Neuroscience for Counselors: Recommendations for Developing and Teaching a Graduate Course

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In recent decades, professional counselors have increasingly focused on neuroscience to inform their case conceptualization and treatment planning with clients. With the additional lens of neuroscience, both the counselor and client can gain new understandings of the client's issues and improve the quality of the therapeutic relationship. The benefits of integrating neuroscience into the profession of counseling (i.e., neuroscience-informed counseling) are being documented in the scholarly literature; however, information on integrating neuroscience-informed counseling into the counselor education curriculum is sparse. This article describes one teaching approach for a neuroscience-informed counseling course. The structure of the course, methods for effective instruction, and ethical and cultural considerations are discussed.

Keywords: **neuroscience, counselor education, teaching, neuroscience-informed, instruction**

Neuroscience-informed counseling is a growing force in the counseling profession (Beeson & Field, 2017). The integration of neuroscience into the profession of counseling has been evident over the past two decades. Examples include the development of neuroscience interest networks by the American Counseling Association (ACA), the American Mental Health Counselors Association (AMHCA), and the Association for Counselor Education and Supervision (ACES). There have been numerous books published that focus on neuroscience for counselors (Field, Jones, & Russell-Chapin, 2017; Luke, 2019) and an increased amount of scholarly literature focused on integrating neuroscience into counseling practice (Beeson & Field, 2017; Lorelle & Michel, 2017; Luke, Redekop, & Jones, 2018; Makinson & Young, 2012; Miller, 2016; Myers & Young, 2012).

Neuroscience is the study of the brain and nervous system (Kalat, 2019). *Neuroscience-informed counseling* involves integrating principles from the structure and function of the brain and nervous system to counseling practice (Russell-Chapin, 2016). This integrative work in counseling is being used to treat behavioral and mental health challenges (Field et al., 2017). According to Beeson and Field (2017), *neurocounseling* is a

> specialty within the counseling field, defined as the art and science of integrating neuroscience principles related to the nervous system and physiological processes underlying all human functioning into the practice of counseling for the purpose of enhancing clinical effectiveness in the screening and diagnosis of physiological functioning and mental disorders, treatment planning and delivery, evaluation of outcomes, and wellness promotion. (p. 74)

Three methods for integrating neuroscience into the counseling profession have been identified in the scholarly literature, including neuroeducation (Fishbane, 2013), neurofeedback (Myers & Young, 2012), and the use of a metaphor-based approach (Luke, 2016).

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The first method, *neuroeducation*, is defined by Miller (2016) as "a didactic or experiential-based intervention that aims to reduce client distress and improve client outcome by helping clients understand the neurological processes underlying mental functioning" (p. 105). Neuroeducation is essentially psychoeducation about the brain and nervous system. Neuroeducation can be used as an intervention to help clients understand the neurological processes that underlie their symptoms and development (Miller, 2016). Miller described various methods for integrating neuroeducation into counseling practice through the use of information on neuroplasticity, brain structures and functions, and memories.

Plasticity is an object's or organism's ability to stretch and to be resilient. As applied to the brain and central nervous system, this is called neuroplasticity or neural plasticity, and involves "changes in the activity and connectivity of the various circuits within the nervous system [that] enable learning, encode memory, and drive behavior" (Li, Park, Zhong, & Chen, 2019, p. 44). Information on neuroplasticity and self-defeating patterns of thought and behavior may help demystify change processes.

Informing clients about the various brain structures and functions (e.g., brain stem, limbic, and cortical regions) can help with understanding the brain from a developmental perspective—that the brain is built to change and to be resilient (Luke, 2019). Educating clients about how their memories are encoded, stored, and accessed, drawn from the groundbreaking work of Eric Kandel (1976), can help clients gain a better understanding of their own brain and behavior (Miller, 2016). This knowledge can instill hope that although events of the past cannot be changed, the meaning of the memories associated with those events can be changed (Sweatt, 2016). Furthermore, the relational context in which change takes place can help clients' brains overwrite rigid rules and threats about relationships learned from earlier dysfunctional relationships (Kandel, Dudai, & Mayford, 2014; Schore, 2010; Siegel, 2015).

A second method, *neurofeedback*, has been recognized as an effective treatment for reducing symptoms of various mental health concerns (Russell-Chapin, 2016). A specialized form of biofeedback, neurofeedback changes brain wave patterns to aid in the treatment of conditions such as attention-deficit/hyperactivity disorder, anxiety, depression, addiction, trauma, autism spectrum disorders, and personality disorders (Russell-Chapin, 2016). Neurofeedback is just one method that counselors can use with clients to help them understand and change the function of their brains. Additional examples include basic biofeedback tools and methods like those found on many "smart" watches and fitness trackers.

The third method for integrating neuroscience-informed counseling is described by Michael and Luke (2016) as using a *metaphor-based approach* to teaching the neuroscience of play therapy. This approach is an extension and application of that described in Luke (2016), wherein neuroscience concepts are used both as metaphors for the human experience, as well as understanding brain function. Tay (2017a) has identified the therapeutic value of metaphor and its utility in understanding language and the body. Relatedly, the practices of mindfulness and meditation often use imagery, a form of metaphor, to engage practitioners in engaging more fully in the experience (Tang, Hölzel, & Posner, 2015). As neuroscience-informed counseling continues to become integrated into the work of professional counselors, counselor educators must adapt in order to keep their coursework relevant.

Counselor Education and Neuroscience-Informed Counseling

Beeson and Field (2017), along with others (Field et al., 2017; Luke, 2017; Miller, 2016) have called for more training for counselors who seek to integrate neuroscience into their practice. They also have

identified the challenges associated with infusing neuroscience into counseling courses. The Council for Accreditation of Counseling and Related Educational Programs (CACREP; 2015) standards now require competency in "the biological, neurological, and physiological factors that affect human development, functioning, and behavior" (p. 10). CACREP standards, along with growing momentum in the field, support the development of a course designed specifically for integrating neuroscience for counselors. The AMHCA clinical training standards include recommendations for competence in understanding and applying the biological bases of behavior. The AMHCA standards outline basic knowledge and skills, which include integrating research into practice, as well as clinical interventions.

Field et al. (2017) laid a foundation for incorporating neuroscience-informed counseling across the CACREP curriculum. This approach addresses neuroscience in pre-existent courses, yet there is limited availability of literature on how to teach a graduate content course in neuroscience-informed counseling. In the absence of established models for teaching a course in neuroscience-informed counseling, counselor educators and others can feel at a loss for how to proceed. The purpose of this article is to provide recommendations for developing a neuroscience-informed counseling course designed for graduate students. This includes the course structure (e.g., content and resources), methods for effective instruction (e.g., teaching approach and assignments), and ethical considerations.

Course Structure: Content and Resources

The Neuroscience for Counselors course builds on prior core counseling courses, including counseling theories and the fundamentals of counseling. As such, it represents an extension of counseling theory and fundamentals and is not intended to be a substitute or replacement. Neuroscience-informed counseling explores how different counseling theories and interventions influence and change neurobiology and help facilitate client wellness.

The Neuroscience for Counselors course was offered to master's students enrolled in a CACREP-accredited counseling program at a mid-size university in the northeast region of the United States. The course was offered as an elective that fulfilled three graduate credits toward degree completion. The course was designed as an introduction to neuroscience research and clinical interventions for counselors. Specific attention was given to reviewing the structures, systems, and functions of the brain. Psychodynamic, behavioral, humanistic, and constructivist counseling theories were explored in relation to neuroscience research. The neuroscience of mental health disorders, such as anxiety, depression, stress, and addictions and substance use, were explored.

Course assignments included developing a neuroscience-informed guided metaphor; completing a brain resource book on structures, systems, and functions; dyads to practice using neuroscience-informed counseling interventions; reflection in a neuroscience process analysis log (N-PAL); and activities exploring neuroscience-informed technology. A final paper included a case conceptualization based on the 8-factor meta-model (Luke, 2017, 2019) of case conceptualization to explore their client's presenting concerns.

The assigned textbook for this course was Luke's (2016) *Neuroscience for Counselors and Therapists: Integrating the Sciences of Mind and Brain*, which focuses on client conceptualization, brain anatomy, various theoretical approaches, and an array of commonly diagnosed mental health concerns. The text also provides case vignettes highlighting how a student might use neuroscience-informed counseling interventions with a diverse population of clients. The first chapter of the text discusses ethical and philosophical issues related to integration. Chapter 2 presents an overview of the basic brain structures,

systems, and functions, including neurons and synapses. Chapters 3 through 6 cover the major categories of counseling theories: psychodynamic, cognitive-behavioral, humanistic-existential, and postmodern and constructivist. Chapters 7 through 10 describe conceptualizing and treating anxiety, depression, stress-related disorders, and substance use disorders. The text is written for counselors and counselors-in-training who have little or no background in the physiological bases of behavioral and mental health concerns.

The course instructor provided supplemental material, including magazine articles, peer-reviewed journal publications, apps, videos, websites, and links to neuroscience interest networks. For example, students were provided a link to the Neuroscience News website, which is an independent science news website that offers free cognitive science research papers, neuroscience resources, and a science social network. Also included were links to the Dana Foundation, an organization that supports brain research via grants, publications, and education, and the ACA's Neurocounseling Interest Network. The supplemental material was selected as a method to broaden student understanding and support knowledge acquisition in neuroscience.

Methods: Teaching Approach and Assignments

Experiential education is not a new approach in higher education. Educational psychologists in the past, such as John Dewey (1938), Carl Rogers (1969), and David Kolb (1984), have laid the groundwork for the development of contemporary experiential education. Kolb (1984) defined *learning* as "the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience" (p. 41). The Association for Experiential Education (AEE; 2019a) defined *experiential education* as a teaching philosophy "in which educators purposefully engage with learners in direct experience and focused reflection in order to increase knowledge, develop skills, clarify values, and develop people's capacity to contribute to their communities" (para. 1). In essence, experiential education is the process of learning through experience *and* reflection.

Methods of instruction in the Neuroscience for Counselors course were consistent with the 12 principles of practice outlined by the AEE (2019b). For example, class assignments provided students with the opportunity for reflection, critical thinking, and personal application. The instructor's teaching roles included "setting suitable experiences, posing problems, setting boundaries, supporting learners, insuring physical and emotional safety, and facilitating the learning process" (AEE, 2019b, para. 9). Sakofs (2001) cautioned that experiential activities can be misused by educators as a form of entertainment with no real educational value. The following six assignments were designed with the intention to deepen students' understanding of neuroscience concepts as they relate to the profession of counseling.

Six Neuroscience Course Assignments

Developing a neuroscience-informed guided metaphor. Historically, neuroscience has been considered the realm of the medical professional or psychiatrist who has studied the complex inner workings of the brain. Developing a neuroscience-informed guided metaphor provides counseling students the experiential opportunity of taking an unfamiliar concept or idea (i.e., using neuroscience-informed counseling) and making it more accessible by relating it to ideas they are already familiar with (Jamrozik, McQuire, Cardillo, & Chatterjee, 2016; Lawson, 2005). For this assignment, students were assigned to read the article "The Birth of the Neuro-counselor?" (Montes, 2013), in which the term *neurocounselor* was first used. The article introduces and encourages students to begin thinking about what it means to use neuroscience-informed counseling in practice and how it influences their professional identity as a counselor.

After reading the article, students illustrated a guided metaphor that could be used to inform their model of neuroscience-informed counseling practice. Students were provided with the prompt, "Neuroscience-informed counseling is _____" and then asked to fill in the blank with a noun. Students included a paragraph explaining their choice in metaphor and how they came to make that decision. Students were asked to share their metaphors with their peers in class. A student's illustration could be a visual representation, in writing, or a combination of both. *Metaphor* is, simply put, the practice of describing one thing in terms of another (Tay, 2017b). More specifically, the use of metaphor increases understanding of a less well-understood concept or idea by describing it in terms of something that is better understood. In the assignment described above, students generated metaphors such as "neuroscience-informed counseling is the first mission to the moon," "neuroscience-informed counseling is a penlight in a dark maze," and "neuroscience-informed counseling is a puzzle" to be solved. Lawson (2005) extolled the virtues of metaphors in counseling, noting that they "can help the counselor connect to the client's world" (p. 135). The use of neuroscience metaphors, whether generated by the client or the counselor, can aid in promoting empathy and therefore trust (Luke, 2017) and can aid in learning neuroscience concepts (Michael & Luke, 2016). For example, in the wildly popular "I Had a Black Dog, His Name Was Depression" World Health Organization video on YouTube (over 9 million views as of this writing), depression is compared to a black dog that affects every facet of an individual's life (World Health Organization, 2012). The metaphor works by comparing an abstract concept like depression with something concrete like a black dog. It enables the client to experience their depression as something happening to them, not emerging from their core self. When incorporated with relevant neuroscience information, the metaphor takes on increased significance. This black dog hijacks a person's will, leaving them with diminished options for meaningful action.

Developing metaphors for the counselor's roles when using neuroscience-informed counseling can clarify and strengthen counselor identity. When introducing this assignment, it is important to note that neuroscience-informed counseling is not its own therapeutic orientation. Whereas many graduate counseling programs have courses focused on advanced therapeutic orientations, such as solution-focused therapy or motivational interviewing, a course in neuroscience for counselors can strengthen a counselor's current theoretical framework (Luke, 2017). For example, counselors practicing cognitive behavior therapy who learn about Hebb's rule (1949), which states that "neurons that fire together wire together," along with the concept of neuroplasticity, have another avenue of support for clients working to make positive behavioral changes. In this example, neuroscience can help the client gain awareness of the neurological structures that reinforce their behavior and also provide hard evidence that change is possible (Li et al., 2019). Neuroscience-informed counseling is one of many tools in the counselor toolbox. In addition to conceptualizing neuroscience-informed counseling as part of their professional identity, students also learn content knowledge of the brain's structures, systems, and functions.

Brain structures, systems, and functions book. This assignment required students to research the basic structures, systems, and functions of the human brain and design their own book. The instructor provided students black and white images of various structures of the brain discussed in the class textbook. Images included lateral and dorsal views of the brain, the two hemispheres of the brain, the three divisions of the brain (i.e., forebrain, midbrain, and hindbrain), the four lobes of the brain (i.e., frontal, temporal, occipital, and parietal), the anatomy of a neuron, and a stem chart of the nervous system tasks, including the sympathetic and parasympathetic nervous system functions. This approach is supported by works such as the Wammes, Meade, and Fernandes (2016) investigation of the neural processes of storing and retrieving memory. The authors found that drawing important words and phrases improves one's ability to remember important concepts. Students were asked to use various mediums, including colored pencils, crayons, and markers, to label and highlight the

different neuroanatomy. Students also were asked to use their class textbook to write descriptions of the functions of these parts of the brain within their assignment.

Mental health diagnoses can be intimidating for clients, as can the symptoms of a disorder. Anchoring a client's experience in their neurobiology can increase their understanding of what is happening. Basic neuroscience information can empower them to learn more about, and in some ways objectify, their experience. In other words, knowledge of the underlying brain function can encourage clients to reflect on mind and body and how they interact. For example, depression is a result of brain function, but the choices an individual makes in response can be a function of the mind. In practice, clients can be led through the process of identifying brain function and mind function.

The brain structures, systems, and functions book assignment helps to empower students by providing them with the language and imagery surrounding neuroanatomy. Once counselors feel confident in their knowledge of basic brain regions and systems they can use it to empower clients by providing them a physiological explanation of their experiences. For example, knowledge about the autonomic nervous system can help a client struggling with generalized anxiety disorder. According to the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; American Psychiatric Association, 2013), generalized anxiety disorder is characterized by excessive anxiety and worry that is difficult to control, with symptoms that might include restlessness, feeling on edge, being easily fatigued, difficulty with concentration, muscle tension, and sleep disruptions. Clients struggling with generalized anxiety disorder can feel as if they are in a constant state of emergency. Understanding how the sympathetic nervous system prepares the body for emergencies can help a client understand what they are experiencing at a physiological level. This can make them more receptive to interventions that activate their parasympathetic nervous system functions and move them from "fight or flight" to "rest and digest." Once students in the course obtained content knowledge regarding the brain's structures, systems, and functions, they applied that knowledge in dyads.

Dyads. Experiential learning takes careful planning, structuring of lessons, and intentionality in teaching practices (AEE, 2019). Experiential activities such as dyads can help students learn the material through the act of "doing." Tollerud and Vernon (2011) described the benefits of experiential learning as "promoting interest in a topic, supporting student retention of the material, and involving students in their education" (p. 285).

Luke (2017) outlined neuroscience concepts that can be used as interventions with clients (e.g., memory systems, Hebb's rule, left and right brain processing, mirror neurons, attention, and mindfulness). In the neuroscience course, students practiced discussing neuroscience concepts in dyads where they took turns acting as counselor and client. The neuroscience concepts coincided with Chapters 3–10 in the textbook. This provided practice for students using the neuroscience concepts with specific theoretical approaches (e.g., contemporary psychodynamic, behavioral approaches, humanistic approaches, and constructivist approaches), but also could align with a particular mental health diagnosis (e.g., anxiety, depression, stress disorders, and substance use disorders). For example, discussion about Hebb's rule may apply to counselors working from a behavioral approach or counselors working with clients struggling with specific issues such as substance use.

The instructor provided a dyad prompt for students relating to the chapter material for that class session. For instance, the prompt for Chapter 3, Contemporary Psychodynamic Approaches and Neuroscience, was, "Tell me more about your early memories pertaining to key relationships (i.e., parents, siblings, guardians)" and "How do you feel these early memories influence your key

relationships today?" The discussion prompt provided the student counselor an avenue to discuss the neuroscience concepts identified in the chapter (i.e., relationships in the brain/interpersonal neurobiology, consciousness, and memory systems) with their mock client. Students were graded on their ability to use the neuro-concepts and attend to their fundamental counseling skills (e.g., unconditional positive regard and empathy).

The dyad activities also highlight the positive benefits of right hemisphere to right hemisphere connections validated through neuroscience. According to Badenoch (2008), right hemisphere to right hemisphere connections are at the root of change, as interpersonal connections are rooted in the neural processes of the right hemisphere. Practicing mock counseling sessions provides students the opportunity to develop healthy relationships with their peers in class. This experience can later become a parallel process by which they use the positive experience in class with their future clients.

In counseling, two approaches parallel the class experience. In the first, counselors can apply the same material described above with their clients, using process-based psychoeducation. For example, the counselor can present information on the neurobiology and role of early memories, relationships (past and present), and consciousness/unconsciousness in the client's depression. They can then ask the questions described above directly to the client. The second approach involves a Gestalt technique wherein the client's depression, their brain, and the client themselves all sit together in the room. The client is guided through a discussion with these constituent parts in order to better understand the role that each plays in the living of the client's life. As students completed each dyad, a system was created for them to reflect on their experience as described below.

The N-PAL (Neuroscience-Personal Analysis Log). According to Faiver, Brennan, and Britton (2012), the purpose of a personal analysis log (PAL) "is to help students track their progress over the semester in terms of self-awareness and comfort level with the counseling process" (pp. 292–293). Students completed nine neuroscience personal analysis logs (N-PALS) throughout the course. Entries were made in class after each dyad. Students were given the opportunity to analyze and express their feelings in relation to the dyad activities and course material. The purpose of the N-PAL was to help students reflect on their counseling work while integrating neuroscience concepts into the mock counseling sessions with their classmates.

N-PALs consisted of five questions: (a) On a scale from 1–10, how confident do you feel applying the assigned theoretical approach for this dyad? (b) On a scale from 1–10, how confident did you feel using neuroscience concepts in this dyad? (c) What were some new areas of growth and development during this dyad? (d) Assess your own performance during this dyad and provide specific examples, and (e) What is your reaction to the course material (i.e., assigned reading, class lecture, videos, discussion)? The N-PAL's structure is consistent with the experiential education principle, which states that experiences are structured to require the learner to take initiative and make decisions and be accountable for results (AEE, 2019). The questions were developed to encourage students to reflect on their dyadic experiences and think critically about their neuroscience-informed interventions while being held accountable for areas of growth and development.

Exploring neuroscience-informed technology. With the increased focus on neuroscience in popular culture and media, there has been an influx of new neuroscience-informed technology. Students were asked to find three technological tools that could inform their neuroscience-informed clinical work. The tools were to fall into three distinct categories: one app (e.g., mindfulness, anxiety, or brain information app), one video (e.g., YouTube, TedTalk), and one technological application (e.g., pulse oximeter,

biofeedback equipment, EEG reader). After identifying the neuroscience-informed technology tools, students posted on an online discussion board describing how they would use their identified tools in a counseling session.

There is an abundance of neuroscience-informed technology on the market today. Counselors recommending meditation apps or assorted TedTalks to their clients may be using this technology without awareness of their neuroscientific implications. Counselors do not have to work from memory alone but can take advantage of the growing number of resources available today (e.g., journal articles, books, apps, videos). Counselors who take advantage of resources also must be savvy consumers. For example, prior to recommending apps or videos to clients with neuroscience-related material, counselors should check the source to confirm it is reputable and use the material themselves. Whereas the neuroscience-informed technology discussion post helped to build awareness of technological tools, the final case conceptualization paper served to showcase the content students gained throughout the course.

Case conceptualization. As a summative assignment, students completed a three-part case write-up that demonstrated their ability to conceptualize client issues and apply neuroscience-informed interventions. The instructor provided students with a fictional client case vignette, including biopsychosocial information. The first part of the assignment required students to use an 8-factor meta-model (Luke, 2017, 2019) to conceptualize their client's case. This 8-factor model is a holistic model identifying eight components that every counselor must consider when working with clients: thoughts, feelings, behaviors, environments, experiences, biology and genetics, relationships, and the socio-cultural context in which the client lives.

Students were asked to include neuro-concepts in their discussion of each of the factors. For example, if the student identified that the client was experiencing anxious thoughts, they would include a description of how the amygdala modulates the client's reactions to events perceived as dangerous or scary. This part of the assignment demonstrated the counseling student's mastery of case conceptualization in conjunction with their understanding of how neuroscience concepts can influence the client's symptoms.

The second part required students to review their conceptualization and write a phenomenological description of the client across the eight factors of the model. A phenomenological description provides an opportunity for students to consider, beyond the prescribed clinical note, what it might be like to "walk in this client's shoes." Writing a phenomenological description uses right-brain processing skills of creativity and intuitiveness. Although the description is the student's interpretation of the client's experience, the exercise can strengthen skills in empathic awareness and creative thinking. Thinking about the phenomenology of a client (i.e., what would it be like to walk in the client's shoes?) can deepen therapeutic rapport, strengthen conceptualization skills, and help build empathy.

The third part of the assignment was for students to select a theoretical approach, along with a rationale for their choice, and create a transcript of a session with the client. The transcript had to include a brain-based counseling intervention (e.g., discussion about Hebb's rule, neuroplasticity, or memory storage). Neuroscience is an essential tool for helping clients understand what is happening to them. For example, a client who has suffered a trauma and is struggling to understand why they cannot remember events clearly may find respite in knowledge regarding how traumatic memories are stored in their brain. Knowledge about neuroscience can help normalize and validate clients' experiences.

In summary, six assignments were described above: neuroscience-informed guided metaphor; brain systems, structures, and functions book; dyads; the N-PAL; exploring neuroscience-informed technology; and a case conceptualization paper. The assignments were developed to build students' understanding of the material and improve their ability to integrate neuroscience into their case conceptualization, treatment planning, and counseling skills. With the growth of neuroscience integration into the counseling profession, best practice dictates that ethical and cultural considerations are addressed.

Ethical Considerations

With nascent developments in the counseling profession, such as neuroscience-informed counseling, come potential risks to clients' well-being. The ACA *Code of Ethics* (2014) states that "Counselors practice only within the boundaries of their competence, based on their education, training, supervised experience, state and national professional credentials, and appropriate professional experience" (Standard C.2.a). Scholarly literature has recognized the need for professional counselors to work within their scope of practice (Luke, 2019). As the counseling profession continues to integrate neuroscience into practice, the boundaries of that practice are not always clear. For instance, at what level of integration must counselors be educated in neuroscience explicitly? Who governs the practice of integration and ensures that counselors are following best practice, especially when best practice has not been established?

Each of the three areas described above—neuroeducation, neurofeedback, and metaphor—present distinct ethical challenges. Neuroeducation, like psychoeducation, can become too didactic and place counselors in the role of content expert, as opposed to process expert. It may be easy for counselors to share brain information with their clients, becoming dependent on sharing facts instead of sharing a process. Studies have demonstrated the potential for harm in the helping relationship when clients view helpers as aloof related to neuro-speak, as clients may feel powerless to change their neurobiology (Kim, Ahn, Johnson, & Knobe, 2016; Lebowitz & Ahn, 2014).

Neurofeedback can require advanced knowledge in technological interventions. For example, neurofeedback often requires the use of technological equipment to read and equalize brainwave activity. The Biofeedback Certification International Alliance (n.d.) offers a training program specifically for neurofeedback certification. With certification comes a level of oversight and guidance that promotes proper training of practitioners. However, certification is not a legal requirement to use neurofeedback in counseling practice. Therefore, what is a counselor's ethical responsibility to acquire education in the use of neurofeedback equipment with clients? How much education is enough to be considered competent? Also, in terms of counselor identity, can neurofeedback be considered counseling or is it an adjunct to counseling?

Given these concerns, the use of metaphor may be a reasonable middle ground wherein counselors are still integrating neuroscience into counseling, but not to the extent that it becomes something different. The use of metaphor is less about teaching clients and more about coming to a mutual understanding of the client's experience using terms that make sense and matter to the client (Tay, 2012). However, this approach requires the counselor to understand brain function and to stay current in the literature to ensure that the metaphor is accurate and apropos to the client situation. For example, memory has been likened to a video recording of events, yet the function of memory has been demonstrated as far more constructed than a recording of facts. In this case, memory is more like a movie wherein the recordings have been edited to tell the story

based on the movie-maker's experience and desire. It is imperative for professional counselors to consider standards of ethical practice in order to meet the ethical principles of beneficence and nonmaleficence. Similarly, counselors also have a responsibility to be aware of cultural considerations when integrating neuroscience into their counseling practice.

Cultural Considerations

There is a power differential in the therapeutic relationship, in part because of the needs and vulnerabilities that can accompany clients when seeking counseling. Clients might feel disempowered in the counseling relationship because of intersections of race, gender, age, spirituality, and social and economic status (Ratts, Singh, Nassar-McMillan, Butler, & McCullough, 2016). In addition, if counselors use language about the brain that may be perceived as intimidating or unsafe by clients, it could harm the therapeutic relationship. Integrating neuroscience into the counseling profession requires counselors to develop self-awareness surrounding neuroscience terminology and power inequalities in the counseling relationship. It is vital for counselor educators to consider the ethical and cultural implications of teaching a neuroscience-informed counseling course in order to help students learn how to facilitate a therapeutic environment where clients feel safe to process their experiences.

Conclusion

Given the benefits of neuroscience-informed counseling to treat behavioral and mental health concerns, counselor educators must begin to integrate neuroscience-informed counseling into the curriculum. Developing a neuroscience for counselors course using the aforementioned recommendations for course structure and methods for instruction is one approach to meeting this need. Assignments included a neuroscience-informed guided metaphor; development of a brain structures, systems, and functions book; dyads to practice using neuroscience-informed counseling interventions; N-PALs for reflection; a neuroscience-informed technology discussion post; and a summative case conceptualization paper. Integrating neuroscience-informed counseling into the counseling curriculum, while simultaneously addressing ethical and cultural considerations, has the potential to improve graduate students' case conceptualizations, treatment planning, and counseling skills.

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