomic nervous system (ANS), and hypothalamic-pituitary-adrenal (HPA) axis, a neuroendocrine component of the stress response. The two branches of the ANS, the PNS and the SNS, counterbalance each other.

The ANS and the HPA axis, the primary components of the stress response systems, can be triggered acutely in response to threat. Individuals with anxiety disorders are particularly vulnerable to overreactions to external and internal stressors and have greater difficulty calming down once they have been triggered. Such dysregulation is usually associated with reduced activity in the PNS and heightened activity of the SNS. This imbalance can lead to increased and chronic release of the excitatory neurotransmitters, norepinephrine and epinephrine, with a consequent increase in arousal, alertness, vigilance, heart rate, respiratory rate, and other physiological functions (Thayer, Friedman, & Borkovec, 1996). Given the links between ANS dysfunction and stress-related medical conditions (e.g., cardiovascular disease, irritable bowel syndrome, and chronic skin conditions such as eczema and psoriasis), it is not surprising that individuals with anxiety disorders often present with these physical conditions (Azimi, Lerner, & Elmariah, 2015; Manabe, Tanaka, Hata, Kusunoki, & Haruma, 2009; Roy-Byrne et al., 2008).

Heightened activity of the HPA axis increases the release of cortisol, the most studied stress response hormone. Chronically elevated cortisol levels impede the production of immune cells and increase the risk of cardiovascular diseases, type 2 diabetes (Siddiqui, Madhu, Sharma, & Desai, 2015), cancer, cognitive impairment, and dementia. The sensitive neurons of

the hippocampus, implicated in cognition, memory, and emotion regulation, are highly vulnerable to damage from excess cortisol. The association between hippocampal cell loss and conditions such as anxiety disorders and neurodegenerative disorders is an area of ongoing research (Lundberg, 2005).

Anxiety disorders are characterized by dysfunctions in emotion regulation circuits. The higher centers, such as the medial prefrontal cortex (mPFC), modulate activity in the lower subcortical centers, particularly the amygdala, via multiple pathways including the thalamus. The amygdala is the nexus of species-specific defensive reactions such as fear and anger, as well as their associated behaviors. In anxiety disorders, the amygdala, which generates the fear response, is typically overactive, while the mPFC which inhibits this system is underactive (Craske et al., 2017). The thalamus, a complex bilateral structure, projects to and communicates with the amygdala, mPFC, and vast areas of the cerebral cortex. When the thalamus provides input to the amygdala that it has previously encoded as threatening, the amygdala, in the absence of sufficient inhibition by the mPFC, triggers a fear response by recruiting various brain circuits, as well as activating the SNS and the HPA axis. Similarly, thoughts may activate the excitatory neurons in the PFC, which then projects to the amygdala, stimulating an integrated visceral response via the thalamus, resulting in physical symptoms of anxiety (Immordino-Yang, 2014, 2017). In anxiety disorders, these bottom-up and top-down pathways reciprocally and chronically activate each other augmenting the overall response (Bandelow et al., 2015; Porges, 2001, 2009; Venkatraman, Edlow, & Immordino-Yang, 2017).

The primary inhibitory neurotransmitter implicated in this pathology is GABA. Neurons in the PFC and other cortical structures as well as the thalamus release GABA, which inhibits overactivity in

the amygdala. GABA attaches to receptor sites, for instance those in the central extended nucleus of the amygdala, thus inhibiting the over-reactivity that generates anxiety reactions. Research reveals that individuals with anxiety disorders have lower levels of GABA, and that other biochemicals correlated with anxiety may block GABA receptor sites (Nuss, 2015). Numerous medications, for instance, benzodiazepines, gabapentin, and antidepressants, target the GABA system as a way of decreasing anxiety. Levels of serotonin are also attenuated in anxiety disorders, providing a rationale for the use of selective serotonin reuptake inhibitors (SSRIs) in treating anxiety disorders (Albert, Vahid-Ansari, & Luckhart, 2014).

Conventional treatment of anxiety spectrum disorders

Currently, treatment for anxiety spectrum disorders typically occurs first in primary care settings (Bystritsky et al., 2013) where individuals usually receive self-help strategies and medication or are referred for cognitive behavioral therapy (CBT). Pharmacological treatments include anxiolytics (benzodiazepines), antidepressants, beta-blockers (which block the action of epinephrine), and sometimes the anticonvulsant pregabalin.

Treatment varies depending on the type of anxiety disorder, but tends to follow a framework of psychotherapy and medication, or a combined approach that may include other techniques. The most commonly recommended form of psychotherapy, CBT for anxiety disorders, is multifaceted and involves cognitive restructuring; psychoeducation about anxiety; training in the awareness and regulation of cognitive, physiological, and behavioral cues; techniques to alter and replace unhelpful coping mechanisms; relaxation techniques; and more recently, mindfulness (Bystritsky et al., 2013; Crits-Christoph et al., 2011). Other treatments include group CBT, exposure therapy, psychodynamic psychotherapy,

mindfulness-based psychotherapies, and exercise. A meta-analysis of interventions for anxiety found the greatest efficacy for medication, followed by mindfulness-based psychotherapies, CBT, relaxation techniques, and exercise (Bandelow et al., 2015). Other reviews comparing combinations of psychotherapy and medication to a mono-intervention yield inconsistent results, suggesting that responses may be individual and treatments should be tailored on a case-by-case basis (Bystritsky et al., 2013; Crits-Christoph et al., 2011).

Anxiety disorders often present with major depressive disorder (MDD) due to underlying neurophysiological vulnerabilities as well as the disheartening impact of anxiety on an individual's personal and professional life.

This diversity in response may also be linked to the high co-occurrence between anxiety spectrum disorders and other mental health conditions. Specifically, anxiety disorders often present with major depressive disorder (MDD) due to underlying neurophysiological vulnerabilities as well as the disheartening impact of anxiety on an individual's personal and professional life. Additionally, addiction disorders often co-present with anxiety disorders. Childhood risk factors for addiction and anxiety disorders are analogous. Furthermore, those with chronic anxiety often self-medicate with addictive substances to dampen the crippling experience of the anxiety. Consequently, clinicians must take into account a constellation of symptoms that complicate the core anxiety diagnosis.

According to Baldwin and Polkinghorn (2005), 50% of those prescribed pharmacological interventions report symptom improvement. The popularity of CBT as a referral for treatment by primary care physicians may be due in part to clinical trials that claim a high degree of efficacy (Foa, Franklin, & Moser, 2002). There is controversy about the efficacy of CBT outside clinical trials. In their meta-analysis,

Stewart and Chambless (2009) found that the value of CBT in real life practice is slightly exaggerated, but still robust. However, a 2011 patient satisfaction survey of CBT treatment for anxiety disorders found that only 41.4% felt they had received adequate treatment (Baldwin & Polkinghorn, 2005; Stein et al., 2011; Stewart & Chambless, 2009). Dissatisfaction with treatment, concerns about side effects, and potential addiction to medication may explain why a high preponderance of those with anxiety disorders (56.7%) seek CAM (complementary and alternative medicine). Indeed, the diagnosis of an anxiety disorder is a predictor of CAM usage (Kessler et al., 2001; Nutt et al., 2007). Popular CAM treatments include herbs, nutrients, massage, acupuncture, homeopathy, and mind-body treatments such as mindfulness, yoga, qigong, and tai chi (Sarris et al., 2012).

Rationale for use of yoga for anxiety

The second line of Patanjali's Yoga Sutras (see Chapter 1, page XXX), "*Yoga citta vritti nirodhah*," is often translated as "Yoga leads to the cessation of the fluctuations (*vritti*) of the mind." A modern understanding is that the practice of yoga helps to ease the agitated parts of the mind. Clearly such calming effects can be beneficial in the management of anxiety. Remarkably, Patanjali's eightfold system of yoga contains many elements used in modern treatments for anxiety: cognitive reframing, behavioral recommendations, relaxation techniques focused on breath regulation, mindfulness of sensory input, as well as methods for greater cognitive flexibility, concentration, and down-regulation of distress.

Nadis

Yoga also describes an energy system in which we may find congruence with our current understanding of the ANS. According to yogic philosophy, energy tracks, called *nadis*, course through the body carrying the life force (*prana*). Free flow in all *nadis* is vital

for health. However, three main *nadis* exert the most influence on wellbeing. Along the left side of the spinal cord up through the left nostril is the *ida*, the *nadi* associated with calming energy, which may be analogous to the PNS. On the right side of the spinal cord up through the right nostril runs the *pingala*, the active aspect, which could correspond to the SNS. In the center, running up the spinal cord, is the *sushumna nadi*. Specific yoga practices are intended to balance the forces of *ida* and *pingala*, causing *prana* to rise through the *sushumna*, leading to a positive shift in mental and physical experience giving rise to peace and clarity. Much of yoga is focused on balancing *ida* and *pingala*. Indeed, the term *hatha* is sometimes translated as “sun-moon”: *pingala* refers to the sun and the moon corresponds to *ida*. Based on this transmutation of ancient ideas into modern scientific ones, yoga can be considered a practice that balances the ANS and is therefore uniquely suited to the treatment of anxiety and anxiety spectrum disorders.

Autonomic nervous system and heart rate variability

Numerous studies support a role for yoga in balancing the ANS. Researchers often measure autonomic balance using heart rate variability (HRV), derived from the rate of change in the number of heartbeats per minute occurring between inhaling and exhaling. Normally, whenever we inhale the heart rate slightly speeds up then slows down during exhalation; this is called normal sinus arrhythmia (RSA). It occurs because breathing in stimulates the sympathetic nerves, which release noradrenaline, increasing the rate of action potentials generated in the sinoatrial node (the heart’s pacemaker). Conversely, breathing out stimulates the parasympathetic nerves, which release acetylcholine, decreasing the rate of sinoatrial node action potentials. HRV is a composite of the effects of breathing (and other factors) on vagal parasympathetic activity (slowing the heart) and sympathetic activity (speeding up the heart). In anxiety

disorders, the overactivity of the SNS and underactivity of the PNS lead to a reduction in HRV, which reflects a loss of flexibility and adaptability of the cardio-respiratory system. Even more crucial for anxiety disorders, low HRV indicates that the PNS, necessary for feeling safe and calm, is underactive, while the SNS is free to induce anxiety in all of its manifestations. The fact that respiratory rate is a major factor in determining SNS, PNS, and HRV gives us a powerful key to emotion regulation. Respiration is the only autonomic function that can be controlled voluntarily. Therefore, voluntarily regulated breathing practices (VRBPs) provide a portal of entry to the ANS, achieved by sending messages from the respiratory system to the brain, which influences emotional states (Brown & Gerbarg, 2017; Brown, Gerbarg, & Muench, 2013; Gerbarg & Brown, 2016). Research shows increases in HRV associated with integrated yoga programs and discrete yoga practices (Tyagi & Cohen, 2016); and studies also indicate that slow controlled breathing, a cornerstone of many styles of yoga, can significantly increase HRV (Brown et al., 2013; Brown & Gerbarg, 2012; Peng et al., 1999).

Notably, the vagally mediated parasympathetic branch of the ANS exerts a greater influence on HRV than the sympathetic branch (Beech et al., 2018). Based on his groundbreaking neuroanatomic studies, Porges developed the polyvagal theory, which proposes that the vagus nerves contain pathways from different levels of evolution. He noted that the majority of vagal fibers are unmyelinated (lacking the myelin sheaths found in later stages of evolution). Myelin forms a sheath that surrounds and insulates the nerve, enabling faster transmission of nerve impulses. Myelinated fibers comprise only 3% of vagal pathways, are found only in mammals, and are most developed in primates. Porges explains that the myelinated nerves within the vagus significantly influence prosocial behavior because they articulate to and permit greater control of those areas of the body that support social

engagement. These include the larynx for voice control, facial muscles for emotion expression, neck muscles for turning toward another person, and the muscles controlling attunement of the ears to human voices. Furthermore, when vagal tone is higher, defensive reactivity is reduced, which allows positive social interactions to occur more easily (Porges, 2011). The effects may be further enhanced in a yoga group practice environment, which for the most part doesn't require conversation or eye contact. Practicing in this way while experiencing physiological shifts that support social engagement could potentially reduce anxiety and social anxiety in particular. Increased vagal tone is also linked to a decrease in symptoms of disorders in which autonomic dysfunction is implicated, such as anxiety spectrum disorders.

According to polyvagal theory (Porges, 2009):

- a physiological state characterized by increased vagal influence on HRV supports social engagement and bonding;
- any stimuli that result in a feeling of safety can recruit neural circuits which support the social engagement system and inhibit defensive limbic structures; and
- interoception (the perception of sensations arising from inside the body) enables social behavior by distinguishing between safe and dangerous situations.

Physical yoga practices provide abundant opportunities to stimulate interoceptive experiences through movement and breathing. Interoception is generally defined as the perception of sensations arising from inside the body, including the internal sensations associated with breathing. Every movement and every breath activate millions of internal receptors that transmit messages through neural pathways (afferents) to the brain. This bottom-up transmission

from the body to the brain has been called “interoceptive messaging” by Gerbarg and Brown. Voluntarily regulated breathing practices (VRBPs) enable us to send bottom-up messages from the respiratory system to the brain, messages that can help us to regulate our emotions (Brown & Gerbarg, 2017). By studying changes in anxiety symptoms and biological markers (e.g., HRV, cortisol, inflammatory markers) and through brain imaging, it may be possible in the future to correlate yoga techniques with the effective treatment of anxiety spectrum disorders.

Changes in biochemicals implicated in anxiety have also been reported with yoga practice. For example, several studies found statistically significant reductions in cortisol pre- and post-yoga intervention (Field, Diego, Delgado, & Medina, 2013; Naveen et al., 2016; Riley & Park, 2015). Intriguingly, a 2014 randomized controlled trial (RCT) found statistically significant improvements in perceived stress and cortisol levels for a stretching yoga intervention, but not for a restorative yoga intervention (Corey et al., 2014). This preliminary finding indicates that for an anxious population, more stretching and movement may be preferable to long periods of stillness and silence, wherein anxious ruminations can emerge. Movement may engage the mind and activate bottom-up calming parasympathetic pathways, positively influencing the internal biochemical environment.

Movement may engage the mind and activate bottom-up calming parasympathetic pathways, positively influencing the internal biochemical environment.

In a pilot study, Streeter et al. (2007) found that yoga increased GABA levels in the thalamus. A subsequent RCT by the same group demonstrated that yoga significantly increased GABA more than in a metabolically matched exercise intervention (Streeter et al., 2010). Drawing on these findings and on polyvagal theory, Streeter and colleagues proposed the

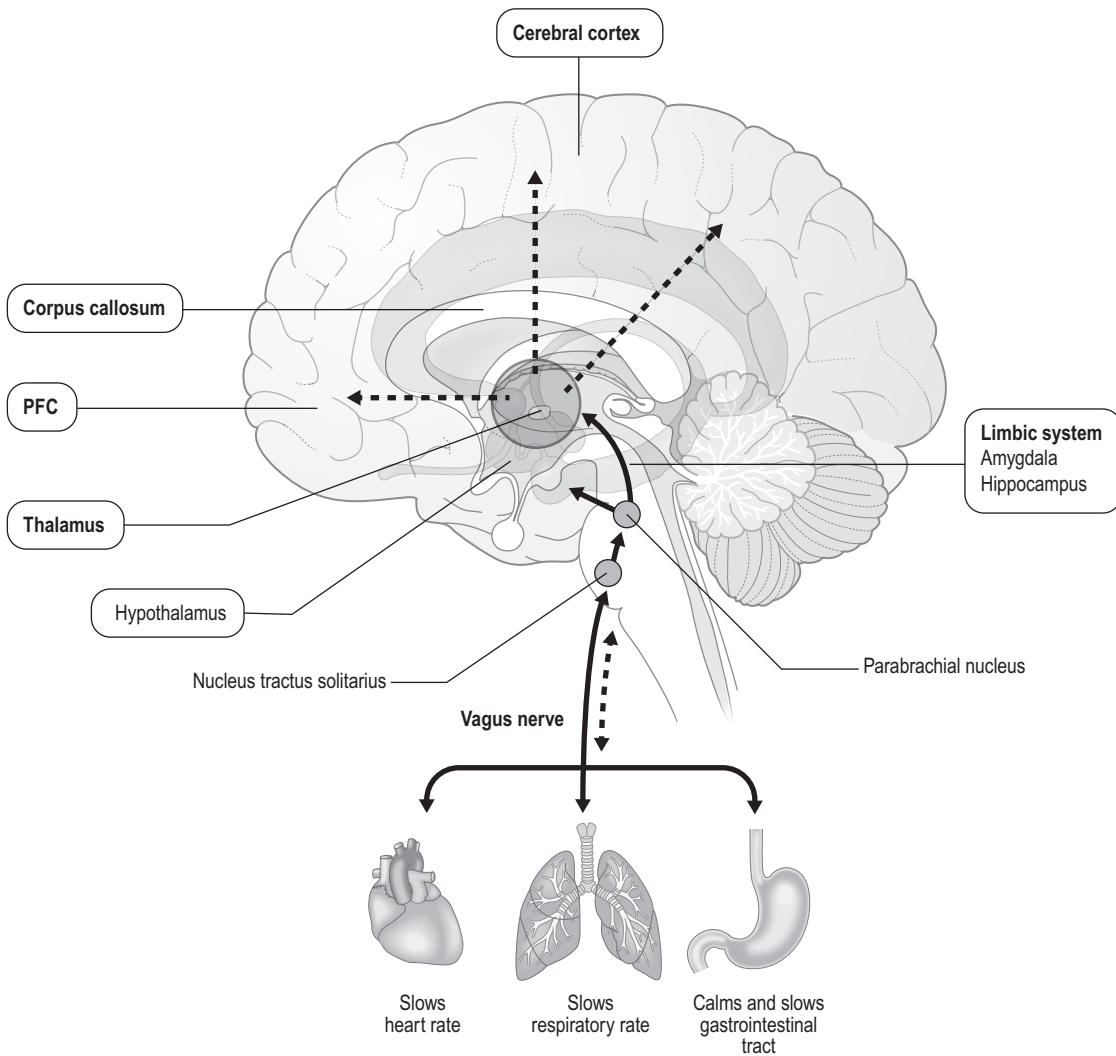


Figure 2.1

Afferent branches of the vagus nerve. Representation of vagal output to the brain. Reproduced with permission from Brown RP, Gerbarg PL, Muskin PR. *How to Use Herbs, Nutrients and Yoga in Mental Health Care*. W.W. Norton. 2012.

vagal-gaba theory, extending Porges’s work to the potential effects of increased PNS activity on brain GABA (Streeter, Gerbarg, Saper, Ciraulo, & Brown, 2012). This offers an additional mechanism whereby certain movements and breathing practices could

improve emotion regulation. Preliminary evidence suggests that during gentle slow breathing and yogic postures, increased vagal activity may upregulate GABAergic transmission along inhibitory pathways from the PFC and insular cortex to the amygdala

(Streeter et al., 2012). This in turn may reduce the overactivity of the amygdala occurring during anxiety. This theory is being evaluated via clinical investigation into the effects of yoga and coherent breathing (gentle breathing, inhaling for six seconds and exhaling for six seconds) in patients with depression, but it has yet to be tested with anxiety disorders (Nyer 2018; Streeter et al. 2017).

Downregulating amygdala activity

Other research has been conducted to examine different mechanisms that point to yoga's role in downregulating amygdala activity. One study comparing the chanting of the yoga mantra, OM, to making the sound "ssssssssssssss" found greater deactivation of the amygdala during OM practice, signifying that OM chanting may help curb anxiety: researchers attributed this change to vibrational stimulation of the vagus (Kalyani et al., 2011).

Afonso (2017) found that long-term yoga practitioners had larger PFCs than age-matched controls. Given that reduced PFC activity and volume, as well as increased amygdala activity, have been found in anxiety disorders, this evidence correlating yoga with greater PFC volume is encouraging.

Research on yoga for anxiety

There is a growing corpus of research on yoga for anxiety in which anxiety may be the main complaint or be present in relationship to another disorder but does not meet criteria for an anxiety spectrum disorder. However, there is a paucity of research on yoga for individuals who do meet diagnostic criteria for anxiety spectrum disorders. Pilkington et al. (2016) reviewed research into yoga for anxiety consisting of three studies of yoga for GAD, one of yoga plus CBT, one of yoga and CBT for panic disorder, and two of yoga for anxiety neurosis (an earlier diagnosis that has been replaced by GAD and PD). Two open studies

investigated the effect on GAD of Sudarshan Kriya yoga (SKY), a breath-based yoga intervention that combines gentle calming breathing techniques with highly activating cyclical breathing. In the first trial, patients with severe treatment-resistant GAD with co-occurrences were taught SKY for five days, were asked to practice the technique each day for twenty minutes, and were given six weekly follow-up sessions: among the 31 individuals who completed the trial there was a 73% response rate and a 41% remission rate. In the second trial, 69 patients with GAD practiced SKY for six months: significant reductions in anxiety were measured by the Hamilton Anxiety Scale (Doria, de Vuono, Sanlorenzo, Irtelli, & Mencacci, 2015; Katzman et al., 2012). A small nonrandomized pilot study compared yoga with naturopathy in twelve patients with GAD (Gupta & Mamidi, 2013). Following three weeks of treatment, both groups had improved levels of anxiety. However, results from such a small study are preliminary at best (Gupta & Mamidi, 2013; Pilkington et al, 2016).

There is also interest in investigating yoga combined with CBT. A 2014 open study augmented CBT with Kundalini yoga for patients with GAD, during which the participants met for six 90-minute weekly sessions of a yoga-based CBT (Y-CBT) program. Statistically significant changes were reported for trait anxiety and also on the Treatment Outcome Package (TOP) scale measuring depression, panic, sleep, and quality of life. Although researchers suggested that Y-CBT might have added value over CBT, these preliminary findings need to be confirmed by a randomized controlled study (Khalsa, Greiner-Ferris, Hofmann, & Khalsa, 2015).

One study in PD compared yoga to yoga combined with group CBT. The interventions lasted for ten months and were administered at weekly 100-minute sessions. Both types of intervention significantly reduced anxiety, panic beliefs, and panic regarding

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bodily sensations. The yoga enriched with CBT showed additional reductions for all of these symptoms (Vorkapic & Rangé, 2014). Further investigation into the value of comparing yoga with CBT and other therapies for enhanced outcomes is warranted. This could also support the role of top-down mechanisms present in yoga in combination with its bottom-up effects.

Two studies on yoga for anxiety neurosis were conducted in Indian hospitals. One found that yoga breath practices improved anxiety more than a placebo control. It was also reported that a comprehensive yoga intervention led to greater improvement in anxiety in comparison to diazepam (Sahasi, Mohan, & Kacker, 1989; Sharma, Azmi, & Settiwar, 1991). However, when reviewing these trials, Kirkwood et al. (2005) observed poor methodology and follow-up work for both.

Since 2005, several reviews have evaluated the effects of yoga on anxiety in individuals who were not diagnosed with anxiety spectrum disorders. One briefly reviewed research evidence and offered a rationale for using yoga to promote self-efficacy and comprehensive transformation (Joshi & Desousa, 2012). A review of 35 trials found that 25 of them showed significant improvements in stress and/or anxiety. Although this evidence was promising, it was marred by inconsistencies: interventions varied widely and the methodologies were not rigorous (Li & Goldsmith, 2012). A review of 25 studies, including sixteen RCTs and seven prospective, controlled, non-randomized studies, reported yoga's role in reducing state anxiety in certain situations (Chugh-Gupta, Baldassarre, & Vrkljan, 2013). Two reviews of yoga efficacy in depression and anxiety found superior evidence for depression, with promising albeit inconsistent results for anxiety (Duan-Porter et al., 2016; Uebelacker & Broughton, 2013). A review of 32 articles on yoga efficacy for anxiety in children and

adolescents found that yoga reduced anxiety in every study, but unfortunately poor methodology and high heterogeneity among the interventions precluded clear conclusions (Weaver & Darragh, 2015). There is general agreement that yoga has value for the treatment of anxiety, but that better study design and clarity regarding the efficacy of different interventions are necessary to understand which practices should be employed, and whether yoga should be used as a monotherapy or as part of a multimodal protocol.

Exploring appropriate dosage and best practices for anxiety, de Manincor and colleagues surveyed 24 yoga teachers with expertise in applying yoga to mental health conditions (de Manincor, Bensousan, Smith, Fahey, & Bouchier, 2015). The consensus indicated that practice should be conducted over five 30-40 minute sessions per week for at least 6 weeks. Breath-regulation techniques, relaxing postures, relaxation techniques, and meditation were identified as best practices for improving anxiety. Teachers also suggested avoiding stimulating practices such as rapid breathing or breath holding, or practices involving complicated instructions or a heated environment (de Manincor et al., 2015). Some of the recommendations conflicted with protocols in other studies. Certain interventions focus on practices that may stimulate and then calm the nervous system, theoretically promoting physiological flexibility. In contrast, other studies focus on the vital role of calming practices without stimulating techniques.

Recommendations for practice

Yoga teachers/therapists offer yoga for anxiety classes to individuals with self-reported anxiety as well as to those with diagnosed anxiety spectrum disorders. Such classes can offer techniques described below) that are useful for anxiety in general. Alternatively, classes for anxiety spectrum disorders are most appropriately taught by a yoga therapist, who should have a higher level of training to develop cumulative

skills from one week to the next. Based on the survey by de Manincor et al. (2015), as well as on the experience gained by this author (Heather Mason) from delivering yoga courses for people with anxiety spectrum disorders, we recommend that courses be 6–8 weeks long, that sessions occur at least biweekly, and that each session lasts for 90 minutes.

Developing safety

Coming to a yoga class to confront feelings of mental discomfort takes great courage, and it is very affirming for students with anxiety to be congratulated for taking an active role in improving their wellbeing.

When offering anxiety-focused classes, cultivating an environment of safety is paramount. There are basic safety tenets common to any yoga class for anxiety. For example, the space should be quiet with very limited interference. Individuals with anxiety tend to be on high alert, such that unexpected sounds or events can be jarring; and due to ANS dysfunction, a person with chronic anxiety will often have more difficulty calming down once they become agitated.

When offering anxiety-focused classes, cultivating an environment of safety is paramount.

Ample space between the mats is important. When people are chronically anxious the mind feels full, and there is often a correlated feeling of limited physical space, creating a greater need for such space. Specifically, the gaps between mats should be wide enough to prevent anyone from accidentally touching another participant, for example, when lying on the mat with arms spread out to the sides or with arms reaching overhead.

Because heat in the body often accompanies the stress response, a hot room may trigger anxiety. However, the room should not be too cold. People with

anxiety tend to have cold hands and feet, because when the sympathetic drive is increased small blood vessels in the hands, feet, and gut constrict. Simultaneously, the body redirects blood and oxygen to large muscles and the brain. Finding a temperature that keeps most of the group comfortable is important. For temperature variations, providing blankets and allowing those with cold feet to keep their socks on is comforting. If the yoga class has mats with good traction, students should not be asked to remove socks. However, physical safety overrides the importance of warm feet, so if slipping is a risk, socks cannot stay on.

Because the vagally mediated social engagement network is underactive when anxiety is present, eye contact can be uncomfortable for people with anxiety, especially for those with social phobia. The mats should be set up in rows rather than a semicircle so that students are not facing one other. Teachers should be mindful about their eye contact with students. Providing options for a downward gaze in poses during which the teacher will be facing students, or attending to a *dristi* (a specific point of focus for the eyes) as is done in classical yoga, provides a structured focal point that helps to diminish uneasiness. Note this does not mean that the teacher must avoid a student's gaze, rather just to be aware of individual reactions to eye contact.

Specific safety needs can best be gauged in yoga therapy classes, when a therapist has obtained background information from each student. For a drop-in anxiety-focused class, intake forms are important, and they are essential when running a program for anxiety or anxiety spectrum disorders. As students provide information about what may distress them in a class environment, they may lower their guard a little, knowing that the teacher/therapist will be more aware of their sensitivities. Most importantly, intake forms allow the teacher to effectively tailor the class to accommodate individual needs and concerns.

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Uncertainty tolerance tends to be very low for people with anxiety. Explaining what you are going to do before you do it helps reduce anxiety. This applies to a brief overview at the start of class as well as teaching movements. For example, informing a student that you are going to adjust their arm position before you do so may avoid causing an excess startle or fear reaction. Providing information about the flow of the class, about how long a pose is going to be held, and what is expected fosters certainty and allows students to relax. Teachers must be consistent and stick to what they say. This means keeping minor promises such as class time boundaries, length of time in poses, and what will be offered in class. If students sign up for an extended course, teachers can gradually provide less information, gently guiding students to tolerate some uncertainty, a helpful skill for them to take into daily life.

Class sequencing

Although inducing relaxation for someone with anxiety is of primary importance, there is often a misunderstanding of what this entails. People with high anxiety are not usually able to begin class with what are traditionally deemed relaxation practices. When there is high sympathetic drive and the mind is racing, sitting silently in gentle, restorative poses may kindle rumination and distress.

People with high anxiety are not usually able to begin class with what are traditionally deemed relaxation practices.

Starting class with dynamic movement and short holds (45–60 seconds) in challenging poses, especially standing postures, help keeps the mind in the present. As needs may vary, students should be cued to go at their own pace, and honor what they feel they need. Knowing that a yoga teacher/therapist is providing the opportunity to tend to their own comfort, rather

than expecting them to conform to expectations, often helps to reduce anxiety.

Dynamic movement could include inhaling while raising hands overhead and exhaling while bringing the arms down, shoulder rolls, cats and cows, and joint rotations; or if the group is physically strong, it might involve sun salutations and *vinyasa* flow. Make sure not to include breath holding, because breathlessness is a common feature of heightened anxiety and therefore holding the breath may increase anxiety. Likewise, the level of challenge for poses depends on the physical capacity of the class. For one group this might mean a very gentle lunge or a chair-assisted standing posture; for another group it might be a sequence of warrior postures. As neck and shoulder tension commonly occur with anxiety, be sure to teach postures that help release these areas. These should be practiced with a pranayama to relax and balance the ANS (see later for focal points of practice).

After about 30–40 minutes of melding dynamic moving and standing poses with pranayama, the body is usually tired, some of the nervous energy has been expended, and the nervous system is generally calmer. This is the perfect time to bring students down to the mat for longer holds in gentle and relaxing poses. Forward bends that stretch the hamstrings are particularly useful, because stretching large muscle groups can be quite relaxing and can release physical tension.

Savasana (a supine resting pose) should be taught with care when students are exhibiting symptoms of anxiety. Although the intent of *savasana* is generally understood as time for relaxation, for those with anxiety disorders, *savasana* provides the greatest space for rumination. Therefore, long *savasanas* are not advisable. To avoid this problem, *savasana* should either be kept short (5–7 minutes), or it should be replaced by a guided relaxation practice, for example, yoga nidra.

Focal points of practice

There are three main focal points to help reduce anxiety during yoga:

1. The development of self-regulation through relaxation-based practices.
2. The cultivation of resiliency.
3. The development of mindfulness in conjunction with 1 and 2.

Self-regulation and relaxation

Self-regulation includes the ability to modulate anxious responses by actively working to induce parasympathetic drive and by cognitive reappraisal. Yoga for anxiety programs should devote the first few sessions to teaching students to notice signals of sympathetic activity and how to reduce them. Many methods can be added for class relaxation such as stretching poses, OM chanting, and the basic class sequencing discussed earlier. However, the influence of breath on the ANS is profound and immediate, and hence pranayama practices that increase parasympathetic activity are a core and primary focus. Two of the most effective techniques are elongated exhalation and conscious slow, gentle abdominal breathing. As mentioned in the rationale section, during exhalation there is increased vagal transmission to the heart, reducing the heart rate. Students with anxiety spectrum disorders can find relief when they learn how to slow their breath and slow their pounding heart. The parasympathetic, calming effects can be further enhanced with *ujjayi* (a form of breathing that involves gentle contraction of throat muscles and leads to an ocean-like sound) during exhalation. It is preferable to teach anxious students *ujjayi* on the exhalation rather than on the inhalation because they will tend to *pull in* the inhalation, which may increase sympathetic drive—possibly even triggering the stress response—thus undoing the calming effects associated with the breath. Therefore, the technique should be performed softly with a

barely audible sound and without any strain or forcefulness in moving the air in or out. After the student has mastered *ujjayi* on the exhalation, they can try it as they inhale as well. To really benefit from this practice, and for it to become embodied learning for off-the-mat emotion regulation, students should be taught to elongate the exhale in every posture until *savasana*. In more challenging poses, the teacher can prompt students to see how elongating exhalation helps them stay present in the posture. Learning how to stay present during uncomfortable feelings and situations is excellent preparation for dealing with fear and stress in daily life.

Individuals with anxiety tend to breathe primarily into the chest and at a faster rate than other people.

Abdominal breathing is equally important as learning to elongate the exhalation. Individuals with anxiety tend to breathe primarily into the chest and at a faster rate than other people. Rapid chest breathing (known clinically as accessory breathing because it relies on the effort of a group of muscles in the upper chest and neck collectively known as accessory muscles) activates the sympathetic response. Reciprocally, sympathetic activity promotes rapid accessory breathing. Those with chronic anxiety and anxiety spectrum disorders are prone to breathing this way, which maintains a bidirectional feedback loop of mounting threat. Teaching students slow breathing and relaxing abdominal muscles to allow freer movement of the breath curbs this habit through respiratory signals that activate vagal parasympathetic pathways, calming the body and mind, reducing defensiveness, and supporting social engagement.

Additional benefits of *ujjayi*

Ujjayi may enhance the calming effect of slow breathing and prolonged exhalation by adding vibrational

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components to the vagal stimulation (Brown & Gerbarg, 2005, 2012; Gerbarg & Brown 2015). The vagus nerve enervates the respiratory tract from the lungs up through the larynx and pharynx. Breathing against the resistance created by vocal cord contraction increases stimulation of the vagus (Brown & Gerbarg, 2005).

Cultivating resiliency

Resiliency refers to the capacity to respond to stressors adaptively, that is, the ability to bounce back, recover, and function well following an adverse event. The practice of relaxation and regulation techniques helps develop resiliency by increasing the range and flexibility of the stress response systems. Resiliency fosters the ability to appropriately respond to the challenges of life; mobilizing for action when necessary and seamlessly returning to a state of peace and ease when action is no longer needed. It is a comprehensive capacity that includes cognitive, neurological, emotional, and physiological flexibility, all of which are influenced by the ANS and reflected in HRV (Thayer, 2000). Flexibility in the ANS includes the ability to downregulate quickly when sympathetic activity isn't necessary, and to move from a relaxed state to a more energetic one if a situation calls for it. Relaxation-based practices theoretically tone the vagus and enhance HRV and resiliency. Furthermore, specific techniques that tone both the sympathetic and parasympathetic branches of the ANS also cultivate resiliency. For example, alternating between a calming and an activating pranayama, which could be a brief rapid breath (*bhastrika* or *kapalabhati*) followed by a slow *ujjayi* breath. Another example is the cyclical breathing (no pause between inhalation and exhalation) at varying rates, slow, medium, fast, and slow again, as is practiced in Sudarshan Kriya yoga (discussed in the section covering research on yoga for anxiety). The basis of resiliency is the capacity to shift, adapt, and balance activity of the SNS and the PNS in response to changing demands and challenges, which

can be trained through these techniques. Because introducing a breath that increases sympathetic drive can induce anxiety, it needs to be done with caution; please refer to the Additional Precautions section for specific guidance.

Research on the respiratory system aligns with the yogic idea of balancing the *ida* and *pingala nadis*, namely that right nostril breathing is associated with sympathetic drive, while left nostril breathing promotes greater parasympathetic activity (Pal, Agarwal, Karthik, Pal, & Nanda, 2014). Teaching alternate nostril breathing (ANB) may therefore balance these systems (Lee & Ghiya, 2012). Because airflow is reduced during this practice, it is best to build up to it gradually, reducing the risk of causing panic. People with PD may associate the slight breathlessness that usually occurs in the learning stages with symptoms of a panic attack. Therefore, yoga teachers should tread lightly and use careful discernment regarding when and how to introduce alternate nostril breathing.

Teaching coherent breathing, which involves gently inhaling for six seconds and gently exhaling for six seconds, is one of the most effective ways to enhance HRV. For most adults, excluding significant respiratory or other medical conditions, optimal HRV occurs when the individual does coherent breathing at 4.5–6 breaths per minute (bpm). Adults who are more than six feet tall reach optimal HRV between 3–4.5 bpm. The influence of breathing on HRV is most amplified at this rate (Brown & Gerbarg, 2012). Students can practice coherent breathing as a stand-alone technique during class, or can be guided to keep this breathing rhythm throughout the entire posture practice. Pacing the breath with a soundtrack of a chime once every six seconds to cue inhalation and exhalation assures the ideal breath rate and eliminates the sympathetically activating effect of mental counting. Students can download a breath-pacing chime track (or other appealing tones) to use during home practice,

during the day when they feel stressed or anxious, and at night to quell the worried ruminations that often prevent sleep (Brown & Gerbarg, 2012).

Threading mindfulness through the practice

A state of mindfulness may naturally arise as postures direct students' attention to sensations in the body; this will engage cortical structures without effort. Specific mindfulness teaching can enrich this practice, further recruiting top-down processes through explicit attention to body sensations and cognitive reframing.

Mindfulness techniques can be integrated into self-regulating practices. For example, the yoga teacher/therapist can ask students to notice where the breath is felt in the body, to notice the specific sensation of breathing into this area, and then to consciously bring the breath into the abdomen. Offering very basic psychoeducation regarding how chest (accessory) breathing increases sympathetic response while belly (diaphragmatic) breathing invokes parasympathetic activation, followed by a recommendation to notice how mood and thoughts elicit respiratory changes (throughout the practice), can help students to observe this process in daily life. In fact, students may learn to prevent a mounting sympathetic response by developing awareness of the location of the breath; if they notice they are chest breathing they can immediately engage in abdominal breathing, thus curbing anxiety. Similarly, teaching students to notice the length of breath, sense if anxiety is present, and then elongate the exhalation, is another way to bring mindfulness and regulation together.

Building tolerance

Yoga teachers/therapists can use challenging poses as a form of mindful exposure therapy. For example, students can be asked to maintain an intense position such as *utkatasana* (chair, or powerful, pose) while noticing their mental reactions. Classic reactions include a desire to escape, self-judgment, and fear, especially concerning how long the experience will

last. The teacher/therapist can explicitly name such responses to help students notice them.

Reminding students that the class is a safe space to explore thoughts and reactions may strengthen their resolve to try.

Another way to build tolerance and also self-awareness is to take a student into a challenging pose and ask them to notice exactly which sensations are arising and driving their desire to escape the pose, and also what thoughts and beliefs arise in connection with these sensations. Through careful use of humor, the teacher can mention common mental and physical experiences to normalize them (assuring students that their experiences may be different). Reminding students that the class is a safe space to explore thoughts and reactions may strengthen their resolve to try. Mentioning that any physical distress can be easily alleviated by simply exiting the posture—as opposed to in daily life, where distress is not so easily relieved—inspires a greater willingness to explore. By remaining present with the experience, students can build greater tolerance and a different relationship to uncomfortable feelings. This enhanced awareness can be transposed onto uncomfortable experiences and responses as they occur outside the yoga class.

Managing emotionally challenging experiences in yoga classes

It is not uncommon for people with high anxiety to have anxiety responses triggered in class or individual yoga therapy sessions. The experience of doing something new, coupled with a host of sensations that arise through poses and the tendency to easily panic, may elevate levels of anxiety, even in classes that are tailored to reduce anxiety. This is not something for the yoga teacher/therapist to worry about. Such reactions provide opportunities for students to learn how to manage their anxiety reactions in a safe and

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accepting environment. The following considerations are helpful in calming down a student and recontextualizing the experience: normalizing the experience for the student can reduce embarrassment and fear, and explaining how this reaction in a yoga class provides an opportunity to alter responses can reframe the experience as useful in managing anxiety. This can be done in a group setting as well as in individual yoga therapy sessions (albeit it with only a brief explanation as other students may need attention). The student can then be asked if there is a pose they would prefer. To further downregulate anxiety, the yoga teacher/therapist might stand or kneel by the student and breathe with them at a slow controlled rate to help the student slow down their breathing. This may be enhanced by suggesting the student looks at the teacher, potentially engaging the mirror neuron system to help guide the way to a slower respiratory rate. Another method is to hold a challenging or empowering pose that redirects attention (unless this was the cause of distress) and mitigates feelings of helplessness or vulnerability.

Scope of practice for yoga therapists

Given the higher level of distress for individuals with anxiety disorders compared to those with trait anxiety, we recommend that classes targeting anxiety spectrum disorders be taught by yoga therapists. Techniques to manage emotionally overwhelming reactions require greater knowledge and understanding of general anxiety and anxiety spectrum disorders, the therapeutic relationship, and the potentially harmful adverse reactions in clients. These are beyond the scope of practice of most yoga teachers.

Yoga therapists are also best prepared to offer individual sessions for people with anxiety disorders because their training specifically covers the use of yoga in anxiety management. Through a thorough clinical intake, yoga therapists can understand factors contributing to anxiety and design a therapeutic plan that uniquely suits the student, as the following case report illustrates.

Dan suffered from PD. Participating in a yoga class for anxiety management reduced his anxiety overall, but panic attacks continued to plague him. Dan was nervous about his performance at work and would often have panic attacks on the way to the office. In the initial session with the yoga therapist he explained that his experience of panic included a rapid change in breathing and limpness in his legs that would render him unable to walk or even stand. Incapacitated by this experience, Dan was despondent and self-loathing and often did not make it to work, which only worsened the problem. Through mindful inquiry during yoga therapy, Dan was able to identify the cascade of thoughts that would precede a full-blown panic attack. As Dan only lived two miles from work, the yoga therapist suggested that he walk rather than take public transport. The intention was that the act of walking would prevent Dan's legs from going limp. Therefore, Dan was instructed that whenever he felt nervous during his walk, he should speed up to prevent his legs from buckling and simultaneously elongate his *ujjayi* exhale (Dan already knew *ujjayi* breathing from his yoga class). Whenever the thought cascade began, even before his anxiety arose, Dan was to speed up and elongate his exhalation.

In later sessions, Dan identified aspects of his life in which he felt inadequate. He learned to overcome feelings of inadequacy by the same techniques: elongated *ujjayi* exhalation and fast walking. An assessment of Dan's movement and strength revealed weakness in his shoulders and lack of tone in his leg muscles. A yoga therapy sequence was designed to strengthen Dan's legs and shoulder muscles, as well as to open his chest to give him a sense of confidence. Over the course of four months Dan's body began to change, his panic attacks subsided, and he started to feel competent at work, which in turn enhanced other aspects of his life.

Yoga in clinical practice

Integrating yoga practices with psychotherapy and other forms of mental health treatment can significantly support therapeutic progress. With specific training, clinicians can learn how to integrate breath

practices, basic movements, and yogic relaxation techniques into a wide array of treatments.

Breathing techniques that cultivate self-regulation and promote resiliency, which supports client self-efficacy, can be integrated into both therapy sessions and home practices. Many psychology students are already taught breath-regulation techniques to help clients manage distress. Through yoga training, clinicians can refine these skills. Similarly, psychiatric nurses, psychiatrists, general practitioners, dentists, social workers, counselors, and other therapists can be trained to teach breathing techniques to anxious patients. Anxiety often arises during therapy sessions as the client tries to talk about painful, frightening experiences. The fear of this anxiety can inhibit the client from thinking or talking about such issues. Anxiety-disordered patients frequently rely on avoidance, including avoidance of their own memories and thoughts, to prevent the discomfort of overwhelming emotions.

Teaching patients to do calming practices during therapy sessions as needed provides a way for them to work on anxiety-related issues and to make progress. Knowing that they can control anxiety emboldens patients to tackle issues they would otherwise avoid.

Anxiety-disordered patients frequently rely on avoidance, including avoidance of their own memories and thoughts, to prevent the discomfort of overwhelming emotions.

Sometimes during a session, after exploring difficult issues, a patient may feel upset. Encouraging the patient to do three to five minutes of calming breath practices at the end of the session reduces distress and facilitates transition out into the world.

Mental health professionals can also learn to teach techniques like yoga nidra to help clients to deeply

relax and better understand the roots of their anxiety. Traditionally, yoga nidra was used to induce a deep relaxation to uncover and transform unconscious tendencies. Its careful use in therapeutic work can be highly valuable in helping clients to accept and integrate previously intolerable feelings and emotions. Teaching yoga nidra does require specific training, because it differs from the techniques generally used by mental health providers. Many guided yoga nidra downloads are available, but students with acute anxiety disorders should be referred to teachers with expertise in applying yoga nidra to this population, rather than directed to use recordings without therapeutic supervision.

The worldview offered by yoga may also support therapeutic work. Rather than focusing on pathology, yoga sees the person as a dynamic interplay of arising tendencies, some of which have been cultivated and others that have been ignored, and most of which derive from forces outside the client's realm of responsibility. Through self-development, calm and ease can emerge while fear and worry can move into the background. People need not suppress aspects of themselves, but rather notice the spectrum of experiences, aspects of the self, wherein constant change is the norm. This broader view can help patients re-envision themselves on a trajectory of possibility rather than to identify solely with a diagnosis. Clients who are interested in yoga philosophy may also benefit from the comprehensive view of reality expressed in yoga where daily concerns can be held by the background container of the cosmos. Many people with anxiety disorders feel isolated and disconnected. The experience of meaningful connection to oneself and to others, which sometimes occurs during yoga practice, can mitigate isolation and greatly enhance the quality of life.

Additional precautions

People with anxiety spectrum disorders can be exquisitely sensitive to physical sensations, social

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interactions, perceived criticisms, tones of voice, or other stimuli that they may perceive or misperceive as unsafe. Although it is impossible to eliminate all potential anxiety triggers, being mindful of the client's vulnerabilities enables the teacher/therapist to minimize adverse reactions (see the section covering developing safety in yoga in clinical practice).

The most specific precautions exist around teaching any kind of rapid breathing. In a one-on-one session, the client should be asked about the nature of their anxiety, including the duration and intensity of anxiety, and the presence of symptoms such as panic, phobias, and specific triggers. The yoga teacher/therapist should also find out what (if any) methods have helped the client control their anxiety in the past, so that the client's strengths and skills can be integrated into their treatment plan.

The most specific precautions exist around teaching any kind of rapid breathing.

In an anxiety-focused yoga class, it is important to avoid bringing attention or exposure to individual students by making general suggestions to the whole class, for instance, "As we do more rapid breathing, if you begin to feel anxious, just slow your breathing and breathe gently until it subsides." Given that people with anxiety may struggle to calm down from excess sympathetic drive, teaching a calming pranayama, such as gentle *ujjayi*, followed by an activating one, such as a very brief *kapalabhati*, and then returning to *ujjayi*, is safer than teaching only rapid or forceful breathing, particularly at the beginning.

Future directions

Research on yoga for anxiety, studies exploring discrete mechanisms, and an increasing trend toward using yoga in anxiety management, collectively indicate that the inclusion of yoga in the treatment

of anxiety disorders is on the rise. Although yoga is widely used for everyday anxiety, a gap exists in knowledge about the efficacy of yoga programs for anxiety spectrum disorders. Better studies are needed to bridge this gap, particularly to develop evidence-based guidelines for integrating yoga into clinical mental health practice. Such guidelines would include information about the expected benefits as well as the potential risks inherent in each practice. Mental health care professionals and facilities need to match treatments with specific diagnoses. Yoga programs will need to adapt to the constraints (e.g., treatment time, staff time, and facilities) of clinics, hospitals, and other institutions. Requiring adherence to complex, time-consuming regimens will make integrative treatment more difficult. Yoga teachers and researchers will do well to listen and take into account the needs and limitations of mental healthcare providers. By the same token, mental healthcare professionals will need time to learn about the many possibilities for enhancing patient outcomes by integrating yoga into their treatment regimens or by referring to yoga therapists who are qualified to work with severely anxious patients.

The emergence of research on integrating yoga with treatments such as CBT and other psychotherapies opens a new domain for helping a significant proportion of patients who do not respond adequately to conventional intellect-based approaches. Once the evidence is sufficiently robust to establish significant anxiolytic effects with yoga, consumers, mental healthcare professionals, and mental health policy leaders should welcome the arrival of new approaches that are less expensive and free of the side effects and possible addictions associated with pharmaceuticals.

In summary, anxiety spectrum disorders can provide a point of entry for yoga into mental health care. The popularity of classes and training in yoga for anxiety indicates that this aspect of treatment could lay

the groundwork for how yoga will be adapted for other mental health conditions. With such growth, there will ideally be increased knowledge sharing and availability of resources for research, resulting in the development of best practices based on clinical experience and solid research. Practice guidelines could include a menu of yoga options or combinations of practices best suited for specific anxiety symptoms and specific anxiety spectrum disorders, how to safely tailor practices for different levels of symptom severity, how to modify practices in the presence of comorbidities, and how best to integrate yoga with other psychological interventions for the benefit of the patient.

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Chapter 2

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