CHAPTER GOALS

The chapter is designed to

1. extend your understanding of what neuroscience is and its relevance to the ongoing evolution of counseling and psychotherapy;

2. discuss the resistance that some mental health professionals have to the new neuroscience force that is emerging in the field and specific factors that contribute to this resistance;

3. expand your knowledge of basic aspects of neuroscience, including your understanding of neurotransmitters and different brain parts;

4. increase your awareness of the ways that neurotransmitters and different brain parts are linked to various cognitive, emotional, psychological, and behavioral reactions people manifest in their lives;

5. broaden your thinking about the different counseling/psychotherapy skills and interventions that complement the optimal functioning of various neurotransmitters and different brain systems; and

6. increase your understanding as to how helping strategies that are based on neuroscientific research findings complement an integral approach to counseling and psychotherapy.
**VIGNETTE #2**

Sachi is a 28-year-old, single female of Japanese descent. She moved to the United States from Japan a year ago as a result of a job advancement that was offered by the large corporation where she is employed. Sachi’s career move has resulted in advancements in her income and professional status within the company where she is employed. However, these career benefits have come at a cost: She is feeling increasingly depressed as a result of being isolated from family members and friends in Japan, and she is also experiencing elevated levels of generalized anxiety. The increasing anxiety Sachi is experiencing in combination with more frequent depressed moods is leading to a circular problem, as it contributes to Sachi’s growing concern that her work performance may suffer as a result of these problems and possibly have a negative impact on her standing in the company. In an effort to do something about these problems, Sachi has sought help by scheduling an appointment with a counselor in the company’s Employee Assistance Program.

We will refer to Sachi’s case at different points in this chapter to highlight various concepts associated with neuroscience and its relevance to counseling and therapy theories and practices. A description of the four quadrants that compose the integral theory is presented as a resource below. This resource is included at the beginning of the chapter to help you acquire a deeper understanding of the integral approach to counseling and psychotherapy that is discussed throughout this book.

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### AN INTEGRAL APPROACH TO COUNSELING AND PSYCHOTHERAPY

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<th>The Behavioral/Physical/Neurological Quadrant</th>
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<th>The Cultural Community Quadrant</th>
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<td>Cultural and community factors as they impact clients’ mental health and the process and outcomes of counseling and therapy</td>
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### INTRODUCTION

Mental health practitioners are becoming increasingly aware of the neuroscientific revolution that is unfolding in the fields of counseling, education, psychiatry, psychology, and social work. Although there is growing awareness of this exciting new force in the mental health professions, many practitioners lack the training that would enable them to more fully understand the relevance of neuroscience to counseling and psychotherapy theories and practices.
Various issues related to neuroscience were presented in Chapter 1. This was done to

a. provide a general overview of what neuroscience is,

b. acknowledge that this field is the newest force making a substantial impact on the work mental health practitioners do in the field, and

c. explain how this new force fits into the Behavioral/Physical/Neurological Quadrant that complements the integral approach to counseling and therapy discussed in this book.

To build on the information presented in Chapter 1, we discuss additional issues of relevance to neuroscience as a vital component in an integral approach to counseling/therapy. Consequently, we begin this chapter by reiterating the definition of neuroscience. As defined in Chapter 1,

Neuroscience is essentially the scientific study of the nervous system. Traditionally, neuroscience has been seen as a branch of biology. However, it is currently viewed as an interdisciplinary science that incorporates knowledge from many other disciplines, such as psychology, computer science, mathematics, physics, philosophy, and medicine.

As a result of the interdisciplinary nature of this field, the scope of neuroscience has broadened to include the study of the molecular, developmental, structural, functional, evolutionary, computational, medical, and psychological aspects of the nervous system in general and brain functioning in particular.

The research focus and techniques used by neuroscientists have also expanded enormously, from biophysical and molecular studies of individual nerve cells to a broad range of new imaging techniques that are used to study perceptual, motor, cognitive, and psychological reactions and brain functioning.

The preceding chapter also generally describes a number of basic neuroscience concepts. These include discussing what neurons, neuroplasticity, and mirror neurons are and how they impact human functioning. Those discussions remind us that the brain is essentially composed of billions of neurons that transmit even more electronic-chemical signals in the brain that affect the way people think, feel, and behave (Ndabahaliye, 2002).

The term neuroplasticity was also defined in Chapter 1. In describing the meaning of this important concept, it was pointed out that

Up until the late 1990s, professional and laypersons alike believed that people were born with a given number of neurons in the brain. It was generally accepted that, while neurons could “die” due to brain injury, disease, and exposure to toxic chemicals entering the brain; new neurons could not be reproduced. This widely held belief about brain chemistry has been found to be irrefutably false as a result of research conducted by neuroscientists during the late 1990s and early 21st century. The brain’s ability to reproduce new neurons and reorganize itself by forming new neural connections throughout life is referred to as neuroplasticity (Begley, 2007).

There are different ways in which researchers have noted neuroplasticity to occur. One
way involves the manner in which existing neurons contribute to the production of new neurons to compensate for injury, disease, and exposure to toxic environmental conditions (including environmental pollutants, poverty, violence, and other forms of oppression and social injustice).

Neuroplasticity also occurs as a result of intraneural chemical adjustments that neurons make in response to new situations and experiences that characterize peoples’ lives. Recent research findings have verified that neuroplasticity is enhanced when people are engaged in repetitive behaviors, such as routinely practicing a musical instrument; exposed to enriched environments, such as the enriched environments that are created in many preschool programs; and exposed to new, novel, supportive, and challenging activities, including counseling and psychotherapy (Cozolino, 2002, 2010a, 2010b).

The last statement in the definition of neuroplasticity underscores the basic biological fact that counseling and therapy represent unique experiences that can lead to the generation of new neurons and neural wiring that greatly affect how people think, feel, and behave. The term neurogenesis is closely related to the concept of neuroplasticity and refers to the generation of new neurons in the brain.

While neurogenesis is most apparent in infant and child development, researchers have described conditions that foster or inhibit neurogenesis in adult animals as well (Gould, Reeves, Graziano, & Gross, 1999; Siegel, 2007). This includes studies that describe positive neurogenetic reactions that are correlated with new learning activities (Becker, 2005; Gould et al., 1999), adequate sleep (Mirescu, Peters, Noiman, & Gould, 2006), and physical exercise (van Praag, Shubert, Zhao, & Gage, 2005). In short, the researchers listed above provide evidence that explains how and why new learning activities, adequate sleep, and regular exercise contribute to the generation of new neurons and/or the healthy maintenance of existing neural networks.

Of particular relevance to this chapter is the understanding of two additional basic points. First, from a neuroscientific perspective, it is important to understand that the process of counseling and psychotherapy depends on clients’ natural biological propensity for neuroplasticity and neurogenesis. This is so because positive counseling and therapy outcomes result in the generation of new neurons and neural networks that affect various changes in the brain that underlie clients’ sense of psychological well-being or distress.

Second, the types of changes clients hope to achieve in counseling and therapy are fostered by the neurological alterations that practitioners stimulate by using various theoretical principles, skills, and interventions that are increasingly known to stimulate the generation and optimal release of various neurotransmitters that promote changes in clients’ neural wiring and brain functioning.

Thus, to expand your knowledge of the relevance of neuroscience for counseling/therapy theories and practices, this chapter builds on the short introduction in Chapter 1 that briefly discusses the role of neurotransmitters. This discussion is followed by a description of key neurotransmitters that are generated in the body and their role in healthy brain functioning, all of which contributes to clients’ sense of psychological well-being or distress.

This chapter continues by presenting information that describes the role and function
that different parts of the brain play in affecting the way people think, feel, and behave. We hope you find the discussion of how different counseling skills and interventions contribute to the release of various neurotransmitters and healthier brain functioning to be especially helpful in increasing your understanding of the relevance of neuroscience to the work practitioners do with their clients.

Before continuing with these discussions, it is readily acknowledged that the study of neuroscience and its relevance to counseling and therapy theories and practices can be daunting for many persons in the mental health professions. This may, in part, be due to a person’s preconceived notions about the complexity of neuroscience as well as one’s unfamiliarity and lack of training in this area. We also recognize that many people tend to avoid learning about subjects that they think are too complex for their liking.

With this in mind, we have made a special effort to describe neuroscience and its relevance to counseling and psychotherapy in ways that we hope will both increase your understanding of some of the basics of these interrelated topics and be professionally empowering. By dedicating an entire chapter to extending the general discussion on neuroscience that is presented in Chapter 1, we hope you will be excited about the potential impact this new force has to increase the efficacy of the mental health professions in the coming years.

To more fully understand the relevance of neuroscience to counseling and psychotherapy theories and practices, it is important to explore why this new force continues to be a vital missing link in the mental health professions (Farmer, 2009). It is also important to know what can be and is being done to address the general omission of neuroscientific knowledge in many professional training programs and clinical practices. The following section discusses these issues in greater detail.

**NEUROSCIENCE: THE MISSING LINK IN COUNSELING AND THERAPY THEORIES AND PRACTICES**

Despite acknowledging that neuroscience is slowly being infused into professional training programs as well as some counseling and therapy practices, Farmer (2009) asserts that it continues to be the missing link in the mental health professions. In terms of the present discussion, it is important to discuss how and why this missing link prevents mental health practitioners from operating at a higher level of efficacy and intentionality.

A basic assumption that underlies the following discussion is the belief that practitioners’ interest in neuroscience will be enhanced by describing the relevance of neuroscientific research findings as they relate to the specific skills, interventions, and theories that counselors and therapists use in the field. In addition to increasing the efficacy of the work mental health professionals do, Farmer (2009) outlines several other reasons why it is important to address this missing link in the mental health professions:

1. Although the neuroscientific revolution that is occurring in the mental health professions may not provide answers to all the challenges practitioners face in their work, the important knowledge generated from this revolution and its relevance to mental healthcare need to be acknowledged and understood.
2. Neuroscientific insights can be of immediate and direct benefit in improving our understanding of human development and behavior as well as the types of helping interventions that are likely to be useful in promoting positive counseling and psychotherapeutic outcomes among clients in diverse populations.

3. The probability is that neuroscience will continue to yield significant insights that are relevant to counseling and therapy for the foreseeable future. Consequently, practitioners must be ready—intellectually, emotionally, and institutionally—to understand the developments that are unfolding in these areas and be able to implement this new knowledge in their work or run the risk of becoming increasing irrelevant and nonviable members of the mental healthcare professions in the 21st century.

4. Neuroscience is enhancing our understanding of what it means to be human. The utilization of knowledge generated from neuroscientific research findings to increase the effectiveness of counseling and therapy will largely depend on whether practitioners’ conception of mental healthcare is narrow (excluding neuroscientific knowledge and research findings) or broad (including neuroscientific knowledge and research findings).

5. Neuroscience can help mental health practitioners more effectively deal with the multifaceted problems clients present; clinical practice is becoming increasingly difficult as practitioners encounter greater complexity of human and societal problems and diagnoses.

6. Mental health professionals will increasingly be challenged to operate in ways that reflect a greater integration of knowledge from diverse fields and disciplines in the future. (pp. 1–2)

The integral model presented in this book represents one way mental health professionals can address the missing link described above. This can be done by increasing our professional efforts to develop and implement a more fully integrated and multidisciplinary approach to helping clients. Such an approach necessitates increasing our knowledge of neuroscience and its relevance to counseling and therapy theories and practices (Behavioral/Physical/Neurological Quadrant considerations).

Clearly, the sort of comprehensive approach to counseling and psychotherapy that is reflected in the integral theory presented in this book requires mental health professionals to move to a new level of consciousness as they are challenged to embrace a more holistic view of counseling, psychotherapy, and human development (Societal/Professional Quadrant factors). As noted in this chapter, an important aspect of developing an integral approach to counseling and psychotherapy necessarily includes acquiring more knowledge about neuroscience in general and other factors that compose the Behavioral/Physical/Neurological Quadrant.

History teaches us, however, that calls for significant changes in any professional field are predictably met with resistance. Certainly, that has been and to some degree continues to be the case in calling on mental health professionals to learn about the relevance of neuroscience for counseling and therapy theories and to incorporate this new knowledge into their professional practices.
The following section discusses several factors that underlie such resistance. It also outlines new ways of thinking about neuroscience that can be helpful in minimizing the manifestation of resistance to neuroscience that contributes to the perpetuation of this missing link in the mental health professions.

**ACKNOWLEDGING THE RESISTANCE TO NEUROSCIENCE**

The assertions put forth by Farmer (2009) and other mental health professionals (Cozolino, 2002, 2010a, 2010b; Ivey, Ivey, Zalaquett, & Quirk, 2009) constitute a compelling argument that supports the notion that neuroscience promises to be a force that will continue to transform the practice of counseling and psychotherapy. Despite the potential of this science-based perspective to revolutionize the work practitioners do in the field, there is substantial resistance to support this perspective by numerous persons in the mental health professions. Part of this resistance is grounded in the perceived complexity many mental health professionals hold about neuroscience and their lack of formal training in this area, as noted above.

Louis Cozolino (2002), a well-respected neuroscientist who has written extensively about the relevance of neuroscience to psychotherapy, identified additional factors that contribute to this resistance. In Cozolino’s (2010b) words, “Many mental health practitioners have a bias against neuroscience. They describe it as confusing and irrelevant to their work. Although I agree it can be confusing, it is extremely relevant to the process of counseling and psychotherapy” (p. xvi).

In addition to this viewpoint, we point to a philosophical perspective that represents a deeper and more pervasive variable underlying much of the resistance that is manifested toward neuroscience in the mental health professions. The philosophical perspective we are referring to is reflected in the remnants of dualism that continue to lead many practitioners to consciously or unconsciously dichotomize their thinking about the mind and matter (e.g., the brain). This dichotomous thinking contributes to much of the resistance or apathetic reactions some mental health professionals feel toward the rising neuroscientific force in counseling, psychology, and social work.

**Dualistic Thinking About the Mind and the Brain**

The puzzle of the relationship between the mind and matter (the brain) is not only a conundrum for the ages, but continues to be manifested in different ways among mental health professionals. This historical mystery is reflected in a philosophical perspective referred to as dualism.

Dualism is reflected in a set of views about the relationship between mind and matter (i.e., the brain), which begins with the claim that mental phenomena are, in some respects, nonphysical. From this perspective, the mind refers to nonphysical properties that include thinking, spirit, soul, or some such equivalent (Hiley, 2001).

Historically speaking, dualism is thought to have originated at least as far back as Plato and Aristotle. These philosophers speculated that the mind existed as an incorporeal soul from which a person’s intelligence, reasoning, and wisdom are manifested. Plato and Aristotle both maintained, for different reasons, that people’s “intelligence” (a faculty of the mind
A generally well-known and alternative version of dualism is attributed to René Descartes. It is reported that around 1641, Descartes linked the mind with a person’s consciousness and self-awareness and identified the brain as the seat of intelligence, serving as the purveyor of a person’s behavioral responses to his or her environment and monitor of an individual’s biological mechanisms. Hence, Descartes was thought to be among the first to formulate the mind-body dichotomy argument that is perpetuated in similar ways among many mental health professionals today (Praetorius, 2003). In doing so, they tend to associate the mind with mental and psychological processes, whereas the brain is linked to behavioral, physical, biological, and neurological processes and entities. Farmer (2009) suggests that resistance to the rising neuroscientific force in the mental health professions is largely due to those practitioners who continue to embrace the latter type of dualism.

Speaking from a historical perspective, Farmer (2009) notes that

Sigmund Freud is a symbol of the desirability of rejecting the dichotomy of biology and psychology when it comes to mental healthcare. Freud’s own career is also symbolic of how, because of the lack of development in neuroscience in his time, there has been the sort of historical accident in the separation of psychotherapy from the biological.

During Freud’s youth in the 19th century, a predominant view (that continues to be manifested by many persons today) was that mind and brain were two dichotomous entities, one being psychological and the other physical. Toward the end of that century (i.e., the late 1880s), new knowledge about the brain emerged, including the discovery of neurons and synapses. Sigmund Freud, who by this time had been trained as a neurologist (i.e., one who treats diseases of the brain and nervous system), also had a great interest in the mind, and he wanted to combine a psycho-biological view of the person with the notion of the mind. To pursue this interest, he went to Paris to study with Jean-Martin Charcot, who was using hypnosis to treat patients with hysteria to demonstrate the interactions between the body, the brain, and the mind. (p. 105)

Recently, Andreasen (2001) expressed a more inclusive and integrated alternative to dualism that is consistent with the thinking of a growing number of mental health professionals in the field today. According to Andreasen, “the brain and mind are inseparable and refer to the same thing or activity. The mind is the product of the activity occurring in the brain at the molecular, cellular, and anatomical levels” (p. 27).

Our own view of the mind and the brain puzzle extends Andreasen’s (2001) perspective further by noting that the mind is the product of the activity occurring in the brain at the molecular, cellular, and anatomical levels, which are in turn impacted by a person’s interpersonal relationships, cultural context, and societal experiences (Individual Perceptions and Meaning Making Quadrant, Behavioral/Physical/Neurological Quadrant, Cultural Community Quadrant, and Societal/Professional Quadrant considerations). Andreasen’s and our own explanation of the
mind and matter (i.e., the brain) puzzle implicitly supports the importance of neuroscience and its relevance to counseling and therapy theories and practices.

Competency-Building Activity 2.1 will help you clarify your own thinking about your level of support for the neuroscience force that is emerging in the mental health professions. It does so by encouraging you to first reflect on your own views of the meaning of the mind versus the brain as it relates to counseling and therapy issues. By engaging in this reflective process and following the additional steps included in this competency-building activity, you are likely to gain insights into your tendency to support or not support the neuroscience revolution that is occurring in the mental health professions.

**COMPETENCY-BUILDING ACTIVITY 2.1**

**Exploring Your Own Views of the Mind, the Brain, and Neuroscience**

**Instructions**

In this section of Chapter 2, you have read about what the term *dualism* means as it relates to the way the mind/brain controversy has been and continues to be conceptualized by philosophers and mental health professionals. Several key points associated with dualism are summarized in the following instructions for this competency-building activity.

**Step 1:** Please take time to review the following summaries of dualism and reflect on your own thinking about the mind/brain debate as you do.

A. Historically, philosophers such as Plato and Aristotle suggested that a person’s intelligence, reasoning, and wisdom emerge from nonphysical/nonbiological entities such as the soul or other metaphysical processes.

B. On the other hand, Descartes linked the mind with a person’s consciousness and self-awareness and identified the brain as the seat of people’s intelligence and behavioral reactions to life situations. In doing so, Descartes was among the first to formulate the mind-body dichotomy argument that is perpetuated in various ways among many mental health professionals today (Praetorius, 2003). This perspective primarily associates the mind with mental and psychological processes, whereas the brain is linked to behavioral, physical, biological, and neurological processes and entities.

C. Sigmund Freud rejected the dichotomy of biology and psychology when it came to addressing mental disorders. Freud’s own training in neurology is likely to have influenced his thinking about the biological foundations of mental disorders.

(Continued)
D. More recently, Andreasen (2001) expressed a more inclusive and integrated view of dualism that is consistent with the thinking of a growing number of mental health professionals in the field today. As pointed out in this chapter, Andreasen asserted that “the brain and mind are inseparable and refer to the same thing or activity. The mind is the product of the activity occurring in the brain at the molecular, cellular, and anatomical levels” (p. 27).

E. The authors of this book have extended Andreasen’s (2001) view further by suggesting that the mind is the product of the activity occurring in the brain at the molecular, cellular, and anatomical levels, which are in turn impacted by a person’s interpersonal relationships, cultural context, and societal experiences. This latter effort to resolve the mind/brain dichotomy integrates considerations associated with all four quadrants that compose the integral theory of counseling and therapy (Individual Perceptions and Meaning Making Quadrant, Behavioral/Physical/Neurological Quadrant, Cultural Community Quadrant, and Societal/Professional Quadrant considerations).

Farmer (2009) suggests that resistance to the rising neuroscientific force in the mental health professions is often noted among practitioners who embrace perspectives of dualism that are consistent with the ideas summarized in points A and B above.

**Step 2:** After you have had a chance to reflect on the summary of the perspectives outlined above, write down your own views of the mind/brain debate. When completing this part of the competency-building activity, please briefly indicate which, if any, of the above stated perspectives match your own thinking of this debate and which perspectives are most unlike your own views of this controversy.

**Step 3:** Indicate how strongly you support or do not support the neuroscience force that is currently rising in the mental health professions as part of your reflective response to this written activity.

**Step 4:** Keeping in mind your response to Step 3, briefly write down how you think your work as a mental health practitioner might be impacted by the support or lack of support for the neuroscience force that is rising in your profession.

**Step 5:** After you have completed the four preceding steps, please note whether there is anything you might want to do to increase your effectiveness as a practitioner by developing a greater understanding of the relevance of the neuroscience revolution that is occurring in the mental health professions. When you have completed this competency-building activity, please file your responses in your personal-professional development portfolio.
Ivey and his colleagues (2009) extend several points that have been made about the relevance of neuroscience to counseling and therapy up to this point in the chapter. Their comments also illuminate additional barriers and resistance to this new force in the mental health professions.

Counseling builds new brain networks. Research in neuroscience and cognitive science is highly supportive of our emphasis on listening, empathic understanding, and building strengths and wellness. Somewhat surprisingly, neuroscience’s findings on the brain result in a more complete awareness of how environment and culture shape the individual. The bridge between biological and psychological processes is erasing the old distinction between mind and body, between mind and brain—the mind is the brain.

How and why are neuroscience and cognitive science relevant to counseling practice? First, neuroscience provides comforting research that suggests most of counseling theory and practice is on target. But it also gives us a clearer understanding of why what we do actually works. Moreover, it imparts ideas for improving our work with clients. We also learn that our wellness and environmentally based orientation is correct. Unless we have a meaningful and effective environment, we cannot grow and change. In counseling, this means that our key word *relationship* is all that more important and that we need to honor and respect what we have done and what we can do in the future.

You likely have noticed frequent stories on television and in the popular media on brain research and its implications for the future. This research has reached a state of precision where it now has immediate meaning for counseling process and outcome. Neuroscience and neuroimaging have found that measurable structural changes occur in clients’ brains as a result of cognitive and interpersonal therapy. Advances in positron-emission tomography scans and functional magnetic resonance imaging have made it possible to measure areas of the brain that “light up” or “fire” under various stimulus conditions. And it is not just the client who develops new neurons and neural nets in the process of counseling; the counselor’s brain is changing as well.

Getting our field to accept and learn about this new area will be challenging, however. We aren’t aware of any curriculum that includes a serious discussion of how we can use neuroscience and cognitive science in counseling and therapy practice. Fortunately, our major accrediting association, the Council for Accreditation of Counseling and Related Educational Programs, anticipated this future in its 2009 standards. In relation to one of CACREP’s “eight common core curricular areas,” we found the following statement incorporating these new ideas:

Human Growth and Development—studies that provide an understanding of the nature and needs of persons at all developmental levels and in multicultural contexts, including all the following:

a. Theories of individual and family development and transitions across the life span

b. Theories of learning and personality development, including current understandings about neurobiological behavior
This CACREP Standards statement provides a rationale and direction for our new future. We are now at a point where neuroscience and its related areas can and will provide a powerful impetus for adding new content to our counseling curriculum and practice. Unless we become aware of this new paradigm and change, we are in danger of falling behind in our daily practice, teaching and research. John Cacioppo and Jean Decety have written that “psychological science in the 21st century can and should become not only the science of overt behavior, not only the science of the mind, but the science of brain function.” Not only does neuroscience clearly indicate that we are on the right track, but it also demonstrates the need for updating our field if we are to remain current and relevant.

Many counseling professionals worry about the “medical model” and a possible focus on pathology. However, you will find that neuroscientists have a strong environmental orientation—client development over the life span clearly impacts the brain. Evidence suggests that effective counseling and therapy can change the brain in positive ways. In truth, neuroscience reinforces counseling’s wellness model. (pp. 19–20)

Despite the resistance and apathy some practitioners exhibit when encouraged to consider the relevance of neuroscience to counseling and psychotherapy, neuroscientific research findings suggest that every counseling and therapy session inadvertently stimulates a variety of neurological changes in both clients and practitioners (Goleman, 2007; Siegel, 1999, 2007) as well as the different counseling and therapy theories, skills, and interventions they use in their work (Farmer, 2009) foster the release of various neurotransmitters and stimulate related brain changes. The unintentional and unconscious impact that these practitioners have in this regard largely occurs because many professional training programs and theories textbooks have not made the connection between popular approaches to counseling and therapy and recent research findings in neuroscience.

We strongly support the inclusion of neuroscientific knowledge when planning and implementing counseling and therapy services with our clients (Behavioral/Physical/Neurological Quadrant and Societal/Professional Quadrant factors). We also recognize that this new theoretical and evidence-based force will increasingly impact the mental health professions in many transformative ways in the years to come.

Despite our strong support for and recognition of the transformative potential of neuroscience in the mental health professions, we encourage students and colleagues to approach their learning about this new force with cautious enthusiasm. By balancing one’s enthusiasm with a cautious eye, mental health professionals will avoid falling prey to publications that overstate the positive aspects of neuroscience for counseling and therapy without basing these claims on credible research findings. This word of caution is consistent with the importance of operating as scientist-practitioners and embracing empirically supported theoretical perspectives in professional practices, as discussed in Chapter 1.
The following sections of this chapter present information that is designed to increase your understanding of neurotransmitters and how they affect various cognitive, emotional, psychological, and behavioral reactions people have to their life experiences. Similar issues about specific parts of the brain are discussed later in this chapter. All the information presented in the following sections is based on numerous empirical studies in neuroscience.

**WHAT ARE NEUROTRANSMITTERS?**

As noted in Chapter 1, the chemicals that are exchanged in synapses between neurons are called *neurotransmitters*. Neurotransmitters carry messages between neurons that stimulate biological reactions in different parts of the brain. The impact of these neurotransmitters and the chemical reactions they stimulate in localized parts of the brain contribute to the different cognitive, emotional, psychological, and behavioral outcomes people manifest in their lives.

Researchers have linked the production or lack of production of specific neurotransmitters to various environmental stressors and people’s lifestyles (including a person’s dietary intake, coping strategies, and use of leisure time; Anderson & Summers, 2007). New research discoveries in these areas are greatly expanding our understanding of the ways that the problems clients report in counseling and psychotherapy are directly tied to changes in their brain chemistry in general and the overproduction or underproduction of neurotransmitters in particular (Farmer, 2009).

Although many clients cannot control many of the stressors that occur in their environment, they can control the decisions they make that are related to their lifestyle. One of the basic decisions clients make in this regard relates to their dietary habits and intake.

The expanded knowledge base related to the links between clients’ diets, the production of neurotransmitters, and various behaviors that underlie mental health and psychological disturbance are leading many practitioners to direct attention to these aspects of the Behavioral/Physical/Neurological Quadrant when using an integral approach to counseling and therapy. This is especially true among practitioners whose theoretical orientation to counseling and psychotherapy is anchored in a holistic view of mental healthcare (Melanson, 2007).

Given the growing relevance of these aspects of the Behavioral/Physical/Neurological Quadrant for counseling and psychotherapy, the following section is specifically designed to extend your knowledge of how clients’ diets affect the production or suppression of various neurotransmitters that, in turn, affect clients’ moods, thoughts, feelings, and behaviors.

**We Are What We Eat**

Nutrients in the foods we eat and liquids we drink generate certain amino acids in the body. These amino acids affect our brain chemistry by increasing or decreasing the production of various neurotransmitters. As noted above, nerve impulses that are transmitted by neurotransmitters across neural synapses contain chemical information that impacts people’s thoughts, moods, attitudes, and behaviors. The findings of numerous neurological studies have increased our understanding of the effect that different foods, vitamins, mineral supplements
(e.g., folic acid, choline, and selenium), as well as various drugs and alcohol have on the production of neurotransmitters in the brain and related behavioral and psychological reactions (Hubbs-Tait, Nation, Krebs, & Bellinger, 2005).

Why this emphasis on nutrition as we start a discussion on neurotransmitters? First, effective nutrition and a healthy body are essential for optimal brain functioning. Chudler (2010) examines the relationship of diet to brain and nervous system functioning. For example, he states that lack of selenium can result in central nervous system damage, Vitamin E is important for cell membranes, and iron is necessary for basal ganglia functioning and preventing anemia.

As part of the assessment process in counseling and therapy, it is important that you consider health-related behavior. You may not think of nutrition and diet counseling as part of your work, but it is becoming increasingly obvious that you need some knowledge in this area—at least enough for intelligent referral.

Of the more than 100 neurotransmitters that have been identified by researchers, 4 are particularly relevant to the work mental health practitioners do to foster clients’ well-being. We are becoming more aware of the ways that the proper production of these neurotransmitters (or lack thereof) impact people’s behaviors and psychological reactions. The specific neurotransmitters that are of particular relevance in this regard include acetylcholine, a neurotransmitter important for memory and learning; serotonin, our natural mood stabilizer and sleep promoter; dopamine, our natural energizer and mental focuser; and GABA (gamma amino butyric acid), our natural relaxer (Cozolino, 2002).

Table 2.1 provides additional information regarding the effects of deficiencies in the production of these neurotransmitters as well as specific foods that enhance or decrease their production in the brain. Understanding the relevance of the information presented in Table 2.1 to counseling and psychotherapy is leading many practitioners to discuss these aspects of the Behavioral/Physical/Neurological Quadrant with their clients (Farmer, 2009).

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<tr>
<th>Neurotransmitter</th>
<th>Effects of Normal Functioning</th>
<th>Effects of Deficiency</th>
<th>Foods to Avoid</th>
<th>Foods to Consume</th>
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<tr>
<td>Acetylcholine</td>
<td>Critical for memory, learning, optimal cognitive functioning, emotional balance and control</td>
<td>Deterioration of memory and imagination, fewer dreams, increased confusion, forgetfulness, cognitive disorganization, lack of emotional control, increased aggression</td>
<td>Sugar, deep-fried food, junk food, refined and processed food, cigarettes, alcohol</td>
<td>Organic eggs, fish (especially salmon, mackerel, sardines, and fresh tuna)</td>
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</tr>
<tr>
<td>Serotonin</td>
<td>Directly effects the way a person feels, behaves, and thinks; sustains one’s interest in and energy for emotional, cognitive, and behavioral processes; vital to sleep and anxiety control</td>
<td>Low mood, depression, difficulty sleeping, feeling “disconnected,” lack of joy, anxiety</td>
<td>Alcohol</td>
<td>Fish, fruit, eggs, avocado, wheat germ, low-fat cheese, lean poultry</td>
</tr>
<tr>
<td>Dopamine</td>
<td>Regulates movement, emotional wellness, motivation, pleasurable feelings</td>
<td>Lack in drive, motivation, and/or enthusiasm; craving of stimulants (e.g., caffeine)</td>
<td>Tea, coffee, caffeinated drinks</td>
<td>Regular balanced meals, fruits and vegetables high in Vitamin C, wheat germ</td>
</tr>
<tr>
<td>GABA (Gamma amino butyric acid)</td>
<td>Helps reduce anxiety and induces relaxation and sleep</td>
<td>Hard to relax and can’t switch off anxiety</td>
<td>Sugar, alcohol, tea and coffee, caffeinated drinks</td>
<td>Dark green vegetables, seeds and nuts, potatoes, bananas, eggs</td>
</tr>
</tbody>
</table>

**HELPING STRATEGIES THAT PROMOTE HEALTHY NEUROTRANSMITTERS**

Table 2.1 provides guidelines that counselors and therapists may find helpful when presenting nutritional counseling information to promote their clients’ healthy generation of the four neurotransmitters described above. In addition to these helping strategies, researchers have identified additional counseling and therapy skills and theoretical approaches that have a positive effect on the generation and release of these important neurotransmitters. Ivey, Ivey, and Zalaquett (2010) provide a detailed summary of some of the possible counseling skills and psychotherapeutic treatment strategies that can impact the neurotransmitters outlined in Table 2.1 in ways that promote clients’ health and well-being. The following information is based on the important work these and other researchers have done in this area.

**Counseling/Therapy Skills and Intervention Strategies That May Impact the Generation and Release of Acetylcholine**

Ivey et al. (2010) suggest numerous helping strategies that may enhance the production and release of acetylcholine. This includes counseling strategies that help clients develop and implement an exercise action plan; learn
to use meditation on a regular basis; and explore ways to develop new, positive social relationships.

Referring back to Sachi, the 28-year-old Japanese client described in Vignette #2, practitioners operating from a neuroscience perspective may consider how this client’s overall psychological disposition may be positively impacted by recommending that she consider implementing some or all of the intervention strategies listed above. From a neuroscience perspective, it is possible that encouraging clients like Sachi to develop and implement a holistic plan that includes increasing their level of daily exercise and use of meditation and working to build new social relationships may simultaneously promote the sort of positive psychological disposition and sense of emotional well-being that is linked to the generation of increased levels of acetylcholine in the brain.

Competency-Building Activity 2.2 helps you assess your readiness to implement counseling and therapy interventions that are anchored in a neuroscience perspective that includes the helping strategies listed above. Upon completing this competency-building activity, you will be more aware of the types of knowledge and skills you currently possess, as well as those that need to be developed in adopting a neuroscience-oriented approach to counseling clients like Sachi.

COMPETENCY-BUILDING ACTIVITY 2.2

Assessing Your Readiness for Implementing Neuroscience-Based Counseling and Therapy Interventions

Instructions

In this activity, you are encouraged to assess your interest and readiness in using a holistic counseling approach that is grounded in a neuroscientific perspective when working with clients like Sachi (the client in Vignette #2). As noted in this chapter, practitioners operating from a neuroscience perspective are likely to encourage clients like Sachi to develop and implement a holistic treatment plan in counseling and therapy. Such a plan might include offering assistance in developing a daily exercise action plan, encouraging the use of meditation, and exploring ways that they can build new social relationships. These strategies are, in part, aimed at promoting the sort of psychological well-being that is linked to increased levels of acetylcholine in the brain.

Please write down your reactions to the following questions on a blank piece of paper to assess your interest and readiness to implement a holistic approach to counseling that is grounded in a neuroscience helping perspective.

**Question 1:** What is your initial reaction to the specific suggestions that were made for developing the sort of holistic approach with clients like Sachi that is described in this section of Chapter 2?
Question 2: What other helping strategies do you think would be useful to implement with clients experiencing similar concerns as Sachi in counseling and therapy situations?

Question 3: Write a statement that describes how comfortable and competent you feel at this stage of your professional development in offering assistance to clients like Sachi in developing a daily exercise action plan, using meditation, and exploring ways that they can build new social relationships.

Question 4: Write a statement that describes how comfortable and competent you feel at this stage of your professional development in implementing the strategies you listed in your response to Question 2 with clients like Sachi.

Question 5: Write a statement that describes how interested you are in developing additional knowledge and skills that are necessary to effectively implement a holistic approach to counseling clients like Sachi in the future (e.g., by offering assistance in developing a daily exercise action plan, encouraging the use of meditation, and exploring ways that clients like Sachi can build new social relationships, to name a few).

Question 6: What specific actions can you take to develop the knowledge and skills needed to effectively implement the holistic interventions that are recommended for use with clients like Sachi (e.g., by offering assistance in developing a daily exercise action plan, encouraging the use of meditation, and exploring ways that these clients can build new social relationships)?

Question 7: Write a statement that describes how interested you are in increasing your knowledge and competence in effectively implementing the strategies you listed in your response to Question 2 with clients like Sachi.

Question 8: What specific actions can you take to develop the knowledge and skills needed to effectively implement the strategies you listed in your response to Question 2 with clients like Sachi?

Be sure to file your responses to this competency-building activity in the personal-professional development portfolio you are developing as you read this book and continue to complete the competency-building activities included in each chapter.

Counseling/Therapy Skills and Intervention Strategies That May Impact the Generation and Release of Serotonin

Ivey et al. (2010) note that normal levels of serotonin are vital to ensure adequate sleep patterns, maintenance of positive mood, control of one’s anxiety, and feelings of self-esteem. On the other hand, serotonin deficiencies are related to increased depression, impulsive behaviors, anger, and aggression. These researchers further suggest that a variety of
counseling skills and therapeutic intervention strategies are likely to be useful in promoting healthy levels of serotonin. This includes implementing various strategies associated with positive psychology/wellness counseling theories (see Chapter 13), cognitive-behavioral theories (see Chapters 7 and 8), and efforts to assist clients in developing clear visions and meaning in their lives (strategies that characterize many existential-humanistic counseling interventions, discussed in Chapters 9 and 10).

It is also reported that using the sort of positive restorying associated with narrative counseling (see Chapter 4) and gaining a commitment from clients to implement new action strategies that are based on their restorying is helpful in generating increased serotonin levels (Ussher, 2010).

Practitioners working from a neuroscientific perspective may consider how fostering Sachi’s (the client described in Vignette #2) serotonin levels may be helpful in addressing her concerns about the increased anxiety and depression she is experiencing as a result of relocating for career reasons. Operating from this perspective may lead practitioners to incorporate some or all of the counseling skills and therapeutic interventions listed above to help Sachi deal with the problems she is encountering in her life.

**Counseling/Therapy Skills and Intervention Strategies That May Impact the Generation and Release of Dopamine**

As noted in Table 2.1, dopamine production is linked to a person’s sense of emotional wellness, motivation, and pleasurable feelings. Dopamine deficiency, on the other hand, has been associated with clients reporting a general lack of drive, motivation, and/or enthusiasm to complete routine tasks, as well as increased craving for stimulants (e.g., caffeine).

Ivey et al. (2010) point out that encouraging clients to focus on positive stories about their lives can help increase their dopamine production. They also suggest that directing clients’ attention to their personal strengths may stimulate the generation of dopamine. This can be done by tailoring many of the techniques and interventions that are associated with positive psychology/wellness counseling and solution-focused/brief therapy theories presented in Chapter 13.

Recently, other researchers have noted that an increased production of numerous neurotransmitters occurs when clients receive therapeutic massages. More specifically, patients with cancer and other medical disorders who receive massage therapy benefit from increased levels of dopamine, as well as increased levels of serotonin, oxytocin, endorphins and increased production of natural killer cells (Goodfellow, 2003; Hernandez-Reif et al., 2004).

**Counseling/Therapy Skills and Intervention Strategies That May Impact the Generation and Release of GABA**

Normal levels of GABA are linked to an individual’s ability to effectively manage and reduce anxiety as well as general feelings of relaxation and adequate sleep patterns. Conversely, GABA deficiency is associated with a person’s inability to manage anxiety, inability to remain relaxed for extended periods of time, and sleep disorders (Adamec, 2000).

Ivey et al. (2010) offer a number of suggestions that may have a positive impact on
stimulating increased GABA production among clients whose behaviors and concerns are consistent with the symptoms outlined in Table 2.1. First, these counseling experts point out that the basic listening skills that all mental health practitioners are trained to use in their work are helpful when utilized among GABA-deficient clients. The power of actively listening to clients in a composed and respectful manner not only serves to calm individuals who are anxious and agitated but does so in a way that has a biological impact, resulting in increased production of GABA.

Second, Ivey et al. (2010) assert that various counseling interventions that require clients’ active involvement in learning how to more effectively cope with stresses that occur in their lives represent other strategies that may contribute to increasing individual’s GABA levels. These interventions include but are not limited to stress management and relaxation training, mindfulness counseling (see Chapter 7), and the use of other cognitive-behavioral therapy strategies to increase clients’ self-regulation abilities (Lynch, Jarvis, DeBellis, & Morin, 2007).

**UNDERSTANDING THE COMPLEXITY OF LINKING PEOPLE’S THOUGHTS, FEELINGS, AND BEHAVIORS TO VARIOUS PARTS OF THE BRAIN**

In addition to the information describing the role and function of neurotransmitters in the preceding part of this chapter, this section reports on ways that other neuroscience researchers help expand our understanding of how different parts of the brain impact people’s mental health and contribute to behavioral problems (Cozolino, 2010b). Before continuing this discussion, it is important to emphasize that researchers have not reported a direct causal effect between specific parts of the brain and specific moods, thoughts, feelings, and behaviors clients manifest in their lives. The complexity of brain functioning and related cognitive, emotional, psychological, and behavioral reactions suggests that these reactions result from interfacing biological changes that occur in multiple brain parts.

It is also important to point out, however, that neuroscientists are increasingly demonstrating how various brain parts contribute to the manifestation of different moods, thoughts, feelings, and behaviors. Thus, while it is understood that specific brain parts may not have a definite causal effect on specific psychological and behavioral outcomes, it is equally clear that there are strong correlational effects between the levels of neural activation in different parts of the brain and the manifestation of various moods, thoughts, feelings, and behaviors in people’s lives. Given the importance of understanding the impact that different brain parts have on clients’ mental health, we describe various issues related to this topic below.

Figure 2.1 represents a general profile of the different parts of the human brain. Breakthroughs in neuroscience are helping mental health professionals better understand the ways that these brain parts contribute to the behavioral and psychological responses we experience during the course of our lives.

A detailed discussion of the new knowledge that has emerged from recent neuroscience research on the functioning of different brain parts is beyond the scope of this book.
With these space limitations in mind, we have nevertheless chosen to discuss six different parts of the brain that are thought to be particularly important components of the Behavioral/Physical/Neurological Quadrant and that have much relevance to the work practitioners do in the field. Thus, we direct your attention to the location and impact of the following brain parts on clients’ behaviors and psychological reactions to life: (1) the cerebral cortex, (2) the prefrontal cortex, (3) the cingulate system, (4) the basal ganglia, (5) the temporal lobes, and (6) the limbic system.

**Cerebral Cortex**

The largest part of the brain is composed of an outer, grey-colored section called the cerebral cortex (see Figure 2.2). The cerebral cortex is divided into several lobes called frontal, parietal, temporal, and occipital lobes. Along with other brain components, the cerebral cortex plays a major role in clients’ memory, attention, perceptual awareness, language, and consciousness.

**Prefrontal Cortex**

Figure 2.3 provides a visual representation of the prefrontal cortex, which is located behind one’s forehead. The prefrontal cortex constitutes about one-third of the entire brain. As the most evolved part of the brain, it coordinates such executive functions as a person’s capacity for planning and organizing his or her life, controlling impulses, and critical thinking. Given the importance of such functions in leading an effective and satisfying life, it is important that counselors
and psychotherapists learn about the kinds of intervention strategies that can be used to effectively stimulate the optimal functioning of this part of the brain. A number of such strategies are described later in this chapter.

**Cingulate System**

The *cingulate system* is located beneath the cerebral cortex and close to the center of the brain (see Figure 2.4). The cingulate system plays a major role in enabling people to effectively shift their attention from one idea to another in different situations. This part of the brain is also associated with the coordination of sensory input for emotions, emotional responses to pain, and the regulation of aggressive behavior.

**Basal Ganglia**

The *basal ganglia* consist of a large number of neurons that are located close to the
thalamus and amygdala (see Figure 2.5). This part of the brain is responsible for numerous functions, including motor control; learning; and the mediation of anxiety, fear, and motivation. Currently, popular theories suggest that basal ganglia also play a primarily role in the way people shift their actions in different environmental situations. The “behavior switching” that most people commonly exhibit in their lives is rooted in changes that occur within the basal ganglia. The biological changes that occur in this part of the brain, which lead individuals to change their behaviors in different environmental situations, are also stimulated by signals that come from other parts of the brain, including the prefrontal cortex and the cingulate system.

**Temporal Lobes**

The *temporal lobes* are located on the right and left sides of a person’s head directly above one’s ears (see Figure 2.6). These brain parts are responsible for numerous functions, including hearing, auditory perception, episodic and declarative memory, and language. They also play a key role in a person’s expression of emotion and learning abilities.

**Limbic System**

The *limbic system* is a complex set of anatomical structures that includes the hypothalamus, hippocampus, and amygdala (see Figure 2.7). This brain system has a
major impact on our emotional life, as well as contributing to the formation of memories.

Table 2.2 presents additional information describing how the different parts of the brain briefly discussed above impact a person’s behavior and psychological disposition. Table 2.2 also outlines suggestions for corrective interventions that have been tested and found to be effective with many clients. More information related to these aspects of the Behavioral/Physical/Neurological Quadrant of the integral approach to counseling and psychotherapy is discussed later in this book.

Table 2.2  Brain Parts, General Function, Results of Improper Functioning, and Potential Corrective Interventions

<table>
<thead>
<tr>
<th>Part of the Brain</th>
<th>General Function</th>
<th>Results of Improper Functioning</th>
<th>Potential Corrective Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cerebral cortex</td>
<td>Responsible for many “higher-order” functions, such as language and information processing</td>
<td>Language problems, difficulty understanding incoming information from one’s environment</td>
<td>Increased dopamine production through cognitive-behavioral counseling interventions; changes in diet and use of supplements; food sources of dopamine-increasing tyrosine, including almonds, avocados, bananas, dairy products, lima beans, pumpkin seeds, and sesame seeds; Vitamin C, Vitamin E, and antioxidants</td>
</tr>
<tr>
<td>Prefrontal cortex</td>
<td>Increases a person’s attention span, perseverance, problem solving, forward thinking, empathy</td>
<td>Shortened attention span, distractibility, reduced impulse control, hyperactivity, procrastination, poor judgment, trouble learning from experience</td>
<td>Counseling that helps clients focus on what they like more than what they don’t like, psychotherapy that promotes clients’ sense of meaning in life (logotherapy), biofeedback, medications (e.g., Ritalin, Norpramin)</td>
</tr>
</tbody>
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(Continued)
Table 2.2 (Continued)

<table>
<thead>
<tr>
<th>Part of the Brain</th>
<th>General Function</th>
<th>Results of Improper Functioning</th>
<th>Potential Corrective Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Limbic system</strong></td>
<td>Sets a positive and calm emotional tone of mind, modulates motivation, promotes positive interpersonal interactions and relationships (bonding)</td>
<td>Moodiness, negative thinking and perceptions of events, decreased motivation, social isolation</td>
<td>Counseling and psychotherapy interventions that work to reduce/extinguish automatic negative thinking, interpersonal therapy, body work and massage therapy, aromatherapy, increased physical exercise, supplements (e.g., L-Tryptophan, tyrosine, St. John’s Wort), antidepressant medications</td>
</tr>
<tr>
<td><strong>Basal ganglia</strong></td>
<td>Integrate feeling and movement, smooth fine motor movement, moderate anxiety and fear, enhance motivation</td>
<td>Anxiety, nervousness, fear, panic attacks, excessive efforts to avoid conflict, headaches, very low or excessively high motivation, physical sensations of anxiety</td>
<td>Guided imagery, training for meditation and deep breathing, assertiveness/conflict resolution training, nutritional changes (e.g., eliminate alcohol and caffeine, increase Vitamin B complex), use of chamomile tea and lavender oil for aromatherapy, medication (e.g., antianxiety medication, Xanax, Ativan, Serax)</td>
</tr>
<tr>
<td><strong>Cingulate system</strong></td>
<td>Controls ability to shift attention effectively and move from one idea to another, increases and maintains cognitive flexibility, increases or maintains one’s ability to see options, maintains one’s ability to “go with the flow,” enhances cooperative behaviors</td>
<td>Excessive anxiety, worrying, holding on to hurts from the past, getting stuck on thoughts/ideas, oppositional behavior, argumentativeness, uncooperative behavior, inflexibility, addictive behaviors</td>
<td>Rational emotive behavioral therapy, reality therapy, paradoxical requests (logotherapy), nutritional changes to increase serotonin production (e.g., eating more chicken, turkey, salmon, peanut butter, eggs, green peas, potatoes, milk), increased exercise, medications (e.g., Zoloft, Paxil, Anafranil, Luvox)</td>
</tr>
<tr>
<td><strong>Temporal lobes</strong></td>
<td>Determine understanding and processing of language, long/intermediate-term memory, recall of complex memories, emotional stability</td>
<td>Violent thoughts, aggression, anger expressed externally and/or internally, sensitivity to slights, reading difficulties, emotional instability</td>
<td>Music therapy (using classical music), learning to play a musical instrument, increased sleep, eliminating caffeine and nicotine, biofeedback</td>
</tr>
</tbody>
</table>
USING COUNSELING AND PSYCHOTHERAPY THEORIES TO PROMOTE POSITIVE BRAIN CHANGES

The preceding sections of this chapter are designed to increase your knowledge of basic aspects of neuroscience as they relate to counseling and psychotherapy theories and practices. The specific issues that have been discussed thus far include the presentation of information that is aimed at

a. increasing your awareness of the ways that neurotransmitters are linked to various cognitive, emotional, psychological, and behavioral reactions people manifest in their lives;

b. broadening your thinking about the different counseling/psychotherapy skills and interventions that can possibly promote the optimal production and release of various neurotransmitters in the brain; and

c. fostering new knowledge of the ways that different brain systems contribute to a wide range of cognitive, emotional, psychological, and behavioral reactions people manifest in their lives.

The following section is aimed at increasing your knowledge of neuroscience further by describing how the implementation of different counseling and psychotherapy theories, skills, and related interventions affect different brain systems and human functioning. In doing so, we identify some of the cognitive, emotional, psychological, and behavioral reactions that are linked to various parts of the brain.

Before discussing these issues, however, we present several points that serve as a backdrop for the information that follows. The first point relates to our resolution of the mind/brain debate. As noted earlier, it is our view that the mind is the product of the activity occurring in the brain at the molecular, cellular, and anatomical levels, which are all impacted by a person’s interpersonal relationships, cultural context, and societal experiences.

Second, the process of psychotherapy relies on the brain’s plasticity for its effectiveness. The types of cognitive (problem-solving), emotional, psychological, and behavioral changes that practitioners strive to promote in counseling and psychotherapy are dependent on the production of new neurons and neural wiring that affect changes in different brain systems, which in turn contribute to positive therapeutic outcomes.

Third, “psychotherapy is a process through which neural network integration and coordination can be created or restored. This is especially crucial for the networks that specialize in emotions, cognitions, sensations, and behavior” (Farmer, 2009, p. 109).

Fourth, while empirical research in these areas is still at the embryonic stage, there is a growing body of research literature on the neurobiology of psychotherapy that describes brain changes. These changes appear to be directly impacted by different psychotherapeutic processes. From these research findings, practitioners are beginning to “learn not only about the effectiveness of different psychotherapeutic theories and practices, but also gaining insights concerning which clients, with which psychological disorders, can benefit from and should receive psychotherapy” (Farmer, 2009, pp. 109–110).
Fifth, counseling and therapy often involve assisting clients in shifting attention from a particular negative issue or situation (e.g., the problems that are causing distress) to an alternative perspective (e.g., therapeutic goals and positive outcomes). Neurologically speaking, helping clients shift their attention from negative thoughts and feelings to positive cognitions, emotions, and behaviors results in specific neurological changes that take only milliseconds to occur in different parts of the brain.

Mental health practitioners intentionally or unintentionally facilitate changes in different parts of the brain when providing counseling and therapeutic services to their clients. Clients’ ability to regulate and direct their attention in specific directions enables them to control their distress, learn from new experiences, and reflect on the therapeutic discussions they have with their therapists. Neuroscience tells us that these changes result from both psychological and complementary biological changes that occur as a result of counseling and therapy.

The final point that serves as a backdrop for the information presented below is that research in these areas has been made possible because of significant improvements that have occurred in neuroimaging techniques over the past two decades. Neuroimaging procedures are based on the understanding that mental activity is largely reflected in biological changes that occur in different parts of the brain. This includes an increase or decrease in the volume and flow of blood, oxygen, and glucose in the brain. These technological advancements allow researchers to examine specific biological changes that occur in different parts of the brain before, during, and after counseling, therapy, and other related activities have been implemented.

### Neuroscience Research Findings and Psychodynamic Therapy Theories

An emerging dialogue is occurring between practitioners who support and use psychodynamic therapy theories in their clinical practices and other professionals who understand the relevance of neuroscience to the work psychodynamic practitioners do in the field (Beutel, Stern, & Silbersweig, 2003). One of the central tenets of psychodynamic theories is that clients’ past life experiences result in the formation of mental schemata that are stored in their minds (see Chapter 5). While most people are generally conscious of different aspects of these schemata, psychodynamic theory emphasizes the significant role that the unconscious plays in maintaining negative memories that underlie negative reactions (e.g., anger, sadness, fear, depression) many people routinely experience in their lives (Individual Perceptions and Meaning Making Quadrant factors).

Drawing again from our description of the mind and the brain, we are reminded that the mind is the product of the activity occurring in the brain at the molecular, cellular, and anatomical levels, which are all impacted by a person’s interpersonal relationships, cultural context, and societal experiences. Thus, all the conscious and unconscious memories that are stored in people’s minds are grounded in specific neurological changes that occur in different parts of the brain. Neuroscientists refer to the unconscious memories that contribute to many people’s problems as implicit memories.
These scientists discuss three specific kinds of implicit (unconscious) memories: emotional memories, behavioral memories, and perceptual memories.

Siegel (1999) discusses these memories and their relationship to different brain systems in the following way:

Implicit memory relies on brain structures that are intact at birth and remain available to us throughout life. These structures include the amygdala and limbic regions for emotional memory, the basal ganglia and motor cortex for behavioral memory, and the perceptual cortices and prefrontal cortex for perceptual memory. (p. 29)

The mental schemata and unconscious memories that are formulated early in people’s lives and biologically housed in different brain systems result in distinct neurological wiring. Psychodynamic theorists assert that changing the neural circuitry that underlies implicitly stored memories is likely to involve a considerable amount of time and effort in therapy. However, recent neurological studies have demonstrated how a process called subliminal priming can at least temporarily disrupt the brain circuitry that underlies unconscious (implicit) memories in a very short space of time (Begley, 2007).

Subliminal priming consists of tuning certain neural pathways to certain events. This involves introducing a sensory stimulus (e.g., visual, verbal, olfactory, or auditory cue) to alter a person’s unconscious processes (e.g., implicit memory) at the neurological level. The brain changes that occur during subliminal priming largely take place in the prefrontal cortex, amygdala, and hippocampus (Li et al., 2010).

Begley (2007) discusses the affect of subliminal priming in an investigation that was conducted to reduce negative and unconscious stereotypes that Israeli college students held toward persons of Arab descent. This experiment is detailed in Chapter 5, when psychodynamic theories (including attachment theory) are discussed in greater detail.

**Interpersonal therapy (IPT)** is a short-term psychodynamically based theoretical approach to counseling and therapy. IPT focuses on the ways that unconscious processes adversely affect a person’s interpersonal interactions and result in various forms of psychological distress and disorder (see Chapter 6).

IPT was initially developed to treat adult depression. It has since been effectively applied to other psychological problems, including the treatment of depression in adolescents, the elderly, and people with human immunodeficiency virus (HIV) infection (Cuijpers, van Straten, & Andersson, 2008).

In studying the neurological and psychological impact of IPT, Brody and his colleagues (2001) studied the effect that this treatment modality had among clients suffering from major depression. Three groups were included in this investigation: (1) a group of clients whose only form of treatment for their depression was a medication called paroxetine, (2) a group of clients engaged in 12 weekly IPT sessions, and (3) a control group that received no treatment. All the research participants underwent brain imaging procedures before and after participating in the study.

Positive psychological changes in depression levels were noted when comparing pre- and post-test self-reports from the clients in the medication group, as well as in the IPT group. However, no changes in depression
levels were reported among the persons composing the control group.

The researchers also reported notable neurological changes occurring among the clients in the medication group and the IPT group but not among the persons in the control group. Like the clients in the medication group, the persons participating in 12 weekly IPT sessions demonstrated decreased neural activation in their prefrontal cortex and cingulate systems (Brody et al., 2001).

**NEUROSCIENCE RESEARCH FINDINGS AND COGNITIVE-BEHAVIORAL THERAPY THEORIES**

Although still low in actual numbers, there has been more neuroscientific research done to determine the biological impact of cognitive-behavioral theoretical models than for any other counseling and therapy theory. One of these studies involved the work of Furmark and his colleagues (2002), who studied the psychological and neurological impact of cognitive-behavioral therapy among clients experiencing anxiety attacks when involved in public-speaking situations. The researchers used self-report instruments to measure clients’ subjective experience of their anxiety levels, as well as having all the research participants undergo brain imaging before and after the study began.

The results of this investigation indicated that, while persons making up a control group did not demonstrate changes in their anxiety reactions to public speaking, research subjects in both the cognitive-behavioral therapy group and a medication (citalopram) group exhibited significant and positive psychological and neurological changes.

In detailing the results of this investigation, the researchers highlighted two particular outcomes: First, the persons assigned to both experimental groups reported significant anxiety reduction in public-speaking situations.

Second, like the individuals in the medication group, persons receiving cognitive-behavioral therapy manifested noticeable changes in specific brain systems as reflected in the pre- and post-test brain-scanning procedures. These neurological changes specifically resulted in decreased neural activity and blood flow to the amygdala and hippocampus (Furmark et al., 2002).

Both of these brain structures (the amygdala and hippocampus) are located in the limbic system. As noted in Table 2.2, normal functioning of the limbic system is linked to a positive and calm emotional tone of mind, while overactivation of the limbic system is associated with excitability and anxiety. It is understandable, then, that persons receiving the sort of counseling that proved to promote optimal functioning of the limbic system would likely report reduced public-speaking anxiety as a result of participating in that therapeutic modality.

**Biofeedback training** is a popular offshoot of cognitive-behavioral therapy that is used for a broad range of client problems. This includes but is not limited to using biofeedback training with clients experiencing migraine and tension-type headaches, sleep disorders, anxiety attacks, phobias, and neuromuscular disorders, to name a few. Although much research has been conducted to assess the efficacy of biofeedback over the past 30 years, investigations focusing on the impact of biofeedback on different brain systems is a relatively new research area.
Of particular interest for the present discussion, several researchers have recently reported how biofeedback training fosters the optimal functioning of several specific brain systems that are linked to clients’ mental health and sense of personal well-being. This includes studies that examined the types of neurological changes that ensue from using biofeedback training with clients experiencing panic disorders (Goodwin & Montgomery, 2006) and individuals suffering from stress-related headaches (Cathcart, Winefield, Lushington, & Rolan, 2001).

Both of these studies confirmed that biofeedback training contributed to the optimal functioning of clients’ prefrontal cortex and limbic system. Several other neuroscience researchers have also noted how the use of biofeedback training can promote the optimal functioning of clients’ temporal lobes, which is identified as another area that is important in engendering and maintaining mental health and well-being (Amen, 1998; Critchley, 2001).

Neuroscience research findings such as those discussed above enhance practitioners’ understanding of some of the ways that traditional counseling and therapy theories and related interventions can affect clients’ brain systems when used in clinical practice. This understanding will expand over the coming decades as additional investigations are made into these and other areas that focus on different aspects of holistic and integral approaches to counseling and therapy. The collective findings of all the work that neuroscience researchers have done and will do in the future will not only help practitioners use the counseling and therapy theories that currently exist in the field today in more intentional and efficacious ways but will also give birth to new approaches in mental healthcare.

Such efforts will bode well for the mental health professions, as the cultural-racial transformation of our society is leading many persons to question the relevance and viability of traditionally trained practitioners. These questions are particularly aimed at those practitioners who continue to use traditional counseling and therapy theories in ways that are not responsive to or respectful of culturally different clients’ worldviews, values, and helping preferences (D’Andrea & Daniels, 2001a, 2001b). Efforts to develop and implement new holistic and integral mental healthcare services will, indeed, need to be more culturally responsive, effective, widely accessible, and cost efficient than the fragmented mental healthcare services that are currently available to promote healthy human development in our culturally diverse society.

Many practitioners are striving to implement more holistic and integral interventions that are aimed at supplementing and extending the traditional therapeutic theories discussed in this book. For those practitioners who are not competent to provide specific holistic services that may be of benefit to their clients, many are developing relationships with other healthcare providers so that they can make informed decisions when referring clients to these allied professionals. This includes developing referral connections with individuals who can effectively provide nutritional counseling, massage therapy and body work, qi gong, various forms of music therapy, yoga training, indigenous healthcare, sexual counseling, guided imagery and visualization, aromatherapy, meditation training, community advocacy interventions, and physical exercise planning services.

Practitioners are encouraged to keep two overarching considerations in mind when
making such referrals. First, it is important to consider the level of cultural competence (see Chapter 3) that other professionals exhibit when providing the types of services listed above to clients from diverse groups and backgrounds. This consideration reflects the referring practitioner’s commitment to ethical professional practices that is emphasized in Chapter 1.

The second consideration focuses on the degree to which the services clients are encouraged to receive from other healthcare providers are empirically supported by research findings (see Chapter 1). This consideration directs particular attention to the degree to which neuroscientific research findings affirm the efficacy of such services when implemented among culturally diverse client populations.

The latter point requires a basic understanding of the relevance of the newly emerging field of cultural neuroscience to the work mental health professional do in a culturally diverse, 21st-century society. This topic is discussed in the following section of this book.

**CULTURAL NEUROSCIENCE**

The brain exists only in relationship to what goes on around it. Input from the environment in terms of visual impressions, sounds, sensations, tastes, and aromas is organized into meaningful and lasting brain patterns in the child’s brain. In effect, what goes into what we call the mind is as important as the biological processes described in the previous sections of this chapter. And of course, thoughts, behaviors, emotions, and meanings are learned within particular cultural contexts (Individual Perceptions and Meaning Making Quadrant, Behavioral/Physical/Neurological Quadrant, and Cultural Community Quadrant factors).

Cultural neuroscience is the interdisciplinary field that studies the relationship of culture, biology, brain functioning, psychology, and other social sciences. It is an area just beginning to unfold in the social sciences but already has profound implications for our professional practices, particularly as they relate to the development and implementation of preventive and social justice advocacy interventions to promote healthy human development.

Among the relevance of these interdisciplinary connections is information generated by cultural neuroscientists in the American Association for the Advancement of Science who discuss the adverse impact of the culture of poverty on millions of persons in our society, especially the youngest members of society. As cited by Krugman (2008),

> Poverty in early childhood poisons the brain. . . . Many children growing up in very poor families with low social status experience unhealthy levels of stress hormones, which impair their neural development. (p. 28)

Additional cultural neuroscience research findings of relevance to practitioners who work with persons in the culture of poverty come from a compilation of studies that was completed by Evans (2004). These research findings highlight the adverse impact that poor children experience as a resulted of being routinely exposed to increased levels of family turmoil, violence, separation, and lack of social support. Evans further noted that children living in poverty tend to have poorer nutrition, live in polluted environments, and attend
schools that are less effective. All these factors contribute to the development of unhealthy stress hormones, particularly cortisol, which can be permanently damaging to the brain.

What are the implications of these findings for counseling and therapy, helping practices that have primarily been developed to address the needs of verbally talented persons from middle- and upper-class backgrounds? Given the failure of the mental health professions to substantially address the unique strengths and needs of poor persons, the data suggest that we need to reconsider and expand our professional roles and mission to facilitate the healthy development of persons living in poverty in general and poor children in particular.

Despite the failure of the mental health professions to effectively address the strengths and needs of people living in the culture of poverty, traditional individual, family, and group counseling and therapy theories that are grounded in culturally biased helping perspectives remain the mainstay of helping for many practitioners. The summary of research findings presented above suggests that the counseling and therapy services many practitioners provide poor clients are simply not relevant to the challenges many people living in poverty routinely face.

As a mental health practitioner, you can play an important role in fostering the development of new neurons and neural networks among the clients you work with. As noted throughout this chapter, providing counseling and psychotherapeutic services that help generate new neurons and neural networks are key in helping clients from diverse cultural groups learn to lead more satisfying, productive, and empowering lives.

In achieving these counseling outcomes, it is useful to think of the brain as being flexible and plastic, ever-changing through its relationship with the environment. Neuroscience in general and cultural neuroscience in particular underscore the vital role that the client-counselor relationship plays in promoting the sort of psychological and neuroscience changes that are necessary to realize new and untapped dimensions of human development and well-being (Cozolino, 2002, 2010b).

From the perspective of cultural neuroscience, it is important that mental health practitioners direct time and energy to acquire and implement the multicultural counseling competencies that have been developed and formally endorsed by numerous professional organizations (American Psychological Association, 2003; Daniels & D’Andrea, 2003; Sue, Arredondo, & McDavis, 1992). These competencies serve as blueprints that practitioners can use in effectively building the kinds of therapeutic relationships that foster mental health and optimal neurological functioning among clients from culturally diverse groups and backgrounds. Chapters 3 and 12 detail additional issues that describe why it is vital for practitioners to develop these competencies when providing services to culturally different clients (Cultural/Community Quadrant and Societal/Professional Quadrant considerations).

Blanding (2010) summarizes additional research findings that are relevant to a broader discussion of cultural neuroscience. These findings are presented below.

- One of the generally accepted assumptions about neuroscience is the view that biological processes that occur in the brain are similar to the brain activities that all people experience, regardless of a person’s cultural background. However, Blanding (2010) disputes this generally held view by reporting
on the results of brain imaging procedures (fMRIs) that have been done among American and Indian students who listened to classical music. The brain imaging results of these persons indicated different patterns of neural activation had occurred in different parts of the brains of the American students versus their Indian counterparts. This finding substantiates one of the ways that culture appears to have a differential impact on the activation of different brain systems when presented with similar environmental conditions.

- When analyzing the results of brain imaging procedures (fMRIs) among research subjects from Japan and the United States, it was noted that greater levels of neural activation were recorded in the parts of brain that are associated with emotional reactivity when presented with pictures of human faces. While the fMRI results of persons from the United States reflected significantly higher activation in analytical regions of the brain (in the prefrontal cortex), the Japanese research participants recorded lower neural activation in this part of the brain when presented with the same pictures.

- People (typically persons from the United States) who exhibited an individualistic cultural orientation to life manifested different neural activation levels in different parts of their brains (as measured by fMRIs) when compared with brain imaging results of persons from East Asia who operated from a collectivist worldview (Blanding, 2010). This latter research finding is supported by the work of Park and Huang (2010), who provide convincing neurological evidence that points to the differential impact of individualistic versus collectivistic cultural worldviews on a person’s brain functioning.

- Significantly more East Asians were found to possess a genetic trait (a short allele in their serotonin transporter gene) that makes them susceptible to depression in comparison with research subjects in the United States. However, Blanding (2010) points out that the support many East Asians commonly experience as a result of being a part of collectivistic cultural groups helps prevent the manifestation of clinical depression during many Eastern Asian persons’ lives.

- When viewing photographs of human faces that express fear, research participants more accurately identified the intended emotion portrayed in the photographs if the faces presented appeared to be persons from their own cultural-racial group. When conducting this study among culturally different persons, the fMRI results of the research participants indicated that the brain system associated with emotional reactivity (the part of the temporal lobes called the superior temporal sulcus) reflected higher levels of neural activation when the research participants were presented with pictures of people from their own cultural-racial group experiencing fear as compared with the neurological reactions that individuals from other cultural-racial groups exhibited when viewing the same photographs.

Our daily cultural interactions lead to certain patterns of neurological responsivity that can be captured in brain imaging procedures. Kitayama and Park (2010) cite research showing that westerners tend to activate the frontal cortex when involved in mathematical calculations, while Chinese and Japanese people exhibit higher activation levels in the parietal regions of the brain when they are engaged in the same cognitive activity. The parietal lobe
is a part of the brain positioned above the occipital lobe and behind the frontal lobe.

The information related to cultural neuroscience presented above has several important implications for the work mental health practitioners do in multicultural counseling and therapy situations. First, although limited in number and scope, the existing research findings that report on the similarities and differences in the neurological functioning of persons from different groups and backgrounds validates much of what the multicultural field has already known: that persons reared in one cultural-racial group experience and process life experiences differently from persons in other cultural-racial groups. Despite this understanding of cultural differences, many practitioners are surprised to learn that people in different cultural-racial groups have different neurological reactions when viewing pictures of persons who physically resemble themselves in comparison with those brain reactions that occur when viewing photographs of persons in other cultural-racial groups.

Needless to say, these differential neurological reactions make the understanding of multicultural issues more complex than previously thought. Among the relevant questions to be posed to practitioners regarding this matter are the following:

1. Are you able to transcend your own cultural biases and conditioning when it comes to understanding why people in diverse cultural-racial groups have different biological reactions to the same environmental situations and stimuli?

2. What are the implications of understanding the cultural basis of these different neurological reactions to the same environment conditions when providing counseling and therapy services among clients from diverse cultural-racial populations?

For practitioners interested in implementing professional services that are informed by neuroscience, it is important to realize that cultural views of the self and others are reflected in similar and different levels of neural activation and in different brain systems depending on a person’s cultural-racial background, conditioning, and lived experiences with others. Cultural neuroscientists have been particularly consistent in describing these neurological differences as measured among persons in diverse cultural groups who adhere to individualistic and collectivist worldviews.

Neurological differences manifested in these areas are not based on multicultural myths but on scientific evidence. With this evidence in mind, we assert the need for practitioners to remain flexible and open to learning new approaches to promoting healthy human development based on the growing empirical knowledge base in cultural neuroscience.

Chapter 3 is designed to expand your thinking of additional cultural issues by emphasizing the importance of recognizing, understanding, and responding to the multidimensionality of multicultural counseling. The multidimensional view of multicultural counseling presented in the next chapter leads practitioners to understand how the interface of clients’ multiple cultural identities and life experiences impacts their psychological development and neurological functioning.

The RESPECTFUL Counseling and Therapy model presented in the following chapter
describes 10 factors that underlie the multidimensionality of multicultural counseling, a concept that is included in the integral theory described in this book. The RESPECTFUL Counseling and Therapy model provides practitioners with a road map that extends practitioners’ thinking about multicultural counseling in ways that include and extend our current understanding of the important psychological and neurological differences that are commonly exhibited by persons in diverse racial-ethnic groups.

This increased understanding is grounded in a more expansive knowledge base related to persons in different religious/spiritual, economic, gender, sexual, and age groups. Many persons in these groups share a common set of life experiences that ensue from various forms of social injustice, oppression, discrimination, marginalization, and devaluation in our contemporary society. All these societal dynamics result in different stressors that adversely impact the mental health, psychological well-being, and neurological functioning of millions of people in marginalized and devalued groups included in the RESPECTFUL Counseling and Therapy framework. Some of these stressors have a traumatic effect on many culturally different clients.

The stressors associated with traumatic life events have a particularly profound effect on the psychological and neurological functioning of persons in culturally diverse groups. Practitioners are increasingly called on to work with clients who suffer from different traumatic experiences that often go unaddressed in counseling and therapy. Unfortunately, many practitioners are not knowledgeable about the psychological or neurological factors that are associated with traumatic stress. This is frequently the case when working with culturally different clients who are traumatized by various forms of injustice, oppression, and discrimination that characterize their lives. The following section is designed to expand your understanding of these issues so that you will be better prepared to effectively address the needs of traumatized clients in culturally competent and responsible ways.

**TRAUMA AND OTHER THREATS TO ONE’S WELL-BEING: MULTICULTURAL AND NEUROLOGICAL CONSIDERATIONS**

Trauma and related threats to individuals’ well-being put many people at risk for psychological and neurological harm. Such harm typically occurs when the life stressors individuals experience exceed their ability to cope in constructive and effective ways. An individual’s personal resources (coping skills, self-esteem, and social support) may be overtaxed when a person is subjected to ongoing environmental stressors over extended periods of time or forced to face a traumatic event that occurs in a short space of time. Persons who experience stressors for extended periods of time or are confronted with immediate traumatic events are vulnerable or at risk for future mental, physical, and/or neurological problems (Lewis, Lewis, Daniels, & D’Andrea, 2011).

Counselors and therapists frequently work with persons in these vulnerable, at-risk groups. This includes providing services to poor, homeless, and unemployed people; adults and children in families undergoing divorce; pregnant teenagers; sexually and physically abused persons; individuals with HIV or AIDS;
persons with cancer; war veterans; and people who are victimized by various forms of ageism, racism, sexism, and other forms of cultural oppression, to name a few.

Heightened, prolonged, and historically based stressors fall within the Societal/Professional and Cultural Community Quadrants of the integral theory presented in this textbook. However, these stressors simultaneously impact factors listed in the Individual Perceptions and Meaning Making Quadrant as well as the Behavioral/Physical/Neurological Quadrant included in this comprehensive theory.

To be effective in their work with these persons, practitioners need to accurately assess the different ways that environmental and historic stressors contribute to the trauma many people experience. This includes being knowledgeable about the ways that intergenerational trauma may contribute to the psychological, behavioral, and neurological problems many persons from various cultural/racial groups experience.

Duran (2006) writes extensively about the adverse psychological impact of this cultural phenomenon. In doing so, he refers to intergenerational trauma as a soul wound. The integral-minded practitioner who understands the complex nature of the soul wound and the significant ways that it contributes to the psychological and spiritual problems many Native American Indians experience today is cognizant of how it affects several factors associated with all four of the quadrants that compose the integral theory discussed in this book.

A soul wound adversely impacts the lives of many other people who are members of cultural groups that are subjected to various forms of violence, injustice, and oppression. This includes many persons of African descent, sexually abused women and children, gay/lesbian/bisexual/transgender persons subjected to personal attacks and collective discrimination, and other persons exposed to various forms of abuse and violence in their lives (Lewis, Lewis, et al., 2011).

Neuroscientists have expanded our understanding of trauma from a Behavioral/Physical/Neurological Quadrant perspective. One of the most comprehensive descriptions of the neurological changes that occur when people experience trauma comes from the work of Jonsson (2009). Commenting on the neurological processes that are linked to traumatic experiences, Jonsson points out that

When a person experiences a traumatic situation or ongoing forms of trauma, the amygdala and hypothalamus activate fight, flight, or freeze responses to such events. When this occurs, these brain parts overcome the normal functioning of the frontal lobe.

The frontal lobe is the part of the brain where our consciousness lives and rational thinking occurs as well as the location that enables us to link new and old experiences and exhibit the capacity to react to situations calmly and with forethought. When a person is traumatized, the level of activation in her or his amygdala and hypothalamus is high enough to interfere with the normal functioning of the frontal lobe. This set of neurological events results in heightened fight, flight, or freeze responses that are accompanied by extreme emotional reactions (e.g., heightened fear, anger, depression, apathy, etc.), which the traumatized person is not fully conscious of as he or she exhibits an increase of irrational thinking and a lack of ability to respond calmly and intentionally to various life events. (p. 450)
Among the treatment strategies Jonsson (2009) found useful in reducing the activation of the amygdala and hypothalamus while simultaneously increasing the activity of the frontal lobe to facilitate traumatic healing is the use of cognitive-behavioral techniques and eye movement desensitization and reprocessing (EMDR) therapy.

EMDR is a neurologically based therapy approach that was developed to resolve symptoms resulting from traumatic events and other disturbing and unresolved life experiences. Practitioners who utilize EMDR with traumatized clients implement a structured format to address past, present, and future aspects of the client’s disturbing and traumatic memories. This therapeutic model was developed by Francine Shapiro (1995, 2001) to resolve trauma-related disorders resulting from a person’s exposure to extremely distressing events, such as rape or negative experiences in military combat.

Clinical trials have been conducted to assess EMDR’s efficacy in the treatment of posttraumatic stress disorder. Research findings revealed consistent positive outcomes when practitioners used EMDR in clinical settings. The accumulation of these positive research findings has resulted in this theoretical model being listed as an evidence-supported therapy (Societal/Professional Quadrant intervention strategies; American Psychiatric Association, 2004; U.S. Department of Veteran Affairs and Department of Defense, 2004).

Neuroscientists will predictably uncover additional biological factors that underlie the onset of psychological trauma as well as new counseling and therapy interventions that are effective in addressing this complex psychological health problem. Advances in these areas will not only result in increased efficacy in treating persons suffering from a broad range of trauma-based disorders but will also increase the use of new empirically supported interventions among persons in diverse cultural groups that are suffering from stress-induced problems (Individual Perceptions and Meaning Making Quadrant, Behavioral/Physical/Neurological Quadrant, Cultural Community Quadrant, and Societal/Professional Quadrant considerations).

It is suggested that prevention services in general and social justice advocacy intervention strategies in particular are likely to be among the specific interventions that will be supported by future multicultural and neuroscientific research findings (D’Andrea & Foster Heckman, 2008). Among the social justice counseling and advocacy areas that researchers are encouraged to study from a neurological perspective are future investigations that study why it is important that our children

- have enough nutritious food to eat,
- have access to good schools in which to learn,
- receive consistent love and guidance from their parents,
- are able to live and play in safe communities, and
- are the direct beneficiaries of public policies that support holistic and integral approaches to healthy human development from a neurological perspective.

Stressors that are linked to the various forms of racism, sexism, heterosexism, ageism, ableism, and other social injustices that continue to be perpetuated in our society represent
additional areas that beg for the attention of neuroscientists and practitioners alike. In this regard, it is noted that many practitioners have become more knowledgeable of the damaging effects of cortisol (the stress-related steroid hormone that suppresses the immune system) and the implications of this neuroscientific finding for counseling and therapy.

Given the relevance and utility of the new knowledge that has been generated from neurological research findings, it is predicted that research in the areas described above will indeed expand in the future (D’Andrea & Foster Heckman, 2008). The new knowledge that will be generated from such endeavors will undoubtedly help increase the efficacy of the work practitioners do in the field. It will also be helpful in building a more just and healthier society in the process.

**SUMMARY**

This chapter invites you to explore numerous issues related to the neuroscience revolution that is unfolding in the mental health professions. To increase your understanding of this important force, we present information that is aimed at expanding your knowledge of the roles that neurotransmitters and different brain systems play in human development. To further expand your knowledge base in these areas, we describe the types of counseling and therapy skills, interventions, and theories that researchers have described as being effective in stimulating the optimal production and release of neurotransmitters in various brain systems.

One of the competency-building activities included in this chapter assists you in assessing your current level of interest, support, and/or resistance to the neuroscience force in the mental health professions. Another competency-building activity helps you assess your ability to implement services that reflect a holistic, integral, and neurologically grounded approach to counseling and psychotherapy. This latter competency-building activity also encourages you to consider ways that you can develop new knowledge and skills to more effectively implement such services in the future.

The mental health professions will greatly benefit as the neuroscience revolution continues to expand to new and uncharted areas. Future research findings generated in the subfield of cultural neuroscience will be particularly helpful in advancing practitioners’ understanding of the relevance of brain science for the work they do in a culturally diverse society.

The next chapter will expand your understanding of the multidimensionality of multicultural counseling and therapy. Specific multicultural competencies and interventions are described in Chapter 3. Learning about these competencies and interventions will lead you to think in new ways about the important roles practitioners can play in making a more positive impact on the psychological and neurological well-being of larger numbers of persons from diverse and marginalized groups than has been accomplished in the past.

**Learning From the DVD That Accompanies This Textbook**

The Chapter 2 video clip that is included on the DVD that accompanies this textbook
provides an overview of some of the key points related to the neuroscience revolution that is emerging in the mental health professions. You can also access a podcast that summarizes information presented in Chapter 2 by going to www.sagepub.com/ivey7e. Both the video and podcast represent additional resources that are designed to assist you in synthesizing the new knowledge you have acquired as a result of reading Chapter 2 and completing the competency-building activities included in this chapter.