

# Anxiety and Neuroscience

## Tim<sup>1</sup>

*Tim is a 21-year-old male seeking treatment for what his mom describes as "constant worry." This constant worry has begun to affect Tim's academic performance in college, where he is a junior. It has also resulted in him having an upset stomach on an almost daily basis. When asked about what he is worried about, he struggles to identify specific stressors or precipitants to his anxiety. He reports that the times he feels most relief from his free-floating worry is when he is watching television or playing video games. He adds, however, that during commercials or when his game is loading, when he is no longer distracted, the anxiety comes flooding back. In addition to this free-floating anxiety, Tim describes difficulty in social settings, wherein he feels judged, especially when the attention is on him. His mother reports that this seemed to begin around the transition from elementary to middle school. Tim adds that his mother has attended his therapy sessions (along with many other meetings) throughout his life, and he finds comfort in having her there, even though he recognizes it as "out of the ordinary."*

## Opening Questions

- What does anxiety look like in an individual, both colloquially and diagnostically?
- What is the best treatment for anxiety?
- How can therapists use findings from neuroscience and apply them in sessions without lecturing or overwhelming an anxious client?

## Chapter Goals

- To establish the biology- and theory-based foundations for anxiety and its treatment
- To identify how the four categories of treatment approaches covered in this book address anxiety, leading . . .
- To demonstrate what integration of these theories with neuroscience findings looks like in the treatment of anxiety

## INTRODUCTION

Regardless of what any of us think we know about anxiety, all we really need to remember is the name of one small nut: the almond. The Latin term for *almond* is *amygdala*. The amygdala is the structure in the center of the limbic system that resembles an almond, in both shape and size (Figure 7.1). And the amygdala is not only the geographic or structural center of the limbic system; it is also the center of human emotion.

Take a moment to reflect on these questions for yourself:

1. What do *you* (as a person) know about anxiety?
2. What do you *want* to know about anxiety?
3. What do *we* (as a field) know about anxiety?

When I teach the course by the same name as the text, I pose these questions to the class, and together we consider these questions across six categories: trivia, symptoms, causes, location (in the body), impact, and treatment. Responses range widely, but there are certainly some factors that stand out. Here are a few from each category, presented in Table 7.1 based on informal analysis. See how many resonate with you and your experience.

**Table 7.1** Folk Wisdom About Anxiety

Trivia	Symptoms	Causes
<ul style="list-style-type: none"> <li>• It's terrible</li> <li>• People think it's for introverts and low self-esteem</li> <li>• People think you're fragile, sick</li> <li>• Limits your actions and is life-isolating</li> <li>• Abnormal, a bad sign</li> <li>• More socially acceptable than "worry" or "fear"</li> </ul>	<ul style="list-style-type: none"> <li>• Concentration inability, hypervigilance</li> <li>• Thinking—Too much, none</li> <li>• Crying</li> <li>• Sleep disturbance</li> <li>• Physical—Sweaty palms and armpits, muscle tightness, rapid breathing</li> <li>• Avoidance</li> </ul>	<ul style="list-style-type: none"> <li>• Transitions</li> <li>• Fears—Vulnerability, lack of control, success</li> <li>• Past, present, and future</li> <li>• Everything, anything, and nothing</li> <li>• Expectations—Social comparisons</li> </ul>

(Continued)

**Figure 7.1** Almond



Source: ©iStockphoto.com/golovorez.

**Table 7.1** (Continued)

Location	Impact	Treatment
<ul style="list-style-type: none"> <li>• Everywhere!</li> <li>• Chest</li> <li>• Skin</li> <li>• Shoulders</li> <li>• Head</li> <li>• Home, work, grocery store, relationships, driving— Anywhere and everywhere</li> </ul>	<ul style="list-style-type: none"> <li>• Social—Tough to live with and love with, for both partners</li> <li>• Behaviors that follow anxiety create problems</li> <li>• Hard to have empathy for those with anxiety</li> <li>• Work—Concentration, interactions</li> <li>• Physical—Weight, sleep, immune system, headaches, chest pain, digestive issues</li> </ul>	<ul style="list-style-type: none"> <li>• Education—Not a character defect, but an actual brain mechanism</li> <li>• Don't fight it</li> <li>• Self-talk</li> <li>• Support the client!</li> <li>• "Just get over it"</li> <li>• Stop maladaptive behavior</li> <li>• Relaxation techniques</li> <li>• Find something to do</li> <li>• Secondary gains—What is the client getting out of it?</li> </ul>

What things stand out as you read these? It certainly seems that students, therapists, and clients receive and emit a lot of different messages from different sources about what and where anxiety is and what to do about it.

### The Basics From the National Institute of Mental Health

#### Anxiety Disorders

- Approximately 40 million American adults ages 18 and older, or about 18.1% of people in this age group in a given year, have an anxiety disorder.
- Anxiety disorders frequently co-occur with depressive disorders or substance abuse.
- Most people with one anxiety disorder also have another anxiety disorder. Nearly three-quarters of those with an anxiety disorder will have their first episode by age 21 and a half.

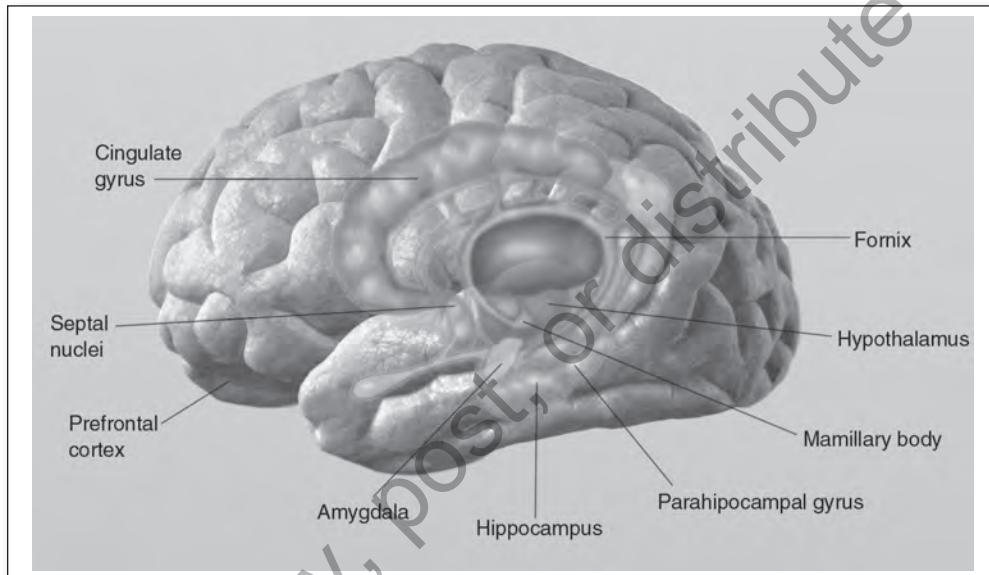
### WHAT IS ANXIETY . . . IN THE BRAIN?

LeDoux (2003) offers a starting place for identifying both “the what” and “the where” of anxiety, especially in terms of general anxiety disorder (GAD):

In summary, generalized anxiety is an aroused state of mind initiated and maintained by emotional processing. As a result, it requires, at a minimum, networks involved in arousal (monoamine systems), emotional (amygdala), . . . and cognitive (prefrontal

cortex, hippocampus) functions. And while individual brain regions and networks make distinct contributions to the processes that together constitute anxiety, anxiety itself is best thought of as a property of the overall circuitry rather than of specific brain regions. (Ledoux, 2003, p. 290)

**Figure 7.2** Limbic System



Source: Garrett, Bob. *Brain & Behavior: An Introduction to Biological Psychology*. 3rd ed. Thousand Oaks, CA: Sage, 2011.

### DSM-5 Description

As we explore anxiety and GAD specifically (reasons for this are discussed below), it is interesting and important to note that a major shift in diagnostic categorization took place in the transition from the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) to the fifth edition (DSM-5) (American Psychiatric Association, 2013). Obsessive-compulsive disorder (OCD) was previously considered to be an anxiety disorder and was thus categorized as such in the DSM-IV, whereas in the DSM-5, OCD and related disorders exist in their own category (including body dysmorphia, hoarding, and hair-pulling disorders). In addition, acute and post-traumatic stress disorders, which were once classified as anxiety disorders, are now in their own section of trauma- and stress-related disorders, along with reactive attachment disorder, disinhibited social engagement disorder, and adjustment disorders. Anxiety disorders in the DSM-5 now include the following:

- Separation anxiety disorder
- Selective mutism
- Social anxiety disorder

- Panic disorder
- Agoraphobia
- Generalized anxiety disorder

Each of these disorders brings with it specific symptoms, duration, and intensity, along with qualifiers like exclusions for general medical conditions and substance intoxication and withdrawal. Because of the reclassification in the DSM-5, this chapter will use the more general descriptors of anxiety as a phenomenon, rather than trying to address differential diagnosis or to cover every disorder. For example, in order to move toward a diagnosis of an anxiety disorder, the individual's fear or anxiety must be *excessive*, meaning out of proportion of what might be expected according to cultural norms; must be *persistent*, meaning of sufficient duration to cross a diagnostic threshold; and must result in a "behavioral disturbance" related to fear or anxiety. So what we see in this is severity, duration, and behavioral dysregulation. What follows is a list of descriptors for clinicians in identifying anxiety in their clients, using the diagnostic criteria for GAD as a starting point (see also Table 7.2):

- a. Excessive anxiety and worry, which is apprehensive expectation, more often than not for at least six months, about multiple events/activities
- b. Worry is difficult to control (implies attempts have been made)
- c. Three or more symptoms of behavioral dysregulation:
  - Restlessness, keyed up, on edge
  - Easily fatigued
  - Trouble concentrating; mind going blank
  - Irritability
  - Muscle tension
  - Trouble falling or staying asleep, or restless sleep
- d. These things significantly impair functioning in social, work, and other situations
- e. Not caused by substance or medical condition
- f. Rule out a host of other specific anxiety, stress, mood disorders first

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## WHERE IS ANXIETY . . . IN THE BRAIN?

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The DSM-5 distinguishes fear from anxiety by describing fear as a response to a real or imminent threat whereas anxiety is the anticipation of a future threat (American Psychiatric Association, 2013). This echoes LeDoux's (2003) discussion of the distinction between the two: "fear is viewed as a reaction to a specific and immediately present stimulus, whereas anxiety is a concern about what *might* happen" (p. 289). So anxiety could be thought of as a perception, leading to an emotional response, which is interpreted cognitively and

**Table 7.2** What Is Anxiety?<sup>2</sup>

Theory	Aphorism	Branch	Related Theme
Psychoanalytic views	<i>Psychopathology is historical</i>	Freudian	Love unrequited; or death
		Adlerian	Inferiority, vis-à-vis perception of self, by self and others
Cognitive-behavioral views	<i>Psychopathology is behavioral</i>	Cognitive	Results from distorted thinking
		Behavioral	Anxiety is natural; avoidance is what leads to problems
		Acceptance and commitment	Meta-anxiety is the problem
Humanistic-existential views	<i>Psychopathology is relational</i>	Person-centered	Isolation
		Existential	Life and death
		Gestalt	Anxiety is enacted
Constructivist views	<i>Psychopathology is constructed</i>	Narrative, solution-focused	"Management versus elimination" (Quick, 2013)

demonstrated behaviorally, whether that behavioral response is automatic (fight/flee/freeze), autonomic (heart rate/respiration), or voluntary (approach/avoidance). However, a caveat here is that the lines between anxiety and fear are not so clear. In fact, anxiety is positioned in the center along a continuum from stress (on the lesser extreme) to fear (on the other extreme), with significant overlap between both stress and anxiety, and anxiety and fear. This is true particularly in the brain.

Anxiety or worry, in order for it to cross the threshold of disorder, must be excessive, enduring, and uncontrollable; must have behavioral indicators; and, in order to distinguish it from fear, must be hypothetical or anticipatory, instead of *real* (future). This is important for clinicians, therapists, counselors, and others to grasp. Anxiety is both real and not real. Anxiety is not about what has happened (past) or is happening (present); it is about what may happen. In the interest of empathy, consider clients' experience of this cognitive-emotional-behavioral-contextual phenomenon: their pain is real, but based on something that is not real. And yet, it is absolutely real. For friends and loved ones of individuals struggling with anxiety disorders, this can be extremely challenging to comprehend, and even more challenging to sympathize/empathize with. Friends and family members are far more likely to attempt to talk them out of it! By the time our clients get to us, they are often incredibly discouraged by their experience, in terms of both living it and trying to understand it and explain it to others.

## GENERALIZED ANXIETY DISORDER

For this discussion, I start—and end—with GAD for several important reasons:

1. GAD is one of the most, if not the most, pervasive of the anxiety disorders.
2. It is extremely difficult to treat given its diffuse nature (no identified stressor, target, environmental reinforcer, etc.).
3. It is highly comorbid with other anxiety disorders (e.g., social anxiety and specific phobias) and with mood disorders.
4. Despite being relegated to “residual” disorders in the first three iterations of the DSM, its prevalence, course, and disturbance have brought about its standing as a free-standing disorder, and those who’ve worked with these clients or lived with GAD themselves understand how life-altering this disorder can be.
5. LeDoux (2003) and others have noted that while the DSM and practitioners have sought to differentiate types of anxiety disorders, at the neurological level they have, at least in part, very similar mechanisms.
6. Simple space limitations—it would be impossible to cover every anxiety disorder here.
7. Lastly, GAD is an exemplar of anxiety in general as seen through the neuropsychological lens provided by Badenoch (2008). She describes the causes of anxiety in terms of interpersonal neurobiology (IPNB):
  - Genetic vulnerability
  - Alterations in neurotransmitters and hormones
  - Deficits in brain structure and function
  - Disruptions in interpersonal relating (inner community)
  - Social network reinforcement of neural networks

These categories can be used to describe the causal factors in the full range of anxiety disorders, not to mention the stress and stress-related disorders (DSM-5). Holly Hazlett-Stevens (2008) offers a very helpful taxonomy of sorts in assessing and thereby understanding GAD. In discussing assessment of anxiety and its related constructs, she identifies:

- Worry severity—the intensity of a client’s anxiety in general, whether or not the client crosses the diagnostic threshold for the disorder
- Worry content—the domains of worry that clients often fall into: relationships, lack of confidence, aimless future, work, and financial (see the Worry Domains Questionnaire [WDQ]; Tallis, Eysenck, & Mathews, 1992, as cited in Hazlett-Stevens, 2008, p. 41)
- Meta-worry—a client’s worry about the negative impacts of his or her worry

- Worry beliefs—a client’s perception about the potential benefits of his or her worry
- Intolerance of uncertainty—the relationship between GAD and a client’s difficulty in tolerating ambiguity or uncertainty

These approaches to assessment of GAD assist in identifying the mitigating and exacerbating factors involved in GAD in particular and anxiety in general. In GAD, worry severity, for example, can vacillate between low-grade, chronic worry that serves a nagging, distracting role in daily functioning and acute levels of worry at certain times of the day around certain activities (or inactivity) that evoke different behavioral responses from these clients. The content of GAD, client worry itself, can range from deeply personal, specific types of worries to the more common type of diffuse, free-floating worry; in the first instance, the client might describe the worry diffusely, but locate it nearer to a loved one, finances, the future, or something else.

## INTEGRATION

In Chapter 1, I laid out a very simple framework for the work therapists conduct in therapy. Every therapist, working with every anxious client, must deal at some level with the client’s thinking, feeling, and behaving. Each client with anxiety comes to therapy with his or her own genetic composition, biological factors, experiences, and formative environments. These factors shape and are shaped—and are in the process of being shaped—through a sociocultural milieu that frames all of the above. Therefore, I’ve included Table 7.3 and discussion following that outlines one way to view anxiety through each of these factors, along with their respective, relevant neural correlates or analogs, as the case may be.

Table 7.3 is fairly long and detailed, even in an abbreviated format. Let’s look at how these seven components might look if we were to assume linearity:

Genetics/Biology → Environment → Experiences → Thinking, Feeling, Behavior  
 ←-----Sociocultural Milieu-----→

Tim is born with his own genetic code, which is completely out of his control. Part of this genetic code includes the template for his biologically determined temperament and personality. It includes predispositions toward certain ways of thinking, feeling, and behaving—and all of this arrives with him at his birth. He is also born into an early environment that is not of his own choosing and will remain that way to a great extent for the first almost two decades of his life. The specifics of his environment may change (physical location, caregivers, schools, etc.), but they will remain his environment. It is then in this context that he experiences the world and the world experiences him. Tim will view these experiences through the lens of his environment, which is further shaped by the sociocultural milieu from which he comes. These experiences and environments will then impact gene expression, effectively turning on and off certain genes, which will then impact

**Table 7.3** Seven<sup>3</sup> Dimensions of Anxiety

Dimension	Description	Neuro Correlate	Example
<b>Thoughts</b>	Thoughts tend to be intrusive, persistent, pervasive (in GAD, not in specific phobias), and uncontrollable, or controlled only with great effort	Some research points to the cingulate system (includes outer band of limbic system) that results in cognitive rigidity, blocking the ability to think flexibly in the presence of irrational fears (Amen, 1998)	Tim's limbic hyperactivation, and the amygdala in particular, blocks his ability to think around or beyond his anxiety, keeping him locked in anxious thoughts about his anxiety
<b>Feelings</b>	Specific or diffuse, future oriented, and subjective experience of fear or impending doom/problems	Feelings as real and reality are activated in the amygdala as the first circuit for threat response, and yet don't make it to the prefrontal cortex for higher-order processing, keeping feelings in control	Anxiety is largely immune to rational, reasoning processes, but Tim, when not distracting himself, tries to avoid his anxiety by trying to talk himself out of his anxiety, thereby giving his feelings enduring power
<b>Behaviors</b>	Avoidance, attempts to control through approach/avoidance but usually through avoidance; approach behaviors usually involve controlling others or managing thoughts, as in talking oneself out of anxiety	Anxiety is a specter, so when behavior follows the anxious experience as if the anxiety were corporeal, the anxious feelings are validated, giving them additional power	Tim has become convinced behaviorally that his anxious experience portends danger, and reacts accordingly, thereby locking the threat-detection system in the "on" position
<b>Environment (Past and Present)</b>	Cues from the past environment trigger anxious responses in the present; defined by uncertainty, unpredictability; patterns of avoidance that give validity to	Threat avoidance in the early environment signals danger, and that danger is both avoidable and controllable, via either magical worry or hypervigilance	Tim's experience need not be interpreted solely from a psychodynamic perspective to appreciate that threat detection and danger avoidance have led to

Dimension	Description	Neuro Correlate	Example
	subjective anxiety; manage current environment through “harm avoidance”	These messages are stored in implicit memory and emerge through cognition, emotion, and behavior; fear responses and circuits in the brain are anachronistic in the sense that old fears/ anxieties stored early on emerge into awareness as if no time has elapsed	a hyperalert system: “threats are everywhere, whether you can see them or not; better safe than sorry”; Tim learned early on to be anxious/afraid, of both the known and the unknown, and these fears remain in the present even when based on past learning experiences
<b>Experiences</b>	Except for PTSD, specific experiences are unnecessary to reinforce anxiety, except that avoidance both proves the “need” to be anxious and serves as a protective factor	Consider how the insula seems to connect motor neurons to the limbic system, adding emotional content and impact to motor firing in response to facial expressions and nonverbals	Tim’s brain has been “learning anxiety” since early on as his insula connects behaviors observed with emotions experienced
<b>Biology/Genetics</b>	Up to 30% genetic factors; results in physiological symptoms of muscle tension, restlessness, and “butterflies” in stomach	Classical conditioning demonstrates the power of pairing stimulus and response, and in this case, physical experience during autonomic activation becomes paired with the subjective experience of anxiety	At this point, whenever Tim has an upset stomach, tight muscles, or sweating palms, he defaults into an anxious response through classical principles
<b>Sociocultural Milieu</b>	Twice as frequent in females, and much more likely to occur in industrialized countries	Given the feminine bias, anxiety disorders give rise to societal prejudice that anxiety is a “woman thing”	Tim’s anxious experience is compounded by his self-critical loop of being anxious, judging the anxiety and then judging himself

subsequent gene expression. This is the broader context into which Tim's thoughts, feelings, and behaviors are formed.<sup>4</sup> His thoughts, feelings, and behaviors are mutually reinforcing and are shaped by his biology, environment, and experiences. They also shape his genetics through gene expression and experiences. For example, his thoughts and feelings about his environment and certain experiences will shape subsequent thoughts and feelings, but will also heavily influence what he does (or does not do) in response to his environment and those experiences. All six of these factors take place in the larger cultural context, but they also converge to create Tim's individual sociocultural reality.<sup>5</sup>

## FOUNDATIONS: THEORY RESPONSES TO ANXIETY

### A Psychodynamic/Psychoanalytic Response to Anxiety

*Eros and Thanatos*; sex and death; love and life. These are the two primary forces that drive human behavior in Freud's conception. Even more so is the connection between anxiety and both sexual expression and nonexistence. The unconscious processes—the dynamic that undergirds sex and aggression—is the home of anxiety, as allowing unacceptable impulses to emerge is extremely anxiety-provoking, as they might result in judgment, humiliation, and ultimately death (see Freud's 1922/2010 discussion of fear and anxiety). How far we've come as a society from these primitive conceptions—or have we? Anxiety results from unmet needs—both physical and psychological, but socially as well. Society is forever pushing the boundaries of decorum, constantly confronting how far ego defense mechanisms can be pushed. The resulting tension is anxiety. For this section, we'll take a closer look at these psychodynamics through the lens of attachment, consciousness, and memory, much like we did in Chapter 4.

*Attachment*: As a people, our earliest relationships are those formed (or not) with our primary caregiver(s). These early relationships provide a context for us to work through our tensions about life across all five psychosexual stages of our development (*Eros* component). In addition, these earliest connections, at their most fundamental, teach us about whether the world is a place in which we can meet our needs for love and survival (*Thanatos* component). This psychoanalytic influence is best seen in the work of object relations theorists (e.g., Karen Horney) and attachment theorists (e.g., John Bowlby). Believing we can get our needs met (for both love and survival) from a safe figure provides freedom and opportunity to explore the environment. However, when these early attachments are absent or unstable, an existential type of anxiety develops. This anxiety creates energy, and that energy must go somewhere—usually exiting in the form of defense mechanisms.

*Consciousness*: Consciousness, or rather unconsciousness, is a mixed blessing, especially in terms of anxiety. If all of the tasks our brains relegate to automatic, out-of-consciousness, and even autonomic processes were to be brought into the foreground of conscious awareness, the system would be quickly overwhelmed and likely overheat, resulting in shutdown. This would be an anxiety-provoking situation indeed. At the same time, the unconscious processing that takes place can also result in anxiety. In psychodynamic terms, our brains

are constantly recording, and these implicit (background, outside-of-awareness) recordings can impact our ability to be and remain calm in certain situations. Imagine what is being recorded implicitly in terms of early attachment described in the preceding paragraph. How might these unconscious messages about the world impact thinking, feeling, and behavior? Bringing these unconscious materials to the fore enables other brain systems besides the limbic system to exert control, and thereby regulate the system. One implication is related to memory.

*Memory:* Memory, and implicit memory in particular, is a key phenomenon in understanding behavior, both neurologically and psychodynamically. Consider Alfred Adler's (1929/1964) conception of anxiety. Our early experiences as human infants and small children are saturated by inferiority experiences: we can't reach, lift, or control much of anything in our environment or ourselves (Neukrug, 2011). This is appropriate developmentally, unless implicit memories of those experiences form the basis of adolescence and early adulthood (May, 1950/1977). Experiencing feelings of inferiority as facts rather than malleable emotions determines the impact of this developmental process. In Adler's work, we see a foreshadowing of both cognitive therapies and constructivist approaches to self-creation. One of Adler's main treatment interventions involved earliest memories, both generally and in regard to specific areas. How does one know which memory is relevant, whether client or therapist? According to Adler, the one that emerges is the relevant one, merely because it did emerge. The tenor of the memory—made explicit through the clinical interview—provides clues to the implicit memories regarding inferiority in the early environment.

### Psychoanalysis in Session: Tim

*Therapist:* Tim, I'm interested in what you recall from your childhood, in terms of relationships. Could you describe your relationship with your primary caregivers—your mother and father, I believe?

*Tim:* Hmm . . . My parents were really attentive when I was a kid. I recall my dad telling me that he would follow me around when I was a toddler and preschooler, blocking me from bumping into things and hurting my head. I remember my mom as really emotional—often crying, yelling, or laughing; whatever she felt, she felt it intensely and expressed it that way. I seem to remember that the two things they always said were "I love you" and "Be careful!" They said those a lot!

*Therapist:* I think I get it. They were clear about being aware both of their love and of dangers in the environment. When do you first recall feeling what we would now refer to as anxiety?

(Continued)

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*Tim: I think I was always anxious when leaving or being away from my parents. The big "event" was trying to spend a week away at church camp. I was miserable the first few days, but I stayed. I'll never forget those feelings!*

*Therapist: It seems like I can see some of that experience in your face right now as you think of it.*

*Tim: Yeah, it was a horrible feeling.*

*Therapist: If you were to speculate, Tim, how would you guess that experience might be connected to both your early experiences and your current experience of anxiety?*

*Tim: I have no clue . . .*

*Therapist: Well, here's what I think I heard, in terms of the messages you may have been receiving and encoding: The world is an unsafe place, and the only way to be safe in it is to be close, in physical proximity. When feelings come along, they can take on a life of their own—you told me earlier that your dad did not express much emotion, whereas your mom was highly emotional—both messages about feelings, either that they are to be avoided (for some undisclosed reason) or that they are all-powerful and reality based.*

*Tim: Whoa, I can totally see that. When you put it that way, it seems like it would be weirder if I weren't anxious all the time!*

### **A Brain-Based Psychoanalytic Response to Tim's Anxiety**

Given that few things in life, if any, are certain, this form of anxiety is especially tricky. Sometimes referred to as anticipatory anxiety, the focus of the worry is on awaiting the future to arrive so that relief will come. Since the future is unknowable, this anxiety is a constant no-win for the client in that he or she will never achieve the prescience needed to forestall the anxious experience. One thing that is clear from all psychodynamic views of human experience is that both early relationships and early environments have a critical role in shaping the individual's experience of the world. So what happens in the brain of an anxious person from a psychoanalytic perspective?

Learning is the biological process of acquiring new knowledge about the world, and memory is the process of retaining and reconstructing that knowledge over time. . . . [T]he brain has two major types of memory: explicit (declarative) memory, for facts and events, people, places, and objects; and implicit (nondeclarative) memory, for perceptual and motor skills. Whereas major aspects of explicit memory require the hippocampus and adjacent cortex—and in humans involve conscious awareness—implicit memory does not require conscious awareness and relies mostly on other brain systems: namely, the cerebellum, the striatum, the amygdala, and, in invertebrate animals, simple reflex pathways themselves. (Kandel, Dudai, & Mayford, 2014, p. 163)

*Implicit Memory:* Like a video recorder left on that has been forgotten, this memory system absorbs messages outside of awareness and shapes learning, as we see in Kandel et al.'s (2014) definition above. So what has Tim learned, in terms of memory, relative to early attachment and relationships? The answer to this question is where therapy for Tim's anxiety from a neuro-psychodynamic perspective rests: making implicit memories (those out of awareness) explicit by bringing them into his awareness. Tim's generalized anxiety has been running on autopilot and has been increasingly doing so throughout his life, as his implicit memories (learning) about the world (relationships, drives, etc.) have gone unchallenged. These learned responses (in the psychoanalytic sense, not the behavioral) have his amygdala and associated structures tuned in to unnamed threats that keep him keyed up, waiting for the threat that rarely ever materializes.

### Psychoanalysis in Session: Tim Continued

*Tim:* So how am I supposed to use this information about memory and apply these insights about my relationship with my mom to get rid of this anxiety?

*Therapist:* Good question, Tim; however, the question implies that all anxiety is always bad and that happiness can only be found by eradicating it. While that may feel desirable at this stage of your development, it's not really reflective of how this works.

*Tim:* I was afraid of that!

*Therapist:* And in that statement right there, we find the beginning of the path to wellness!

*Tim:* Huh?

*Therapist:* One of our goals in working together is to unearth the root of these implicit memories in order to re-remember them. For example, your experience of being afraid of not being able to erase your anxious response—one embedded in the fiber of who you are—is telling.

*Tim:* How so?

*Therapist:* Well, when you describe your experience and your goals, I hear escape and avoidance as a basis for your orientation to life.

*Tim:* Sounds right.

*Therapist:* Where do you suppose that comes from? What might you have learned in your early environment about these things?

*Tim:* Let's see . . . We talked about my dad never really showing emotion and always being afraid I would get hurt. My mom . . . Well, she was always very emotionally reactive, and, well, you can see for yourself that she came to my first session with me. Is that the stuff you mean?

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*Therapist: I think those are powerful examples of your early environment (not to mention your current one, in terms of your relationship with your mom) teaching you about avoidance, escape, alertness, emotional boundaries, and so forth. What would it be like if you told your brain that what you are experiencing is perfectly natural, especially based on your early environment? It may not be especially desirable, but it is a part of who you are now, and where you are now in your life, even if you don't have to stay there.*

*Tim: I always look at my experience that something is wrong with me, but I never really considered that I learned to be this way, that my implicit memories were shaping my amygdala to stay primed for threats. It sounds more natural how I got here; it's less mysterious.*

## A Cognitive-Behavioral Response to Anxiety

One of the complicating factors regarding worry is that somehow the worry itself is harmful and must be removed, avoided, numbed, or otherwise eliminated (Hazlett-Stevens, 2008). A related concept in GAD is that worrying about something actually increases the likelihood of that thing occurring. Here again we see the power that is given to the cognitive-affective-behavioral triad (e.g., negative thought connects to negative emotion—*anxiety*—leading to physiological arousal, behavioral avoidance, and so on).

Another consideration regarding types of worry includes magical worry, which is similar to Hazlett-Stevens's (2008) worry beliefs. This is precisely the inverse of the metacognition described previously. In this thinking, the persistent worry is believed to somehow inoculate or insulate the worrier from the worrisome event. We likely all can relate to or know someone who, for example, perseverates about the safety of a loved one going on a trip. The underlying belief is often that this worry helps provide a measure of safety for the person; this is basically a form of superstition. The overall category of this type of worry is that the worry serves some productive or adaptive purpose. Another example of this is that worrying keeps an individual from forgetting important events, like waking up in time for a job interview. So, rather than sleeping peacefully and arriving rested, the person might instead worry excessively about not getting up in time, experience disruptive sleep, and arrive at the interview sleepy and restless. Regardless of the reason, clients with excessive, free-floating anxiety typically have beliefs regarding their worry/anxiety, and it can be useful in therapy to explore these beliefs.

Lastly is the operant conditioning understanding of anxiety. Similar to the beliefs about anxiety described above, where anxiety serves a functional purpose, the behavioral therapist views the chronic worry as having a payoff. Imagine for a moment what a person might possibly get out of persistent worry. Here are some questions to reflect on that may point to a few possibilities:

- What happens after a worry is alleviated, even if for a short moment?
- When one's mind is preoccupied with worry, what does that preclude him or her from thinking, feeling, or doing?
- If someone has become used to chronic worry, what would he or she do if it stopped or was no longer a part of his or her life?

In therapy, I often ask clients what their brain is telling them about their anxiety. I alluded to this above, but it's an important concept to reiterate. Worry and anxiety are bad enough on their own, but then the worry about anxiety (meta-worry) and what that experience means for them can exacerbate their experience of anxiety. Imagine that, while working with Tim, you learn that his overactive sympathetic nervous system is sending vague alarm messages consistently, while his parasympathetic nervous system (PNS) is not doing its inhibitory job (Grawe, 2006). He experiences anxiety as a subjective, cognitive-affective event that then becomes linked to physiological responses through associative learning. Now his body is tuned to these bodily experiences: sweating palms, rapid heartbeat, shallow breathing or deep sighs, muscle tension, and so on. This has at least two impacts: the first is that now physiological experiences are reciprocally linked to the subjective experience of anxiety: Tim eats something that upsets his stomach, causing it to churn, much like it does when he attends to his generalized anxiety. He then brings into his conscious experience anxiety that was not present prior to the physiological experience. This is tied to the second point here, that worrying about worry is a powerful experience for clients. Not only has their PNS pushed alarm messages in the absence of a realized threat, now their mind is interpreting those experiences as something in and of itself to be worried about. This creates a self-defeating anxiety loop that is challenging to break, even in therapy.

Mindfulness and awareness-focused cognitive-behavioral therapy (CBT) approaches address this worry-about-worry dynamic. They *call attention to our attention* in the experience of anxiety. Worry and anxiety are bad enough on their own: they are largely immune to rational thoughts in the moment since objective, higher-order processing exists on a completely different brain circuit than does the emotional, reactive circuit. While this difference certainly has self-protection and preservation functions, our metacognitive capabilities as humans can also cause complications.

### Cognitive-Behavioral Therapy in Session: Tim Continued

In working with Tim's GAD, let's look a little closer at his experience: he has an emotional experience that feels like anxiety, or has a physiological experience that he associates with anxiety (e.g., he feels a churning in his stomach and feels subjectively worried about nothing in particular). He could also have these experiences and not recognize them as anxiety. Now let's say he begins to think and feel something about that feeling of anxiety. At first, he may try to identify where the worry is

*(Continued)*

(Continued)

coming from: "Have I forgotten something?" "Has something bad happened?" Upon realizing that nothing is "wrong" and that there may be nothing objective tied to the experience of anxiety, he moves to the next thought or series of thoughts: "I need to stop worrying because there's nothing wrong; nothing to worry about." When this fails to stop the anxiety, the next thought occurs: "There's nothing wrong; I can't stop myself from worrying. There must be something wrong (in the world or with me)!"

Now reflect, for a moment, on what this would look like in therapy: an emotional experience (anxiety/worry) that "came out of nowhere."

*Therapist: Tim, from what you told me, your experience of anxiety is similar to the following: You felt it (physically as well as emotionally); you believed it was tied to something "real" ("I must be anxious for some reason"); you could not identify an anxiety-producing source; you attempted to talk yourself out of feeling anxious, to no avail; and you began to realize that you can't "manage" or "control" the anxiety. What comes next? How do you feel in this situation? What do you do?*

*Tim: I panic. I recognize that I'm anxious for no reason, that I can't stop it, and that means that something is wrong with me.*

*Therapist: And then what happens?*

*Tim: Next comes this downward spiral of anxiety, followed by self-judgment.*

*Therapist: And of course, it would not take many of these cycles for a person (you) to jump straight to judgment-avoidance, which we will return to later. Worry about worry complicates the personal experience of the client—all clients, not just you.*

*Tim: Yeah, it feels really out of control, and that makes me feel worse!*

*Therapist: I'd like to talk for just a minute about what is happening in your brain when you're experiencing this. When you begin to become aware of what your brain and nervous system are doing, you increase your ability to externalize your experience of anxiety, rather than judging it. For example, you might begin to say to yourself, in the presence of anxiety, "Oh, there goes my overactive amygdala again, telling me to worry for nothing."*

*Tim: [Smiling/grimacing] So now I have to add talking to myself to my list of problems?*

*Therapist: Well, Tim, from a cognitive-behavioral perspective, you are already talking to yourself. We are just trying to make those statements more productive.*

*This intervention must not be underestimated. Assisting clients in becoming mindfully aware of what their brain and autonomic nervous system are telling them or doing to them is vital in moving through treatment of anxiety (and other) disorders. Confronting negative self-talk through externalizing the dialogue and situating the thoughts in a specific brain region rather than lumping them into the self is the next step in healing Tim's brain.*

### A Brain-Based Cognitive-Behavioral Response to Tim's Anxiety

Hobart Mowrer, in describing his instrumental learning (environmental), also aids in understanding Hebbian learning (neurological):

Anxiety, according to Mowrer, motivates us to deal with traumatic events in advance of their occurrence. . . . And because anxiety reduction brings about relief or security, it is a powerful reinforcer of instrumental behaviors (arbitrary responses that are learned because they satisfy some need or accomplish some goal). Responses that reduce anxiety are thus learned and maintained. (LeDoux, 1996, p. 232)

This research led to Neal Miller's (as cited in LeDoux, 1996) studies in which he taught mice to "fear" a buzzer by pairing the sound with an electric shock. When the mice randomly jumped to another section of the cage, the buzzing and shock stopped. Later, the shock was discontinued but in the presence of the buzzer the mice engaged in the same escape or avoidant behavior. What we know about learning is that the firing patterns in the brain that correlate with behavior become strengthened through repetition and intensity.

Martin Seligman (1972) observed that blocking the anxious animal's path to avoidance resulted in the extinction of the fear response. The catch is that this works far more effectively with animals than humans. In part, the stimuli are arbitrary and somewhat innocuous, in terms of the context, compared with the vicissitudes of daily human experience: someone jumping out at us and flashing a light while we get shocked is relatively unlikely to happen. In contrast, a person really could leave the toaster on with the result that a fire damages his or her home. LeDoux (1996) also asserted that anxiety was a learned response highlighting the amygdala's role in emotive learning.

In LeDoux's writings, we can see the links between the gulf dividing prominent psychoanalytic and behavioral explanations of anxiety thusly: "anxiety is the result of traumatic learning experiences. Since traumatic learning involves (at least in part) fear conditioning, it is possible that similar brain mechanisms contribute to pathogenic anxiety in humans and conditioned fear in animals" (LeDoux, 1996, p. 235). Drawing on Susan Mineka's (e.g., 1979) studies of innate fear of snakes with monkeys, "Humans learn about many things by observing others in social situations and it has been proposed that anxiety, especially pathological anxiety, is sometimes or even often learned by social observation" (LeDoux, 1996, p. 237).

Returning to Tim with this intervention, a strict CBT approach would explore with Tim his self-statements, which reveal his core beliefs leading to his free-floating anxiety. And this has clear, well-documented merit. But from a neuroscientific-integration perspective, we want Tim to increase his own awareness of how his brain and nervous system are functioning, as we began above. So, instead of focusing on the antecedent thought, we might focus on the consequent or subsequent thoughts.

### Cognitive–Behavioral Therapy in Session: Tim Continued

The therapist might ask provocatively, “What is the payoff for your anxiety, Tim?” and perhaps more to the point here, “What would you have to give up if you let go of some of your anxiety, Tim?” These are different types of therapeutic questions, as the mere fact that he’s come to therapy would seem to obviate. However, clinical questions, particularly those from the neuro-aware clinical perspective, are more than just getting answers and gathering information. Tim may initially wonder about the purpose of this question, but it is a great lead-in to his self-perception regarding his anxiety. The answer paves the way for his reflection on what purpose his anxiety may serve based on the way he views it. For example, he might offer one of the following types of responses:

- With a confused look: “Nothing!”
- “I don’t know; it’s the only way I know to be!”
- “I feel pressure to fix it, get over it, or escape from it.”

This set of responses provides insight into how Tim understands himself and his brain in particular. In the first instance, the bigger therapeutic picture is to teach him that questions have purpose and that the therapist will rarely ask a question whose answer can be inferred, or to satisfy his or her own curiosity. In the second, we see that the self-judgment, denigration, and perhaps flagellation over this brain condition has only exacerbated the problem, and yet, he persists in this experience: this reveals a couple of possibilities, first that Tim is receiving some payoff from this cycle of anxiety and self-judgment, or second that his thoughts, beliefs, and feelings following his experience of anxiety are, at the very least, making the experience of anxiety worse, but more likely they are also leading to further problems and additional dysfunction. When working with Tim, the first step is to disabuse him of the notion that any and all anxiety is bad and that it must be eradicated. Anxiety in the brain and sympathetic nervous system serve vital protective functions, and so to blunt or remove them would be counterproductive. Further, his judgment of his experience has done little if anything to aid in his feeling better, so it’s time to reframe both his experience of anxiety itself and his thinking, beliefs, and feelings about the anxiety.

*Therapist: What have you tried in the past that has worked well with managing this anxiety, Tim?*

*Tim: [Scoffs] Not much. Distraction works, but only while I’m totally distracted, but the anxiety comes flooding back. I’ve tried medications, but they leave me feeling groggy. I’ve tried relaxation exercises, but those seem to make me even more anxious.*

*Therapist: OK, so that’s what has you feeling a little desperate for a way forward. I’m going to ask you to do something this week that may be a little awkward feeling at first. First, stop trying to stop feeling anxious.*

*Tim: OK . . . ?*

*Therapist: I know, I said it might feel awkward. I would also ask you to become aware of when you feel anxious and mark it down somehow.*

*Tim: How?*

*Therapist: Some of my folks will keep a notepad with them and make a hash mark when they notice themselves feeling anxious. Others will say something aloud like "There it is!" which may be more awkward depending on whether you are in line at the grocery store or at home alone.*

*Tim: OK, and then what?*

*Therapist: That's it. Just stop trying to stop being anxious, and try to notice when you are aware of being anxious (the times when your brain is "seeing" something to be anxious about).*

## A Humanistic-Existential Response to Anxiety

One of the hallmarks of the humanistic-existential force of psychotherapy involves the idea of holism, connection, and integration. One way to think of this is flow. Flow is the experience described by Mihaly Csikszentmihalyi (1990) wherein anxiety is high enough to produce arousal that is sufficient to produce excellent results, without being so high that it short-circuits performance. It is the balance between challenge and skill. So we see in this the double-edged nature of anxiety: it provides arousal of the organism so that our attention, awareness, and focus are piqued; it also can overload our systems resulting in fight, flight, or freeze responses. The result, in contrast to flow, is the limiting—at times severely—of basic functioning, and even more so of performing. This is where we see the complementary relationship between the sympathetic and parasympathetic nervous systems. The former is responsible for arousal in preparation to fight or flee, while the latter is responsible for returning the body to homeostasis.

For most clients—and people in general, I think—balance is an elusive (and maybe illusive) experience, wherein we find it as we are in the process of swinging from one extreme to the other. Consider a commonsense therapeutic approach to clients: for those clients who are emotionally activated or reactive, therapists can focus on developing a cognitive focus and cognitive skills. In contrast, for overly intellectual or cerebral clients, therapists can focus more on emotional awareness and affective activation. These approaches are designed to promote balance in understanding the world. Now consider clients who, like Tim, are anxiety ridden, and whose sympathetic nervous system is hyperactive, or parasympathetic nervous system is hypoactive. How might this awareness, or at least an understanding of this, be useful in therapy with clients?

One of the values of this category of approaches, beyond the accepting, relational perspective, includes the recognition that death is unavoidable. While this at first does not exactly seem like good news, Frankl (1959/1984) in particular illustrates how embracing this reality can serve as a powerful motivating force: meaning in life is found first in recognizing that life has an end, and second in accepting responsibility for taking action that

will enact meaning in the limited time we are given. In this sense, Tim's anxiety may be touching on an ultimate reality, that the threat he constantly perceives, though unnamed, is a primal sense that time is short and that life ends. Integrating this reality and experience with the concept of flow described above, we have a basis for the following therapeutic dialogue.

### Humanistic–Existential Approaches in Session: Tim Continued

*Therapist: Tim, I want to try something with you, if that's OK . . . a thought experiment, if you will.*

*Tim: OK.*

*Therapist: Up to this point, you have viewed your anxiety as negative, something to be avoided at all costs, right?*

*Tim: Definitely. I hate it!*

*Therapist: OK, but what if there were some value to it—a message that serves some purpose; what would that be like?*

*Tim: I can't imagine what that would be like. It's too uncomfortable.*

*Therapist: I hear that it is uncomfortable for you, even to the point that you'd do almost anything to get away from it.*

*Tim: That's exactly how I feel.*

*Therapist: OK, good. Let's imagine that each day is a journey into anxiety, with each moment one of increasing intensity.*

*Tim: That's easy to do. I wake up, and it (the anxiety) jumps on me and builds from there.*

*Therapist: Is there a point during the building of this intensity that your anxiety carries a message with it, for you in particular?*

*Tim: A message? Like "Danger!"?*

*Therapist: Yes, exactly like that. Any other messages?*

*Tim: I don't know. That's the big one.*

*Therapist: After the danger message, what might be the next message?*

*Tim: [After some time spent thinking] "Do something about it!"*

*Therapist: Very interesting!*

*Tim: Why?*

*Therapist:* Well, what if your anxiety experience could be a call to action. You've mentioned in previous sessions that distracting yourself by watching television or playing video games helps, but then the anxiety comes "flooding back."

*Tim:* That's right. So what?

*Therapist:* It seems that your anxiety is indeed a call to action. However, the action you're taking is only temporary. Are there other times that you take action that you get positive results?

*Tim:* Now that you mention it—and I'm a bit embarrassed that I forgot this before when you asked me—when I'm doing physical work, or work that has a clear outcome, or when I'm solving a problem or learning something new—during any of those times I feel good while doing them and for a bit afterward, like I've accomplished something.

*Therapist:* So it sounds like somewhere between the times you get up and right afterward, your anxiety peaks and floods the system, blocking you from being able to take action. What if we could catch it/you just prior to it peaking, so that you could identify these things that make you feel productive?

*Tim:* [Energy increasing] That would be amazing!

### A Brain-Based Humanistic-Existential Response to Tim's Anxiety

A brief review at this point is in order to highlight how three theories in this school of thought look in the brain and then combine them to intervene with Tim. In the first case, person-centered approaches, the epitome of humanism, seek to connect with clients *where* they are, *when* they are, and with *whom* they are. They seek to separate the client's personhood from his or her behavior, resonating acceptance for the client from a place of genuine acceptance. This conveys acceptance to the client by the therapist even at the neurological level. The mirror neuron system, which is essentially motor neurons, has been demonstrated to connect neutrally to the limbic system by way of the insula (Jacoboni, 2009). This means that movements—both enacted and observed—carry with them emotional content. This means that the first thing Tim will experience neurologically is the therapist's unconditional acceptance of him, both explicitly and implicitly. Tim has learned from his environment to take nothing as it is, for there is always an unseen risk. A therapist who resonates acceptance will counter this learning resulting in relational dissonance—a good thing for disrupting Tim's anxiety circuits.

A second dynamic in these approaches is that described in the dialogue above: the connections between freedom and responsibility, and anxiety and meaning, in the existential therapies. Tim's freedom, or rather his perceived freedom, has been limited based on the hyperactivity in his brain's alert systems: the sympathetic nervous system's excitatory function may be locked in the "on" position, while the parasympathetic nervous system's inhibitory function may be locked in the "off" position. This permits alarm messages to flood in, unchecked, preventing Tim from taking action—the very thing that counteracts generalized anxiety.

A third dynamic is the Gestalt notion of holism, which while viewed psychologically, in terms of thinking, feeling, and behavior becoming integrated, serves also as a powerful metaphor for the dis-integration of Tim's brain. Vertical integration, as described by Badenoch (2008), allows a person to live a regulated experience, wherein the midbrain (limbic system) sends predictable alarm messages that are then interpreted and managed by the forebrain (prefrontal cortex), and sends messages that either correct errors in mid-brain messages or create solutions for later use. In the lateral integration, the logical, straight-line thinking of the left hemisphere balances the Gestalts, if you will, created by the right hemisphere. In Tim's case, the pictures created in the right hemisphere are ones of danger, and are blocking the balance function of the left, in large part due to the hyperactivity of the amygdala.

### Humanistic-Existential Therapy in Session: Tim Continued

So how are therapists to manage these insights in therapy? The first approach is to, in an atmosphere of acceptance and regulation, send these messages to Tim implicitly. This can sound like mysticism, but it's actually based in science (e.g., Iacoboni, 2009; Ramachandran, 2000). The self-regulatory capacity of the therapist offers a neuro-relational model for Tim to mimic, implicitly, if not also explicitly. This is, at least in part, why many clients come to therapy having read a lot of self-help books but describing only limited success. Without the regulating relationship (Badenoch 2008), the insights, awareness, and information are half-measures—less than, even. So the first intervention from this perspective—a perspective gaining in acceptance across theories—is the person of the therapist. It is only in this context that Tim's brain can allow itself to hear, learn, and experience.

In this context, the therapist might use the information described above to give Tim a new perspective on his anxiety.

*Therapist: So, Tim, as we work together, I'm mindful that the two halves of your brain may not be communicating effectively with one another.*

*Tim: [Gives a skeptical look]*

*Therapist: Stay with me for a moment. The left side of your brain houses the majority of your logic processes; the right houses emotional awareness and meaning. So, imagine that just as you and I are currently in a give-and-take relationship, what would happen if one of us stopped talking or the other talked so loudly that the other could not be heard? That would not make for a very healthy relationship, would it?*

*Tim: No, I guess not. Is that what's happening in my brain?*

*Therapist: Yes, I think so, though we can't exactly use a scan or blood test to prove this, at this point in our technological evolution. Let's assume that this is true, at least for a moment.*

*Tim: OK.*

*Therapist:* I've printed out some cards that have the types of messages that the left hemisphere of the brain might say, as well as the things the right might say. Take a look.

*Tim:* Whoa, my right hemisphere definitely seems to be in control.

*Therapist:* It certainly seems that way. Next, I'd like to set up a way for the two halves of your brain to try and communicate in a way that both sides are heard.

*Tim:* [Looks skeptical again]

*Therapist:* It's a process called "role-play," and in this case we're going to set up two chairs, one for each side of your brain.

*Tim:* [Looking nervous now]

*Therapist:* [Catching the look on Tim's face] Instead of actually placing your brain on the chairs, I'm going to ask that you take a seat in one of the chairs, speaking for one side, while I represent the other side of your brain by sitting in the other chair. Then we'll talk about what that was like.

An alternative approach is for the therapist to use an empty chair to understand hemispheric functioning, but anxious clients may respond better to role-play with the therapist than to empty-chair techniques (Harriet Bachner, personal communication, August 25, 2014).

## A Constructivist Therapies Approach to Anxiety

In constructivist approaches, the personal construction of reality is a hallmark and is an important, foundational consideration for working with anxiety, in part because of the subjective nature of anxiety—there's no talking people with an anxiety disorder out of their anxiety! Hazlett-Stevens's (2008) taxonomy of anxiety offers an incidental constructivist, even solution-focused, approach to better understand Tim's experience, leading to possible routes to treatment: worry severity, worry content, meta-worry, worry beliefs, and intolerance of uncertainty. We have alluded to meta-worry and worry beliefs above, so we'll focus on worry severity here.

*Worry Severity:* Consider that when working with Tim we use a scaling approach to understanding the severity of his anxiety. While typically associated with solution-focused therapy, many, if not most, therapists use scaling questions. The simplest scaling question for anxiety is a 1–10 scale, where 1 equals little to no anxiety, 5 equals moderate anxiety, and 10 equals the most intense, debilitating anxiety. One of the most important features of using scaling questions is to make certain that the client has a really clear picture of what each number represents, especially in the beginning to aid in establishing a baseline experience. For example, Tim initially notes that his anxiety is debilitating and is probably an 11. His hyperbole notwithstanding, his response gives us two important pieces of information. The first is that his experience of his anxiety is extremely discomfiting and painful—regardless of any

objective measure. The second is that he is currently unmedicated, denies self-medicating (drugs or alcohol), continues to attend school regularly, and denies having panic attacks. This tells the therapist that what he is experiencing on a regular basis may be closer to a 6–8 on our scale. This does two things: first it recalibrates the therapist with Tim so that they are speaking the same language; second it normalizes Tim’s experience for him. For instance, showing him a quick video clip of someone having a panic attack can aid him in recognizing that it could be worse, but also that one of the complicating factors in dealing with anxiety is the fear or worry about what the anxiety itself means (see Bandura’s research, referenced throughout the book, on the inverse relationship between physiological arousal and self-efficacy).

As therapists work with clients like Tim, the clients’ experience of anxiety is the therapists’ experience, so they should be extra cautious in challenging the clients’ perspective—GAD clients are typically used to encountering people who, unless they struggle with anxiety themselves, can be quite dismissive of their experience, often using “Why don’t you just . . . ?” to communicate their lack of understanding of anxiety disorders. This leads to a second consideration related to both the severity of the anxiety and the content of the anxiety.

### Constructivist Approaches in Session: Tim

*Therapist:* So, Tim, you’ve identified that when you’re experiencing your anxiety at its worst, it peaks at an 11 on a scale of 1–10.

*Tim:* [Laughs nervously]

*Therapist:* That is fine; it tells me a lot about how uncomfortable, even painful, this is and has been for you.

*Tim:* I’ll say!

*Therapist:* So how about when it’s this moderate, free-floating anxiety, when there’s nothing you can point to that’s amiss; what’s that number?

*Tim:* Probably a 7 or 8.

*Therapist:* So it’s still pretty potent in your experience. Tell me about a time when it’s less than that—both the number and the situation.

*Tim:* Well, when I’m playing video games or watching TV, I’d say it drops to 3 or 4, but that’s because I’m distracted.

*Therapist:* Well, don’t judge that too harshly. It sounds like you’ve found something that reduces your anxiety and that can be a good thing. What’s a not-good thing about it?

*Tim:* Well, I can’t avoid my way through my whole life.

*Therapist: Why not?*

*Tim: Well, I guess I could, but I don't want to.*

*Therapist: OK. Why not?*

*Tim: Because . . .*

*Therapist: I hear you saying you want more from your life. Is that correct?*

*Tim: Definitely. But it's scary.*

*Therapist: It certainly seems that way. But you've found at least two ways to combat it.*

*Tim: What?*

*Therapist: Well, first of all, you're here. You could have chosen to continue distracting yourself, as many people do. Second, you have identified that by engaging your brain in some other task (distracting), you experience a reduction in your anxiety—by half! How could you do more of that?*

*Tim: You mean like watching more TV and playing more video games?*

*Therapist: That would certainly be an option, if it results in what you want. But what about other ways of engaging your brain?*

### **A Brain-Based Constructivist Response to Tim's Anxiety**

Erik Weißenmayer (Figure 7.3) is a mountain climber. He is an actual person, not a case study. It is special enough that he has climbed Mount Everest.

It is more than special that he did it and he is blind. In fact, he is the only blind person to climb Mount Everest. He was not carried; he climbed on his own. So how did he see? With his tongue, of course! Erik wears what is called BrainPort (Figure 7.4), a device that assists him to see using his tongue.

The BrainPort device uses a video camera strapped to the user's forehead and transmits the video signals to a tab containing some 300 electrodes. These transmit the signals through his tongue and are interpreted by his brain, by the occipital lobe, no less. In one demonstration, Erik wore a pack on his hip that contained a monitor, which allowed others to view what his "sight" looked like to him.

The main purpose of sharing this story is it highlights a simple, powerful truth regarding vision: humans see primarily with their brains, not with their eyes. The role that our eyes play in vision is the reception and absorption of light from our environment. Light from the environment is transmitted via the cornea to the retina, where the signal continues to the occipital lobe of the brain for processing. This is phenomenal considering the sophistication of the eye as a light-receiving device, wherein it "merely" transmits light to the brain. The light absorbed by the eye has no intrinsic meaning, except that meaning which is assigned by the occipital lobe in the brain. And that meaning is based both on experience and learning, as well as context.

**Figure 7.3** Erik Weihenmayer

Source: Photo courtesy of Skylar Williams, TouchTheTop.com.

**Figure 7.4** BrainPort

Source: BrainPort V100 photo courtesy of Robert Beckman.

This physiological reality of how vision works is possibly the single most powerful metaphorical concept in treating anxiety, not to mention numerous other presenting problems. There are several ways to approach using this physical reality with clients, but constructivist therapies, and their emphasis on the construction of reality, parallel how the brain constructs reality from visual stimuli.

In therapy, I might show my clients (Tim in this case) a video of Erik climbing blind, while “seeing” with his tongue. Depending on clients’ level of insight, awareness, and personal motivation, I might ask them to tell me what they think the relationship is between the video and anxiety.<sup>6</sup> Often the responses are quite concrete, like “I guess you’re saying that if he can overcome his blindness, then I can overcome my anxiety?” Or “I have to be more aware of my

other senses in fighting anxiety.” Neither of these comes close to the purpose of the video, but as noted they can give me a sense of how and where my client’s thinking is. Using this information, I might utilize the following exchange with Tim.

### Constructivism in Session: Tim Continued

*Therapist:* So, Tim, we’ve discussed how anxiety is your body’s way of preparing you to respond to a threat, whether real or perceived. In your case, you seem to perceive threats where there are none—as we often refer to it, free-floating anxiety.

*Tim:* That’s right.

*Therapist:* I’d like you to watch this brief video and see what you think about it.

*Tim:* [After watching the video] Wow, that’s incredible! I should definitely be able to beat this if he can face blindness. But I still don’t know how, and I feel bad that all I have is anxiety when there are people like this guy who are blind and climbing mountains.

*Therapist:* You just revealed some really powerful thoughts about yourself and your experience, Tim. Thank you for sharing that. First, let’s begin by looking at how you experience your free-floating anxiety as a miserable experience, and then you judge yourself for feeling that, right?

*Tim:* Yep.

*Therapist:* And is that judgment helping you feel the way you want to feel and to do the things you want to do?

*Tim:* You know it doesn’t.

*Therapist:* Yes, but stay with me for a moment longer. Your experience of anxiety is no less real for you than Erik’s blindness is for him. What I want you to begin to see from the video is that humans see with our minds, not really from our eyes. Whatever it is we think we are seeing with our eyes is really an interpretation by our brain. So depending on the brain, the “seeing” may be very different.

*Tim:* I think I see what you mean. You’re saying that my anxiety is more about what my brain is telling me about threats in the environment, but does not necessarily mean those threats are there?

*Therapist:* Precisely.

(Continued)

(Continued)

Tim: *So how does knowing that help me with anxiety that isn't real?*

Therapist: *That's just it—the anxiety is very real, but may not be based on reality.*

Tim: *I think you might have lost me there. You're saying that my anxiety is real, but it's not reality?*

Therapist: *Close. Your brain is "seeing" threats that feel very real, but may not be based on an external reality. This is part of the reason the anxiety feels free-floating: there is not an identified threat to "see," but more of a sense that there is a threat based on what your brain thinks it is seeing.*

Tim: *So does that mean I am crazy or not?*

Therapist: *Definitely not crazy, though you may feel that way at times.*

Tim: *I sure do! What can be done about it? Help!*

Therapist: *Well, the first step is what we have already begun to do today –recognize the difference between visual stimuli and seeing (vision in the brain). Consider another example: what color is this water bottle [holding up an orange water bottle]?*

Tim: *Is this a trick question?*

Therapist: *Yes and no.*

Tim: *Before this session, I would have said "orange." Now I'm not so sure.*

Therapist: *I get that a lot. And I would agree that it is orange. How do you know it's orange?*

Tim: *I just know that's what orange looks like.*

Therapist: *OK, but was there ever a time when you would not have known this color is orange?*

Tim: *Sure, when I was a little kid, I guess.*

Therapist: *OK, so what happened that changed things for you?*

Tim: *My mom or somebody taught me that color is orange.*

Therapist: *Right, same here. So, we're saying that before we learned that this color is called orange, it had very little meaning to us. Fair to say?*

Tim: *I think I see where you are going. It was not the color orange until my brain learned that that particular color means "orange."*

Therapist: *Yes, keep going.*

**Tim:** *And that means that when my brain is "seeing" a threat, and making me anxious, that it is because I learned to "see" this way and therefore feel this way?*

**Therapist:** *Yes. And therefore . . .*

**Tim:** *Therefore, I can be aware that my anxiety is a function of my brain learning to "see" the world this way. So how do I fix my brain?*

**Therapist:** *That's the million-dollar question, isn't it? This first step is often the biggest one, recognizing that what our brains tell us is not always reliable information. We construct our own views of reality, and in the case of your anxiety, managing rather than eliminating your anxiety is more realistic.*

### Summary for Tim

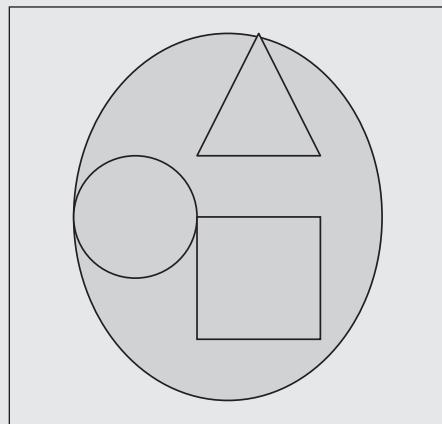
*Obviously, Tim has a ways to go in managing his anxiety more effectively. However, through the process of therapy infused with neuroscience metaphors and as empowered knowledge, Tim can take a different approach (multiple different approaches) to managing his anxiety. And in the meantime, he's learning to listen to his brain and his symptoms and determine for himself how he might approach them—the closest he's come to feeling empowered in quite some time.*

## Biology Box 7.1

### The Amygdala in Therapy

Throughout this book, I've written about the amygdala in two particular ways, both of which are technically incorrect, yet somewhat necessary for clarity. Here I offer a reminder of the bilateral nature of brain structures, such that when discussing the amygdala, it would actually be more accurate to refer to it/them as amygdalae, the plural. I also offer an expanded discussion of the limits of describing the amygdala as if it were a single structure that served one function or set of functions. LeDoux (2003) has gone so far as to suggest that it is inaccurate to refer to the amygdala in this way, noting that it is more of a bundle of neurons with myriad function and connections beyond being an independent structure.

**Figure 7.5** Parts of the Amygdala



(Continued)

(Continued)

In Figure 7.5, the triangle represents the lateral amygdala, the circle represents the location of the basal amygdala, and the square represents the location of the central amygdala. The lateral nucleus (amygdala) is the entry point of sensory input related to alarm or alertness—the system that is first to receive input, even before higher-order processing in the prefrontal cortex (Grawe, 2006). The basal nucleus receives its input from the hippocampus, where we already know consolidated memories are stored (LeDoux, 2003). These memories provide context for interpreting the alarm response. The central nucleus receives input from both the lateral and basal nuclei in order to mediate the input of the two, signaling further excitatory responses in the case of an actual threat or inhibitory response (through release of the neurotransmitter GABA) to send to the prefrontal cortex for further processing and evaluation.

### Neuro in the News

#### What Anxiety Does to Your Brain and What You Can Do About It

Everyone has an opinion about anxiety. This is an important dynamic of our modern world: anxiety is so pervasive that it is a daily part of our cultural conversation. There are now anxiety management “apps” for our phones, self-help books galore, and bloggers and help sites like the host of this article, Lifehacker (Henry, 2013). All this points to two things we’ve explored in this chapter, that anxiety is mysterious and miserable. It is also discrete from stress (the reason the two are addressed in two separate chapters in this book) as evidenced by this article. Stress represents an external force, much like LeDoux’s discussion of fear, while anxiety is more of an internal experience. This article is one of the more scholarly, yet user-friendly, web primers about anxiety. Even still, the article also demonstrates what can only be described as our attempts to grasp around in the dark for answers, both to the causes and to the interventions, for anxiety. Psychological theory and now neuroscience have lit candles in the corners of our understanding, yet the “answers,” if there are any, remain shrouded in mystery. One thing this reality points to is the indispensable nature of therapy and therapists. Until (if) and even following any so-called cures, our world remains in need of trained listeners who can self-regulate for the sake of their clients as they explore these personal experiences and mysteries.

Source: Henry, A. (2013). What anxiety does to your brain and what you can do about it. *Lifehacker*, November 20. Retrieved from <http://lifehacker.com/what-anxiety-actually-does-to-you-and-what-you-can-do-a-1468128356>.

### SUMMARY

This chapter illustrates the tricky waters therapists might find themselves in as they attempt to treat anxiety disorders. We all seem to experience worry and anxiety, often in extreme episodes of momentary panic or distress. Instruments such as the DSM-5 help us quantify the range and duration of what is in essence a qualitative experience and thus provides a clearer (albeit imperfect) sense of whether anxiety has crossed over into a disorder requiring treatment.

As we've discussed the many neuro-aware treatments throughout the chapter, you may have noticed how the various models share remarkable overlap. Anxiety, with its confounding arrays of presentation, in a sense unites therapists in the need to utilize all of the resources available to them. In this respect, we understand that of course there is no "best treatment" of anxiety.

Understanding the basic neuroscience of anxiety becomes a unifying factor in the integration and application of psychotherapy. Therapists seeking to integrate neuroscience into the treatment of anxiety address anxiety as a social, biological, and phenomenological experience. In considering ways to apply neuroscience research to therapy, therapists have the option of using these findings literally, as in the case of explaining the roles of the sympathetic and parasympathetic nervous systems in understanding getting stuck in anxiety. They also have the option to use these findings as metaphors for larger therapeutic principles, as in the case of vision in the eyes and perception in the brain.

As we conclude this first chapter on applied integration, a couple things will have become evident. The first is that a brain-based approach to therapy is not quite as technical as we might have imagined. Some readers may be disappointed to note the absence of direct-brain interventions—therapists don't yet use deep brain stimulation (DBS) in order to alter brain patterns. Other readers will be relieved that while neuroscience has so much to offer anxiety-ridden clients, they need not memorize long lists of terms and concepts. Either way, the literature is clear that the integration of neuroscience into therapy is a viable next step in the evolution of psychotherapy and counseling.

## NOTES

1. Throughout these applications chapters, I have, of course, created vignettes based on amalgams of multiple clients. In addition, I have intentionally tried to maintain cultural ambiguity in an effort to integrate and apply at a general level, setting the stage for future, further integration based on racial and ethnic differences.
2. The tables used herein are meant to be heuristic in nature and not comprehensive. Use of alliterations such as these are inherently dangerous in that while they provide shortcuts to conceptualizing information, they also necessarily limit the scope and depth of information that can be provided. The reader is cautioned, therefore, to reference them as such: learning aids that are decidedly limited.
3. At times throughout, the dimension of environment is divided into two components, effectively making eight dimensions. However, this is used more to illustrate the temporal nature of certain dimensions and their interactions with the other dimensions.
4. While tempting to apply certain models of the relationships among thinking, feeling, and behavior, for the purposes here, and for clarity's sake, I address them as a whole, as much research has demonstrated the interrelatedness and bilateral nature of them.
5. In each of these remaining four integration chapters, a similar paragraph structure and content will be used to guide the reader toward a clearer understanding of the material that follows—the redundancy is intentional and functional.
6. As a matter of fact, I will often use a question/task such as this to help me determine and assess a client's insight, awareness, and/or motivation.

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