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In recent decades, neuroscience research has provided consistent evidence that counseling and psychotherapy alter the brain in prosocial and adaptive ways. An evolving understanding of the neurobiological basis of psychological processes has led to a push for the integration of neuroscientific findings into the counseling field. Trauma treatment is an emerging focus of clinical practice that has received growing attention within the counseling literature and is an area that is heavily influenced by neuroscientific research. It is known that traumatic experiences negatively impact the nervous system in contrast to how counseling has been proven to impact the brain and nervous system in positive, prosocial ways. Through effective counseling, trauma survivors may be able to heal the deleterious impacts on the nervous system caused by traumatic experiences. An exploration of how counselors are learning to integrate neuroscience into clinical practice, particularly in the treatment of trauma, would shed light on the effectiveness and practicality of relevant neuroscience knowledge, competencies, and strategies.

At the macrosystemic level, to remain current as a mental health profession, the counseling field must keep abreast of current trends and integrate neuroscientific research findings into clinical practice, training, research, and clinical supervision. However, to date, it is unclear how counselors are gaining knowledge of neuroscientific principles and emerging research as well as if and how this information is being applied to clinical settings. The purpose of the current study was to explore the experiences of practicing neuro-informed counselors regarding their training in neuroscientific concepts and implementation of neuroscience-related concepts into their work with trauma survivors. The study sought to understand how practicing

counselors gain access to training in neuro-informed counseling, the perceived efficacy of trainings, as well as any barriers they face to receiving appropriate training. Further, this study explored if and how these counselors are integrating neuroscientific concepts into their clinical practice, their conceptualizations of the neurophysiological impact of trauma on survivors, and which neuroscientific concepts counselors find most relevant and impactful in their clinical work. The study sought to begin bridging the gap between hard neuroscience research and application into counselor training and clinical work.

EXPLORING COUNSELORS LEARNING AND APPLICATION OF NEUROSCIENCE IN  
CLINICAL TRAUMA PRACTICE

by

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## CHAPTER I: INTRODUCTION

In recent decades, neuroscience research has provided consistent evidence that counseling and psychotherapy alter the brain in prosocial and adaptive ways (Gonçalves & Perrone-McGovern, 2014; Karlsson, 2011; Penadés et al., 2013). An evolving understanding of the neurobiological basis of psychological processes has led to a push for the integration of neuroscientific findings into the counseling field (Beeson & Field, 2017; Gonçalves & Perrone-McGovern, 2014; Myers & Young, 2012; Russell-Chapin, 2016). Some consider neuroscience to be the “fifth-force” in the counseling field (D’Andrea, 2012; McHenry et al., 2014), with relevant neuroscientific findings becoming the “practice standards of the future” (Myers & Young, 2012, p. 21). The 1990s were designated *the decade of the brain* by United States Congress (LOC, 2022). During this decade, a boom in neuroscientific research, technology, and imaging allowed for understanding the brain as more complex than was previously imaginable (LOC, 2022; Miller, 2016). Following these technological advances came the push to integrate neuroscientific findings into the fields of mental health, including counseling.

In 2008, the federal government further shaped the future of the helping professions when the National Institute of Mental Health (NIMH) established the Research Domain Criteria (RDoC) as a framework for including neuroscientific findings within the investigation of mental disorders (NIMH, n.d.). In 2013, President Barack Obama created the *Brain Research through Advancing Innovative Neurotechnologies (BRAIN)* within the National Institutes of Health (NIH) to “accelerate the development and application of new technologies that will enable researchers to produce dynamic pictures of the brain that show how individual brain cells and complex neural circuits interact at the speed of thought” (NIH, 2014). These evolutions highlight the push towards an increasingly brain-based mental health model. Research in allied fields, including

counseling psychology (Godd & Parnell, 2107; Goss, 2016), education (Goswami, 2006; Howard-Jones, 2014; Simmonds, 2014), psychiatry (Cookey et al., 2018), and social work (Egan et al., 2011) indicates a broad push for the integration of neuroscience into research, practice, and education. These parallel helping professions all recognize the importance of neuroscience integration but are lacking clarity regarding how to implement it effectively and consistently into training and practice. As such, it is imperative that members of the counseling profession take steps to integrate neuroscience into counseling training, research, and practice to remain at the forefront of emerging knowledge.

Reflecting this need, from 2013 to 2015, neuroscience interest networks were established within the Association for Counselor Education and Supervision (ACES), the American Counseling Association (ACA), and the American Mental Health Counseling Association (AMHCA). Relatedly, in 2017, the *Journal of Mental Health Counseling* added a *Neurocounseling* section to drive the integration of neuroscience into the counseling profession (Beeson & Field, 2017). In 2018, the AMCHA launched the Neuroscience in Clinical Mental Health Counseling Task Force to help facilitate the move towards neuroscience integration into the field (Russo et al., 2021). At the level of accreditation, the 2016 CACREP standards included the requirement that counselor training contain education regarding neurological factors and foundational principles across multiple standards (CACREP, 2015). Taken as a whole, it appears that there is a move towards the importance of understanding how emerging neuroscientific research is applied to the helping professions, specifically to counseling. At the macrosystemic level, to remain current as a mental health profession, the counseling field must keep abreast of current trends and integrate neuroscientific research findings into clinical practice, training, research, and clinical supervision. However, to date, it is unclear how counselors are gaining



knowledge of neuroscientific principles and emerging research as well as whether this information is being applied to clinical settings.

### **Neuro-Informed Counseling Defined**

Neuroscientific research has been utilized to validate the efficacy of existing counseling theories and interventions (e.g., CBT) as well as to contribute to the formation of new models and techniques (e.g., brainspotting; Beeson & Field, 2017; Field et al., 2019). The American Mental Health Counselors Association (AMHCA, 2016, Section V.A.) outlines neuroscience knowledge and skills in the biological bases of behavior (BBB) necessary for the training and practice of clinical mental health counselors (CMHCs). This move towards utilizing neuroscientific research to inform counseling practice has been labeled “neuro wise counseling, neurocounseling, neuroscience-informed counseling, and neuro-informed counseling” (Field, Jones, et al., 2017; Russell-Chapin, 2016; Russo, 2021). Russell-Chapin (2016) defined neurocounseling as “the integration of neuroscience into the practice of counseling by teaching and illustrating the physiological underpinnings of many of our mental health concerns” (p. 91). Beeson and Field (2017) expanded this definition, defining neurocounseling 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)

This approach entails the integration of neuroscientific research findings into the counseling field to inform current practices (Beeson & Field, 2017). Neuro wise counseling is the idea that counselors can provide treatment to clients that is informed by emerging

neuroscientific research (Russell-Chapin, 2016). This includes diagnosis, conceptualization, relationship formation, intervention, and the engagement of other professionals to assist in client care (e.g., medication referrals). While Beeson and Field (2017) contended that neurocounseling is a specialty within the counseling field, Field et al. (2017) asserted that all counselors should be “neuro wise and not neuro naïve” (p. 94)—that is, counselors should have a working knowledge of important physiological and neurological considerations relevant to the counseling field. Neuro wise counseling is synonymous with neuro-informed counseling, a concept for understanding the move toward a more neuroscientifically sensitive and responsive approach to counselors’ work. As the field’s breadth and depth of understanding in this topic rapidly evolves, so does the language used around it. The language used in the most recent literature is neuroscience-informed or neuro-informed counseling (Luke, Redekop, et al., 2020; Russo et al., 2021). Therefore, this term is used throughout this study. What remains unclear is how counselors are receiving education, training, and supervised experiences that are needed to function as neuro-informed practitioners.

### **Trauma Treatment and Neuro-Informed Counseling**

The word trauma has its origins in the Greek and Latin words for “wound” (Onions et al., 1966). Psychological trauma is a wound left in the nervous system by overwhelming experiences. Trauma treatment is an emerging focus of clinical practice that has received growing attention within the counseling literature and is an area that is heavily influenced by neuroscientific research (Uhernik, 2017). It is known that traumatic experiences negatively impact the nervous system, which is in contrast to how counseling has been proven to impact the brain and nervous system in positive, prosocial ways. Through effective counseling, trauma survivors may be able to heal the deleterious impacts on the nervous system caused by traumatic

experiences. An exploration of how counselors are learning to integrate neuroscience into clinical practice and particularly in the treatment of trauma would shed light on the effectiveness and practicality of relevant neuroscience knowledge, competencies, and strategies. Furthermore, an in-depth investigation and identification of the challenges that counseling practitioners face in learning to integrate neuroscience concepts, particularly when treating clients who have experienced psychological trauma, may help to remove barriers and provide for wider access to this important information.

A response-based definition of trauma is used in the current study, emphasizing an individual's response along with what occurs within the nervous system during a distressing and overwhelming traumatic event. From this perspective, trauma is not an event; rather, it is a result within the nervous system when an organism is strained beyond its capacity to cope and adapt by an overwhelming, traumatic event (Levine, 1997). Levine's (1997) work was based primarily on the principle of the human animal, with an instinctual, adaptive, evolutionary capacity to heal. The body's response to stress is often an adaptive process in which stress is experienced and then processed through the nervous system and resolved (Jones et al., 2017). Unfortunately, these natural healing and protective responses can be overridden by neo-cortical inhibition, more commonly known as the rational mind, or the stress response may be otherwise interrupted or unsuccessful. Stress generated by neural connections in the nervous system during the trauma response is unable to move towards an adaptive resolution, causing dysregulation in the Autonomic Nervous System (ANS; Giaretto, 2019; Levine, 2010).

Emerging neuroscientific research is influencing the creation of new theories, modalities, and conceptualizations of clinical symptoms while also providing evidence of the efficacy of existing psychological theories and interventions (Beeson & Field, 2017). One important

example of this is that researchers within the counseling and allied mental health fields have turned their attention towards the neurobiological impact of trauma on the human brain and nervous system and are working to understand how neuroscientific findings can be effectively integrated into clinical practice (Field, Jones, et al., 2017; Mahajan, 2018; Russell-Chapin, 2016; Weiss, 2007). Trauma impacts individuals of all identities, and mental health professionals are experiencing an influx of clients presenting with symptoms related to trauma (Absher et al., 2021; Cénat & Dalexis, 2020; Pappa et al., 2020; Webber et al., 2016). An estimated 6 in 10 men and 5 in 10 women will experience a traumatic experience in their lifetime (U.S. Department of Veterans Affairs, 2016). Roughly 8 million adults meet diagnostic criteria for post-traumatic stress disorder (PTSD) in a given year, according to the U.S. Department of Veterans Affairs (2016). The U.S. Department of Health and Human Services (2003) considers trauma a public health crisis. The United States has been involved in active military conflict consistently over the last 2 decades, and political and civil unrest in the United States has been particularly traumatic for many over the last several years. Additionally, individuals all over the world have undergone the COVID-19 pandemic and lockdown. Experts assert that concerns about the pandemic, fear of contracting the virus, public health instructions, and measures for isolation and social and physical distancing have been traumatic events experienced collectively by individuals around the globe (Absher et al., 2021; Cénat & Dalexis, 2020; Pappa et al., 2020).

A leading voice in the conversation related to the treatment of trauma as well as the neuroscientific underpinnings of clinical presentations of trauma is Bessel van der Kolk. van der Kolk (2006) published a study that discussed the clinical implications of neuroscience research in PTSD. Neuroimaging studies of individuals experiencing high emotional arousal revealed increased activation in subcortical brain regions, but reduced activation and blood flow to

various areas in the frontal lobe, including Broca's area, which are responsible for verbal communication of what one is thinking and feeling. These findings led van der Kolk to conclude that this process may impact an individual's ability to verbalize traumatic experiences. van der Kolk also found that sensory input, including reminders of the past, can automatically stimulate hormonal secretion and can influence the activation of sub-cortical brain regions implicated in attention and memory. These findings provide a partial explanation for the re-experiencing of traumatic events and attentional symptoms often experienced following a traumatic experience (van der Kolk, 2006).

Such research findings have considerable implications for the efficacy of talk therapy, meaning that, at times, clients are unable to verbally process traumatic events. Such research findings call into question the efficacy of top-down approaches (i.e., utilizing talk and cognitions to verbally process traumatic memories) versus bottom-up (i.e., body-based and somatic experiencing of stored emotions) processing of trauma as well as the importance of neuro-informed trauma counseling more broadly. These findings are particularly poignant for the field of counseling given that most counseling theory and skills rely on verbal processing through the frontal cortex.

The integration of a neuroscientific perspective into clinical practice shifts primary treatment goals from assisting clients in changing their unwanted thoughts, feelings, and behaviors (i.e., top-down processing) towards helping clients improve their emotional and physiological regulation (i.e., bottom-up processing; Russell-Chapin, 2016). A deeper understanding of trauma's impact on the nervous system has pushed the field towards the integration of body-based approaches to address the physiological impacts of psychological trauma. In fact, trauma's impact on the brain can result in traumatic memories being verbally

inaccessible. Subsequently, as trauma is often stored as implicit rather than explicit memories, the Broca's area of the brain may be impaired, and memories may be fragmented or otherwise verbally inaccessible (van der Kolk, 2015; Weiss, 2007).

### **Counselor Training in Neuroscience**

Master's level counseling programs include knowledge and theory-based courses, along with clinical courses, wherein students practice their skills (Beijan et al., 2021). There is currently no widely accepted framework for training counselors to implement a neuro-informed counseling approach. CACREP (2015) requires that all counseling students develop an understanding of the "biological, neurological, and physiological factors that affect human development, functioning, and behavior" (p. 10). Drafts of the 2024 CACREP standards have been released and have expanded the expectation of counselor competency in the area of neuro-informed understanding. The new standards similarly require a neurobiological foundation and etiology of addiction and co-occurring disorders, specifically mentioned in the sections regarding Lifespan Development, Clinical Mental Health Counseling, and Addiction Counseling.

AMHCA is the only counseling association to produce standards related to biological bases of behavior (BBB) and the importance of neuroscience in the practice of mental health counseling. AMHCA recommends that CMHCs have specialized training in the BBB, beyond the courses agreed upon by CACREP. The standards focus on the role of biological factors underlying mental health disorders, enumerating specific knowledge and skills useful for counselors. The BBBs include an understanding of the organization of the central nervous system; the role of plasticity of the brain and neurobiology across the lifespan; the neurobiology of thinking, emotion and memory; and the neurobiology of mental health disorders (AMHCA, 2016). The BBBs include neurobiological information and skills but are not all specifically

neuro-informed. These include investigation of the roles that genetics, hormones, and the nervous system play in shaping an individual's behavior.

There is a need to explore how neuro-informed counselors are integrating neuroscience into their clinical practice, including an exploration of the method of training and exposure to neuroscience knowledge. This research could help facilitate the development of neuroscience-informed instructional strategies in counselor education and training and guide counselors in selection of materials (e.g., textbooks, training materials, other resources) to enhance the accuracy of neuroscience and ethical practices (Beeson, Field, et al., 2019). Counseling associations and counselor educators can use the results of previous research as well as findings from the present study to integrate neuroscience into counselor training (Beeson, Field, et al., 2019; Field et al., 2019; Russo et al., 2021). Such research may help to inform the creation of future continuing education programs and advanced training credentials to fill the gaps and extend what is taught in master's level training.

### **Purpose of the Study**

The purpose of the current study was to explore the experiences of practicing neuro-informed counselors related to receiving training in and the integration of neuroscience-related concepts into their clinical work. The research sought to understand how practicing counselors gain access to training in neuro-informed counseling, the perceived efficacy of trainings, as well as any barriers they face to receiving appropriate training. Further, the research explored how these counselors are integrating neuroscientific concepts into their clinical practice, their conceptualizations of the neurophysiological impact of trauma on survivors, and which neuroscientific concepts counselors find most relevant and impactful. The researcher explored how neuro-informed counselors are translating neuroscientific findings into their clinical work

with the goal of bridging the gap between the extensive hard science that exists in the neuroscience field and its application to counselor education and practice. Finally, the researcher explored neuro-informed counseling with trauma survivors, as this is an important emerging trend in the field. Trauma is a commonly encountered clinical issue for which a neuro-informed approach is supported in the literature, trainings, and education.

### **Research Questions**

Specifically, the following research questions were addressed:

**Research Question 1:** What are the experiences of self-described neuro-informed counselors related to receiving training in neuroscience concepts?

**Research Question 2:** How do self-described neuro-informed counselors integrate neuroscientific findings into their clinical trauma work?

### **Need for the Study**

Trauma is ubiquitous in society. Psychological trauma is among the areas of psychological study that has benefited most from recent neurobiological research. Researchers in the counseling and allied mental health fields are turning their attention towards the neurobiological impact of trauma on the human brain and nervous system and how that information can be integrated into the treatment of psychological trauma (Field, Jones, et al., 2017; Mahajan, 2018; Russell-Chapin, 2016; Weiss, 2007). This quickly evolving area of study has direct implications for practicing counselors. Importantly, a lack of understanding of the neurophysiological underpinnings of trauma and the multitude of trauma responses can lead to re-traumatization of the client or to the implementation of ineffective counseling interventions (Uhernik, 2017). Although there have been numerous calls for counselors to work from within a



neuro-informed framework, particularly when treating traumatized clients, it is unclear whether practicing counselors are adapting to this need appropriately.

Not all research from the vast field of neuroscience is relevant, practical, or even helpful to incorporate into counseling or to share with clients (Miller, 2016). There is currently a lack of consensus regarding what counselors are or should be learning about neuroscience and how they are using it in their clinical practice. Additionally, how counselors are accessing and integrating neuroscientific-related standards into their practice is unclear. Barriers to this knowledge need to be identified so that they can be addressed, increasing counselor access. Leaders in the field have illuminated the importance of staying as close to the hard science as possible (Field et al., 2018). However, there is a need to distill this complex technical information in a way that is widely accessible for the counseling profession to adequately and ethically integrate. Quantitative research has confirmed the importance of neuroscience in the counseling field, explored counselors' attitudes and beliefs about neuroscience (Beeson, Kim, et al., 2019), and even gauged the extent to which individuals are receiving training (Russo et al., 2021). A qualitative exploration can reveal the experiences of neuro-informed counselors and identify additional research questions needing investigation.

There is a need to explore how counselors integrate neuroscience into their clinical work in the treatment of trauma. Neuroscience is influencing the creation of new theories, modalities, and conceptualizations while also providing evidence of the efficacy of existing theories and interventions (Beeson & Field, 2017). We now know that counseling can impact the nervous system in positive, prosocial ways that help heal the wounds left by traumatic experiences. However, it is important that we build upon this understanding in the counseling field so that survivors of trauma have access to effective, trauma-informed care based in the humanistic

counseling traditions. Adequate measures do not currently exist to study these phenomena. Although there has been some quantitative investigation done in this area, a qualitative exploration is needed for a more in-depth understanding. This study investigated how neuro-informed counselors are translating and integrating neuroscientific findings into their clinical trauma work.

### **Definition of Terms**

The following are operational definitions of terms used in this study:

1. Neuroscience: The field of study dealing with the structure and function of the brain; central, peripheral, and enteric nervous systems; and the endocrine and immune systems.
2. Neuro-informed counseling: 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 (Beeson & Field, 2017).
3. Neuro-informed counselor: A licensed or provisionally licensed mental health counselor with training in relevant neuroscientific concepts which guide their clinical work.
4. Neuromyth: A “misunderstanding, a misreading, and in some cases a deliberate warping of the scientifically established facts to make a relevant case for education or for other purposes” (Organization for Economic Cooperation and Development [OECD], 2002, p. 71).

5. Trauma: Trauma results from an event, series of events, or set of circumstances that is experienced by an individual as physically or emotionally harmful or life threatening and that has lasting effects on the individual's functioning and mental, physical, social, emotional, or spiritual well-being (Substance Abuse and Mental Health Services Administration [SAMHSA], 2014).
6. Trauma is not an event; rather, it is what results within the nervous system when an organism is strained beyond its capacity to cope and adapt by an overwhelming, traumatic event (Levine, 1997).
7. Traumatic event: An event or experience that overwhelms an individual's ability to cope and regulate, causing trauma in the nervous system.
8. Neuroeducation: An important aspect of neurocounseling is neuroeducation, or brain-based psychoeducation illustrating and teaching the underlying physiological and neurological process of mental functioning and mental health concerns (Miller, 2016).
9. Translational neuroscience: The application of neuroscience laboratory research into the development and application of clinical interventions.

### **Brief Overview**

In Chapter 1, the researcher defined neuro-informed counseling and trauma. Chapter 1 also included the statement of the purpose of the study, need for the study, and research questions. Chapter 2 includes a review of relevant literature related to the emergence of neuro-informed counseling in the field and its relevance to the treatment of psychological trauma. Chapter 3 outlines the methodology of the study, including an overview of the hypotheses, participants, variables, procedures, data analyses, and limitations. Chapter 3 also includes a full report of the

pilot study results. Chapter 4 includes the results of the study. Finally, conclusions, discussion of the results, and implications for future research are presented in Chapter 5.

## CHAPTER II: LITERATURE REVIEW

### **Neuroscience and the Counseling Field**

It is widely acknowledged that the counseling field has had four major forces representing significant shifts in the predominate theoretical understanding over the last 100 years or so, each of which is supported by neuroscientific findings of the last several decades (McHenry et al., 2014). The first force was psychoanalysis, followed by behaviorism, humanism, and finally multiculturalism. Many consider neuroscience to be the “fifth-force” in the counseling field (D’Andrea, 2012; McHenry et al., 2014), with relevant neuroscientific findings becoming the “practice standards of the future” (Myers & Young, 2012, p. 21). Each force has constituted of a metamorphosis in the field and did not always come easily or quickly. A lag exists between initial discoveries and when the approaches that are a result of discoveries become integrated as the norm. One implication of the current study is to hasten the time it takes to make neuroscience learning mainstream for counselor practice and training by better understanding how practicing counselors who are neuro-informed have learned to practice in this manner.

The first force, psychoanalysis, was pioneered by Sigmund Freud. Remnants of Freud’s work and ideas are still prevalent in counseling literature today. For example, counseling is still anchored in Freud’s use of the therapeutic conversation (McHenry et al., 2014). Neuroscience research has shown that interpersonal interactions, such as the therapeutic conversation, have the potential to strengthen existing neuronal connections and build new neural networks (Coutinho et al., 2014, 2017; Geller & Porges, 2014; Ivey et al., 2012). Controversy and progress have gone hand in hand since the inception of psychoanalysis, beginning with dissidents such as Adler,

Jung and Rank, and Ferenczi (Bergmann, 2004). There is currently a similar tension between the integration of neuroscience and protectors of the humanistic nature of the field.

The second force was spearheaded by John Watson and B.F. Skinner (Corey, 2009). Behavioral research, through systematic trials, demonstrated that environmental changes can alter behavior. It took many researched-based examples for practitioners in the field of counseling to recognize the importance and value of integrating behavioral change practices and theory into counseling research, education, and practice. Behaviorism grew in popularity through the observation of its effectiveness. Now, neuroscience research can document how and why these changes are possible (McHenry et al., 2014).

Humanism, the third force, moved the field away from the strictly behaviorist model of creating change through external sources towards a process of facilitation of client growth from within (Kay, 2009). Humanism complemented and deepened the work done in the counseling field. The counselor's role in the therapeutic conversation shifted from a one-up medical model, with the therapist as the expert knowing what is best for the client, towards a role as guide and facilitator, with the counselor being the expert in the counseling process and the client being the expert in their own life. Pioneers of this movement included Rollo May, Carl Rogers, Viktor Frankl, and Abraham Maslow (Gladding, 2001). The hallmark of a humanist approach to counseling includes Rogers' (1951) necessary and sufficient conditions (empathy, unconditional positive regard, and congruence). Although the intrinsic value of these approaches was suggested early on, neuroscientific findings have offered concrete evidence of the positive impact of such approaches on the human brain (Coutinho et al., 2014; Gonçalves & Perrone-McGovern, 2014; Karlsson, 2011; Penadés et al., 2013). For example, neuroimaging reveals that when a client experiences empathy from a counselor, increases in brain activity and neurogenesis are observed,

which supports a client's capacity to change (Eres et al., 2015; Fan et al., 2011). Brain cells can form new neural connections in response to new learning experiences and environmental stimuli through a process called *neuroplasticity* (Kandel, 1998). This concept supports the humanistic emphasis on human potential and an individual's ability to change (Kandel, 1998; Kindsvatter & Geroski, 2014; Penadés et al., 2013; van der Kolk, 2006; Weingarten & Strauman, 2015).

In recent years, the counseling field has turned its attention towards the importance of multiculturally informed counseling in an effort to better understand and address the unique humanity of every client. An effort exists to conceptualize clients more fully in relation to their human universality, cultural variation, and individual uniqueness (McHenry et al., 2014). Talk of the beginning of multiculturalism as the fourth-force in the counseling field started in the early 1990s, when a real concerted effort to integrate multiculturalism into the counseling field began (Pedersen, 1991; Ponterotto & Cass, 1991). Initially, many counselor education programs had issues of multiculturalism confined to one course. Although it took time for these multicultural roots to grow, multiculturalism is currently clearly integrated within and across counseling curricula (McHenry et al., 2014). The process of multicultural integration parallels the current movement towards neuroscience integration in the counseling field. Multiculturalism, cultural sensitivity, and humility are now central parts of every aspect of the counseling field and training, existing as their own CACREP standards, required as stand-alone courses, and infused across curricula.

As with the first three forces, neuroscience supports and deepens the importance of multicultural sensitivity in the counseling field. Counselors must understand the ways culture and society impact clients, including structures of power and oppression, biases, racism, discrimination, and violence. Neuroscientists agree that an intricate relationship exists between

social and cultural dimensions and brain development (Ivey et al., 2012; Marmott & Wilkerson, 2006; Zalaquett & Ivey, 2018). Leaders in the counseling field are now discussing the integration of neuroscience as the beginning of the 5<sup>th</sup> force in the counseling field (D'Andrea, 2012; McHenry et al., 2014; Miller, 2016). AMHCA (2016) recognized that their proposed standards of neuroscience “knowledge and skills related to the biological bases of behavior may be covered in a single course, or more commonly, across several courses or domains of inquiry” (p 13).

Counseling, by nature, is an interdisciplinary field, allowing for the integration of information from other fields to strengthen the field itself. According to Kaplan et al. (2014), “Counseling is a professional relationship that empowers diverse individuals, families, and groups to accomplish mental health, wellness, education, and career goals” (p. 366). There are many ways in which neuroscience can help strengthen this professional identity, from assessment and rapport building, to conceptualization, to the development and implementation of interventions. Neuro-informed counseling has supported the effectiveness of various treatment modalities, such as neurofeedback, which can be used for both assessment and intervention (Field, Jones, et al., 2017). Neuroscientific findings can help clients and clinicians understand and address pathology as well as optimize individuals’ functioning.

Translational neuroscience is the application of neuroscience laboratory research into the development and application of clinical interventions and is the basis of neuro-informed counseling (Davies et al., 2020). Although counselors do not conduct the hard neuroscience research themselves, through translational neuroscience, counselors can integrate these findings into research, practice, and education. It is important, therefore, that counselors are able to accurately translate neuroscience firsthand without becoming too far removed from the hard science in their application. Unfortunately, this may not be realistic for the average counseling



professional. An inability to accurately translate neuroscience research can lead to neuromyths and inaccurate, ineffective, and potentially harmful use of neuroscience in counseling. Further exploration is needed, therefore, to standardize and identify how counselors are taking the information from the discipline of neuroscience and translating and integrating it accurately in a manner that is complementary to the counseling field and within the framework of counselor training.

### **Neuro-Informed Counseling Practice**

To date, CACREP standards include only short statements about requirements related to the integration of neuroscientific research into counselor preparation. It is likely, however, that future CACREP standards will include more requirements in this area. Furthermore, most counselor educators are not trained in a manner that allows them deep proficiency in the translation of neuroscientific research into forms that they or their students can apply to practice. Therefore, it is an important but open question how counselors are acquiring training that allows them to function as competent neuro-informed counselors. Without standardized training or guidelines around neuro-informed practice, counselors must seek out and piece together information on their own with little guidance. The importance of competence in the integration of neuroscience into the counseling field cannot be overstated. At present, there are not clear benchmarks for assessing competency in this area.

Neuro-informed counseling can support each stage of counseling, beginning with intake, assessment, and rapport building. The establishment of a safe, secure therapeutic environment is an important first step in all counseling and, in particular, the treatment of psychological trauma to keep the client's nervous system as regulated as possible and to allow the client to fully engage (Uhernik, 2017). This necessitates a safe, secure therapeutic relationship. Empathy is

essential to creating a secure therapeutic relationship, and emerging neuroscience research findings are further deepening our understanding of its value. For example, neuroimaging reveals that when a client experiences empathy from a counselor, increases in brain activity and neurogenesis (i.e., the process of new neuronal formations in the brain) are observed, which enables client change (Field et al., 2019). When empathy is present, counseling becomes a safe holding space for the processing of painful memories, emotions, and sensations.

Within neuro-informed therapeutic practice, the assessment phase includes an evaluation of client physiological functioning from a neuro-informed perspective (Uhernik, 2017). Observation and listening skills can be utilized to gather information regarding the client's neurophysiological functioning from the very first contact (Field et al., 2019). Knowledge of neurophysiology can inform assessment, with every detail leading to additional information about the functioning of the client's brain. Observations such as rapid breathing, flushed face and/or neck, rigid posture, quick speech, and psychomotor agitation may be clues to brain dysregulation (Russell-Chapin, 2016).

This assessment phase should include both assessment and self-report of current physiological functioning. This may include biopsychosocial history, trauma history, and formal assessment for early attachment disruptions (Uhernik, 2017). Neuro-informed counseling also allows for brain-based outcome studies to evaluate the counseling process, offering evidence-based support for the counseling process (Beeson & Field, 2017; Field, Jones, et al., 2017). Specializations in brain-based techniques, such as neurofeedback, have emerged from neuro-informed counseling (Beeson & Field, 2017), such that the approach is emerging as an important modality for counselors. Neurofeedback is a kind of biofeedback that can be used in counseling settings to teach self-control of brain functions by measuring brain waves and providing a

feedback signal (Marzbani et al., 2016). However, given the novelty of this movement, it is unclear how practicing counselors who attempt to utilize neuro-informed approaches are obtaining the training needed or whether they are doing so effectively.

### **Benefits of Neuro-Informed Counseling**

There are numerous ways in which skilled neuro-informed counseling may be beneficial to the counseling field. For example, researchers can utilize neuro-informed ideas to explore how and why counseling changes the brain, providing support for the effectiveness of emerging neuro-informed techniques and informing the creation of new treatment modalities. Translational neuroscience is the application of neuroscience to outside fields, or the application of neuroscience laboratory research into the development and application of clinical interventions (Davies et al., 2020). Counselors must be able to translate neuroscience information in order to accurately integrate it into their research and practice for an effective neuro-informed approach. Such an approach considers how the brain and central nervous system processes are impacting clinical presentation to deepen counselors' understanding of client concerns, enhancing sophistication of case conceptualization and the customization of treatment planning. In other words, neuro-informed counseling provides counselors with a much more holistic, mind-body integrative approach to their work (Field, Jones, et al., 2017).

The neuroscience revolution in counseling has been moderated by an appreciation for and adherence to the humanistic traditions of counseling (Weisberg et al., 2008). Although the importance of relevant variables that cannot be quantified must be acknowledged, neuro-informed counseling provides a new way for counselors to know, conceptualize, understand, and help clients, thereby enriching the field's humanistic tradition (Goss & Parnell, 2017; McHenry et al., 2014; Wilkinson, 2018, 2019). Some writers have warned against the integration of

neuroscience into the profession, expressing various concerns, such as an overemphasis of the medical model, a focus on pathology, and a movement away from the core humanistic values and principles of the field (Wilkinson, 2018). Some have presented these concerns as important cautions to consider when integrating neuroscience into counseling (Ivey et al., 2012; Miller, 2017). Others maintain that the integrative nature of the counseling profession has laid the groundwork for a more inclusive integration of neuroscience in service of the humanistic principles upon which the field is built (Beeson & Miller, 2019; Busacca et al., 2015). Taken together, there is mounting support for the integration of neuroscientific understandings into counseling practice while preserving the field's humanistic identity. What is needed, however, is greater understanding of how counselors are learning to become neuro-informed and how they utilize neuroscientific knowledge within their clinical settings. Further research is needed to identify essential neuroscience knowledge and competencies and determine the minimum neuroscience knowledge and skills required for a counselor to be adequately neuro-informed in their clinical practice. A complicating factor related to neuro-informed counseling practice is trauma treatment. Trauma survivors are at risk for re-traumatization without specific consideration of the way trauma impacts the nervous system.

### **Integrating Neuroscience Within Counselor Training**

While CACREP (2015) includes requirements for understanding of relevant biological, neurological, and physiological factors and drafts of the 2025 CACREP standards expand on this expectation, there is no widely accepted framework for training counselors to integrate neuroscience into practice. However, ways of integrating neuroscience into counseling have been proposed. Busacca et al. (2015) presented a rationale for an integrally informed mode for infusing neuroscience into counselor training. They emphasized the importance of an integrative

framework, with neuroscience supporting the humanistic principles of counseling and erasing the distinction between mind and body. A cross-disciplinary framework utilizing an integral model and experiential learning honors the validity of each discipline and grounds their integration. Duenyas and Luke (2019) proposed recommendations for developing and teaching a Neuroscience for Counselors graduate course to build on prior core counseling courses. The authors proposed experiential education, with assignments providing students the opportunity for reflection, critical thinking, and personal application. Similarly, Lorelle and Michel (2017) proposed how counselor educators can include neuro-informed topics in a human development course. These conceptualizations and propositions emphasize the importance of experiential, cross-disciplinary, and integrally grounded coursework.

At present, the BBB released by AMHCA are the only standards related to the integration of neuroscience into the practice of mental health counseling. AMHCA recommends that CMHCs have specialized training in the BBB, beyond the courses agreed upon by CACREP. The BBBs list specific knowledge and skills related to the biological factors relevant for counselors, including an understanding of the organization of the central nervous system, the role of plasticity of the brain and neurobiology across the lifespan, the neurobiology of thinking, emotion and memory, and the neurobiology of mental health disorders (AMHCA, 2016). The BBBs include neurobiological information and skills but are not all specifically neuro-informed.

Russo et al. (2021) examined the extent to which a sample of counselors had received training in these BBBs. Participants reported prior training that addressed neuroscience-related standards significantly less frequently than other standards. The same study found that continuing education was a more common pathway to training in the BBBs than graduate education. There is a concern, therefore, regarding the potential lack of consistency and

standardization in neuroscience-related training. Additional continuing education trainings are needed in neuroscience-related content. Furthermore, there is a need to understand existing barriers and why counselors may not receive more training in neuroscience-related standards as well as the experiences of counselors around receiving and implementing neuroscience-related standards into their practice with trauma survivors.

Beeson et al. (2019) had participants rank sources of information by frequency of utilization: college course, neuroscience interest networks, television, Internet search engines, social media, conferences/ workshops, books, scientific journals, and newspapers/ magazines. This study found the top three rated sources of information used by counselors to be college courses, scientific journals, and books. Russo et al. (2021) similarly investigated how counselors are being trained in the neuroscience-related BBBs. Russo et al. found that counselors are primarily accessing neuroscience information through continuing education rather than at the graduate course level. There is no standardization across these continuing education opportunities and no research into their effectiveness. Therefore, the counseling field must create and evaluate various strategies to enhance neuroscience knowledge competencies among counselors. This requires an exploration of the efficacy and accessibility of current training pathways, specifically in regard to how counselors who identify as neuro-informed practitioners are gaining the skills to implement this approach. Relatedly, it remains unclear if and how neuro-informed counselors are utilizing their skills to effectively work with trauma, a condition that notably leads individuals to seek out the help of professional counselors.

Beijan et al. (2021) conducted a consensual qualitative analysis of counselor educators' experiences incorporating neuroscience into their teaching. Researchers interviewed eight instructors of record within a CACREP-accredited program. Six domains, 18 categories, and 37

subcategories emerged from the data analysis. They found that neuroscience knowledge has influenced pedagogy, with participants applying neuroscience concepts to promote student learning, such as the promotion of relational safety to enhance self-regulation enhances learning, information retention, and integration. The researchers identified a need for literature and continued research addressing counseling and counselor education and suggested that competencies addressing neuroscience could contribute to standards for the use of neuroscience in counseling. An exploration of counselors' experiences integrating neuroscience into clinical practice will contribute to the development of those standards.

Master's level programs include knowledge and theory-based courses, often with an emphasis on constructive and experiential learning, along with clinical courses, wherein students practice their skills (Beijan et al., 2021). There is a need to explore how neuro-informed counselors are integrating neuroscience into their clinical practice, including an exploration of the method of training and exposure to neuroscience knowledge (Dekker et al., 2012) to facilitate the development of neuroscience-informed instructional strategies to guide counselors selecting continuing education resources and enhance the accuracy of ethical and competent neuroscience practices (Beeson, Kim, et al., 2019). Counseling associations and counselor educators can use the results of previous research as well as findings from the present study to integrate neuroscience into the counselor training (Beeson, Kim, et al., 2019; Field et al., 2019; Russo et al., 2021). Such research may help to inform the creation of future continuing education programs, advanced training credentials, to fill the gaps and extend what is taught in master's level training.

## Attitudes, Beliefs, and Ethical Considerations

There has been discussion in the counseling field regarding the potential risks and ethical concerns associated with the integration of neuroscience into counseling. This movement is not strictly benevolent, and it is important that the potential for harm be addressed, particularly in the treatment of trauma survivors who are at risk of re-traumatization. For example, some believe neuroscience is at odds with the humanistic principles of the counseling field, with a concern over science-based reductionism (Wilkinson, 2018). Neuroscience does not reflect the personal meaning or subjective significance or experiences; therefore, has been discussion about how this hard science can be congruent with humanistic model of the counseling field. However, Beeson et al. (2019) found that 80% of a sample of counselors and counselors in training believe the integration of neuroscience moves the profession closer to core values. Additionally, while biomedical explanations can reduce shame, blame, and the stigma around mental health disorders (Leibowitz & Applebaum, 2019), there, at times, exists the unintended consequence that clients may feel diminished in their autonomy. It is important for counselors to maintain an awareness of the possibility that while clients may feel the condition is not their fault, they may also feel it is out of their control, increasing the belief that only biological-based treatments will be effective, lessening buy-in for counseling interventions (Leibowitz et al., 2017; Luke, Beeson, et al., 2020).

There is also the danger inherent in the persistence of neuromyths amongst counselors (Kim & Zalaquett, 2019). Evidence suggests that individuals tend to more readily believe information attached to neuroscience principles, whether the information is true or false. This phenomenon has been termed *neuroenchantment* (Coutinho et al., 2017; Racine et al., 2010; Slaby & Choudhury, 2011). Ali et al. (2014) studied this phenomenon when they engaged 26



participants from an advanced undergraduate course focusing on the merits and shortcomings of different imaging techniques. These participants had majors spanning psychology, neuroscience, and cognitive science, and the course instructor had repeatedly insisted on the current impossibility of mind-reading. Participants were told they were participating in a study on the “The Neural Correlates of Thought,” for which scientists at the Montreal Neurological Institute had developed new experimental technology to decode resting state brain activity and read the human mind. Participants were attached to the mock brain scanner, and one researcher implemented a technique used by magicians to obtain information written on a piece of paper in participants’ pockets. At the end of the “scanning” process, the computer presented the pocketed information on a screen, imitating mind-reading. Participants then completed self-report measures concerning their beliefs and experiences. Subjective ratings indicated that despite the current impossibility of neuroscientific mindreading and the haphazard setup of the mock scanner, individuals were neither skeptical nor suspicious of the results.

The existence, prevalence, and dangers of neuromyths have been explored in the fields of education (Dekker et al., 2012; Howard-Jones, 2014; MacDonald et al., 2017), as well as the mental health counseling field (Kim & Zalaquett, 2019; Lithander et al., 2021). Kim and Zalaquett (2019) ran an exploratory study on the prevalence and predictors of neuromyths among potential mental health counselors. A total of 125 undergraduate students in rehabilitation counseling, education, and psychology completed a survey exploring neuroscience knowledge, attitudes about neuroscience, and intention to apply neuroscience in practice. The survey included 17 statements about the brain and its influence on health and behavior, six of which were neuromyths (e.g., we only use 10% of our brains; there are critical periods in childhood after which certain things can no longer be learned). Descriptive analysis confirmed that 56.0-

85.6% of participants believed at least four of six presented neuromyths. The existence of these misconceptions about brain and nervous system functioning presents difficulties in the application and integration of neuroscience into education and counseling practices. Counselors may put clients at risk by applying counseling methods and interventions based on misinformation. Research suggests that neuroscience literacy may protect individuals from believing in neuromyths (Dekker et al., 2012), supporting the need for comprehensive training and education in the mental health field.

Research suggests that while there is a high level of interest in the integration of neuroscience across fields, high rates of neuromyths and low levels of accurate neuroscientific knowledge persist (Dekker et al., 2012, 2017; Kim & Zalaquett, 2019; MacDonald et al., 2017). In their previously discussed study of the prevalence and predictors of neuromyths among potential mental health counselors, Kim and Zalaquett (2019) identified attitudes towards neuroscience as an important factor to understand, as students with more positive attitudes towards neuroscience tended to have more accurate neuroscientific knowledge. Exposure to science media and newspaper articles about the brain have been found to improve neuroscience literacy and reduce beliefs in neuromyths (Dekker, 2019). Inability to accurately understand/interpret neuroscientific findings may lead to inaccurate applications in counselor education and practice and could increase the risk of harm and the ability of the counseling profession to contribute to the evolving conceptualization of mental health and wellness (Beeson, Field, et al., 2019; Kim & Zalaquett, 2019).

Beeson et al. (2019) surveyed 416 counselors at different points in their careers. The online survey explored attitudes towards neuroscience, exposure to neuroscience information, and accuracy of participants' neuroscience knowledge. Researchers found that the diverse

sample of counselors and counselors in training had very positive attitudes towards and interest in neuroscience and reported a willingness to integrate neuroscience into their practice. However, participants indicated discomfort in explaining neuroscience in practice due to a perceived lack of preparation, particularly at the graduate school level. Participants reported the belief that the time and effort required to learn neuroscience is worth it, although cost, time, and self-efficacy are the identified barriers to integrating neuroscience into practice. These findings have been supported across helping professions (Dekker et al., 2012; Field, Jones, Luke, et al., 2018; Fung et al., 2014, 2015). While interest is high, self-efficacy and accuracy of knowledge remains low. In a survey study of the extent of counselor training in neuro-informed counseling competencies of 260 counselors, Russo et al. (2021) found that continuing education opportunities appeared to be the most common pathway to training in neuroscience related biological bases of behavior (BBBs), as outlined by AMHCA (2016). In fact, counselors were much less likely to encounter this information in their graduate programs than through continuing education. Unfortunately, the study did not define continuing education, so concern exists around the rigor and standards of the neuroscience-related educational opportunities available to counselors. The researchers stated a need for the counseling profession to address concerns regarding the lack of consistency and standardization of training in neuro-informed counseling training to ensure counselors are receiving sufficient training. They called for future studies to evaluate counselor and counselor educators' understanding as it relates their clinical practice and/or teaching. The current study attempted to address some of these concerns by exploring how neuro-informed clinicians are receiving training and implementing neuroscience into their clinical practice.

It is important that counselors maintain an awareness of the potential for the medicalization of practice, ensuring that the integration of neuroscience enhances, rather than

undermines, the developmental, humanistic, wellness, and social justice framework of the profession (Russo et al., 2021). Furthermore, counselors must work from a place of accurate scientific data rather than pseudoscience and misinformation, which has the potential for harm, particularly in working with trauma survivors. For example, an attempt to process trauma may cause overactivation in a traumatized nervous system, causing further harm if clinicians are not well equipped to understand and tend to the dysregulation that exists in the nervous systems of these vulnerable clients. Accurate and effective training for the integration of neuroscience into the counseling field and the treatment of psychological trauma is imperative. Work with a trauma survivor is a unique and important gateway for the integration of neuroscience into the counseling field at large, given the neurophysiological impacts of trauma on the nervous system. Further exploration is needed for the development of standardized practices and benchmarks for knowledge, competencies, and how counselors can best become sufficiently neuro-informed in their practice. Relatedly, it is important to understand how neuro-informed counselors have learned to integrate neuroscience research findings into their clinical practice.

Counselor practitioners, researchers, and educators with a dispositional interest in neuroscience are taking a very deep dive into the vast and complex field, but not all of neuroscience is relevant or useful to the counseling field. Training in this hard science has a different emphasis than much of counselor training; however, the push for this integration is occurring. There is a tension between the medical model of hard science training and research and the holistic, humanistic field of counseling. Researchers in counseling must explore how neuroscientific research findings fit into the overall way counselors are trained and deliver services.

Leaders in the neuro-informed counseling movement believe that counselors need to stay as close to the accurate hard science as possible and understand with some depth how the brain and nervous system are impacted by counseling interventions (Field et al., 2018). However, it remains unclear how neuroscientific research outcomes can be intentionally and systematically integrated into the counseling field in a way which honors the professional counseling identity, promotes self-efficacy, and ensures accurate knowledge and meaningful application. While continuing education opportunities exist, there is no established framework or way to ensure adherence to existing standards. Therefore, the need exists to address the lack of standardization and consistency in neuro-informed counseling training and education (Russo et al., 2021). The current study, therefore, explored the experiences of counselors who are neuro-informed in their work with trauma survivors to identify their understanding of neuroscience concepts and how they have been trained in clinical practice. A clearer understanding of neuro-informed counseling practices should help to move the field towards the establishment of a framework for standardization of neuro-informed counseling and training.

Emerging neuroscientific research is influencing the creation of new theories, modalities, and conceptualizations of clinical symptoms while also providing evidence of the efficacy of existing psychological theories and interventions (Beeson & Field, 2017). One important example of this is that researchers within the counseling field have turned their attention towards the neurobiological impact of trauma on the human brain and nervous system and are working to understand how neuroscientific findings can be effectively integrated into the counseling practice (Field, Beeson, et al., 2017; Mahajan, 2018; Russell-Chapin, 2016; Weiss, 2007).

## **Trauma: A Neuro-informed Definition**

Trauma is pervasive in society. For example, Kilpatrick et al. (2013) found that approximately 89.7% of U.S. residents reported experiencing at least one traumatic event, based on criteria from The American Psychiatric Association's (APA, 2013) Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5). A response-based definition of trauma emphasizes an individual's response along with what occurs within the nervous system during and after a distressing event. From this perspective, trauma is what results in the nervous system when a traumatic event pushes someone beyond their capacity to cope and adapt (Levine, 1997). Humans evolved with an instinctual, adaptive capacity to heal. The body's response to stress is an adaptive process in which stress is processed through the nervous system and resolved (Jones et al., 2017). Unfortunately, these natural healing and protective responses can be overridden or rendered unsuccessful, causing dysregulation in the Autonomic Nervous System (ANS; Giaretto, 2019; Levine, 2010).

A healthy stress response involves activation of the Sympathetic Nervous System (SNS), one branch of the autonomic nervous system that increases arousal, activates fight or flight responses, and prepares for threat (Levine, 2010). Once safety is achieved, the parasympathetic nervous system, the second branch of the ANS, acts as the brake to discharge energy and bring the system back to a state of relaxation (Giaretto, 2019). However, when the ANS is overwhelmed beyond its capacity to self-regulate during a traumatic experience and this natural discharge is inhibited, the nervous system becomes dysregulated, resulting in a wide range of trauma-related symptomology (Giaretto, 2019; Levine, 1997). Individuals experiencing such nervous system dysregulation often find their way to counseling and are diagnosed with such issues as Acute Stress Disorder, PTSD, or Complex-PTSD.

When an individual experiences a traumatic event, the SNS is activated to initiate the complex fight-or-flight response. The incoming sensory information is received and processed by the thalamus and, from there, directed to the appropriate subcortical or cortical areas, including the amygdala, which assesses the emotional salience of stimuli. When the amygdala registers a threat, it signals the hypothalamus to direct the pituitary gland to release hormones and the locus coeruleus to release neurotransmitters that activate the SNS and initiate the fight-or-flight response (Jones et al., 2017; van der Kolk, 2006). The body begins to mobilize, directing all possible energy and resources to the parts of the body that will keep an individual alive (Jones et al., 2017). Allostasis is the physiological capacity to adapt to stressors, while the allostatic load is the toll an allostatic response takes on the brain and body (Field, Jones, et al., 2017). During an acute trauma response, the hypothalamus is hyperactive, leading to increased hormone secretion and increased allostatic load (van der Kolk, 2006).

Chronic or severe trauma leads to allostatic overload and causes neural damage (Weiss, 2007). Traumatic stress can interrupt the body's negative cortisol feedback loop, which normally functions to stop production of cortisol. When the feedback loop is impaired, stress responses remain activated, causing symptoms of continued, maladaptive hyperarousal (Weiss, 2007). The resulting dysregulation in the brain and nervous system leads to significant distress, resulting in maladaptive social, emotional, cognitive, and physical outcomes long after the threat has passed (Jones et al., 2017). Understanding the nuanced and complex CNS and ANS responses that trauma survivors experience is key to counselors being able to perform effective neuro-counseling. Yet, it remains unclear how neuro-informed counselors are obtaining the neuroscientific training needed to support clients who have experienced psychological trauma and the CNS dysregulation that may result.

## **Neuroscientific Concepts Influencing the Counseling Field**

While the medical model of the neuroscience field may stray, in some ways, from what most training in the counseling field consists of, the push for the integration of translational neuroscience is taking place and necessitates attention. Leaders at the forefront of this integration speak to the importance of staying true to the hard science (Field, Jones, & Russell-Chapin, 2018). Neuromyths or the overextension and misrepresentation of the original research are possible risks from the translation of hard neuroscience into the applied context of counseling. There is the risk that application becomes too far removed from the actual science and, as a result, clients are not helped. Researchers argue that counselors must be able to understand and translate neuroscience information first-hand (Jones et al., 2017); however, how they become prepared to do so is unclear. Therefore, there is a need to balance the humanistic approaches of counselor education, which center on theories of change and human development, with the medical models of relevant neuroscience research. As processes for developing neuroscientific literacy among clinical mental health clinicians have yet to be identified, there is a need to explore how neuroscience fits into the work of clinical mental health counselors. Given the importance of accurate information in the counseling field, this section presents the integral information found across relevant neuro-informed counseling literature.

There is a need to identify the concepts from the field of neuroscience that are most relevant to the counseling field and how these can best be disseminated. To date, there is little organized consensus among scholars regarding what research and knowledge is most beneficial for counselors to understand or share with clients, particularly in the treatment of psychological trauma; however, some common themes have begun to emerge. The following section outlines some of the key concepts that are discussed in counseling and neuroscience textbooks and



articles. These concepts include a good deal of technical knowledge that not all clinical mental health counselors may be equipped to integrate into their work. However, as previously noted, there are ongoing calls for neuro-informed counseling, not as a specialty, but as an important component of all clinical mental health counseling moving forward. These calls raise important questions regarding how neuro-informed counselors are trained and how they practice to ensure accurate neuroscience information in the counseling field.

### **Organization of the Mammalian Nervous System**

In addition to understanding the brain and its various structures, an understanding of the rest of the nervous system and how it functions to keep humans safe is an important neurophysiological consideration for the neuro-informed counselor. Knowledge of the nervous system allows counselors to conceptualize the distress of dysregulated, traumatized clients. Neuro-informed counselors can help clients understand their own nervous system states and implement strategies to help discharge traumatic energy and re-regulate their traumatized nervous systems. The mammalian nervous system is comprised of two major branches: the central nervous system (CNS) and the peripheral nervous system (PNS). The central nervous system consists of the brain and spinal cord. The cranial nerves, spinal nerves, and peripheral ganglia make up the PNS, which convey sensory information to the CNS and messages from the CNS to the body's organs, muscles, and glands. The PNS is divided into the somatic nervous system and the autonomic nervous system. The somatic nervous system is responsible for voluntary muscle movement, innervating sensory information from sensory organs, and controlling movement of skeletal muscles. The autonomic nervous system (ANS) regulates involuntary processes involving smooth muscle, cardiac muscle, and glands. The ANS is then even further divided into the sympathetic nervous system (SNS) and the parasympathetic

nervous system (PNS; Carlson & Birkett, 2017). The ANS is activated by internal and external threat. The two divisions of the ANS work together to protect an organism through a hierarchy of defensive responses: social engagement, fight, flight, and freeze (van der Kolk, 2006). Although consensus exists that the counseling field must prepare counselors to remain as close to the hard science as possible, there is currently no framework outlining for the depth and detail of counselors' knowledge of the nervous system. It is clear, however, that neuro-informed counseling necessitates an understanding of the organization of the mammalian nervous system, which includes an understanding of the body's natural threat response. This understanding aids counselors in conceptualizing, normalizing, and treating symptoms trauma survivors may experience and seek treatment for.

### *Sympathetic Nervous System*

The sympathetic branch of the ANS is involved in the activation of the body's fight or flight response in the face of threat through the expenditure of energy from reserves in the body. This may present as restlessness, rapid breathing, flushed face and/or neck, rigid posture, quick speech, or psychomotor agitation, to name a few examples. The SNS controls the adrenal medulla, a set of cells located in the interior of the adrenal gland, which produce epinephrine and norepinephrine as hormones when stimulated, which increases heart rate and raises blood sugar, preparing and mobilizing the organism to respond to threat through flight or fight response (Carlson & Birkett, 2017). The SNS of an excited organism increases blood flow to skeletal muscles that are actively being engaged. If a counselor recognizes the signs of overactivation of the sympathetic fight or flight response during session, they can use interventions that will help the client downregulate, such as deep breathing, simple meditation, or sipping mindfully on warm tea. Conversely, depending on the stage of therapy a client is in, a counselor might engage

interventions that help heighten the fight/flight response (e.g., movement in session, interoceptive attention to internal sensations) to move it to a natural, adaptive resolution (Levine, 1997). The SNS is always active; the key is to ensure regulation.

### ***Parasympathetic Nervous System***

The PNS is involved in activities that increase the body's supply of stored energy, including salivation, gastric and intestinal motility, and increased blood flow to the gastrointestinal system (Carlson & Birkett, 2017). The PNS is involved in social engagement behaviors and works to calm and relax an organism after SNS activation in response to threatening stimulus, working with the SNS to create cycles of activation and decreased activation (Porges, 2011). The PNS influences heart rate independently of the SNS, particularly resting heart rate. Vagal fibers inhibit sympathetic influence and mobilization while also promoting a rapid decrease in metabolic output (Porges, 2007; van der Kolk, 2006). However, when SNS threat responses of flight and fight are unsuccessful or overwhelmed, the PNS is responsible for the freeze response, wherein an organism shuts down and essentially prepares for death, from an evolutionary standpoint (Giaretto, 2019). If a client is overwhelmed to the point of a freeze response, wherein the dorsal vagal nerve is activated to, in session, the counselor may notice signs such as shallow breathing, collapsed posture, slow speech, fixed gaze, low tone of voice. Traumatized nervous systems become dysregulated at inappropriate times and cause symptomology and distress for trauma survivors. Neuro-informed counselors can help clients cultivate an awareness of their different nervous system states and develop and implement strategies that help regulate a dysregulated nervous system. If a therapist recognizes that a client is in a parasympathetic freeze response state of hypoarousal, they can engage interventions that promote upregulation and mobilization, such as utilizing a cold ice pack or drink of water,

vibrant aromatherapy fragrance, or using movement such as running in place to elevate the client's heart rate.

## **Neuroplasticity**

The theory of neuroplasticity has been identified as particularly relevant to the counseling profession (Gonçalves & Perrone-McGovern, 2016; Miller, 2016). Eric Kandel's (1998, 2005) brain research revealed that brain cells can and do form new neural connections in response to new learning experiences and environmental stimuli through the process of *neuroplasticity*. In fact, both positive (therapeutic) and negative (traumatic) experiences alter the brain (Kindsvatter & Geroski, 2014; Penadés et al., 2013; van der Kolk, 2006; Weingarten & Strauman, 2015), through positive and negative neuroplasticity (Goncalves & Perrone-McGovern, 2016) (e.g., learning to play the piano versus learning to dissociate to escape the anxiety created by trauma). Neuroplasticity can be an empowering notion for clients in counseling who often feel helpless or hopeless to change. The idea of neuroplasticity can restore hope, reduce shame and blame, and gain buy-in from clients of the therapeutic process, which, when well-established, physically alters the brain towards adaptive growth (Field, Jones, et al., 2017; Luke et al., 2020). This concept is not overly technical and can be easily integrated into counselor training and practice to support humanistic ideals of growth and development.

Neuroscience researchers have identified psychosocial factors which interfere with the efficacy of synaptic transmission, contributing to negative neuroplasticity. These factors include, but are not limited to, emotional neglect, addiction, stress and trauma, and environmental impoverishment (Field, Jones, et al., 2017). Such conditions are responsible for molecular, cellular, and brain changes at the structural, functional, and connectivity levels and are associated with psychological distress (Gonçalves & Perrone-McGovern, 2016). Conversely, factors such as

nurturing, caring, healthy behavior, emotional regulation, and environmental enrichment have been identified as promoting positive neuroplasticity through the creation of new synapses, *synaptogenesis*, and new neurons, *neurogenesis*. These factors have profound implications for counselling, namely promoting healthy development and countering the effects of negative neuroplasticity (Gonçalves & Perrone-McGovern, 2016).

The prosocial neuroplasticity promoting factors map nicely onto the common factors identified as necessary and sufficient for therapeutic growth across all psychotherapeutic theories. The common factors of therapeutic change were defined by Laska et al. (2014) as:

(a) an emotionally charged bond between the therapist and patient, (b) a confiding healing setting in which therapy takes place, (c) a therapist who provides a psychologically derived and culturally embedded explanation for emotional distress, (d) an explanation that is adaptive (i.e., provides viable and believable options for overcoming specific difficulties) and is accepted by the patient, and (e) a set of procedures or rituals engaged by the patient and therapist that leads the patient to enact something that is positive, helpful, or adaptive. (p. 3)

Neuroscience research has shown that the counseling ideals of empathy and healthy interpersonal relationships, such as the therapeutic relationship, have a positive impact on neuroplasticity, supporting the efficacy of the counseling common factors (Coutinho et al., 2014; Eres et al., 2015; Fan et al., 2011). What remains unclear is the ability of neuro-informed counselors to employ the concept of neuroplasticity to educate their clients and to support therapeutic change.

## **Effects of Trauma on Specific Brain Regions**

Leading writers and researchers within the neuro-informed counseling movement assert that a working knowledge of various brain regions and their functioning is an important knowledge component for the neuro-informed counselor (Field et al., 2018). Understanding of brain regions has developed along with new technological advances, including functional magnetic resonance imaging (fMRI) and electroencephalogram (EEG), providing insight into the way trauma impacts various brain regions (Uhernik, 2017). Working knowledge of brain regions and the impact of both negative and positive neuroplasticity is important for the neuro-informed counselor to comprehend (Field et al., 2018; McHenry et al., 2014; Uhernik, 2017). Further research is needed to establish benchmarks and a framework around the depth and technical knowledge that is needed for effective integration into the wider counseling field. Nevertheless, key areas of the brain that are often discussed within counseling literature along with a current understanding of their functioning are described below. It is likely that a neuro-informed counselor will need to possess functional knowledge of these brain regions and systems when working with trauma clients both to provide psychoeducation and to execute counseling interventions adroitly.

### ***Frontal and Prefrontal Cortex***

The frontal and prefrontal cortex are the executive control centers of the brain, responsible for higher order processing and making decisions about cognitive and emotional responses, communicating with almost every other area of the brain (Weiss, 2007). The prefrontal cortex filters out nonessential stimuli and refines the process of homeostasis created by the hypothalamus. Studies have shown decreased volume and atrophy in the prefrontal cortex among victims of abuse and neglect. These neuronal deficits in the prefrontal cortex and insula

have been linked to symptoms of trauma such as numbing and dissociation (Navalta et al., 2018). Dissociation is generally a feeling of disconnection from oneself and/or the external world and can manifest in many ways including emotional numbness, a coping strategy and state of being in which one is not feeling or expressing emotions. Hypoactivation in this area of the brain is thought to contribute to impairment of impulse control and inhibition of reactions, particularly in response to trauma-related cues (Weiss, 2007). The orbitofrontal cortex is a region within the prefrontal cortex that is involved in interpersonal functioning, regulation of autonomic functioning, stimuli discrimination, learning, and problem-solving (Cavada & Schultz, 2000). Furthermore, the dorsolateral prefrontal cortex helps control unwanted thoughts and memories and contributes to a sense of time. Dysregulation of this area may contribute to post-traumatic re-experiencing symptoms, intrusive thoughts, and clients' difficulty recalling specific timelines of events (Navalta et al., 2018). Both areas show decreases in functioning following certain traumatic experiences, leading to a variety of maladaptive social, emotional, cognitive, and physical outcomes.

A clinician who understands these traumatic impacts on the prefrontal cortex can more meaningfully conceptualize a client's struggles and symptomology. Neuroeducation around the dysregulation a person is experiencing can help to normalize their struggles. It may further assist clients in understanding that their experiences are a natural response to trauma and that they are safe even in distressing circumstances.

Broca's area, also located in the frontal cortex, is associated with language production and can be impacted by trauma, resulting in a difficulty for survivors to put words to experiences at specific times, such as during symptoms of re-experiencing or dissociation (Field et al., 2017). This fact has implications for talk therapy and bottom-up versus top-down processing approaches

to healing trauma. A neuro-informed counselor should be aware that a client may not be able to verbalize all aspects of traumatic experiences during times of overwhelm due to impairment in regions of the prefrontal cortex and that they may need a bottom-up therapeutic approach in order to process stored trauma. Counselors must be mindful of overwhelming clients during the process of trauma reprocessing. Knowledge of these process not only help clinicians understand what to expect and what they are observing in their clients, but to help clients understand their experiences as normal responses to traumatic events.

### *Thalamus*

The thalamus is responsible for relaying much of the incoming sensory information to the rest of the brain. Hypersensitivity or hyposensitivity to certain stimuli may result following traumatic experiences (Weiss, 2007). Furthermore, impaired corticothalamic circuitry, the connection between the thalamus and the cortex, can cause an individual to have problems with concentration and being fully engaged in the present (van der Kolk, 2006). The thalamus also helps to integrate declarative memory, and impeded thalamic functioning may cause an individual to have traumatic memory trapped in the body and senses, with no fluid narrative around it (Field, Beeson, et al., 2017). This has implications for bottom-up therapeutic approaches, which can target sensations even if no explicit memory exists. An example of this would be the interoceptive practices of Somatic Experiencing, wherein the counselor guides the client to notice what is happening in their bodies, experiences like activation in the chest, numbness, or increased heart rate. Counselors can help clients to recognize where traumatic energy may be trapped in their nervous system in order to activate and bring it to an adaptive resolution (Giaretto, 2019).



### ***Hippocampus***

The hippocampus is responsible for the establishment of declarative, long-term conscious memories and memory consolidation. Individuals who have experienced trauma have been found to have decreased activation in the hippocampus and sometimes decreased hippocampal volume after chronic exposure to trauma (Navalta et al., 2018). These changes may be due to excessive exposure to stress-related hormones, such as corticosteroids, and may explain symptoms of avoidance and numbing, the inability to recall traumatic experiences, memory fragmentation, dissociation, emotional dysregulation, and hyperarousal (Weiss, 2007). Neuro-informed counselors can educate their clients and assist them in identifying these symptoms. Through positive psychosocial, neuroplasticity-promoting experiences in counseling, clients can begin to heal the damage left behind by traumatic experiences.

### ***Amygdala***

The amygdala assesses the emotional valence and safety or threat of stimuli received from the thalamus and the hippocampus, which is then sent to subcortical regions and the brain stem to activate appropriate responses, and to the hypothalamus to trigger neuroendocrine and autonomic responses (Weiss, 2007). When a stimulus is registered as threatening, the amygdala communicates with these brain structures to initiate the fight or flight response (Field, Jones, et al., 2017). Hypersensitivity in the amygdala is often a result of trauma, which can contribute to symptoms of hyperarousal and reexperiencing (Fonzo et al., 2010; Weiss, 2007). Hyperarousal occurs when an individual is easily triggered into a state of fight or flight. Survivors of trauma often experience distress and anxiety as a result of hyperarousal. Knowledge of the impact trauma has on the amygdala can help facilitate an understanding of the symptoms and distress

that clients face. Counselors can engage clients in contemplative exercises such as intentional awareness of the five senses to help downregulate the amygdala (Gerritsen & Band, 2018).

### ***Hypothalamic-Pituitary-Adrenal (HPA) and Sympathetic-Adreno-Medullar Axes***

While not a specific brain region, the HPA and SAM axes are functional systems with relevance to the stress response and impacts of trauma. All incoming sensory information is filtered through the thalamus. When the amygdala detects danger in the environment, before the threat is even in one's conscious awareness, the HPA and SAM axes are stimulated to initiate a cascade of neurobiological events and to launch the SNS into action through the release of chemical messengers. These processes activate the pituitary gland, which then activates the adrenal glands, to release additional stress response hormones. These hormones then affect the heart, lungs, brain, and muscles, triggering a fight or flight sympathetic response (Uhernik, 2017). The functioning of the HPA and SAM axes appear to be altered by trauma and chronic stress (Godoy et al., 2018; Weiss, 2007). Flashbacks and other forms of re-experiencing symptoms associated with trauma may continue to stimulate activity in the HPA axis, as one contributing factor to the complex symptoms of avoidance and numbing (Weiss, 2007). When a threat is no longer present, a well-regulated HPA axis stimulates a negative feedback loop that discontinues the production of corticotropin-releasing factor to re-regulate the system. The negative feedback loop is part of the adaptive functioning of the HPA axis and is essentially the off switch of the HPA axis when the threat is no longer present. This is an adaptive process intended for short periods of stress response. However, prolonged or traumatic stress disrupts the adaptive functioning of the stress response systems, causing system dysregulation. The chronic overactivation of the HPA and SAM axes impact multiple brain regions, including the frontal

and prefrontal cortices, the amygdala, and the hippocampus, leading to post-traumatic symptomology (Field et al., 2019).

The neuro-informed counselor should possess knowledge of the processes that the HPA and SAM axes employ so they can provide neuro-education to clients regarding what is occurring when unresolved trauma is at play. Clients will often feel confused as to why their brain and body highjack their experience when anxiety is present, so educating about these processes can be comforting. Furthermore, counselors need the capability to recognize evidence of a dysregulated HPA axis and notice if the content of a counseling session heightens such symptomology. Dysregulation may present in multiple ways, such as rapid breathing, difficulty focusing, tearfulness, disorientation, and even anger. Counselors must be equipped to recognize when the HPA Axis is overactive to help clients navigate this dysregulation by training them to return to a state of regulation within and between sessions.

### **Trauma Theory in Counseling: Bottom-Up vs. Top-Down Processing**

The integration of neuroscience into clinical practice can shift primary treatment goals from assisting clients in changing their unwanted thoughts, feelings, and behaviors (top-down processing) towards helping clients improve their emotional and physiological regulation (bottom-up processing; Russell-Chapin, 2016). From a top-down approach, a counselor uses techniques and skills to activate the frontal cortex, encouraging the client to change thoughts, feelings, and behaviors using evolutionarily newer parts of the brain. This, in turn, should change brain structure and function (McHenry et al., 2014). Interventions in the realm of traditional talk therapy, such as CBT or narrative therapy, are considered top-down approaches. By contrast, bottom-up approaches focus on the body, targeting energy that is stored there maladaptively, aiming to regulate the nervous system. As a result, thoughts, feelings, emotions, and behaviors,

can shift towards adaptive resolution (Giaretto, 2018). A deeper understanding of the way trauma impacts the nervous system has enhanced and complemented traditional talk therapy towards the integration of body-based approaches to address the physiological impacts of trauma that cannot be properly processed by strictly talking about it. In fact, the way trauma impacts the brain means that, often, traumatic memories are not verbally accessible. They may be stored as implicit rather than explicit memories, Broca's area may be impaired, and memories may be fragmented or otherwise verbally inaccessible (van der Kolk, 2015; Weiss, 2007).

Somatic Experiencing (SE), Eye Movement Desensitization and Reprocessing (EMDR), Sensorimotor Psychotherapy (SP), interpersonal neurobiology, and even trauma-sensitive yoga are examples of body-based, bottom-up trauma modalities (Emerson, 2015; Ogden et al., 2015; Shapiro, 2001). *Somatic Therapy Toolbox* (Mishke-Reeds, 2018) is one example of a bottom-up resource for clinicians, with 125 bottom-up worksheets and exercises designed to treat trauma and stress. Symptoms of trauma often involve emotional and physiological dysregulation, which can be reflected in symptoms of depression, anxiety, hypervigilance, and substance use; lack of sleep, nightmares or flashbacks of the event; and social withdrawal, physical pains, and hypervigilance (Brubacher, 2018; van der Kolk, 2015). The ability to track certain physiological responses to stress and trauma in clients during sessions can help guide therapeutic intervention using bottom-up modalities. These responses can include hyperarousal responses (e.g., restlessness, rapid breathing, flushed face and/or neck, rigid posture, quick speech, psychomotor agitation) or hypoarousal (e.g., shallow breathes, collapsed posture, slow speech, fixed gaze, low tone of voice) of the nervous system (Giaretto, 2019).

Bottom-up therapeutic approaches aim to process trauma stored in the nervous system and body in the context of a safe and secure therapeutic relationship (van der Kolk, 2015). *Using*

*Neuroscience in Trauma Therapy* (Uhernik, 2017) is a resource that outlines how therapists can integrate neuroscientific concepts into their clinical practice. Dana (2018) provided conceptual and practical ways to integrate polyvagal theory in clinical practice through neuroeducation and exercises promoting self-awareness of nervous system regulation.

### ***Polyvagal Theory***

Polyvagal theory is based on the work of Steven Porges (1997, 2003, 2007, 2011) and proposes a framework for integrating the structure and function of the mammalian nervous system and stress response into mental health treatment. PVT emphasizes the role that the 10th cranial nerve, the vagus nerve, plays in regulating social engagement and threat responses and necessitates an understanding of the organization of the mammalian nervous system (Porges, 2011). This theory organizes the ANS into three stages of phylogenetic development, each with distinct adaptive behavioral strategies: The Dorsal Vagal Complex (DVC), the sympathetic nervous system (SNS), and the Ventral Vagal Complex (VVC). PVT has guided the development of clinical interventions, such as work by Dana (2018), *Polyvagal Theory in Therapy*. Trauma interventions including Somatic Experiencing, developed by Peter H. Levine, are heavily influenced by PVT.

It is important to note that critiques of this theory do exist. While it is a clinically useful theory, there is a lack of hard science research supporting the physiological or evolutionary basis of Porges' claims. It is widely used among trauma counselors to help survivors heal, but it is also important to maintain an awareness of the possibility for the overextension or misrepresentation of science into practice. Grossman and Taylor (2007) were among the first to challenge polyvagal theory, speaking to the complex nature of the systems in question. Porges (1995, 2004, 2011) spoke to respiratory sinus arrhythmia (RSA) as cardiorespiratory phenomenon that

supports PVT. Grossman and Taylor (2007) pointed out that this is not an entirely reliable measurement given a number of confounding variables. These critiques are supported by others (e.g., Neuhuber & Berthoud, 2022; Taylor et al., 2022). While it is currently widely accepted in the field and provides a useful framework for neuro-informed practice, it is also an example of how we have a long way to go in our understanding and integration of neuroscience into counseling in a useful, accessible, and accurate way.

The mammalian nervous system has evolved with specific neural and behavioral features designed to react to internal and external stimuli to maintain safety and homeostasis. PVT links the evolution of the autonomic nervous system (ANS) to an organism's range of emotional expression, quality of social communication and engagement, and complex defensive behaviors (Porges, 2003). An understanding of what is happening in the nervous system through neuroeducation allows for more self-efficacy, autonomy, and the ability to re-regulate. PVT outlines a hierarchical relationship among three subsystems of the autonomic nervous system that have evolved to support adaptive behaviors in response to the environmental features of safety, danger, and life threat (Porges, 2011). The term "polyvagal" is meant to emphasize that there are two branches of the 10th cranial or vagus nerve. One is the evolutionarily older, unmyelinated dorsal vagal circuit associated with defense. The dorsal motor nucleus (DMNX) in the dorsomedial medulla in the brainstem and the dorsal branch of the vagus nerve make up the dorsal vagal complex (DVC; Porges, 2011). The second is the evolutionarily newer, myelinated ventral vagal branch, only observed in mammals and associated with physiological states related to feeling safe and social (Porges, 2011). The ventral vagal branch makes up part of the ventral vagal complex (VVC). The VVC acts as what is referred to as the vagal brake, inhibiting mobilization of the SNS, enabling social engagement and engagement with the environment (van

der Kolk, 2006). PVT is a clinically useful theory, particularly in that it breaks down complex mechanisms into easily translatable concepts that clinicians and clients can explore in the clinical setting. It can help empower clients to manage their maladaptive stress responses and contribute to the reduction of shame and blame for survivors of trauma by normalizing symptomology as adaptive responses to trauma.

### ***Neuroception***

In order to survive and determine which defensive or social behaviors to activate, mammals must evaluate the safety of their environment, determine friend from enemy, and communicate with their social unit (Porges, 2001). Porges (2011) used the term neuroception to describe how neural circuits determine whether internal and external cues are safe, dangerous, or life-threatening. The nervous system relays sensory information to the thalamus, which organizes and sends processed information to appropriate regions of the brain, including the amygdala, where the emotional valence of experiences is determined. This information is sent to subcortical motor structures and the brain stem to elicit appropriate responses (Weiss, 2007). The brain works with the afferent fibers of the vagus nerve to constantly monitor internal and external safety through implicit processes involved in neuroception (Porges, 2011).

In social environments, neuroceptive processes pick up on social cues from others' muscles involved in facial expression, voice prosody, gaze, and head gestures, which are innervated by the myelinated ventral vagus nerve (Geller & Porges, 2014; Porges, 2011). In this way, neuroception works to determine the intention of others' voices, faces, and hand movements through the ventral vagus nerve (Porges, 2011). The extent to which a counselor needs to understand the neurophysiological mechanisms at play in neuroception is not clear in the literature. It is possible that a basic understanding of the process rather than what is presented

in much of the neuro-informed counseling literature may be sufficient. Neuroception may become impaired toward hyper or hypoactivation as a result of trauma. Trauma survivors may experience benign situations as threatening or conversely may misinterpret danger as safety. The consequences may result in intense anxiety or fear when there is no threat, or clients may repeatedly find themselves in dangerous or unhealthy situations or relationships. Clinicians who recognize these patterns can help bring client awareness to facilitate the healing of neuroceptive processes.

### ***Hierarchy of Defense Responses***

As the vertebrate nervous system evolved, becoming more and more complex, its repertoire for affective and behavioral responses expanded (Porges, 2011). According to PVT, the ANS can be organized into the DVC, the SNS, and VVC, each representing a distinct stage of evolutionary phylogenetic development with distinct adaptive behavioral strategies. The DVC is the most ancient and is responsible for immobilization in response to threat. According to PVT, the earliest mammals were equipped only with this dorsal portion of the vagus. The SNS is then responsible for mobilization as well as fight or flight behaviors. The phylogenetically newest stage is the VVC, responsible for social communication and engagement (Porges, 2011). Once the ventral vagus branch evolved, mammals were able to engage with each other socially, rather than respond with only fight, flight, or freeze. These responses occur hierarchically, meaning the first response option in most situations is social engagement through activation of the VVC, while the freeze response would be considered a last resort (Porges, 2011).

The appropriate response is initiated once neuroception has assessed the safety of the environment. If neuroception determines safety, the vagal brake remains engaged, partially suppressing the SNS and allowing for social engagement through the VVC. If, on the other hand,



neuroception detects danger, the vagal brake is released, and the SNS prepares the organism for action through flight, if possible, and then fight. Following successful SNS activation and threat evasion, the vagal brake of the PNS reactivates and brings the system back to rest. However, if SNS activation is not successful, the dorsal vagal branch activates immobilization, or feigned death, through the DVC. PVT is only one of several theories that exist to explain the freeze response, but it is clear that immobilization serves several evolutionary functions. Feigned death may act to deter a predator looking for live prey, but there is also an analgesic effect produced by the DVC to protect the organism from physical and emotional pain.

PVT attempts to create meaningful links between basic scientific research, social behavior, and clinical practice (Billow & Weinberg, 2014). As such, many counseling interventions and strategies have been developed based on PVT. When clients understand their symptoms as adaptive responses to traumatic, maladaptive circumstances, they can build self-compassion and begin to heal. By cultivating an awareness of various nervous system states and associated symptoms and experiences, clients can take control of their symptomology and implement strategies to regulate and repair their nervous systems.

### ***Somatic Experiencing***

As an example of how PVT can be integrated in practice, SE is a bottom-up treatment modality used for trauma resolution, with the goal of enabling the body's natural ability to self-regulate and process trauma (Levine, 1997, 2010). Developed by Peter Levine, and with more than 45 years of successful clinical application, it is a multidisciplinary approach to trauma treatment. The practitioner is trained to track visual cues thought to be indicative of parasympathetic and sympathetic activation, under the premise that the ANS initiates protective responses when exposed to physical or emotional threat. The nervous system becomes

overwhelmed when stimulation is introduced too fast, too soon, or when it is too much for the capacity of the ANS stress response to process (Giaretto, 2019). SE emphasizes the importance of attending to the neurobiological and physiological processes implicated in traumatic symptomology, with the goal of activating the body's natural ability to release trapped traumatic stress and heal the impact of traumatic events (Giaretto, 2019). In this way, SE is allowing for traumatic stress maladaptively stored in the brain and nervous system to be reprocessed towards and adaptive resolution.

SE practitioners aim to work directly with the client's nervous system. Clients' attention is guided towards interoceptive (awareness and sense of internal sensations), proprioceptive (awareness and sense of the position of the body), and kinesthetic (awareness and sense of movement of the body) experiences to enable the completion of thwarted, biologically based, self-protective responses (Payne et al., 2015) through intentional activation of the ANS. Clients are guided to pendulate, or move between, states of nervous system arousal and nervous system regulation. Counselors are trained to track nervous system activation through specific visual cues, which are hypothesized to be indicative of parasympathetic and sympathetic activation.

Outcome studies have demonstrated the effectiveness of SE trauma resolution therapy (Briggs et al., 2018; Leitch, 2007; Leitch et al., 2009; Parker et al., 2008). Other relevant literature presents hypothetical neuroscience models theorizing neuroscientific underpinnings implicated in SE (Payne et al., 2015). For example, Hricko (2011) discussed the way SE activates the right hemisphere of the brain to help with whole brain integration as a hypothetical mechanism of trauma healing. Research has demonstrated that it is the right hemisphere that processes unconscious emotions and contributes to emotion regulation, while the left hemisphere helps with sorting and making sense of experiences. Integration and communication between the

two hemispheres, therefore, is imperative to the processing of traumatic experiences (Hricko, 2011).

The benefits of interoceptive, body-based therapies have been hypothesized, beyond SE specific literature (van der Kolk, 2006). Payne et al. (2015) spoke directly to the interoceptive, proprioceptive, and kinesthetic underpinnings of SE. The authors suggested a focus on the functioning of the deeper, regulatory levels of the nervous system. These systems interact together to form a complex, dynamic system which can enter various functional and dysfunctional states and are susceptible to increased stress produced during the traumatic stress response. Payne et al. (2015) suggested that SE works to restore optimal functioning to the nervous system by way of accessible cortical areas of the brain in communication with subcortical networks. These networks are all implicated in interoception, proprioception, and kinesthesia, which are important aspects of SE.

Successful SE therapy and intervention supports the importance of considering neuroscientific concepts in therapeutic settings and the effectiveness of bottom-up interventions. Neuroscience explanations can help promote the effectiveness of new modalities that may otherwise face doubt or pushback in the field. The depth of understanding of this neuroscience information that is necessary to be taught and integrated into the counseling field for effective intervention needs to be explored. An understanding of the neurophysiological underpinnings can deepen the efficacy of the work counselors do, but research is still needed to identify benchmarks and framework for accurate integration.

### **Adaptive Information Processing Model**

While PVT addresses the way trauma impacts the nervous system, the Adaptive Information Processing (AIP) model addresses the way traumatic memories are processed and

stored in the brain and has guided the development of Eye Movement Desensitization and Reprocessing (EMDR). However, its application goes beyond EMDR. It can provide an understanding and conceptualization of the way traumatic memories become maladaptively stored in memory networks in the brain, leading to symptomology and distress in clients. Such an understanding of the underlying reasons for their distress is empowering and even comforting for clients (Hase et al., 2017; Shapiro, 2001). It provides a physiological framework for processing distressing memories, both implicit and explicit. By attending to the thoughts, feelings, and sensations associated with the maladaptive memory, the information processing system can be stimulated in a safe therapeutic environment. Using various techniques, such as targeted eye movements used in EMDR, the brain is given an opportunity to reprocess the “stuck” pathogenic memories to an adaptive resolution (Shapiro, 2001).

The human brain processes incoming experiences based on prior experiences. Neurobiology currently offers two complex models of information processing: the parallel distributed processing/connectionism model (PDP) and the thalamocortical-temporal binding model (Bergmann, 2020). Extreme stress experienced during trauma, the flood of hormones and neurotransmitters, and overactivation of the nervous system, for example, may impair the brain’s natural information processing system so that the memory becomes pathogenic, stored in a raw, unprocessed, maladaptive form. A particularly distressing memory may be unable to connect with other existing memory networks that hold adaptive information. It becomes “stuck” in this excitatory state, and can, therefore, be easily triggered by external and internal stimuli, leading to symptomology such as re-experiencing symptoms of PTSD. Dysfunctionally stored traumatic memories form the basis for post-traumatic symptomology, including emotions, cognitions, and behaviors that lead to intra and interpersonal distress for clients. Perceptions of current situations

may be more easily linked to associated memory networks in these unprocessed, dysfunctionally stored memories, leading to trauma symptoms, such as re-experiencing of traumatic memories and sensations (Shapiro, 2001).

According to the AIP model, trauma is subjective. The information processing system can be disrupted by more than just the overwhelming traumatic stress associated with a traumatic experience as defined by the DSM-5. Shapiro (1989) distinguished between “big T” and “little t” trauma. “Big T” trauma includes those experiences that are considered life threatening. “Little t” traumas encompass events experienced as traumatic at a personal level, such as a negative interaction with a loved one or the loss of a pet. “Little t” traumatic experiences may not be experienced as trauma by everyone, but it is important that clinicians maintain an awareness of the subjective, response-based nature of trauma (Shapiro, 2001).

### ***EMDR***

Pioneered by Francine Shapiro (1989), Eye Movement Desensitization and Reprocessing (EMDR) is an evidence-based, bottom-up trauma treatment based on AIP theory. The EMDR protocol involves eight structured phases in which the processing system of the client’s brain is stimulated to reprocess maladaptively stored traumatic memories to an adaptive resolution. This also involves the reprocessing of negative beliefs into adaptive beliefs (Murray, 2016). Based on Shapiro’s Adaptive Information Processing (AIP) model, the eight phases of EMDR include history-taking (a), preparing the client (b), assessing the target memory (c), processing the memory to adaptive resolution (d-g), and evaluating treatment results (h) (APA, 2017). The way the brain stores memories forms the basis of human experience. The brain’s adaptive information processing system takes events as individuals experience them and processes them into memory. When distressing events occur, the system processes them in a way that maintains mental health.

Although events may cause distress, eventually the information processing system brings the information to an adaptive resolution, resolving the associated distress. Overwhelming, traumatic events, however, can cause this system to break down.

Extreme emotion floods the brain and nervous system with hormones (i.e., adrenaline and cortisol) and alters neurotransmitters. Emotional flooding seems to impede the brain's natural ability to process information. The unprocessed traumatic events remain stuck in the nervous system exactly how individuals experienced them, unable to meet adaptive resolution. The distressing perceptions later express themselves as nightmares, flashbacks, intrusive thoughts, inability to focus, and other symptoms. The mind holds related emotions, perceptions, bodily sensations, and cognitions in a state similar to the time of the event, ready for activation (Shapiro & Solomon, 2010).

The EMDR process begins with the establishment of treatment goals and safety. The counselor then prepares the client for EMDR by making sure the client has adequate resources and coping skills established to aid in emotion regulation. The counselor then works with the client to identify and gather information about the target memory or memories, before prompting the client to focus on the memory and engage in eye movements or tapping until the client no longer reports distress related to the particular memory or thought. These eye movements and tapping are intended to bilaterally stimulate the brain, which is theorized as activating the brain's adaptive information processing system. Once desensitization occurs, and the memory is, theoretically, reprocessed to an adaptive resolution, the client and counselor work to create a positive cognition to focus on and continue the eye movements or tapping to help instill the new positive cognition through the same processing system. In addition to PTSD (Usta et al., 2018), depression (Wood et al., 2018), Obsessive-Compulsive Disorder (OCD; Marsden et al., 2018),

and autism spectrum disorder (ASD; Lobregt-van Buuren et al., 2019) are a few of the mental health diagnoses for which EMDR has been empirically shown to be effective.

### **Summary**

As presented in this chapter, a great deal of technical neuroscience research and information can be translated into the counseling field, much of which is directly relevant to the treatment of psychological trauma. While the push for this integration exists, it is not yet disseminated widely in counselor education. There is a gap between the call for integration and translation of this extensive knowledge, the information and education individuals in the field readily have access to, and the way counselors are traditionally trained. Beyond the AMHCA BBB standards, no framework or benchmarks to ensure accurate and successful integration of neuroscience into the counseling field currently exist. Relevant education opportunities for counselors have no standards by which to measure their effectiveness or relevance. Moreover, much of the information available from the field of neuroscience, while relevant, may not be helpful or necessary for effective neuro-informed counseling. There is a need to identify the relevant and helpful information to make it easily accessible to counselors. The extent to which a counselor needs to understand the mechanisms at play in relevant neurophysiological processes is not clear or consistent in the literature. It is possible that a more basic understanding of these processes than what is presented in much of the neuro-informed counseling literature may be sufficient, increasing accessibility. However, balance is crucial. Counselors must not become too far removed from the true hard science to simplify concepts, risking the spread of neuromyths and misinformation. It is important that counselors are able to read and accurately understand the hard neuroscience in order to accurately translate it for clients and integrate it into clinical practice. While the integration of neuroscience into trauma counseling can be effective, training

for many of these specific modalities are cost-prohibitive or otherwise inaccessible. Counselors have identified cost as a major barrier to neuroscience integration (Russo et al., 2021). It is important, therefore, to identify how counselors who consider themselves to be neuro-informed are gaining access to the information and what they have found most helpful in their work. In this study, the researcher engaged with counselors who consider themselves neuro-informed to explore what they have found most useful in their own training and integration of neuroscience research into their work as clinical mental health counselors, with an emphasis on work with trauma survivors. The study investigated what this translation and integration looks like in clinical training and practice with the purpose of bridging the gap between hard science and clinical application in the clinical mental health counseling field.



### CHAPTER III: METHODOLOGY

Despite the clinical relevance and significance of neuroscience in the treatment of psychological trauma in the counseling field outlined in Chapters 1 and 2, no standard benchmarks of neuroscience-related knowledge and competencies exist in the counseling field. It remains unclear how practitioners can effectively integrate neuroscientific findings into research, education, and practice. Current research suggests many clinicians may be unfamiliar with relevant neuroscience concepts. Specifically, within the field of counseling, it remains unclear if and how counselors are using neuroscience concepts as a component of treatment or to treat trauma, a condition in which knowledge of physiology, nervous system, and brain responses are particularly important. Trauma is a regularly presenting clinical issue for which a neuro-informed approach is indicated in the literature. Relatedly, little research has explored perceived barriers counselors face in accessing neuroscience education and the clinical supervision necessary to integrate these concepts into one's counseling skills framework.

The current study used Consensual Qualitative Research (CQR) to explore neuro-informed counselors' lived experiences of accessing and integrating neuroscience knowledge into their clinical practice. The rationale for the study was outlined in Chapter 1, which highlighted the shift towards brain-based mental health research and care as well as the limited accessibility of important relevant knowledge and the need to adequately translate the hard science into the counseling field. The research discussed in the review of the literature in Chapter 2 revealed the importance of this integration and the challenges counselors face in mastering the neurocounseling approach. In the current chapter, the researcher describes the research questions; the study's methodology, including an overview of CQR, participants, the interview protocol, study procedures, analyses, and limitations; as well as the pilot study.

## Research Questions

The purpose of the current study was to explore counselors' experiences of learning about and integrating neuroscientific concepts into their clinical work in the treatment of trauma.

The following two research questions guided this exploration:

**Research Question 1:** What are the experiences of neuro-informed counselors related to receiving training in neuroscience concepts?

**Research Question 2:** How do self-described neuro-informed counselors integrate neuroscientific findings into their clinical trauma work?

### Consensual Qualitative Research (CQR)

To answer the research questions, the researcher assembled a research team to conduct Consensual Qualitative Research (CQR; Hill, 2015; Hill et al., 1997). According to Hill (2012), CQR is useful for studying topics which lack appropriate measures for quantitative inquiry or are not readily observable (i.e., experiences, attitudes, and beliefs). CQR allows for an in-depth exploration of complex phenomena through rigorous analysis of rich qualitative data. The research team followed a process of consensus to identify key domains and themes that emerge from the data. The results of this study offer a deeper understanding of how counselors are learning about and applying important, relevant neuroscientific concepts within their clinical work, particularly when working with trauma survivors. These results may help to highlight barriers that may impact counselors' use of neuroscientific concepts in practice and guide future research, as well as the development of training practices to encourage counselors' use of neuro-counseling principles, specifically in relation to the treatment of psychological trauma. Implications for future research, training programs, and counseling practice are discussed in more depth in Chapter 5.

## **Philosophical Underpinnings of CQR**

CQR was initially conceived as an exploratory qualitative methodology by Hill et al. (1997) to provide a process for exploring phenomena in the counseling field when the researchers found themselves limited by existing quantitative and qualitative methodologies. They sought to integrate the best features of existing qualitative methodologies including comprehensive process analysis, grounded theory, phenomenological, and feminist theories. As such, CQR is a constructivist approach with post-positivist elements (Hill et al., 2005). CQR researchers recognize the existence of multiple, equally valid, socially constructed versions of the truth, exploring phenomena as they naturally occur. The role of the researcher's inevitable values and biases are explicitly acknowledged and discussed in this methodology so that they can be kept in check and not unduly influence results. CQR involves a deep exploration of each participant's experience as well as cross-analysis exploration of potential commonalities across participants (Hill & Knox, 2021). The methods of data collection are naturalistic and highly interactive, striving to uncover meaning through words and text (Hill et al., 2005). The essential components of CQR include the use of a small, homogenous sample; semi-structured interviews involving open-ended questions; a research team; and a rigorous data analysis process requiring consensus among research team members to identify domains and categories that capture participants' experiences (Hill et al., 2005).

### **The Consensus Process**

CQR "relies on mutual respect, equal involvement, and shared power" (Hill et al., 1997, p. 523) among research team members. Three to five research team members work together to analyze and interpret data gathered from participants through semi-structured interviews. It is understood that participants are the experts of their experiences of a phenomenon. CQR

emphasizes the relationships that develop between participants and members of the research team, suggesting that this relationship allows participants to share their experiences more deeply and openly (Hill, 2015). Research team members should have a basic knowledge of the subject matter, some training in CQR, and a commitment to the project. Depending on the members' prior experience with CQR, it is also recommended that team members, including auditors, engage in some training in the methodology (Hill, 2015).

Bracketing is an essential component of CQR. Prior to data analysis, research team members discuss and record their personal experiences and perceptions as well as their expectations for what might emerge. This process aims to help researchers better set aside their biases through the data collection and coding process so as not to unduly influence the data (Hill, 1997). In the current study, the researcher broached the bracketing process with research team members from the initial team meeting. All members of the research team independently recorded their own experiences, perceptions, and expectations and identified how that might come up in the present study. The researcher bracketed their own relevant experiences, including training in Somatic Experiencing, neuroscience, and neuro-informed counseling approaches. It was imperative for the researcher to maintain an awareness of their own biases regarding the importance of neuro-informed counseling and their own knowledge of the subject matter to ensure that these things did not influence the emergence and creation of categories and domains.

An external auditor is another essential component of the process to serve as a check for the team throughout data analysis, to reduce the likelihood of group think (Hill et al., 1997, 2005). The three primary steps for data analysis in CQR include identifying and coding of domains, developing core ideas by summarizing data from each domain, and identifying key themes across each case through cross-analysis. The research team immerses themselves into

each case individually at first before conducting cross analysis to identify themes across participants. The team must reach consensus about how the data are coded at each of the three steps of the data analysis process.

### **Participants**

It is necessary for participants to have depth of experience in the phenomenon under exploration (Hill et al., 1997). It is recommended that research participants be randomly selected; however, random selection presents challenges for researchers seeking to study a specific phenomenon via qualitative methodology. Therefore, participants in the present study were recruited via email listservs using convenience and snowball sampling strategies to ensure that a homogenous, but representative sample was acquired. The PI reached out via the ACA Neurocounseling Interest Network, the AMHCA Neuroscience Interest Network, BrainstormLive, IRB-approved Facebook Groups, as well as to counselors the researcher knew personally who identify as neuro-informed in their clinical work.

### **Inclusion Criteria**

Participants were screened according to the following criteria:

1. Identify as a mental health counselor and hold state-appropriate counseling licensure credentials (e.g., LPC, LCMHC, LCMHCA).
2. Have been working with clients in a counseling setting as a fully or provisionally-licensed counselor for a minimum of 1 year.
3. Self-identify as neuro-informed in their clinical work and have relevant training and experience which supports that identity.
4. Are currently working as a counselor and with some survivors of trauma.

## **Sample Size**

Hill et al. (1997, 2005) recommended a sample size of eight to 15 participants for CQR studies with a 1 to 2-hour interview. Accordingly, a total sample of eight to 15 neuro-informed counselors was interviewed for this study to achieve consistency of results in a relatively homogenous sample. The participant recruitment strategy discussed below further describes the researcher's plan for ensuring the recruitment of a sample representative of trauma counselors.

## **Procedures**

In the following sections, the researcher discusses the procedures that were used in this study.

## **Research Team**

According to Hill (2012) and Hill and Knox (2021), the CQR research team should consist of three to five members who have basic knowledge of the research topic and training in CQR. The research team for the present study consisted of three members, two coders and one auditor, who worked together as a "set team" (Hill, 2015, p. 51). The two coders included the primary researcher, who is a doctoral student in counselor education. The other coder holds a PhD in Counseling and Educational Development and works as a counselor educator, supervisor, and trauma therapist in a private practice setting. An external auditor was chosen for the research team. The auditor reviewed the research team's work at each major step of the data analysis process. All members of the research team reviewed the first article by Hill et al. (1997) describing the CQR methodology as well as the latest publication on CQR by Hill and Knox (2021), *The Essentials of Consensual Qualitative Research*, as needed before and throughout the data analysis process.

## **Bracketing of Biases and Expectations**

Hill et al. (1997) defined biases as “personal issues that make it difficult for researchers to respond objectively to the data” (p. 539) and expectations as “beliefs that researchers have formed based on reading the literature and thinking about and developing the research questions” (p. 538). It is essential to the CQR methodology that researchers bracket, or identify and set aside, their biases and expectations to minimize their impact on data collection and analysis (Hill, 2021). This is a critical process through which members of the research team discuss their personal experiences, perspectives, opinions, and expectations about the phenomenon under study. This process increases methodological rigor, enriches the research process, and enhances the audience’s understanding of research findings within the context of the researchers themselves (Hill, 2015). Importantly, this step should initially take place after the interview protocol is finalized, but before data collection begins. Bracketing should continue throughout the process of data collection and analysis (Hill & Knox, 2021).

To gain awareness of and set aside biases and expectations that may influence the data collection and analysis processes, before the first research meeting, the primary researcher addressed bracketing individually with the members of the research team. Each team member was asked to write a brief reflection on their intersectional demographic identities and biases and expectations about the importance of neuroscience to counseling and the treatment of trauma. In the first research meeting, the researcher facilitated reflection and discussion of the research team’s own experiences, perceptions, and expectations and how those things might come up in the present study. During the meeting, each team member discussed their reflections in more detail and added any new biases and expectations that emerge during the conversation. Following this discussion, the researcher instructed the researchers to independently record their

own biases and expectations to be included in the final write-up for this study (Hill & Knox, 2021).

### **Participant Recruitment**

Given the qualitative nature of this study, participants were recruited electronically using a combination of convenience, snowball, and purposive sampling strategies. The researcher reached out to neuro-informed counselors via email listservs for the ACA Neurocounseling Interest Network and the AMHCA Neuroscience Interest Network and BrainstormLIVE. The recruitment email (see Appendix D) included a description of the study; inclusion criteria; participant tasks, incentives, and instructions; a Qualtrics link to the IRB Information Sheet (see Appendix E); and initial screening and demographic questionnaire. The researcher shared an invitation to participants in relevant social media groups, including the Facebook groups Psychology, Counseling, Psychiatry, & Neuroscience; Therapists in Private Practice; and Triad Mental Health Therapists, all of which were approved by the UNCG IRB. The recruitment email also included a request that individuals pass on the invitation to individuals they may know who identify as neuro-informed counselors.

### ***Initial Screening Questionnaire***

Individuals who expressed interest in participating in the study were asked to complete a screening and demographic questionnaire prior to being contacted to participate in a semi-structured interview. The researcher designed this questionnaire (see Appendix A), which was examined in the Pilot Study and was used to identify potential participants who met the inclusion criteria and thus qualified to participate in the study. At the beginning of the demographic questionnaire, participants reviewed an electronic version of an IRB-approved copy of the Information Sheet for the study (see Appendix E). At the end of the questionnaire, participants



who were interested in participating in the semi-structured interview were asked to record their name, email address, and phone number.

### ***Sample Selection***

As responses to the screening survey were completed, the researcher screened respondents for their eligibility to participate in the semi-structured interviews. A minimum of eight participants were selected among all available and eligible volunteers to participate in the study. The researcher contacted these individuals to confirm their willingness to be interviewed and schedule an interview time.

### **Data Collection**

To collect data for this study, the researcher conducted semi-structured interviews to ensure consistency across interviews. The interviews included the predeveloped interview questions (see Appendix) as well as follow-up questions and probes that became relevant throughout the interview. Interviews were conducted and recorded via Zoom and lasted approximately 1 hour. The relevant interview questions were co-constructed by myself and a faculty advisor based on thorough review of the literature related to trauma counseling and the integration of neuroscience into the counseling field.

### **Semi-Structured Interview Protocol**

Hill and Knox (2021) recommended that no more than eight to 10 open-ended, scripted questions be included for each 1-hour interview. This should allow interviewers time to probe important areas while maintaining consistency across interviews. CQR semi-structured interviews typically consist of three sections. To begin, interviewers ask about emotionally neutral and broadly relevant topics to “warm up” participants and build rapport (Hill & Knox, 2021, p. 21). Next, the interviewer focuses intensely on the main topic of interest, including the

discussion of specific events, experiences, attitudes, and beliefs. Finally, participants are asked to reflect more broadly on the topic (i.e., advice or suggestions related to the topic) (Hill & Knox, 2021).

An initial interview protocol was developed by the primary researcher and faculty advisor based on a thorough review of the literature related to neuro-informed and trauma counseling and the experiences of the researcher and faculty advisor, as well as consultation with experts in the field. The questions were then piloted and revised. Results of the pilot study are discussed later in this chapter. According to Hayes and Singh (2012), the researcher in qualitative research is the primary instrument for collecting the data to be analyzed. Thus, in CQR, the researcher(s) conducting the interviews acts as the primary data collection instrument. In the current study, the researcher conducted all interviews to ensure consistency across results.

According to Hill et al. (1997), reviewing the questions ahead of the interview provides participants with time to reflect on their experiences and prepare their responses. This may be particularly beneficial when researchers are asking about technically difficult topics. In the context of this study, allowing participants to reflect on their experiences of learning and about integrating neuroscience into their clinical practice – and with trauma survivors, in particular – provided them more time to reflect, leading to richer responses.

### **Transcription**

Interviews were transcribed via a transcription service (i.e., [dictation@triadtranscription.com](mailto:dictation@triadtranscription.com)), funded by the researcher. The researcher redacted all identifying information from all interview transcripts and assigned an identification number to each which corresponded to their screening questionnaire to maintain participant anonymity.

Interview transcripts were stored and transmitted between research team members using a secure, password-protected storage system on the researcher's personal computer (i.e., Box).

### **Data Analysis**

In the following sections, the researcher describes the CQR data analysis process that was used in the present study, including the data coding and auditing processes. Bracketing of researchers' biases and expectations is involved throughout the entirety of the data analysis process.

#### **Within-Case Analysis**

CQR data analysis began with interviewers immersing themselves in each individual case (i.e., participant data, interview transcripts) to develop domains and then construct core ideas from the data after they were placed into domains for each case.

#### ***Domain List Development***

Domains are characterized as broad, meaningful subject areas in the data (Hill et al., 2005; Hill & Knox, 2021). The first step of data analysis involves the creation of a domain list, typically of no more than 10-15 domains, depending on the complexity of the data, as more detailed categories emerged in the cross-analysis (Hill, 2015; Hill & Knox, 2021). This can be a deductive or inductive process, with several possible variations. Given the lack of consensus and framework for the integration of neuroscience into the counseling field, as well as the vast nature of the counseling field, as described in Chapter 2, the current research team used an inductive approach, which began with reviewing the interview transcripts to observe which topic areas emerged from the data, applying those to several transcripts, and revising as necessary (Hill et al., 2005, 2012). The research team developed a domain list by reading through one transcript together as a team, proposing ideas for potential domains, then applying this preliminary list to

another transcript and modifying as needed. This process continued with new transcripts until no new domains emerged.

### ***Coding Data into Domains***

Each chunk or block of data (i.e., phrases, thoughts, sentences, paragraphs) were then coded into the established domains. Some data were double or triple coded if they appropriately fit into more than one domain. Excessive double or triple coding may mean that domains should be modified. This process generally happens with the group going through the data together, discussing differences of opinion, and coming to consensus. If the team decided some pieces of data were irrelevant to the study, they were discarded. If any piece of data was deemed relevant but did not fit into any existing domain, it was assigned to a domain of “Other,” which can be revisited to determine whether there is enough consistency for the creation of a new domain (Hill & Knox, 2021).

### ***Consensus Version***

Once all data were coded into the established domains (or discarded as irrelevant), a consensus version (CV) was created for each case. The CV is a document that includes all the raw data organized into domains (i.e., Excel, tables, Word document). The CVs of at least two cases were sent to the auditor to check the domain-creation process before moving on to the next step of data analysis, creating core ideas (Hill & Knox, 2021).

### ***Core Ideas***

Hill (2012) defined core ideas as “summaries of the data that capture the essence of the participant’s statement in fewer words” (p. 111). The next step of data analysis requires the construction of core ideas within the agreed-upon domains, which are added to the CV. This involves paraphrasing participants’ narratives into clear, concise summations, so that the

research team can make sense of the data. The data were distilled into clear, understandable, and consistent language so that core ideas can be compared across cases. It is important that researchers remain close to the raw data (i.e., using participants words when possible) to avoid erroneous interpretations (Hill et al., 2005; Hill & Knox, 2021). The research team may work independently and later compare ideas to arrive at consensus, or they may work as a group constructing core ideas for each case together. Hill (2012), however, recommended that the research team complete at least a few cases together to ensure they all have the same understanding of the process. Hill and Knox (2021) recommended that research team members provide each other feedback throughout the process in order to avoid making assumptions and to discuss the context of the case, keeping their biases and expectations separate from the analysis. In the current study, the research team constructed core ideas together initially until everyone felt confident in the process. At this point, the process was altered for efficiency, with team members developing core ideas for cases individually and then internally auditing one another (Hill & Knox, 2021).

### ***Data Auditing***

To ensure quality and trustworthiness of the research, the auditor was involved at all stages of data analysis. When the domains were generated and core ideas were coded, two CVs were sent so the auditor could provide feedback at this preliminary stage. Then, the final CV of each case coded for domains and core ideas was sent to the auditor for review and feedback. The auditor acted as an editor, attending to small details and the big picture, and a consultant, affirming and expanding the research team's analysis (Hill & Knox, 2021). The team then met to discuss the auditor feedback, going back to the data to resolve any conflicts, and coming to consensus regarding modification to codes before moving on to the cross-analysis. In this study,

upon reviewing the core ideas, the auditor “review[ed] all raw data, read the core ideas...and determine[d] if (a) anything [was] missing and (b) the core ideas could be stated a better way” (Hill, 2015, p. 140).

### **Cross-Case Analysis**

Finally, cross-analysis was conducted to identify common themes or categories across the cases, one domain at a time. Researchers compiled the core ideas for each domain from all cases into a single document to be analyzed. Hill and Knox (2021) recommended the research team starts with a small and relatively simple domain so that members can gain competence with this task.

### ***Category Development and Coding***

Team members reviewed all core ideas within a given domain together to identify common themes across cases, with the goal of creating a category structure that best captures the data within the domain (Hill, 2015; Hill & Knox, 2021). Core ideas according to similar elements or themes across each case were clustered together. Rather than being influenced by the researchers’ preconceived notions or previously existing literature, categories and their titles emerged from the data via an inductive, discovery-oriented process (Hill et al., 1997; Hill & Knox, 2021). The number of categories in each domain may vary, there is no set recommended number of categories per domain, and subcategories may emerge. As the research team came to a consensus on the category structure for each domain, they were sent to the auditor for individual review (Hill, 2015). Once consensus was reached on the category structure across all domains, each discrete core idea was placed into one or more categories or subcategories. If a core idea did not fit into a category, it was placed in the “Other” category, to be revisited. The category list evolved at this stage, as appropriate.

### ***Frequency Labels***

The number of participants whose core ideas fit within each category was noted with the use of frequency labels. This information was used to determine the representativeness of each category to the sample (Hill, 2015; Hill & Knox 2021). Categories that appeared in all, or all but one, of the cases were labeled “general.” If the category appeared in at least half of the cases, up to the cut-off for general, it was labeled “typical.” Categories that consisted of data from at least two cases, but less than half, were considered “variant.” Finally, categories labeled “rare” appeared in only one case.

**Table 1. Frequency Labels for Cross-Analysis**

Frequency Label	Theme Prevalence
General	Category appears in all, or all but one, of the cases
Typical	Category appears in at least half of the cases up to cut-off for General
Variant	Category appears in at least two cases, but less than half of the cases
Rare	Category appears in only one case

### ***The Audit***

To ensure the trustworthiness of the research, the auditor reviewed each domain individually as they were completed by the coding team in addition to examining the entire cross-analysis of all domains to see how they fit together. The auditor determined whether the categories fit the data, the core ideas were categorized according to the best fit for the data, and the hierarchical structure of the data was concise. The auditor also reviewed data coded as “Other” and determined whether these data belonged elsewhere, or if a new category emerged. The research team considered the auditor’s feedback and made necessary modifications, perhaps communicating with the auditor more than once to create a feedback loop.

## **Limitations**

It is important to consider the findings that emerge from this study in the context of its limitations. The primary limitations that exist include researcher bias, generalizability of a limited sample, and the self-report nature of the results. Trustworthiness is a core component of CQR methodology. Accordingly, steps were taken throughout the course of the study to ensure the most unbiased and trustworthy research process in exploring trauma counselors' experiences with neuroscience in learning and practice. These steps include bracketing, working with a research team, and the use of an external auditor.

While a research team and external auditor were utilized, the researcher led the process. As a result, the researcher conducted all interviews, decided on the nature of interview transcription, and led data analysis. While biases and expectations were bracketed, it is possible that the researcher's bias may have influenced data collection and analysis, other members of the research team, and the writing process, considering the researcher's strong belief in the importance of the integration of neuroscience into counseling and the treatment of psychological trauma. Relatedly, this was the researcher's first time conducting CQR. Ladany et al. (2012) found that two research teams, trained the same way, found slightly different results from their CQR analyses of the same data. Despite explicit bracketing, the research team members are human and a part of the process, meaning biases and expectations may still influence results. Hill and Knox (2021) argued that our humanness is what allows for the richness of results, but an explicit awareness and checking must be maintained.

The small, homogenous sample size, which is ideal for in-depth CQR research, does limit the generalizability of the results. Although generalizability is not a goal of qualitative research, the small sample size may limit transferability. The use of convenience and snowball sampling



may limit the diversity of the participants as well. It is recommended that participants in CQR research have knowledge in the subject area. This study may appeal to individuals who are more interested in the integration of neuroscience into the counseling field and the treatment of psychological trauma, which could also skew the results. The sample may not be representative of counselors who do not have an interest in neuroscience.

While triangulation is not necessary in CQR, future research on the subject may benefit from triangulation of self-reported data to increase the trustworthiness of the results. Participants in this study were asked to self-reflect on their experiences of learning about neuroscience and integrating it into their clinical practice. There are trustworthiness implications inherent to self-report data. There is the possibility that answers could be influenced by a social desirability bias, a desire to be viewed favorably by the researcher. Given the self-report nature of the results, analysis could be skewed by simple memory lapse or human error.

### **Pilot Study**

A pilot study of the interview questions was conducted to assess whether the interview questions appropriately and effectively elicited the data sought by the researcher (Hill, 2015) and whether any additional questions should be included. Participants were asked for feedback regarding whether modifications should be made to the protocol before the main study was conducted to facilitate the development of an effective protocol. The pilot study aimed to establish whether participants understood the research questions, the interview questions generated meaningful data about the topic being investigated, and if the interview questions flowed logically (Hill, 2015). In CQR, pilot interviews allow researchers to establish whether (a) participants can understand the research questions, (b) the interview questions lead to data about the topic being investigated, and (c) the interview questions flow logically. Participants are also

asked for feedback about the protocol to determine what modifications should be made prior to conducting the main study.

Accordingly, a pilot study was conducted to assess the effectiveness of the initial screening and demographics questionnaire and the protocol to be utilized. The pilot study was conducted via three individual semi-structured interviews with individuals who identified as neuro-informed counselors (Hill et al., 1997). Pilot study participants responded to the interview questions and provided feedback on the study protocol.

### **Research Questions**

The following research questions were explored via the pilot study:

1. Are the interview questions and screening questionnaire explored in this study appropriate clear, relevant, and succinct?
2. Are there additional topics that should be explored?
3. Are all instructions clear and appropriate?

### **Sample**

Convenience sampling was used to recruit participants for the pilot study. Hill (2012) suggested that such a pilot study sample should include individuals who reflect the population of interest and meet the participation criteria for the full study. Hill recommended piloting interviews with at least two participants who meet the inclusion criteria. As such, three counselors who identify as neuro-informed were contacted. Two of these individuals met all the initial participation criteria for the full study that were identified at the time of the pilot study (e.g., currently practicing with survivors of trauma, neuro-informed, counselor credentials, CACREP-trained). One doctoral-level clinician reported working in a private practice, while the other was working as a professor in neuro-informed counseling. The masters-level clinician was

working on a PhD in Neuroscience and seeing survivors of trauma in a private practice setting. While one participant was not working with survivors of trauma at the time of the pilot study, she was still able to give meaningful feedback given her strong neuro-informed counseling background and her work as a neuro-informed counselor educator. All participants were trained in CACREP-accredited master's and/or doctoral programs and consider themselves neuro-informed in their approach to counseling. The sample used in the pilot study was congruent with CQR methodology to use participants who reflect the population of interest, with an appropriate sample size of three (Hill et al., 1997).

### **Procedures**

Consultation with the IRB at the researcher's University prior to the pilot study determined that IRB review and approval was not necessary prior to conducting the pilot study. The researcher contacted each participant individually to request their participation in the pilot study. With each participant, the researcher then identified and scheduled a mutual time for an interview lasting approximately 1 hour. All three interviews were conducted via Zoom and were recorded in full after the researcher received verbal consent from participants to do so. The need for written formal consent had been deemed unnecessary for the pilot study. According to Hill et al. (1997), reviewing the questions ahead of the interview provides participants with time to reflect on their experiences and prepare their responses. As such, participants received the list of interview questions prior to their interviews, providing them an opportunity to reflect more deeply on the interview questions. Following the interviews, the researcher reviewed the recordings and notes taken during the interviews to identify necessary modifications for the main study.

### *Initial Interview Questions*

The list of interview questions to be used in the main study were piloted, per the recommendations of Hill et al. (1997). The researcher developed the list of questions in consultation with a faculty member in the Department of Counseling and Educational Development at UNCG and a professor at the University of North Carolina at Asheville. The initial interview protocol included the following questions:

1. What training have you received in neuroscientific concepts?
  - a. What training experiences were most important or impactful for you? For example, trainings you attended, course work completed, etc.?
  - b. Other relevant training experiences?
  - c. What barriers have you faced in gaining access to such information?
  - d. When or how do you feel you've been supported in gaining access to neuroscience information and training?
2. What neuroscientific concepts have you found most impactful in your clinical work?
3. How do you define trauma?
4. Think about your experience working with trauma survivors.
  - a. Have neuroscientific concepts influenced your work with trauma survivors?
    - i. If yes, what neuroscientific concepts are relevant to how you understand and treat survivors of trauma?
5. Think of a recent case of a trauma survivor and tell me about this case.
  - a. How do you conceptualize this client? Please be as specific as possible.
  - b. What are examples of interventions you have used or might use with this client?

- c. What would success look like for this case?

### **Findings and Modifications**

The pilot study participants did not give specific feedback regarding modifications to procedures or instructions. These participants did indicate a need for further clarification around full study participants' educational history in the initial screening and demographics questionnaire. In response to this feedback, open-ended questions regarding the specific concentrations of full study participants' graduate degrees were added. For the interview protocol, the pilot participants and the researcher discussed the inclusion of an open-ended invitation for full study participants to pay attention to their own nervous systems and reactions during the interview process from the beginning of the interview, in the interest of eliciting information about their cognitive, affective, and physiological responses to the interview questions. Several questions were modified and added to the interview protocol based on pilot study participant feedback. With the modifications and additional questions, the interview protocol for the full study took about 1 hour, which is congruent with recommendations from Hill (2021). The following modifications were made based on feedback from pilot study participants.

One pilot study participant reported feeling energized and excited by the questions and the topic. In an effort to intentionally elicit information regarding participants reactions, attitudes, and beliefs, the following introductory statement was added to the interview protocol:

I invite you to notice what comes up for you in your nervous system as we go through this interview. If anything noticeable comes up, feel free to share that. We have lots of different ways of knowing, and information from all of your ways of knowing are helpful.

A new first question was added to obtain specific information about the work of full study participants, and a new second question was added asking participants to define-neurocounseling. The original first question was simplified and reorganized. The last two probing questions in the initial question were separated out into later questions in the interview protocol. At the suggestion of pilot participants, two additional probing question were added to question four:

4. What neuroscientific concepts have you found most impactful in your clinical work?
  - a. If applicable, how have you found any neuro-informed concepts applicable in other areas of your work (i.e., work with supervisees or students)?
  - b. Have you led workshops, talks, or CEUs? Have these been impactful in these areas? If so, how?

Another question addressing full study participants' perceptions of the integration of neuroscience into the counseling field was also included:

8. Where do you believe the field is with this integration of neuroscience as a whole?
  - a. Do you feel supported in trying to embrace neuro-informed counseling by the field at large in terms of attitudes towards neuroscience in the field, accessing accurate neuro-science training, and integrating into your practice?

A question was also added to explore full study participants' subjective comfort level with these concepts:

2. How would you describe your comfort level in applying neuroscience knowledge with trauma survivors?
  - a. What more would you want to learn to be more comfortable and confident integrating neuroscience concepts into your clinical work?

A final open-ended question was added, inviting full study participants to share anything additional they believed to be relevant. This included an invitation to check-in with their own nervous system reactions to the interview process with the purpose of eliciting information about attitudes, beliefs, and feelings regarding the integration of neuroscience into the counseling field.

3. Is there any other information you think is relevant to share?
  - a. What do you notice in your own nervous system now?

Prior to data collection, further modifications were made to the interview protocol based on feedback from the researcher's dissertation committee. Questions were added and slightly modified to elicit more specific feedback around counselors' thought processes and interventions when integrating neuroscience into their clinical work. See final interview protocol in Appendix C.

## CHAPTER IV: RESULTS

In the current study, the researcher investigated the experiences of self-described neuro-informed counselors learning about and integrating neuroscience concepts into their clinical trauma work, to address the proposed research questions:

**Research Question 1:** What are the experiences of self-described neuro-informed counselors related to receiving training in neuroscience concepts?

**Research Question 2:** How do self-described neuro-informed counselors integrate neuroscientific findings into their clinical trauma work?

Participants included licensed or provisionally licensed mental health counselors holding state-appropriate licensure credentials who have worked with clients in a counseling setting for a minimum of one year. Participants all self-identify as neuro-informed in their clinical work, with relevant training and experience to support that identity, and are currently working with survivors of trauma.

### **Sample Description**

Using the IRB approved recruitment procedures described in Chapter III, a final sample size of ten self-described, neuro-informed clinical mental health counselors (N=10) was obtained for the main study. Nine participants identified as white females, with one participant identifying as a black female, living in various regions of the United States, spanning from the west to the east coast, including California, Louisiana, Georgia, North Carolina, West Virginia, and Maryland. At the time of their interviews, the amount of time that counselors had been working with clients post-graduation from their master's programs ranged from two to 30 years. All participants provide trauma therapy and consider themselves neuro-informed in their work. Each interview lasted from 40 to 63 minutes.



Regarding participants' counseling degrees, five participants held Master of Science degrees, and five held Master of Arts degrees. All but one participant received their degree from CACREP accredited programs. Additionally, one participant with a Master of Science degree in counseling also received her Education Specialist (Ed.S.). Four of the participants also held a PhD in Counselor Education and Supervision from CACREP accredited programs. One participant was also in the process of completing a DMin in Trauma, Moral Injury and Christian Life. Degree concentrations were in clinical mental health counseling, with two also including marriage and family therapy concentration, and one with a focus on body-based healing. Table 3 provides detailed information about participants' current work settings, licensure, and further credentials according to the pseudonyms they have received for the purposes of this study (See Appendix F).

### **Summary of Findings**

Analysis of ten qualitative interviews resulted in the development of six domains. These six domains describe the experiences of counselors learning about and integrating neuroscience concepts into their clinical work with trauma survivors: 1) training pathways and resources, 2) neuro-informed definition/language, 3) client conceptualization, 4) clinical approach, 5) clinical interventions, 6) attitudes and beliefs. Table 2 below provides definitions of each domain. Each of these domains and their corresponding categories will be described in detail below. Table 2 provides a list of all domains, categories, frequency labels, and corresponding participants (see Appendix F).

**Table 2. Domain Definitions**

Domain	Definition
1. Training pathways and resources	Ways in which counselors are learning about relevant neuroscience concepts throughout their career and applicability to counseling clinical practice. Additional resources that help them maintain competency.
2. Neuro-informed definition/language	How neuroscience language and concepts are infused into counselor speech pattern and clinical practice
3. Client Conceptualization	How clinicians are thinking about clients' presenting problems and considering theory for specific clinical cases
4. Clinical Approach	The clinician's approach to the counseling process, from assessment to treatment planning and overall outcomes.
5. Clinical Interventions	What clinicians are doing in the room with their clients, examples of things they say or implement.
6. Attitudes and Beliefs	Counselor personal attitudes, beliefs, feelings, and perspectives about the integration of neuroscience into clinical practice with trauma survivors.

### **Domains, Categories, and Subcategories**

#### **Domain 1: Training Pathways and Resources**

Within the first domain, neuro-informed counselors described ways in which they have learned and are learning about neuroscience concepts relevant to their clinical work in trauma treatment, additional resources to maintain competency, and gaps in available training resources. There was an emphasis on the difficulties participants have faced in seeking neuroscience-informed trainings pathways and resources. Five categories emerged: a) self-study, b) consultation and supervision, c) advanced training and certifications, d) coursework, e) continuing education, and e) gaps in training.

#### ***Self-Study (General)***

Nine participants discussed ways in which they have sought out resources to learn neuroscience concepts to integrate into their clinical practice on their own via self-study, based

on their own interest and initiative. Participants named books, influential individuals, and research articles as helpful resources in their quest for neuro-informed knowledge and competency. There is a clear theme that counselor's hoping to integrate neuroscience into their clinical work feel a responsibility to seek out information on their own, and are looking for more guidance in choosing appropriate materials. According to Bethany, "that puts that responsibility on me to seek out that education, which I'm grateful to have had resources to do... but it does leave you a bit disheartened when you're like, 'Well, just gonna try to figure it out.'"

These nine participants reported a lot of independent reading, studying, and consuming research through books, research articles, podcasts, and various works of influential individuals. For example, Bethany has been intentional about reading books, listening to podcasts, and seeking out continuing education and presentations focused on neuroscience concepts like interpersonal neurobiology and neurodiversity. All of nine of these participants reported they have done a lot of independent reading and consuming research about neuroscience, seeking out information on their own. Specific resources (books, influential individuals, research articles) they have found impactful can be found in Table 6 (Appendix F).

### ***Consultation and Supervision (Typical)***

Consultation and supervision emerged as important aspect of neuro-informed training. Five participants talked about consultation they have received as part of advanced training programs, and four participants discussed relevant neuro-informed supervision they received. These participants considered EMDR and Somatic Experiencing to be neuro-informed modalities, with consultation and supervision as ongoing and integral aspects of both. However, these resources are cost and time prohibitive, and participants expressed a need for more

community, consultation, and supervision around neuro-informed counseling. Elizabeth, for example, reported that she wished there was more neuro-informed supervision available:

I feel like my supervisor tried. [laughs] I know her experience was based on trainings that she's gathered outside of her first schooling as well because she was in grad school in early 2000s. Just less information available.

### ***Certifications and Advanced Trainings (General)***

All participants discussed relevant certifications and advanced trainings which, while not specifically advertised as neuro-informed, they believed contributed to their neuro-informed competence and practice. Participants completed different levels and degrees of training and certification, but common trainings and modalities which participants considered neuro-informed emerged. Diane, Hayley, and Melanie each received training in Somatic Experiencing (SE). SE is a three-year training program. During that time, trainees engaged in consultation with faculty and completed their own personal sessions. According to Hayley, SE involves looking at things through a trauma perspective, to really process trauma through the nervous system. Melanie reported that, although SE “wasn't really pitched as neuroscience” when she started, she came to consider it a neuro-informed modality.

Alexandra, Courtney, Lindsey, Rachel, and Jamie all received various levels of EMDR training and certification, which they consider a neuro-informed counseling model. Rachel, Melanie, and Jamie completed the Certified Clinical Trauma Professional (CCTP) (Levels One & Two), which they each reported included extensive education about the neurobiology of trauma. The training was offered through PESI (<https://www.pesi.com/>) and taught by Dr. Jennifer Sweeney. Jamie, Bethany, and Elizabeth completed various levels of Brainspotting training which involved an understanding of the neuroscientific mechanisms behind why

brainspotting can be effective. Jamie reported the brainspotting training has had a "big impact" on her practice. Interestingly, none of the reported trainings and certifications were specifically advertised as neuro-informed, but participants found them to be helpful in becoming neuro-informed in their clinical work.

### *Coursework (Typical)*

Seven participants discussed coursework they received, or coursework they felt was missing from educational programs, regarding neuro-informed practice. Based on participant report, neuro-informed coursework was not generally readily available as part of most counseling curriculum. For sample, Elizabeth expressed shock that there was minimal education on neurobiology in her MA in Marriage and Family Therapy program:

In my master's program, I was actually pretty shocked that there is pretty minimal education on neurobiology. My recollection is that we literally have one lecture. Maybe three lectures I think it might have been in our diagnosis and treatment class where we look at the anatomy of the brain and some gentle references to it and substance use in treatment.

Elizabeth took a neurobiology course on sensation and perception during her Bachelor's degree course of study and stated they had a foundation of psychology course that integrated neurobiology education. However, they consider the training they had "pretty basic". They also had a "very basic" anatomy and physiology of the brain class as part of their undergraduate psychology degree, but found neuro-informed coursework to be vastly left out of her master's program.

Training pathways counselors considered neuro-informed were often not explicitly neuro-informed. Looking back, Rachel considered the graduate certificate she received in addictions to be neuro-informed, though she did not realize this at the time.

So with the addictions, it was heavily what I now know would be neuro-informed because it was heavily in the neurobiology of addictions. And that really sparked my interest and that that began feeling like this is right. Like this is the direction I wanna be in when I'm learning more about how things disturb us as human beings and how we can go about helping to, whether it is heal or reset or whatever the proper language is for what circumstance is that has occurred.

Participants in counselor educator roles reported attempts to introduce concepts they believe are important to their students, with little support or guidance at the various levels of counselor leadership (i.e., departmental, associations, accreditation). Alexandra reported that she taught in a community and trauma counseling program, focusing on preparation for trauma work. The program required coursework in neurobiology, and as an instructor, she had to learn more about it, herself. Although she was interested in additional, formal neuroscience coursework, she had not completed any because it seems like it would go beyond what is relevant for counseling, that there would be "information in a class like that that I don't need". In curriculum design, she thought a counselor-focused neurobiology class would be important for the program's trauma track.

I actually think we should include a neurobiology class in the track, but I'm not qualified to do that. And when I put it all together, I just thought, "This is better than nothing." So it's basic neurobiology and a real hint of upcoming attachment work that we kind of go into more in the second class. And an introduction to polyvagal stuff, nervous system

stuff. So it's just an introduction to everything, basically. And then the second class I'm really wrestling with. I don't think I have that nailed down yet.

These basic elements of neuroscience were critical to expose students to in her view. She has done a lot of legwork in trying to bring this information to her students. Bethany reported that there was some polyvagal theory woven throughout her master's coursework, but also expressed a course on neurobiology as it pertains to clinical counseling work would have been helpful.

Melanie created a neuro-informed trauma cognate, which is a focused area of study, in her PhD program. Their course sequence included courses on the psychobiology of relationships; the brain and relationships; the Certified Clinical Trauma Professional (CCTP) training; and parts of their SE training to make up that cognate. There was not a course required on trauma in her MA program, however she was taught introductory information related to trauma in her human growth and development course.

Overall participants described that the coursework they received related to neuroscience as part of their counselor training was basic or introductory in nature, and expressed a desire for more coursework focused specifically on neuroscience as it relates to clinical practice in the counseling field. Moreover, coursework participants found relevant was not always explicitly presented as neuro-informed. These participants, with a dispositional interest in neuroscience as it relates to trauma counseling, have sought out or even created coursework on their own to enhance their knowledge, and, in some cases, for those participants in counselor education positions, their students' knowledge.

### ***Continuing Education (Typical)***

Eight participants cited continuing education opportunities as important resources for neuro-informed training and practice. Continuing education was broken down into two subcategories: a) networks, and b) webinars and other shorter-term trainings without certification.

**Networks (Typical).** Five participants talked about other relevant networks and training resources. Courtney and Rachel both attend BrainstormLIVE events (NorthWestern University, Eric Tod Beeson). Courtney expressed that BrainstormLIVE is helping increase accessibility, however counselors are not receiving the necessary and relevant neuroscience information if they aren't actively seeking it out. Accessibility is increasing, with books coming out and sections in *Counseling Today*, but there is a long way to go. Rachel also mentioned neuro-informed CBT and membership in the ACA Neurocounseling Interest Network and AMHCA Neurocounseling Interest Network as helpful resources.

**Webinars and Other Shorter-Term Trainings Without Certification (Typical).** Six participants talked about less formal training resources they have learned about in their efforts to become neuro-informed. Alexandra reported, that while she did not have formal training, she had taken a neurofeedback training and training related to structural dissociation that involved the basics of neurobiology. She described participating in trainings and obtaining information on neurobiology in "bits and pieces along the way." Jamie reported some of her grief trainings have included neurobiology components "here and there." Rachel took a course in neurobiology and a course in medical neurobiology in the human brain online through Coursera via Duke University and the University of Chicago School of Medicine. Alexandra expressed interest in these neurobiology courses, but reported that the information was far more extensive than what she



believed to be relevant to her clinical work. Rachel reported she is "always open to learning more" about how to bring neuro-informed creativity into therapy, especially with trauma in practice. Courtney also mentioned the Adverse Childhood Experience Interface training as influential, with some relevant neuroscience-informed aspects.

Typically, participants reported that they have encountered clinically relevant neuro-informed information in webinars and continuing education opportunities which are not, themselves, specifically neuro-informed. These resources contributed to participant's attempts to become competent in neuro-informed clinical work. Participants maintained an openness to learning about neuro-informed principles and ways to integrate them into their clinical work and remained on the lookout for relevant educational opportunities. Overall, there was a lack of consensus and cohesiveness in the availability and accessibility of relevant neuro-informed information for these trauma counselors.

### ***Gaps in Training (Typical)***

Seven participants discussed perceived barriers to training in neuro-informed concepts and gaps that existed in training counselors to be neuro-informed. Although Alexandra described her work environment as supportive of her offering a trauma track as a certificate program, she has not received support in developing the specific curricula. There had not been interest or resources from colleagues. She stated that there was "zero support in conceptualizing these classes."

I've gotten support in getting all of this through the approval process and into a certificate program, but I've gotten zero support in conceptualizing these classes. Zero. So it's only been me.

Alexandra and Bethany both felt that a course on neurobiology and/or neuroscience specifically as it applies to counseling would be helpful for counseling students. According to Bethany,

I mean, I think even a full course on neurobiology, just neuroscience, that kind of thing, especially specifically applied to clinical counseling. Because sometimes, there definitely are just when things talk about like, this part of your brain region and how it connects this. And I've heard and reviewed those things so many times and I understand these different components of the brain and everything, but really integrating that into a nice, cohesive understanding that I can just spout out and be like, "Yes, this is how this influences this and this," that's never really sunk in for me.

Elizabeth stated that "our clients are trusting us with their brains and bodies, and we aren't always given that foundation". Moreover, counselors are not necessarily being trained to accurately translate the neuroscience information that is available:

It's been around long enough that we should have had significantly more of it involved. When I think about what-- truly I think it does come down to more trainings that really do-- it really does feel really emphasizing actually probably neurophysiology and anatomy. It was so long ago that I had that training and it is sometimes really pretty complex to understand, especially coming, I don't have a medical schooling background, and most therapists that I know don't. I don't know a single therapist who has any medical background, let alone, even if they were even pre-med. I don't think I know of any therapists who are in pre-med.

Participants reported that there are quality trainings available if one looks for them.

Participants also reported that a lot of trainings and materials can be misleading, so one must be

careful in selecting training. Jamie stated that “it's such a rapidly expanding field, that there are new things popping up all the time.” She reported that she has found trainings and resources she respects and trusts to give valid information, but others she has found lacking in reliability.

Time and money were also reported as prohibitive factors in the pursuit of neuro-informed competence. Hayley, Jamie, Rachel, Courtney, Elizabeth, and Brittany identified time as a barrier to learning more about neuro-informed counseling. Jamie stated, “I don't think you can ever really know too much. It's just a matter of the time and the expense of learning more.” The time and practice of integrating these concepts into clinical and coursework in counseling education is a challenge. Elizabeth believed the field needs to recognize how relevant these concepts are and provide guidance on how to make it palatable, interesting, and accessible for new counselors:

Time, for me, is just... It's just time. Specifically, as I'm transitioning to counselor education in a professor role. I think for me, it's the time and the practice of integrating it into counselor education and integrating it into coursework. I want practice and time to figure out how to make it palatable and interesting for new counselors. The field, I think it's just a matter of them... Of people really seeing how incredibly relevant it is. And then I think accessibility, because unless you're an active... This is a huge soapbox for me. Unless you're an active student or you're faculty, just the access to research articles. Counseling Today, whatever that little... If you get that or you get the Family Therapy, even if you have one specific journal or something that you get, you're not necessarily getting the neuroscience information. You're not reading Martin, you're not reading Teicher and Samson's 2016 annual review on all of the neuroscience research on child abuse and the brain. So it's the accessibility, and I think that's getting better with

BrainstormLIVE and with some of the textbooks that are coming out, with some of those resources, and then with the neuro-counseling section of... *Is it Counseling Today?* I think they have something on the brain.

But your typical mental health professionals, like the school counselors that I work with, or the school social worker, school psychologist or some of the LPCs or LMFTs that are around me, they're not getting that information unless they hear me talk about it in a training or something. And then they go, "Oh, that's really interesting." And then they go and get a book and then another book and they want to talk about it. But it's just the accessibility of it, and understanding that it's... You don't have to talk about the HPA axis and cortisol or adrenaline.

Lack of consultation, community, and supervision were also reported as barriers to neuroscience-informed practice. For example, Hayley reported that more case consultation, and peer consultation would help them to continue to further embrace neuro-informed counseling, and she stated that SE practitioners have to pay a lot of money for SE consultation. Elizabeth and Courtney also reported a desire for more neuro-informed community, consultation, and support. Courtney reported,

I don't have a lot of mentorship or supervision or consultation with neuroscience-informed counseling other than the BrainstormLIVE like CEU events that I'm listening in on ... and I have an EMDR peer consultation group.

Participants reported that there are quality trainings available if one looks for them. Jamie and Rachel also reported that a lot of trainings and materials can be misleading, so one must be careful in selecting training. Jamie has found trainings and resources she respects and trusts to

give valid information, but others she has found lacking in reliability. Jamie that “it's such a rapidly expanding field that there are new things popping up all the time.”

Participants reported limited neuro-informed training at the graduate training level and that counselors are generally not being trained to accurately translate complex neuroscience information into clinical practice. Participants also reported a desire for more community, consultation, and supervision around neuroscience-informed counseling. Most trainings with relevant information are not explicitly neuro-informed; participants have found it difficult to evaluate the veracity and reliability of trainings, which are often cost and time prohibitive. Moreover, counselors outside of academic settings do not have easy access to emerging scholarly articles and neuro-informed resources. In summary, participants identified a number of common gaps in training and barriers to the pursuit of neuro-informed competence and clinical practice with implications for the future of the counseling field.

## **Domain 2: Neuro-Informed Definitions and Language**

According to Rachel, “Neuro-informed counseling, for me, is first and foremost that there is an understanding of the neurobiology of trauma.” The second domain captures how neuroscience language and concepts are infused into the speech patterns and clinical practice of all ten participants. This domain emerged from how participants define, conceptualize, and talk about neuro-informed counseling and trauma, as well as the neuroscience concepts they find most impactful in their clinical work. Three categories emerged in this domain: a) neuro-informed counseling definition, concepts, and language, c) trauma definition, concepts, and language, and d) translating neuroscience concepts for clients.

### *Neuro-Informed Counseling Definition, Concepts, and Language (General)*

All participants discussed how they define, think about, talk about, and conceptualize neuro-informed counseling in terms of neuro-informed concepts they have found particularly impactful in their clinical trauma work. These concepts were divided into three subcategories: a) mind-body connection and body awareness, b) attachment and interpersonal neurobiology, and c) other important concepts.

**Mind-Body Connection and Body Awareness (General).** Nine participants discussed how they define or conceptualize neuro-informed counseling as it relates to the mind-body connection, body awareness, and how they integrate these concepts into their clinical trauma work. Lindsey stated that neuro-informed counseling is "just looking at human behavior through a lens that...starts with the brain and moves out from there."

Similarly, Bethany reported that neuro-informed counseling involves the nervous system and whole-body awareness and that our experiences are not just "in our thoughts, in our heads." As such, interoception, the sensing of signals from inside the body, is an important neuroscience concept for Bethany. According to Hayley,

Neuro-informed [counseling] for me is understanding that everything is connected and it's not just a "mind issue," it's the whole nervous system. So it's really looking at how to process things cognitively and then also process things using the nervous system.

Jamie noted that neuro-informed counseling necessitates having enough information and education about what's happening in the brain and body during a traumatic experience, and what is causing clients' trauma symptoms:

I think it's important, especially with the clients that I work with that I have enough information and education about what's happening in the brain and in the body during a traumatic experience after what's causing their trauma symptoms

Participants reported that neuro-informed counseling requires understanding and involvement of the mind and body and how they are connected, with an emphasis on the neurophysiological impact of trauma. According to participants, mind-body connection and body awareness are essential to neuro-informed counseling. These results suggest that neuro-informed counseling necessitates looking at clients holistically, through a lens that includes the mind and the body, including the nervous system.

**Attachment and Interpersonal Neurobiology (Typical).** Eight of the ten participants discussed how they conceptualize attachment theory from a neuro-informed perspective and the importance and impact of integrating attachment and interpersonal neurobiology into their clinical work. For example, Elizabeth connected interpersonal neurobiology to attachment patterns. She described interpersonal neurobiology around attachment as incredibly impactful in her neuro-informed trauma work; being attuned with clients from an interpersonal neurobiology perspective is essential to healing attachment wounds and treating trauma.

Similarly, Hayley stated being attuned to clients, to be able to "be on the same wavelength," understanding their experiences and "almost mirroring" clients' experiences, being really connected in the moment and able to support clients has been impactful in their clinical trauma work. Lindsey reported encouraging adaptive attachment between client and therapist in session and helping clients to conceptualize adaptive attachment for themselves. Melanie also implicated attachment principles as essential to her neuro-informed counseling approach. She

explained that many counselors are familiar with attachment patterns, but the neurophysiology of attachment heavily influenced the way she understood her clients:

I would say like the neuroscience principles to me we can talk about that in attachment language, which I think a lot of counselors can eat that up when it's like, we're really talking about physiology and neurophysiology. And so it's like you could say the same thing in two different sets of language. So I learned a lot about attachment not necessarily the biological underpinnings but that's a big part of how I understand why I'm interested in what I'm interested in.... we're thinking about wellness and the model of human development as it relates to the nervous system and I guess...my experience is more with the autonomic branch of the nervous system and how that informs the symptoms we show up in session with, or the symptoms we experience as a counselor sitting in a room with somebody. So thinking about...mirror neurons and different things about how the different systems are working together that influence what we're seeing [in sessions].

Alexandra reported that she understands attachment patterns, the nervous system, and what dysregulation looks like in treatment, as well as brain disruptions in development across the lifespan that may be impacted by these experiences:

I think about [a neuro-informed counselor] as someone who is aware of what developmental trauma looks like, early childhood trauma, and that someone who understands ... attachment wounds, someone who understands how the nervous system can be dysregulated and what that looks like in treatment. And then also brain disruptions in development across and how those impact individuals across the lifespan.

According to participants, attachment patterns and interpersonal neurobiology are essential to neuro-informed counseling. Attachment patterns impact clients in and out of the



counseling session. An understanding of the neurobiological underpinnings of attachment deepened these counselors' conceptualization of their clients and supported the importance of attunement and therapeutic alliance in sessions.

**Other Important Concepts (Typical).** Seven participants discussed other neuro-informed concepts regarding the neurobiological impact of trauma they find essential to their clinical work. For example, Alexandra noted that it's necessary to understand the neurobiology of trauma in order to understand structural dissociation, which she believes is essential for EMDR. Structural dissociation and fragmenting of the self are impactful clinical concepts in trauma treatment; although they are not explicit neuroscience concepts, they are informed by neuroscience principles.

So it's really hard to do EMDR without understanding parts work, and it's really hard to do parts work without understanding dissociation, structural dissociation specifically.

And it's really hard to understand structural dissociation without understanding a little bit about the neurobiology that impacts trauma.

Courtney and Lindsey both stated the hypothalamic pituitary adrenal axis (HPA) and the production and reuptake of cortisol has been most helpful in their clinical work. These concepts were pivotal in understanding the stress response and how that stress response adapts to early life stress of Adverse Childhood Experiences (ACEs). Courtney noted:

I felt been what has most helpful to my clinical work is the HPA axis, the hypothalamic pituitary adrenal axis and the production and re-uptake of cortisol. It's been a minute since I've really had my head wrapped around that. But that to me, I think was pivotal in my understanding of not only what happens when you see a stress response, but also how that stress response adapts to early life stress or ACEs. So that specifically was really

important to me and that's where I kind of dove into. And I felt that the more research that I did on that, the better I was able to translate that into something that would be meaningful for a parent of a child who had been traumatized.

Lindsey believes being neuro-informed means being person-centered in its truest form. The Adaptive Information Processing (AIP) model is a cornerstone of her neuro-informed trauma work.

So for me it's like I just take that lens of... And this is very AIP model for me of, how is this thing serving you to promote survival? Or, how did it promote survival? [chuckle] And then how can we work backwards? So to me being neuro-informed is being person-centered in its truest form .... I work AIP in a lot without necessarily telling them I'm teaching them EMDR based principles.

While there was some consensus among participants regarding how they thought about and talked about neuro-informed counseling and integrating relevant concepts into their work, nuance also emerged. These discrepancies were not surprising given the lack of consensus in the field around standards for neuro-informed counseling.

### ***Trauma Definition Concepts, and Language (General)***

All ten participants discussed how they define, conceptualize, and talk about trauma from a neuro-informed lens. Typically, participants defined trauma in relation to how events impact and overwhelm the nervous system. A second category also emerged to include other nuances of defining trauma.

**Nervous System Overwhelm (Typical).** Eight participants conceptualized trauma as anything that overwhelms the nervous system, or the brain and body's ability to cope and adapt.

Lindsey defined trauma as:

Anything that overwhelms the nervous system. Anything that elicits ...the HPA access to get kicked into gear and detaches your ability to orient accurately to time, logic, etc.”

Similarly, Bethany describes trauma as “anything that overwhelms your abilities to cope. And I feel like that's the most probably encompassing definition, even though it's a bit vague, because, yeah, so many things can be trauma. [laughter]

Hayley similarly defined trauma as “anything that overwhelms the system.” Melanie expanded on this definition:

Anything that's too big, too fast or too soon or too little for too long. So something that overwhelms the nervous system, the autonomic nervous system where I'm not able to cope in a way that clears the stress. And so I can cope with something and kind of just like brace and move through it but I haven't necessarily cleared the charge in the same way. I might also say it's something that... Like trauma is the response of not responding to my environmental contingencies. So where my response to my environment doesn't match my environment. Almost like that's kind of where the charge is lodged. And so if I am like really activated but my environment is calm then that is acute of like trauma as being residual stress not necessarily like an event but the piece that's unresolved or lingering that's causing me to be more activated than my environment needs or I mean, I'm talking about neuroception but where the neuroception is off-kilter.

According to Elizabeth:

For me, trauma qualifies as anything that was overwhelming or intense either mildly over a consistent period of time or more acutely. Overwhelming and intense, it could be more physiologically like people who identify with panic attacks, or emotionally where they can think to a time of yes they felt really overwhelmed and scared and whatnot.”

Courtney distinguished “Big T” from “little t” traumas and explained trauma is:

Anything that overwhelms the brain and the body's ability to cope with the stressor or the perceived stressor. That's in short. Certainly, you know I separate like what is traumatic in terms of a subjective feeling of pending death or severe physical injury. And then what we consider as more like the colloquial term trauma and what is traumatic emotionally to us, but it's really a broad definition. Whenever I do trainings, I separate out “Big T” trauma, “little t” trauma.

Eight participants defined trauma as anything that overwhelms the nervous system’s ability to cope and/or adapt. This is significant in understanding trauma, trauma symptomology and clinical presentation, and trauma treatment from a neuro-informed perspective.

#### **Other Ways of Defining and Conceptualizing Trauma Linguistically (Typical).**

Seven participants expanded the conceptualization of trauma to include other important factors and considerations. In addition to nervous system overwhelm, Alexandra defines trauma as an experience that goes outside of our ability assimilate it into our breadth of experiences and identity, so it fragments the personality because it overwhelms the system. Importantly, her understanding of trauma includes complex and developmental trauma.

Rachel included the Greek etiology of the word for trauma and the Native American understanding in her trauma definition:

So if you go to the pure word of trauma...From the Greek translation, it really means a wound. And from a Native American translation, it mainly, I think it... I don't wanna say the wrong nation, but a few nations have the same definition. It's a wound where the blood does not flow. That's their definition. And I would agree with those honestly. And so it's a psychological wound from an event, right? And so that's why no one can tell you really whether something is or is not going to create a traumatic response for you. We think of some of the bigger events in life, whether like if you survived a bombing or a shooting or a rape, and we understand that those are traumatic. Yes. And there's other things in life that can also produce a wound where the blood does not flow.

According to Diane, "I define trauma as the inhibition of movement, that either over generations or in some acute traumatic situation, the dorsal branch of the vagus, which shallows breathing and slows digestion, inhibits movement expressions so that the body can survive."

Courtney explained she distinguishes between ACEs and early life stress and different iterations of trauma, to broaden what people experience as traumatic:

That enables us to include like discrimination and racism and COVID and all these other factors, all these other experiences that have similar neurobiological effects, you know, that's been proven by the research. So I use ACEs and then early life stress and then you get into childhood trauma or developmental trauma, like the developmental trauma disorder, like Bessel Van Der Kolk and Bruce Perry have been advocating for, for years among others. So I try to ... differentiate between those different terms. And then talk about like just general stress. So when I define trauma, the short answer here. When I define traumas, I usually use several different phrases and I talk about what they mean and then how they overlap.

In addition to nervous system overwhelm, participants included additional nuance in their neuro-informed definitions of trauma. Trauma was described on individual, community, and systemic levels, as deeply subjective in nature, with varying degrees of impact and many different iterations and presentations.

### *Translation of Neuroscience Language for Clients (General)*

All participants discussed how they advertise and talk about their neuro-informed approach with clients. Participants discussed the depth of their own neuroscience knowledge and how they translate complex neuroscience concepts into terms that are easy for clients to understand and apply in and out of session. While the depth of neuro-informed knowledge and training differed across cases, the sentiment of simplifying and translating concepts for clients was constant. For example, Lindsey identified as a neuropsychologist. She reported that her website explains EMDR and includes a surface-level explanation of the brain (e.g., that brains are hardwired and designed to heal). Lindsey described the role she hoped for counselors to play in translating neuroscience information for clients: “My hope is that actually can be a role for counselors because if we train counselors well, we can be the translators [of neuroscience concepts for clients].”

Lindsey discussed ways in which she sought to simplify and translate complex neuroscience concepts for clients:

I don't say the anterior cingulate cortex, but I do say, like, triggers and fragments of information get stored in your limbic system. And...So I tell people about...your cerebellum and your spinal cord and what your limbic system does and your prefrontal cortex. And I kind of break that down.

Elizabeth stated that she uses “gentle...neurobiological terms just because ... most of my clients aren't really particularly familiar with neurobiology.” Similarly, Jamie learned and integrated neuroscience information in ways that she could explain it to clients:

I might not remember all the technical clinical terms to be able to accurately describe it to, say, a neuroscientist. But I've remembered it more in the ways that I can explain it to the client to kind of make it more digestible for them.

Participants spoke to the idea that counselors are not neuroscientists, but counselors' understanding of neuroscientific processes and how they influence people were relevant to their clinical work. Hayley explained that she used a lot of “non-clinical terminology” and “lay-person terms” to talk about neuroscience concepts with clients. Similarly, Melanie stated she used ideas like autonomic breakdown, client location on their polyvagal ladder, and awareness of sensation. Melanie stated,

We're not neuroscientists but our understanding of those processes and how they influence things is important. And then I talk about it a lot with reference to coping.... I say that I specialize in stress physiology. And usually that somehow means more to people than saying like, my credential as a somatic experiencing practitioner. And so I'll just say, I'm like, what that means is I think about how the body holds stress and that might show up in how we're working together and that's usually maybe like how I would advertise.

Participants discussed frameworks, concepts, and theories that they have used in clinical practice to explain and translate complex neuroscience concepts for clients. Lindsey reported that Polyvagal Theory (PVT) was a “gamechanger” in her clinical work as it normalizes people's trauma responses and provides a "user-friendly" framework for clients. While Lindsey's training

was more in-depth than PVT, it provides a clinical framework for neuroscience integration into practice.

Polyvagal theory has been a game changer of just normalizing the response and giving a very user-friendly framework. Polyvagal theory absolutely. And that's the language I see counselors being the most comfortable with. I, again, my training is like sort of like above the vagus nerve of like what turns it on. For me, I'm looking much more at the default mode network, the central executive network and the salience network. And I really talk to people about dual attention stimulus and how important it is and all the multiple ways that they can help connect to task dependent, present focused orientation.

Similarly, Alexandra believes clients can gain a much better understanding of their own attachment, nervous systems, and brain through polyvagal explanations like the window of tolerance and Deb Dana's polyvagal ladder.

We have gone into polyvagal explanations. We've looked at window of tolerance, I like Deb Dana's ladder better than using the window of tolerance, but we've looked at all of that and explained all of that. I don't know if she would be able to give that back to me, right? But I think she has a much better understanding of her own. .... Attachment, nervous system and brain.

Participants also found the concept of the hierarchy of the brain to be helpful for clinicians and for clients. For example, Melanie was one of several participants to reference the hand-brain model from Dan Siegel as a useful therapeutic tool:

Honestly, I think things like a window of tolerance or I walk people through the polyvagal ladder and in like a really applied way....But yeah, so like window of tolerance, I mean the hand brain model from Dan Siegel, polyvagal theory.



Relatedly, Elizabeth teaches most of her clients about the window of tolerance in some way or another, as a way to reference their nervous system states within session:

Emphasizing, here's what could be happening in your being that it's coming off as relief, it's coming off as safety. Pretty much all my clients get taught about the window tolerance in some way or another and so there's just the conversations that come with that. There's also the stuck on, stuck off that a good chunk of my clients get where it's like, 'Okay, so we have this window of tolerance and also if we've done this, maybe we're up here or maybe we're down here.'"

Overall, the depth of training and neuroscience knowledge differed between participants, but the idea that counselors are not neuroscientists was a constant theme across cases. While the depth of neuroscience knowledge expected of counselors remains unclear, participants all spoke to the importance of translating complex neuroscience concepts for clients in clinically relevant and useful ways.

### **Domain 3: Client Conceptualization**

Within the client conceptualization domain, participants discussed how they think about clients' presenting problems and symptomology from a neuro-informed perspective. The domain includes the categories a) broad trauma conceptualization and b) case specific clinical formulation. Clinical formulation refers to the *why* of the client's behavior and presenting concerns and how the clinician thinks about and understands what the client is experiencing.

#### ***Broad Trauma Conceptualization (Typical)***

In this subcategory, eight participants discussed how they broadly conceptualized and theorized trauma symptomology, presenting concerns, and treatment from a neuro-informed perspective. Participants discussed meeting clients where they are from a neuro-informed

perspective. For example, Rachel reported that she conceptualizes all clients through a neuro-informed lens and described her neuro-informed approach as finding modalities that "help the brain continuously work through what it is trying to work [through] at the level that it's working, and then be able to process that experience. She reported this might involve finding different, creative ways to engage with the brain when cognition isn't available.

Participants reported the ways a neuro-informed lens allows them to help clients access the parts of their brains and nervous systems that are available, especially when trauma has rendered certain areas of the nervous system inaccessible. They also reported integrating neuro-informed principles with counseling theories to deepen their conceptualizations and clinical understanding. For example, Jamie reported that using a neuro-informed approach in conjunction with IFS allows her to "bypass the need for the brain [of the client] to translate [their experience] into language and put words together...or they might get triggered and just kind of act in ways that they wouldn't choose to act if they were able to make it a conscious choice." Jamie views treatment success as "pulling out and identifying all of [clients'] parts and identifying the role that they served and how they protected [the client], and their purpose". This exemplifies the reported theme that trauma symptomology is often the brain and body's natural response to traumatic events in an attempt to keep the client safe.

Courtney described merging the Emotionally Focused Family Therapy (EFFT) concepts of attachment and negative interaction cycle with neuroscientific concepts related to how stress responses adapt to early trauma to contribute to maladaptive patterns in the present:

But it's also relationally, what is that gonna mean after the conflict, after the argument?

Or in the initial stabilization stage, if I'm trying to get 'em to walk away from each other,

how do we reengage, how do we repair, how do we come back when you're still feeling on edge and your nervous system is telling you that this isn't safe or that it's a threat.

And then how do they take some agency and take some of that power back, even if everything in their neurobiology is screaming, this isn't safe, this isn't safe. Helping them see that the safety is in changing some of those patterns and they were really able to take some responsibility for that and rework some of their patterns.

Participants reported that nervous systems learn from traumatic experiences to respond in ways that may cause symptomology. Elizabeth reported thinking often, "of course...a brain would react like that" when hearing clients express their experiences, as those experiences fit within her neuro-informed conceptualization. She emphasized how the brain and body learn to navigate the world and are influenced by traumatic experiences:

Especially when it comes to my clients that are having some sort of relational distress whether it's a couple's client or an individual who's trying to figure out their relationships, really emphasizing your brain and body learn how to navigate the world in this way. Actually, it just did what a good human brain is supposed to do, which is take the information provided to you and use it and respond in the way that you've both been either directly taught, indirectly taught, or had to figure out on your own.

Bethany discussed how people can get "stuck" in the cognitive realm, disconnected from their bodies, just looking for what needs to happen next, or maybe experiencing feelings of shame, but not being in the present. She reported seeing clients who are unaware of being "very much in their heads." According to Bethany, "The present is where we actually have more agency and autonomy". Melanie also conceptualized that trauma clients may not be present in the moment and may be "responding to older stuff" that can get in the way of accessing what

they need to respond to in the moment. She reported the goal of therapy is to be able to respond to what is happening in the present, to not be influenced by past trauma responses or conditioning, particularly, in terms of nervous system response:

So you're not as present in the moment, you're really responding to older stuff. And that can get in the way of what we have access to for responding when you need to. Because if you need to be in a fight or flight, if something is running at you, it's important that you're in a fight or flight. The goal is not that you stay socially engaged or in that state, it's that if you need a freeze because something is life-threatening that you do it. And then when that environment changes that you have your flexibility back

[We can use] neuroception and use orienting as a way to just be like here's where we are now. And then we can go back and actually be with that stuff still because it's important, but we can't be with that in an effective way if we're actively responding to a thing that isn't urgent in the way that the body was responding.

Lindsey stated that she sees clients who can be in their body, but then are unable to connect to an emotion, or are unable to describe it; or, conversely, they are talking to her, but they aren't moving in their body, or connecting to an emotion, so she tries to train clients to interact with their limbic system, in a way that isn't just fight, flight, or freeze, to connect the other parts of the brain.

And so that framework has actually been a really nice cheat for me in terms of conceptualizing things for clients or clinicians I'm training, but I'm sort of looking at that. I think of a balanced brain is able to hold a thought like, I am enough with a descr... With an image or a description, an emotion and a body sensation and bilateral, if they can do

all of that to me, that's a nervous system that is well enough resourced to go do trauma work.

Participants reported that neuroscience influenced the ways they thought about trauma and trauma symptomology. They discussed broad neuro-informed trauma conceptualizations, the ways in which neuroscience underpins how they thought about trauma in clinical settings. This category captured the unique ways participants conceptualized trauma from a neuro-informed perspective, while also exploring commonalities between participants' conceptualizations. Participants used neuroscience to deepen their conceptualizations, merging relevant concepts with other theories, such as IFS and EFFT. Participants conceptualized symptoms as adaptive responses to trauma, ways the brain and body learned to respond to keep clients safe. They emphasized that healing means learning to respond to the present reality, not influenced by threats from the past. Another theme of helping clients to reintegrate different parts of the brain, which may become fragmented as a result of trauma, also emerged.

### ***Case Specific Clinical Formulation (General)***

All participants spoke to the *why* of clients' thoughts, emotions, behaviors and presenting concerns and how the clinician thinks about and understands what the client is experiencing from a neuro-informed perspective. This category illuminates how participants think about their clinical cases through a neuro-informed lens. All ten participants conceptualized specific trauma cases from a neuro-informed lens, including de-identified information about clients' symptomology and clinically relevant history, particularly as it relates to trauma history.

Participants discussed clients' symptomology as adaptive responses to trauma. Alexandra and Bethany both talked clients who presented with symptoms of dissociation, and conceptualized why that would make sense as a trauma response. Alexandra described a client

she worked with who was a survivor of early childhood trauma and sexual violence in adulthood. The client's family had not understood her symptoms:

Yeah. She's kind of your classic nervous system, hyper-reactive, hypo-reactive at times, ADHD. I actually think her family has often joked around with her that she's on the spectrum, she's not on the spectrum at all. I think what actually she has is that inattentive kind of zoned out, dissociative presentation that has been very, very helpful for her all her lifelong in kind of helping her cope and maybe even in ways like keeping her safe at times. Although I think at times it didn't keep her safe too. [chuckle] Yeah, but she's a pretty heavy dissociate or not on the far end of the continuum, where if you think about primary, secondary and tertiary dissociation, she's not got alters or anything like that, but I would say secondary dissociation, pretty strong.

At the beginning of treatment, the rape felt like "a burning fire that had to be put out."

The client was raped by her mother's boyfriends and was a virgin at the time. They focused on processing that trauma with EMDR. Alexandra conceptualized that the client has inattention and a dissociative presentation that have been helpful in her coping and keeping her safe throughout her life, even though at times this did not keep her safe and maybe hurt her. Alexandra described the sexual assault experience as "brutal." it was impacting the client so significantly that it had to be addressed first. They resolved the trauma enough to be able to address other presenting concerns. Bethany also described a client she worked with:

This is a client ...is a parent, and originally sought me out, just recognizing she really needed some support. She felt just... Talked about feeling always just on edge, completely unable to relax, her main coping skill being really just zoning out, dissociating or taking a nap. .... And she has pretty complex trauma history as well, grew

up in a household with two alcoholic parents and a lot of memories of her dad being out drunk somewhere and getting police going looking for him 'cause they can't find him, and the mom catastrophizing and really using the child, her, for comfort. Even though..., a lot of parentification and I think a lot of also just emotional, psychological abuse and neglect. It seems like she's described her mother as being a lot of just very, very alarming patterns throughout her life, continuing into her adulthood. But just things that completely made her home life very chaotic and unstable, and then went on to also have a few experiences in her later teens and early adulthood with abusive relationships. And was previously married, she's divorced from him, but she describes him as someone who likely would've had a narcissistic personality disorder diagnosis, and that just being a very, very unhealthy relationship that she felt very emotionally manipulated and psychologically abused by him as well.

Bethany conceptualized that the client never had a safe, secure place to form a secure attachment; the client reported that she spent much of her childhood scared, while trying to reconcile that with the cognitive awareness that her parents loved her. Things always felt unsafe, unstable, and unpredictable. This client never had anyone she could go to seek reassurance and comfort. The client, therefore, dissociated from her body, to escape the overwhelm:

I think what became really apparent early on was that she just never really had that safe, secure place to form a secure attachment and feel like she was supported and cared for.

She's verbalized she spent much of her childhood scared, even while also trying to...

Reconciling that with this feeling of this knowledge, this cognitive awareness that her parents loved her, but things always feeling very scary, very unstable, very unpredictable and never really having someone she could go to to seek reassurance and comfort. And I

think it seems like she's very much dissociated from her body, and so kind of conceptualizing that as she really didn't have this opportunity to develop a nervous system that was able to really help her to regulate and achieve a sense of calm because she was always in this survival mode.

Participants discussed the ways in which clients respond to current situations in ways that are influenced by past traumatic experiences. Courtney worked with a mother and son as a family system, and they both did their own work individually. The dynamic between mom and son was the focus of treatment. Mom presented as intelligent, loving, warm, with an understanding of attachment processes, but had a complex trauma history and dysregulated nervous system.

The system was so easily flooded and because whenever... I can't talk about him without talking about the mom. So, basically mom had every traumatic experience imaginable. And so they had this dynamic and it was specific, and I'm talking about the mom and the client, because that was really the focus of our treatment. But the mom had so much trauma in her past, really extraordinarily, just really intelligent, remarkable, loving, warm, understood attachment processes. But as the kid got older and his behavior became more verbally assertive to the point of aggressive with her, it was triggering some of her history of trauma. And so then she would... I mean, you could just like watch it happen, she would become full of rage. You could see that all that logical, rational thinking was kind of shutting down.

As her son got older, his behavior became more assertive and aggressive, which began to trigger her history of trauma. She would become "full of rage," as her logical thinking would shut down. Mom would present as physically "ready for a fight," as she saw her son in those



aggressive moments as her childhood abuser, not her child. Courtney helped mom to get into her early experiences to separate out what she was perceiving was happening in the moment because her neurobiological experience was telling her that these experiences from the past were happening in the present. Mom was perceiving threat in the present based on prior traumatic experiences.

He was still in the room for this, but it was kind of prompting her to remember he is not the person that abused you. This kid is not the person that abused you, or the person that's trying to get this kid to live with them is not the person that abused you. It's not the person that took your family members away from you.

Trauma treatment, from a neuro-informed lens, involves helping clients heal their nervous systems so they can respond to the reality of the present, and not to threats from the past. It also necessitates an understand of clients' nervous system states. Hayley described a client:

So 37 year old female, who I see via Telehealth, and we've been seeing her, I think around a year and a half to two years. She's single, never married, no kids, has two cats, works full-time, fully remote, and her trauma history is very extensive in terms of childhood abandonment, neglect, sexual abuse, sexual assault, relationship trauma.

Hayley reported she saw a shift in the client's nervous system following the end of an unhealthy relationship. She conceptualized that the client had been in a significant freeze state, doing anything she could to avoid everything. With the nervous system shift, the client struggled as a lot of traumatic memories of assault and abuse began coming up for her.

And then a few weeks ago is when a lot of the stuff started coming up for her. Like the traumatic memories were coming up about her abuse and all of the assaults that she's endured..... And she was really struggling with that and then decided to not utilize that,

to utilize alcohol. And that was a really. She gave herself alcohol poisoning. So she's... I can see. And so from that, I think that was the grounding thing that she needed. In all honesty, it's like a negative one, but it was still something of like she saw the effects of what she was doing to herself physically.

Melanie also conceptualized a client from a neuro-informed perspective. She described a case of a white, cis female in her mid to late 30s who is married with two children and has a history of emotional and physical neglect from family of origin, but no "high-impact trauma, like no violence but more neglect." A neuro-informed perspective helped Melanie conceptualize the client's emotional dysregulation and understand the client's nervous system states:

They don't down-regulate easily in that state. And so they really need to overdrive, almost hit the gas even more with some physical exercise, or some kinda movement, or contact with a care... Like their partner or child. So that's why we started. We started probably two years ago. And since then they finally are into SE. They're kinda like, "Have you been saying this the whole time?" And I was like, "Yeah, well." Because they really had a cognitive leaning, they have a lot of experience in therapy, cognitive therapy and I really liked that. And so we do some of that. But now we're able to do a lot more mindfulness in session and just tracking activation in session instead of narrative.

These neuro-informed counselors reported that a consideration of clients' nervous systems and the neurobiological impact of trauma underpin the ways they conceptualize client cases broadly and concerning specific case formulation. Participants discussed how trauma from the past impacts the nervous system and the ways clients show up in the present. They conceptualized many symptoms as adaptive responses to traumatic experiences. Participants also conceptualized clients' symptoms and presentations in terms of nervous system states. and

discussed the therapeutic relevance and importance of nervous system regulation. The neurobiology of attachment emerged as an important theme, with the counseling relationship as a potentially reparative experience. A neuro-informed lens helped participants make sense of clients' presenting problems and deepen their conceptualizations. Participants reported a neuro-informed conceptualization of trauma normalized and reduced shame around symptomology and added a meaningful human layer of understanding.

#### **Domain 4: Clinical Approach**

Neuro-informed counselors who participated in this study described their approach to the counseling process, from assessment and treatment planning to overall outcomes. Three categories emerged from this domain, each broken down further into multiple subcategories: a) assessment, b) treatment planning, and c) outcome/impact of approach in counseling. These counselors all discussed the ways in which neuroscience underpins every aspect of their clinical counseling approach.

##### ***Assessment (General)***

All ten participants reported the ways in which a neuro-informed approach to trauma counseling impacts clinical assessment, with subcategories a) therapist attunement, b) informal assessment, and c) formal assessment.

**Therapist Attunement (General).** All ten participants discussed assessment as an ongoing process throughout treatment, with therapist observation and attunement to clients' nervous system states in session as an imperative element of neuro-informed assessment. Nervous system assessment required participants to be attuned to their clients. Hayley reported that assessment of client nervous system states and capacity can shift treatment planning. She

described how she assesses clients' capacity and fight or flight responses and identifies where clients' capacity is limited or stuck to understand her clients from a neuro-informed perspective.

And from a neuro lens I could see that she.. was coming out of avoidance freeze state so that I could see this, the fight or flight response kind of happening because she was also struggling with the fawning as well. And so I could see that shifting.

I think that's where it was. I think I saw, she had been in...the freeze initially when I first started seeing her. And then the past, I don't know, probably six months, it was very much the fawn, and then now I can see the... "oh my God, all of these things happened to me". I could see reality coming in. So I could see the fluctuation in her system and I was like, "okay, she's ready for this". Okay. So .... I can see where we need to build capacity to then deal with trauma work.

Lindsey stated that assessment is on-going throughout treatment. Based on her EMDR and neuro-informed lens, phase eight of EMDR (re-evaluation) happens at the beginning of every session. According to Lindsey, a treatment plan is only as good as the starting point in each session, which is likely to change from session to session:

So a lot of what I do is look at assessing how well their system communicates across regions of the brain or parts. So how well can they describe or put words to things? How well can they describe, can they put an emotion to a feeling or an image or something? And then are they aware of somatic connections to things?

She reported assessing in each session, "What do this brain and nervous system need today." She reported she is assessing tolerance and whether a client is in ventral vagal state, which is where meaningful therapeutic work and trauma processing is possible:

I'm ...assessing tolerance. Our clients only ever have so much tolerance, and in what we do for working with trauma, you are going to stress the system out with our work. And one of the biggest things is are how... If you think polyvagal, like how close to you, are they in ventral vagal? If not, can you get them there? And then if you get them there, do they have the energy, the space to do any other work? Or have they maxed out their capacity to handle stress for today? So I think I'm just constantly thinking of like, how well balanced is this brain today? And so if you take that approach, like your intake is only gonna be a snapshot of that brain on that day. And so I'm much more of a believer of giving and adding adaptive things almost right away because you're going to need to get to know the brain to assess its true strengths and weaknesses over time.

Rachel reported she is always assessing the client's window of tolerance, evaluating where more somatic work and/or regulation might be needed:

But really being able to assess where the client is and what is needed, because they can be coming to me at different phases or stages within their recovery and/or healing journey from their trauma. And so needing to assess where they are, to understand what is needed in that moment, and then moving forward and always assessing

Attunement to and assessment of clients' nervous systems also gave participants clues to clients' trauma history and symptomology. Courtney assessed a client had experienced trauma based on the presentation of hyperarousal and dissociative, hypoarousal symptoms in session. The initial assessment involved recognizing the client's behavior in the context of intense emotional interactions and noticing that there was something about his stress response system which was sensitized and dysregulated:

And I initially thought... I was like, "This kid has got to have experienced some sort of trauma," because of what I was seeing... Of how I would see both hyperarousal and then when things got really intense, I would see more dissociative symptoms in session. It's like, "There has to be something." And other than the emotional intensity in the parent-child interactions, I wasn't sure what it was. And he had denied anything.

And it didn't come out until probably a year or two after I started seeing him that there was some pretty severe physical abuse that had occurred. Of course, then you have to make DSS reports. That was kind of a side story. But the initial assessment was just recognizing his behavior within the context of those intense emotional interactions and seeing that there was something about how his stress response system was working that was a little sensitized, a little dysregulated. It just took me a while to really get to the bottom of the why, those early experiences that had set those patterns into place.

Nervous system attunement and assessment contributed to participants' assessment of progress towards treatment goals. For one client in particular, Alexandra reported specifically assessing dissociation and its impact on treatment planning and client functioning. She assessed treatment progress towards reintegration into life based on cues from her client, for example through the client's verbal report of social interaction and connection. She also asked for more information about experiences that had upset the client and what the client noticed about different nervous system states. Elizabeth also attuned to and assessed clients' nervous system states in session:

Actually today I have a client that-- anyways heaviness, depression, long history of substance use and abuse with opioids. Just a really intense shutdown response, super intense. I am trying to filter out right now how much of that is just muscle memory from

shut down distance not feel for years because it's been substance induced while also it is very much at this point now.

Because that his shut[down] response is so freaking intense that we could do that the whole session and then he'll just leave and nothing will have happened with it because his ability to keep his body safe in that way is so strong.

Participants reported looking for body language, changes in eye contact or breathing patterns, and other physiological shifts as part of their assessment. Elizabeth also used interpersonal cues as part of on-going in-session assessment:

Then when I am doing my assessment of really the interpersonal experience I'm often looking at often my client's eyes because that's what I get with every single one of my clients, of where they look and how they look. Especially when they look at me versus when they don't and how intense that eye contact is because are they holding eye contact or are they touching in? Especially recognizing and pointing, especially in my couples, I'll use body language a lot because that's especially informative for me as far as their levels of closeness, disconnect, comfortability, fear.

Participants reported feedback from their own nervous systems, when attuned to their clients, as equally valuable assessment information. Elizabeth reported this neuro-informed work is based in attunement and requires clinicians to have their own mindful awareness. Furthermore, she stated clients' trauma processing improves the more highly attuned the clinician is in session. After establishing enough rapport with a client, Elizabeth reported she will notice how her body responds to something a client shares. For example Elizabeth reported sharing with a client,

When I hear you say that, I notice my stomach dropped and then it turned. For me, that means I'm feeling really sad or really worried. I'm wondering for you if that feels like it fits, or maybe it does not.

Similarly, Melanie stated that assessment involves what she can visually observe, what the client reports, and her awareness of her own feedback in her bodily system. The clinician's nervous system feedback is impacted by the client's feedback as they are "sharing space. Melanie reported checking in with herself through questions like "what is my gut doing?...where am I holding tension?" She reported this assessment process is harder to describe in words:

Yeah. So I mean, through this (neuro-informed) model, it's both what you can visually observe by the client reports and kind of your like... I mean, if you have awareness enough as a practitioner, what is your feedback? Like my feedback is of course being, impacted by her feedback. Like if we're sharing space and we have rapport built and we do, and so sometimes I can check in with what is my gut? Like how, what, where am I holding tension? And just ask them about that as almost like a mirror. That takes a... I think a little that... That's harder to, describe quickly.

I think yes, we co-regulate in that she can bounce off of me and I'm impacted by her or with any client, but still separate, right? ....When I hear people talk about co-regulation, the way that I am hearing it talked about and my projection right now is that like, that means like we're both soothing, but that's not it. So it's almost like I'm trying really see where she is and either support it up or support it down based on [nervous system] feedback that maybe if she can expand what she's paying attention to, we get a more accurate response. So like maybe she needs to up-regulate based on the cues and the situation and maybe not.



Here, Melanie described using co-regulation for assessment, attending to how she and the client can "bounce off" of each other and be impacted by one another but remain separate. Co-regulation, she explained, is really the clinician trying to see where the client is and either "support it up or support it down" (in terms of nervous system states) based on feedback. She described assessment and intervention as a cumulative process. If Melanie noticed a client "plummeting into...[a] freeze place" she changed how she engaged, to help the client up-regulate into a ventral vagal state. She knew they were "done" processing in one instance, when the client moved and swayed, their breath changed and "their eyes got clear"; these observations gave Melanie insight into a shift in the client's nervous system.

Nervous system attunement emerged as the most common and seemingly impactful type of assessment. Generally, participants reported that assessment is an ongoing process throughout clinical treatment that requires therapist attunement to clients' nervous systems. Participants reported that they assess nervous system states to inform how clients are showing up in session and what they might need on any given day, progress towards treatment goals, readiness for trauma processing, and for clues into a traumatic history and etymology of symptomology. Participants reported clients' body language, eye contact, breathing, and other signs of nervous system functioning as important clinical assessment information. Moreover, participants reported feedback from their own nervous systems, when attuned to their clients, as equally valuable assessment information.

**Informal Assessment (Typical).** Seven participants discussed informal means of clinical assessment starting with first contact, from intake paperwork and initial phone consultation, to scaling questions, client report, and ongoing verbal assessment to check in with clients in every session. For Lindsey, initial assessment began with intake forms. She paid attention to the words

clients used to describe their experience to learn about the narrative they work with. Bethany similarly began assessing a client before the first session, with intake paperwork and initial phone consultation, observing and picking up on things the client noted, things that may give information regarding client's symptomology and dysregulation.

I think even just going off of the intake questionnaire and looking through that before our first session, like our little phone consultation we did, picking up on different things that she was noting. Particularly, she brought up a situation where she was doing some sort of webinar on self-care or something like that, and I guess the instructor had asked everyone that was joining the webinar to do a little somatic practice of taking up space. And so, she was instructed to expand her arms and just imagine taking up a space, and she reported she had a panic attack.

According to Courtney, "I do really frequent verbal [assessment]... If not every session then almost every session, I do a verbal, "How is this going for you?" I try to keep clients engaged in their own assessment process." Alexandra used informal scaling questions to assess for emotional distress, which also provided her some information on client's nervous system states, including possible dissociation:

One of the things that is happening is that she's really emotionally dissociated. So when I ask her how distressing some of her experiences are that she brings up, because she ruminates on them. I'll ask her like, on a scale of 1 to 10, as you think about that, how distressing is that for you? And she's always, always, "One, a 1 or a 2."

Participants reported using informal assessments from very first contact and for the duration of treatment. Informal assessment generally involved intake paperwork, scaling questions, client report, and ongoing verbal assessment throughout the treatment process.

Participants spoke to the ways informal assessment can provide valuable information into clients' functioning and nervous system states.

**Formal Assessment (Typical).** Five participants spoke about formal assessment measures, two of them noting that they typically do not use formal assessment. Participants did provide examples of limited formal assessments they use in treatment, but therapist attunement and informal evaluation accounted for most neuro-informed assessment. Courtney stated she does not typically use formal assessments "other than some client feedback forms." In some cases, "I did use some formal assessments when we were doing EMDR. And, I'm sorry, I'm not remembering what they were."

Elizabeth reported using the more "direct" or formal assessment of the Amen Clinic questionnaire which screens the areas of the brain. This assessment is 60 questions and broken down into a few areas like OCD, ADHD, MDD, anger, bipolar disorder, etc:

That questionnaire, every one of my clients get it because it's at least a gentle guide to what they're experiencing. It does break it down to, depending on how high they're scoring on these, we're seeing this level of activation in these areas of the brain. I do have some questions on my intake questionnaire as far as body aches and pains and timelines of those. As far as my direct assessment in that way.

Jamie has used a formal assessment with one client in particular, but didn't recall which one. She reported ambivalence about it, because it was a self-report assessment. The assessment was not enough to sway Jamie in "any one direction" and wasn't "as important to me as helping the client feel better":

I know at one point I did do an actual assessment. I don't think I have it up here anymore to know or recall which one without digging into a chart. But it was a pretty long one.

And I had some ambivalent thoughts about it. Just because it's a self-report assessment, you could say whatever you want the answer to be. The assessment definitely did show DID. So that was interesting, but again, not enough to completely sway me in any one direction which wasn't even so important to me as helping the client feel better.

The consensus was that therapist attunement and informal evaluation account for most neuro-informed assessment. While participants reported ways in which they have adapted existing formal assessments to inform their work, there was no mention of specifically neuro-informed formal assessments which these counselors have found useful or impactful in their clinical trauma work.

### ***Treatment Planning (General)***

All ten participants reported the ways in which a neuro-informed approach to trauma counseling impacts treatment planning. For example, neuro-informed principles shifted Lindsey's treatment planning perspective, "I think of treatment planning as looking at *what kind of things do this brain and nervous system need.*" The following subcategories emerged: a) goals, and b) pacing and timing of treatment.

**Goals (Typical).** Seven participants discussed how a neuro-informed approach to trauma counseling impacts treatment goals. A neuro-informed perspective shifts goals towards helping clients to improve their emotional and physiological self-regulation, with focus on nervous system states, embodiment, and present moment awareness. Speaking about one client, Alexandra stated their first treatment goal was to get the client acclimated to counseling and their present moment experiences. Treatment goals also included less dissociation, more presence,

reintegration into community, and sustaining a job. Part of treatment would involve helping the client to access and process strong emotions and improve nervous system regulation:

And so, in terms of treatment and planning, the goal is to get her to have a life that she enjoys and that she can kind of function in....And maybe get her to dissociate a little bit less and be a little bit more present, which I think EMDR can do.

Bethany and a client agreed in their first few sessions together that the client would benefit from coping skills to help with being more grounded and present, to start to come into their body, and to improve nervous system regulation. Helping her client recognize what was happening in their nervous system that was contributing to symptomology really helped reduce shame and cultivate awareness and understanding. Bethany reported one treatment goal was to help the client understand that their whole system was chronically overwhelmed and in a state of survival, so sometimes taking a nap or "zoning out" was appropriate, when it was the only accessible coping mechanism and nervous system state. According to Bethany, success for a client might look like being able to spend more time in the present and in their body, being able to attend to any emotion or activation that comes up, and to be able to "ride the waves" of nervous system activation and more easily come back to a centered, grounded place. Bethany stated,

Gosh, I think there's many layers of success that could happen. I think in a perfect world, like an ideal situation, I think success would look like her being able to be spending more time present and in her body, and able to attend to whatever emotion or just activation that may come up for her, and just kind of ride the waves and come back to a place of feeling centered and grounded more easily, while also, I think a big part is being able to increase her self-compassion and her self-assurance, 'cause I think that feeds into a lot of

her anxiety as well, that kind of keeps her in this heightened kind of awareness. Almost like an acceptance of, yeah, there's gonna still be hard things in her life, just by nature of her family, her children, but it's like she can change how she navigates those hard things and how she speaks to herself about those hard things. And I think that those would be the most ideal kind of successes.

Courtney reported she helps clients establish goals from a neuro-informed perspective, probing their interoceptive, internal experiences, nervous system states, and regulation, reviewing and adjusting goals as needed. She spoke specifically to treatment planning with a mother and son she worked with, saying,

Ours [treatment plans] are fairly informal. They're just goals and objectives. But as far as treatment planning goes, I always got a goal from the kid and I always got a goal from the parent, and then I really worked to try to get what they were saying into what I felt like I had to offer. And we did that every year. We would do that every year, and we would talk about... I would really process, "Okay, your goal is..." I think one of them was he'll be more respectful or something..... But like what will you feel like, what will your internal experience be like? And for mom, it was well, she wouldn't be as reactive. She will have this really strong urge to control. Or exert power over him. It won't be to contain him. It'll be that she'll be able to listen and reflect and that she'll feel calm inside even when she feels like his behavior is being difficult.

Hayley reported that her goals for a client may look different from the client's goals for themselves. One goal is often to build capacity and nervous system regulation:

So she still doesn't know what she wants to be when she grows up. She'll tell me on a regular basis. I think in her mind she'd be in a job that is giving back in a way that is

meaningful to her and having a healthy romantic relationship. My view is getting her to a point where she's comfortable with being alone because she actually enjoys herself and can be okay alone and doesn't have to rely on someone else to regulate her or validate her. She can do it internally.

Overall, participants reported that a neuro-informed approach meaningfully impacts and influences treatment goals. Primarily, reported goals were related to nervous system regulation and flexibility, awareness and understanding of nervous system states, and being more embodied and present, with a more easily accessible ventral vagal state.

**Pacing and Timing of Treatment (Typical).** Eight of the participants discussed how considering the neurobiological impact of trauma influences the pacing and timing of treatment. They spoke about the importance of resourcing clients' nervous systems before diving into trauma processing and emphasized patience and intentionality in the trauma counseling process. According to Lindsey, PVT informs treatment planning, because clients must be able to orient to present safety. If clients can't orient to present safety, they aren't ready for trauma work. Hayley stated that clients need to be ready for trauma processing and may not be able to jump right into that work. She reported treatment planning varies and is tailored to individuals, but the basic structure is the same for all trauma clients. Treatment planning begins with stabilization, using coping skills and mindfulness to build a solid foundation. Stabilization and resourcing happens first so that clients are not overwhelmed or flooded:

They're like "let's do SE." I'm like, "I appreciate that, but you are not ready." How I practice, this might be the best way to answer it. So the best way, I talk to people who have significant trauma or really any trauma. My treatment plan structure is the same. It's gonna vary obviously by person, but the structure is let's get you as stabilized as we can

by using coping skills and mindfulness and like really working on a solid foundation. And then once people feel that they're regulated, then we can safely go into SE work. Because I don't wanna overwhelm them.

Elizabeth also spoke to the importance of resourcing and stabilization before trauma processing can begin. She reported that some clients seek her out specifically for brainspotting treatment, but are not ready to jump right into that trauma processing work:

The beginning stages, a lot of psycho-education around those pieces while also just trying to integrate and starting to bring in awareness to the physiological experience and emotional regulation because my anxious clients are probably already feel a little bit more aware of what they want to be aware of anyways. It shifts from there, there's the clients that, once again, I specifically sought out brain spotting then we will go more into direct processing. I find in the way that brain spotting is trained, there are clients that think they want brain spotting, and actually, we can't go there that quickly and that intensely. We can't start with an hour and a half of processing. If we get 15 minutes, that's enough.

Similarly, Bethany reported she is intentional about the pace of therapy because she does not want to overwhelm the client. She spoke about the importance of being mindful of the shame that often comes up very quickly for trauma survivors, and the difficulty clients often have holding compassion for themselves:

I think that's definitely influenced just the goals that we've worked on and focused on, as well as just the rate in which we are trying to make progress towards those goals, and not wanting to overwhelm. And really focusing on, I think for me... For everyone, but particularly for folks who have very significant developmental attachment trauma, being



mindful of that shame that can come up so quickly and the difficulty with holding compassion for themselves and recognizing that as well. So when we are talking about like, okay, you wanna change how you spend hours scrolling on your phone, instead of getting your work done, and then you feel ashamed because you didn't get to these things that you needed to do around the house, and all of these things that overwhelm her. It's like trying to really, really lay that foundation of her body, her whole system. It's just really, really just chronically overwhelmed and in a state of survival. And so if she needs to lay down and take a nap, if she needs to zone out for a bit, and that feels like the only thing she can do right now, that's okay. And the more we can develop some understanding and compassion for those things, the easier it may become to start to shift and work on new coping skills and doing less doomscrolling and more mindful awareness and just sitting outside for 10 minutes or things like that.

According to Alexandra, trauma treatment and healing are a challenge and are "not going to happen fast." She had one client present after an acutely traumatic rape:

And the rape was so big in the beginning that it really felt like a burning fire that had to be put out. It was huge. It was huge. She was a virgin when it happened. She had been a very isolated child. Yeah, it was just huge, right? And it was her mother's boyfriend, just brutal, it was just brutal in so many ways....everything around it was just so big that we had to address that first. So I don't regret it. I think it was the right thing to do, and we definitely resolved it enough to where other things were able to bubble to the surface in a way that it became really clear.

Once the client was stabilized, and having less acute post traumatic symptomology, they began working on early childhood and earlier life experiences that they couldn't address before attending to the trauma of the rape. Trauma treatment takes time:

So that's kind of where we're at now. It's been probably a year and a half to two years in total. We're finally getting to where we're really doing some of the work that has to be done. And I would say for a client like that, it probably takes that long to get there anyway.

Rachel described trauma treatment and healing as a collaborative process: “That there is a process and everyone moves through this process differently, and it's about us learning the rhythm together of what's needed, and to be patient with the process.”

Participants discussed how a neuro-informed approach influence the pacing and timing of clinical trauma work and the importance of being attuned to clients' nervous system states and ability to regulate. Participants emphasized the importance of stabilization and resourcing before beginning to process trauma, and a dysregulated or unresourced nervous system may actually be overwhelmed and, therefore, retraumatized by clinical trauma work.

### ***Outcome/Impact of Approach in Counseling (General)***

All ten participants spoke about results and effects they have seen in response to a neuro-informed counseling approach to clinical trauma work. The following subcategories emerged: a) counselor, b) client.

**Counselor (Typical).** In this subcategory, participants discussed the impact a neuro-informed approach has had on them, personally and professionally. Rachel stated it has been “incredible” to see what people have lived through and to be a part of that healing journey. Jamie explained that using the neuro-informed approach with a client “took a lot of patience and a lot

of rolling with the punches as they unexpectedly popped up. It was like a game of whack-a-mole sometimes". For Courtney, neuroscience impacts every aspect of her work, from clinical work with clients, to supervision and consultation. Similarly, neuro-informed principles have shifted and shaped Lindsey's and Melanie's' perspectives with clients, underpinning every aspect of their work. The overall impact was that a neuro-informed approach influenced every aspect of participants' clinical work, particularly in the treatment of trauma.

**Client (General).** Nine participants discussed the powerful results they have seen for clients healing from trauma as an outcome of a neuro-informed counseling approach. For example, participants reported that a neuro-informed approach helps reduce shame and guilt through understanding, acceptance, and self-compassion. Jamie stated the approach helps clients conceptualize their symptoms (i.e. why they might be unable to speak when triggered, to reduce shame and guilt). She also found that neuro-education helps clients trust her techniques instead of just viewing interventions as "weird," helping with buy-in to the therapeutic process. Melanie also discussed a neuro-informed understanding of symptomology can be affirming and what a powerful impact a neuro-informed approach can have for clients:

And he just started weeping and he was like, that just makes sense. I feel really affirmed and so I feel good about that....And they've had some bizarre, I mean bizarre, I'm saying that, but I mean, cool. Like really noticeable things happen when they pay attention to their body. Now with reference to those family relationships with neglect how that kind of is internalized for neglect for self related to body image and eating. Yeah.

Similarly, Rachel stated that neuro-informed work helped a client not feel "crazy" or that something was wrong with her. The client "started feeling like 'well, this make sense and this is part of being human when things happen.'" The client became more regulated and was able to

stop misusing substances after engaging in neuro-informed counseling. Rachel reported that when approaching counseling through a neuro-informed lens, she “Sees movement.... Sees results.” Elizabeth stated that “clients may display a lot of emotion, really just true raw emotion.” One client might describe the impact of not feeling anxious anymore, or might say that she doesn't feel things "as grandly" and that she feels more consistent connections in life. Hayley reported that she has seen people "heal from their trauma almost instantaneously" using SE, once they are able to get into neuro-informed trauma processing. With a focus on being mindful and present, using a lot of grounding techniques, Hayley reported seeing drastic changes in how clients present in sessions and how they make decisions in life. One client presented with more emotional regulation, less tearfulness in sessions and was able to make healthier decisions in day-to-day life:

Yeah, so this past week she wasn't crying this session, so I would say that's good. She was able to make different choices around like, yeah, I went for a walk and I went hiking and I was like oh, thank God. So really focusing on being mindful and being present and using a lot of the grounding techniques. So from this past, when did I see her? Thursday and then I saw her the Friday before. So from Friday to Thursday, a very drastic difference, yeah.

Alexandra had one client who made "tremendous" progress and drastically improved functioning in her life:

And then she made some really nice progress and got to a point where she was functioning better in her life. She had completely backed out of her life 100%, she wasn't doing anything, pretty much isolating at home. And she managed to get a job and was out in the world a little bit more. And then was able to keep that going for about six

months...And again the kinds of conversations we have now about her experiences with her parents and her family are very different. There's a level of awareness now that is just beautiful. I mean, she can speak to me about her familial relationships in a way that is like, yes, there's awareness, there's clarity there.

In addition to reducing shame and guilt, participants reported that understanding and awareness of nervous system states, regulation and dysregulation, helps clients gain more control, tend to and heal their nervous systems, for better regulation. Courtney provided EMDR and trauma work for a mother for about a year in the context of family therapy, helping her learn about her own nervous system and the ways she was primed for threat. With that knowledge and awareness, she was able to shift negative interaction cycles with her son to be more emotionally present and to regulate herself, which, in turn, helped her son to regulate:

But it was with all of that information, that rich history that she had learned about her own nervous system and how she was primed for threat. And she was able to shift those negative interaction cycles to be able to be more emotionally present, to kind of calm herself, to regulate herself. She could cognitively understand and see the cycle, the pattern that was happening, and then intentionally shift her way out of that. And then as that happened, this kid just blossomed and he was... He started showing all of this like vulnerability and emotion and being able to say like, "Mom, you're doing this again. This is too much for me." He's like, "I'm just trying to do this," or, "I'm just..." When there was some living arrangement situation, he was able to be direct with her and not protect her and protect her emotions because he knew that he could trust that she was going to manage that. And that he could just be a kid and he could be open with her and trust that she was going to be both supportive for him but also be able to challenge him when she

needed to. It just... It ended up being really, really amazing. Took a long time, but it ended up being a really amazing thing to watch unfold.

But that was one of them was that mom felt that her stress related to parenting was decreased...That she felt better able to regulate him because he was really showing some signs of dysregulation, even at school. If he would get corrected at school, he was having a really hard time. And the goal for them was that the parent-child interaction would stabilize such that mom felt like she could access her more rational reasoning brain during conflicts with her son so that they could have some of those corrective emotional and attachment experiences day to day, week to week. So that when he was experiencing different things outside of the home, then he was more regulated

In summary, a neuro-informed approach helps clients understand and conceptualize their symptoms as normal human responses to abnormal traumatic events, to reduce shame and guilt. Participants found this understanding also helps increase client buy-in of the therapeutic process and clinical interventions. Participants reported seeing incredible results, true raw emotions, and lasting trauma healing for clients, with drastic improvements in nervous system regulation and quality of life.

### **Domain 5: Clinical Interventions**

The Clinical Interventions domain explores what neuro-informed clinicians are doing, broadly, in sessions with their clients, including examples of things they say or implement. Four categories emerged, two of which have multiple subcategories: a) therapist presence, b) framing symptoms as adaptive responses to trauma, c) mindfulness, body awareness and grounding, d) techniques, e) neuroeducation. The techniques category contains the subcategories: a) EMDR, b) brainspotting, c) metaphor, d) somatic practices, e) breathwork, f) expressive arts/activities, and

g) tapping. The neuroeducation category contains the subcategories: a) iterative process, b) how clients are introduced to concepts, examples in session, and c) meeting clients where they are and adapting language in session.

### ***Therapist Presence (Typical)***

Eight participants talked about the importance of the therapeutic relationship, therapist presence and attunement, particularly to their clients' nervous systems, and co-regulation as powerful and essential therapeutic interventions. Hayley stated being attuned to clients, "to be on the same wavelength," understanding their experiences and "almost mirroring" clients' experiences, being really connected in the moment and able to support clients has been an impactful intervention in her clinical trauma work. Similarly, Elizabeth described "vibing or something similar to it" as being in alignment with clients and an integral part of trauma treatment. Alexandra reported that reparenting is a big part of what happens in the therapeutic setting, to be able to be present and attuned to her clients to help heal attachment wounds by meeting needs that may have been neglected in childhood or other intimate relationships.

Courtney also described using the therapeutic relationship and co-regulation as an intervention:

I guess essentially, what I was trying to do was to use my relationship with the mom and my work with her to help use the relationship... Use my co-regulation with her, to use that relationship so that then she could get that new experience, understand what that feels like, and then she was able to do that with him. And then when I would do family therapy, I was facilitating or choreographing that together. But generally, my focus was on I was doing that work with mom and then she was doing that work with him [her son].

Elizabeth stated "...as a practitioner, (clinical work) is so based out of attunement, so there's a massive piece of it that even includes my own mindful awareness... Clients just process

better the more highly attuned I am.” She stated there is a piece of relating in safety when the heightened emotion is present in session that is an intervention; it means, "I'm still here while this discomfort is here". Elizabeth stated:

Validating and honoring are interventions used as 90% of my work with most of my clients. Just being safe. Not necessarily a safe harbor, but this is just fine. This is here. In fact, not only is it just fine, but how much I love knowing this about you and that this makes me-- I understand you better now and that this experience you're having, sharing it with me is actually something that can fuel relating in connection and then ultimately “soothingness” and regulation.

Elizabeth emphasized the importance of therapist presence, relationship building, the relational power of the therapeutic alliance in session, what that means for the client’s felt sense in their body and nervous system, and how that can eventually be translated outside of therapy:

I'll highlight for my clients when they do have a true emotional expression for the first time what that meant for them relationally. For me being here and in some ways almost a stranger and really highlighting and helping bring their attention to what was it that I just did there and what was it that was happening in my body in that time and what does it feel like now that it was safe? There's just a lot of relationship building, but also not doing that. Some of it being very direct and outright of saying, you shouldn't just give me information because I'm supposed to, of course, I'm going to take the information, but also really emphasizing what it feels to trust another being and trust in our own bodies. While also acknowledging and that might mean it might take you longer than you want it to take and I've been there too.



Lindsey stated that counselors must help clients stay in a ventral vagal state, in part through attunement and co-regulation. Melanie may intentionally change her speech volume or pace to help a client regulate or shift nervous system states. She reported talking with clients extensively about polyvagal theory, co-regulation, and relationally what is happening in the room:

We talk about relationally, what happens for us in the room. Some usually around mirror neurons, how we are just kind of co-regulating together. And what that means with our prosody, with our posture, with our breath, especially our breath syncs up pretty fluidly and not always intentionally.

Jamie describes it as “an instinctive, unconscious process” to keep her own nervous system regulated in session and emphasized the importance of therapist presence and attunement:

Also that attunement piece. And I think that that really helps with building the therapeutic relationship and them really feeling heard and understood. And maybe that's another piece of brain spotting that's just feels comfortable to me. It's just that intense energy exchange.

According to participants, therapist presence and attunement is an imperative neuro-informed trauma intervention; the therapeutic relationship is an integral part of trauma treatment. By being attuned to and assessing clients’ nervous system, participants reported being able to adjust their own presence to enhance coregulation. They reported seeing better results with higher levels of clinician attunement, with co-regulation between counselor and client as an important aspect of healing the nervous system and repairing attachment wounds.

### *Framing Symptoms as Adaptive Response to Trauma (Typical)*

Six participants discussed helping clients understand and reframe symptomology as adaptive responses to trauma that have become maladaptive now that the client is safe. This can help clients reframe distress, understand their experiences, and reduce shame and guilt. From here, clients can begin to learn to do things differently. Jamie reported that she explains to clients that their brain is doing exactly what it's supposed to do to protect them; this process can just become maladaptive when it continues to happen when the danger is no longer present. Diane explained, "It's not that people are doing anything wrong, it is just a survival mechanism." Elizabeth similarly helps clients reframe their symptomology to reduce shame, self-blame, and guilt:

Very much my brain then very much like, of course also a brain would react like that.

That is for sure when I hear my clients express what they're experiencing. Actually sometimes have to stop myself from being like, "You know that's fine." Because that's not always all that validating for people...

Really emphasizing that your brain and body learn how to navigate the world in this way.

Actually, it just did what a good human brain is supposed to do, which is take the information provided to you and use it and respond in the way that you've both been either directly taught, indirectly taught, or had to figure out on your own. I find that just lifts a lot of the criticism and some of the shame while also it makes knowledge is compassion in that way of, your brain is doing what it's supposed to. It's actually a very good brain. It's just not doing what you want it to do, but it is being a very good brain."

Alexandra helped a client conceptualize and understand her symptoms of dissociation from her emotions as an adaptive skill to keep her going and moving through life, without becoming too overwhelmed to go on:

And so we've talked about that a lot. And last week I got really direct, [laughter] and I said to her, like, you've dissociated from your emotions so much, and in some ways that's good because that kept you going, right? But so much that when you think about these things that are actually quite distressing experiences and really sometimes even scary experiences, you can't give me anything more than a 1 or a 2. And she's like, yeah, I know. So in terms of interventions I've asked her, "When have you had an experience that really did upset you? Like, when do you notice your nervous system really getting activated? And when do you notice your nervous system really being calm and Okay?" And she actually has said that sometimes when she listens to music, it activates her in a way that she can't do for herself.

Similarly, Bethany helped a client understand that "being in her head" has been a very adaptive protective mechanism. She helped her client recognize it is not something to feel shame or guilt about; it has been adaptive and protective to analyze her feelings instead of really feeling them in an embodied, emotional way:

And helping her to, I think, to see ways in which her being in her head has been very adaptive and a protective mechanism. So it's not something we need to shame or feel guilt for, but while also recognizing... Helping her recognize maybe when she's doing that, when she's saying like, "Yeah, I think I feel like X, Y, Z," and she's not naming an emotion, she's naming an understanding or a way of analyzing her situation and making sense of it.

Courtney also provided an example wherein she helped her client reframe her emotional responses to her son. Courtney helped the client recognize that her son was not the person that abused her in the past, that she was safe in the therapy room, in that moment, helping her to recognize the threat was in the past, not in the present.

He was still in the room for this, but I was kind of prompting her to remember he is not the person that abused you. This kid is not the person that abused you, or the person that's trying to get this kid to live with them is not the person that abused you. It's not the person that took your family members away from you.

Courtney merged Emotionally Focused Family Therapy (EFFT) concepts of attachment negative interaction cycle with neuroscientific concepts related to how stress responses adapt to early trauma to help her client untangle her reactions in the present from her survival mechanisms of the past. Helping clients reframe and conceptualize their symptomology as an adaptive response to traumatic events emerged as an important aspect of clinical trauma work, to reduce shame and guilt and build clients' understanding of their experiences, allowing for meaningful healing and growth.

### ***Mindfulness/Body Awareness/Grounding (Typical)***

The mind-body connection was explored as an important neuro-informed concept. Unsurprisingly, eight participants spoke to the power and importance of integrating mindfulness, body awareness, and grounding into session, and helping clients to incorporate these techniques and principles into life outside of session, particularly as techniques for nervous system regulation. Alexandra facilitated a client's attempts to come into their body and into the present moment during trauma processing, "So we're now starting to get into all of that and trying to bring her a little bit more into her body and a little bit more into the present moment."

Rachel stated she always wants to bring the client back to their internal experience and into their body in session. In speaking about a particular client, she reported that she is “Always helping her to also understand her internal experience, so no matter what and how we're processing, to bring her back to her internal experience, bring her back to her body.” Similarly, Bethany incorporated mindfulness throughout the treatment process:

I sprinkle mindfulness everywhere with my clients, and I still feel like even if there's X, Y, Z interventions and stuff that's specific for certain things, I feel like it's important to introduce the concept of mindfulness early on, because so much is built on that.

Bethany reported that she weaves mindfulness throughout treatment, helping clients get into their bodies, and inviting clients to practice mindfulness and body awareness in session, recognizing thoughts and sensations, being curious about the present moment, and helping them to incorporate it and generalize that into everyday life:

So, to help someone come into the present and come out of that autopilot mode, I think can be so helpful. Not even just in like a, "Let's sit down and meditate" way, but like, let's be more aware of like, "Oh, I'm having this thought right now about this situation, and is that really how I think that this is going," or like, "Is that true?" Or recognizing like, "Oh, I just noticed I'm holding my shoulders up at my ears, or I'm clenching my fists. What is that about?" And just being curious with that, so like... I always try to really highlight the idea of just curiosity and compassion when I talk about mindfulness, 'cause I think some people are like, "Mindfulness is just like being aware and just in the moment," and I'm like, yes, and... [laughter] You don't want to be aware of your thoughts and be like, "Oh God, I'm worried about this again," or that kind of thing. You want to give yourself some understanding.

She asks questions of clients to facilitate present moment awareness and mindfulness in session:

And that as we did that, just asking her different questions of like, well, do you notice things like there's tightness in your chest or there's a pit in your stomach. Or even things like, what does it feel like when you notice you're kind of hungry, it's time to eat dinner? And she could not name it. She had no idea. And she even said, even using the bathroom, she would just walk past the bathroom and be like, "Oh, I should... I need to use the bathroom," but not actually have a felt awareness of needing to use the bathroom

Elizabeth also reported teaching all of her clients some basic mindfulness at the beginning of therapy. She used things like the five senses for grounding and some breathwork throughout treatment:

Then there's things like using five things you see, four things you hear going through that, and then some breath work as well, it's so funny with anxious clients. I almost don't want to touch the anxiety because I don't want to teach you like, "Get it away from it," but specifically with her, we did a handful of that for quite a while

Hayley also used grounding techniques to help clients regulate their nervous systems, to get into reality vs. traumatic history. Using cold temperature (like ice cubes or ice cold water), intense flavors like spicy or sour (i.e. warheads to get grounded), textures, snuggling, and being out in nature as a few grounding examples to help regulate client's nervous system:

Absolutely, so the past couple of weeks have been really rough for her. So I've been using a lot of... The interventions have been mostly grounding to help calm her nervous system down, at least to get it back into reality versus traumatic history. So a lot of the colds, a lot of... We talk about spicy. I have a client who utilizes warheads to help 'cause they're so sour. So a lot of that texture, snuggling with animals, being out in nature.

She stated that different modalities may use different techniques for grounding and trauma processing, with essentially the same goals and objectives. Elizabeth also spoke to the idea of body awareness and dual attention between areas of comfort and discomfort, to build resources within her clients:

I have utilized dual attention, which is, can we recognize the discomfort? Can we also recognize areas of comfort in your body at the same time? Being able to really very consciously direct attention from one place to another.... we did a handful of that for quite a while actually, especially the dual attention and being able to recognize areas of safety in my body and can I find a way to anchor into that? Building that body resource and utilize that in times when my anxiety peaks.

Melanie also spoke about mindfulness, dual attention, and orienting with clients. Melanie helped a client take in their experiences around the room to try to be present. The client may not know how to answer or what to do or may feel stuck, so Melanie would give them a task, like counting how many white objects they can see in the office. These practices can help the client tune into where they are in the present moment and respond to what is going on around them, rather than what they may be thinking about, perhaps a thing that isn't true or present in the here and now. This allowed Melanie and the client to use orienting and mindfulness when the client felt panic or started to go into a freeze state. Melanie would stop the client and say "Hey, let's pause and really just ground in here and now". Melanie spoke about the impact this has had with one client in particular:

And it's just like, she's a lot more in her current moment. And so I can ask her, what do you notice as you're telling me about that? How is your body responding? We do a lot of dual stuff like, top half, bottom half, left side, right side. And more and more she's able to

just access that in a way that she really was kind of like, why would... But the story is over here. Yeah.

Participants discussed the importance and impact of mindfulness and grounding in sessions, and the ways they use interventions to facilitate these processes with clients. They also discussed the importance of helping clients to practice mindful grounding strategies in session, and to implement them outside of session, as well. Participants used slightly different language for these concepts, but all spoke to the importance of bringing clients back into their bodies, cultivating mindful awareness, sitting with discomfort, and strategies for grounding as essential aspects of neuro-informed trauma therapy.

### ***Techniques (Typical)***

Eight participants discussed specific neuro-informed technical skills, specialized procedures and methods they implement in trauma therapy. These techniques fall into 7 subcategories: a) EMDR, b) brainspotting, c) metaphor, d) somatic practices, e) breathwork, f) expressive arts/activities, and g) tapping.

**EMDR (Variant).** Three participants discussed how they use EMDR in clinical trauma practice. EMDR is an eight-phase treatment modality that utilizes bilateral stimulation to help clients process trauma “stuck” in the brain and nervous system. Alexandra discussed using EMDR to process an acute trauma to help stabilize the client to move into other work, “We mostly focused on the rape and did EMDR when we worked with each other the first round.” Once the client was stabilized, they were able to move forward with other aspects of therapy.

Courtney worked with a mother and son who were both easily emotionally flooded. Courtney did individual EMDR with the mother for about a year, to stabilize and process some



intense trauma, so that they could move into Emotion Focused Family Therapy (EFFT) with her son:

And then there was actually about a... Probably a two-year period where I... It started as family therapy and ended as family therapy. But right in the middle I had a couple of interns that were seeing the student individually and I ended up doing... I really predominantly saw the parent for trauma work. I did EMDR with her for about a year.

Lindsey discussed the powerful results she's seen with clients doing EMDR, and ways in which she has tailored the approach to accommodate individuals who may struggle with bilateral stimulation:

And the last session I did with her was in the dark, she had sunglasses on and we did auditory, one second and were able to move through a pretty big target using slow, slow, slow, slow, bilateral with auditory. And so I think like I... I mean, we tried it.

**Brainspotting (Variant).** Two participants specifically discussed how they use brainspotting in clinical trauma practice. Elizabeth was aware that some clients seek her out for brainspotting treatment because of her training. Jamie appreciated the versatile nature of brainspotting:

With the brain spotting training, as a clinician, I really, really like the versatility of it. It's not manualized and here's step one and here's step two. It's also really easy to have something come up in a session and be like, "Hey, you know what? Let's brain spot that." And I can pull out my pointer and we can go; there's no big long 5, 6, 7 sessions of preparation work.

**Metaphor (Variant).** Three participants reported the use of metaphor as a technique in clinical trauma therapy with clients. For example, Diane used a metaphor of bubble for

emotional and nervous system regulation. Diane reported that she helps clients learn how to come back to “the bubble” of nervous system regulation for themselves in and, eventually, outside of session. Therapy provided clients with practices to help regulate themselves. Within the context of the therapeutic relationship, mindfulness allows clients to witness and maintain their “bubble” of emotional regulation.

**Somatic Practices (Variant).** Four participants discussed their use of somatic practices in clinical trauma therapy with clients, though when taken into consideration with the Mindfulness/Body Awareness category above, all participants did speak to the importance of involving the body in therapy in some capacity. Somatic practices are used to help clients regulate and to release trauma stored in the body and nervous system. Rachel reported processing emotions somatically, particularly in the beginning of treatment, but continuing throughout. As a dance movement therapist, Diane incorporated somatic practice into all of her sessions, to help clients release and move through their trauma.

If Elizabeth felt things were stuck or not shifting for a client, she might invite some gentle movement to “really encourage some shift of the emotion, so that it can be expressed more and/or differently.” Elizabeth described working with a client whose body would begin to twitch in session, so she invited them to notice if anything felt like it needed to move.

When Melanie observed and assessed a client was entering a state of freeze or shutdown, she invited the client to stand up and sway a little. Melanie will "put a little movement" into talk therapy to help clients orient, as this can help clients respond and breathe into "this is what's true right now. This is my environment. I know how to exit my environment". Melanie reported inviting clients in:

"If your body has an impulse to change position, do that." And so she will without talking about it or she kinda spreads her legs out on the couch and sits in a way that you don't usually sit in an office like at a doctor's office maybe. And it's just like, she's a lot more in her current moment. And so I can ask her, what do you notice as you're telling me about that? How is your body responding? We do a lot of dual stuff like, top half, bottom half, left side, right side. And more and more she's able to just access that in a way that she really was kind of like, why would... But the story is over here. Yeah.

**Breathwork (Variant).** Three participants specifically spoke about breathwork as a technique used in neuro-informed trauma therapy to engage with clients' nervous systems. Elizabeth reported, "All my clients learn breathing techniques...at the beginning." She reported that she might integrate more breathing exercises with clients to really encourage some shift of emotion, so that it can be expressed more or differently, and that she might have to "invite in" a client to try things or do a lot of coaching around "how can we help breathe through this". She reported that she teaches all of her clients breathing techniques, even for clients who are less interested at the beginning. For one client, she emphasized big inhales and smaller exhales of breath to get client a jolt of energy to help shift things because the client's body was holding onto the energy, to encourage movement in the nervous system. Similarly, Melanie helped clients respond and breathe into discomfort and to breathe into the safety of the present moment. Rachel reported she begins every session with breath work and continues the work throughout treatment.

**Expressive Arts/Activities (Variant).** Three participants described expressive arts and activities used with clients in trauma therapy. Rachel discussed the importance of working with clients creatively, to engage and integrate different parts of the brain. She worked with clients somatically and creatively, for example, through use of artwork, or free journaling. Diane and a

client made a line of images on the floor to represent a client's family system and to creatively explore the idea of systems that "led her to dance with her family system." Jamie discussed sand tray as a neuro-informed expressive activity, particularly with children who may not have the language to talk about and verbally or cognitively process their trauma. These creative, expressive activities help clients engage the whole brain to process trauma.

**Tapping (Rare).** One participant reported using tapping with clients as a trauma therapy technique. Rachel said that, when appropriate, she will invite clients to incorporate emotion focused tapping into their breathwork, to encourage movement of stored traumatic energy in the nervous system.

### *Neuroeducation (General)*

All ten participants discussed the importance of neuroeducation in neuro-informed trauma therapy, with brain-based psychoeducation that illustrates and teaches the underlying physiological and neurological process of mental functioning and the therapeutic process as an essential aspect of neuro-informed counseling. Three subcategories emerged: a) iterative process, b) meeting clients where they are and adapting language in session, c) how clients are introduced to concepts/examples in sessions.

**Iterative Process (Typical).** Seven participants discussed neuroeducation as an iterative process that lays the foundation and groundwork for therapy and interventions from the very first session and is built upon and revisited throughout the therapeutic process. For example, Bethany explained that she introduces concepts such as mindful awareness and interoception to clients at the start of therapy as part of neuroeducation and builds on that throughout treatment. Hayley reported that she explains her neuro-informed perspective in every new client session and continues to build on that. Similarly, Elizabeth spent time teaching or giving neuro-informed

explanations, even for clients who may be less interested at the beginning of therapy; she didn't have any clients that didn't get some version of neuroeducation, because "they couldn't do treatment without it."

Melanie viewed the education and introduction of neuro-informed interventions as iterative in her work with clients. Across many sessions, Melanie stated she would talk about neuro concepts and engage clients in neuro-informed practices and interventions. One client asked after two years of neuro-informed therapeutic work, "Have you been saying this [neuro-informed ideas] the whole time?" Melanie was using the neuro-informed lens and interventions all along, but it took time for the client to be able to engage in mindfulness and tracking their activation and fully integrate the concepts:

It's not, "Hey, we've met today and so here's what we're doing." It's almost like we have talked about it this way and like, here's an opportunity, let's do it. So I don't think it's as linear, so it's cumulative, I think for the buy-in. And so across, many sessions we've talked about, autonomic breakdown, where she is on her polyvagal ladder, how she has awareness of sensation, building her, vocabulary and awareness of that, practicing mindfulness using distress tolerance for the obsessive thoughts, whatever you wanna call them. Hypervigilance.

Alexandra also viewed neuroeducation as an ongoing, constant part of her work with clients. With one client, she could tell she laid a good foundation and that they had a shared language of neuro-concepts, particularly related to attachment, the nervous system, and the brain. There was extensive psychoeducation on neuro-informed concepts at the beginning of treatment, and it continued in just about every session. Sometimes concepts required repetition for the client to be able to understand them. Alexandra noted that, even when the client understood the

concepts, she may not have been able to verbally re-state them, but she was able to meaningfully integrate them into her lived experience.

And the kind of conversations we have now are so... like in the beginning I felt like I was doing a tremendous amount of psychoeducation. We have done all of this stuff. We have gone into polyvagal explanations. We've looked at window [of tolerance] , I like Deb Dana's ladder better than using the window of tolerance, but we've looked at all of that and explained all of that. I don't know if she would be able to give that back to me, right? But I think she has a much better understanding of her own. And I find myself in some ways kind of repeating a lot of that in almost every session, in some way I'm kind of reinforcing that information around those three things. Attachment, nervous system and brain. In some way in almost every session, just because I think it doesn't sink in very quickly, right?

Courtney explained she may provide more neuroeducation at some points in treatment than others:

I probably do more at certain periods than others. So I'm remembering with this specific family, like some of the neuroeducation that I did do, was in how they were primed. And their nervous system was giving them certain information that was not necessarily based in the actual reality of their interaction. Especially with mom, and I would do this with her without him a little bit towards the end.

Participants described neuroeducation as an important neuro-informed intervention and an iterative process. Education and treatment may not be linear; it is cumulative. Participants laid foundations for trauma work with neuroeducation from the beginning, but continued the process throughout treatment, often repeating information for clients, and building upon ideas throughout

treatment, connecting neuro-informed concepts to explain other interventions and enhance client buy-in and understanding. Neuroeducation was described as an intentional, iterative, cumulative, and ongoing part of clinical trauma work.

### **Meeting Clients Where They Are and Adapting Language in Session (Typical).**

Seven participants discussed the importance of gauging client interest and understanding of neuro-informed concepts when engaging in neuroeducation. Some clients will want, need, understand, and/or benefit from more neuroeducation than others. This also necessitates adapting and translating language into terms clients can meaningfully understand, tailoring the complexity of neuroeducation language to each individual client. Participants spoke to the idea of counselors acting as translators of complex neuroscience information for their clients, making the concepts clinically relevant and considering how to simplify complex neuroscience concepts for clients.

The depth of neuroeducation Elizabeth provided “depends on the client for sure, because that's informed by ... their interest, but also how much they have learned previous to our meeting.” According to Diane, the amount of neuroeducation depends on the client, “You do it until their eyes glaze over, which for some people is just a teeny bit.” Similarly, the amount of neuroscience Courtney shared in session depended on the client’s interest level and ability to understand. She would assess client's interest level in neuroeducation to determine how in depth to go. “If they get a little glazy,” this would be an indication to stop or pull back the neuroeducation. Courtney was very respectful of client's vocabulary and interest level when talking about neuroscience or neurobiology:

And if they're really clicking with that, then we'll go more into it. But if they're not showing curiosity and if they're not wanting to expand their experience by adding some of this language to it, then I'm going to just kind of go where they're leading me and not

make it about teaching them things that is not really of interest to them. Or I'm weaving it in in smaller, tiny doses throughout, trying to give them some language. But again, I'm just constantly trying to either directly checking that out with them or just picking up on their level of comfort or their level of interest in it.

Rachel explained that “the intervention really is about meeting the person where they are,” and discussed providing neuroeducation regarding the process of therapy in a way the client can understand:

I would explain it and that made it... That helped her like just understand and it helped her to know why we're doing what we're doing, right? And so then to be open to it and understand that that's... Yeah, it's like I tell them, I tell every client, it's not Pixie Dust. It's not gonna happen like instantaneously that we're gonna do this and then boom, you're how you wanna be, you reached all your goals, right?

Melanie explained how neuroeducation can help with client buy-in and also emphasized the importance of tailoring the information to specific clients:

I think from a psychoed perspective probably that's the easiest, but that also helps with some buy-in and informed consent around using the SE model which not everybody wants or like cares to explore. But yeah, so like window of tolerance, I mean the hand brain model from Dan Siegel, polyvagal theory in like a pretty reductionistic overview. I mean, all of it is right, like we're not neuroscientists but our understanding of those processes and how they influence things. And then I talk about it a lot with reference to coping. So I give some pretty basic information about the autonomic nervous system and different patterns that you can get in and how we assess for if we need to calm and soothe



the system by bringing the heart rate down on purpose or mobilize the system, bring the heart rate up on purpose depending on what the symptom and the situation is.

Melanie used her counseling and teaching skills to make things accessible to people in a way that is comprehensible and affirming:

And I feel confident in what I'm sharing. Like the psycho ed piece I feel really good at. I feel like I can use my counseling skills and my teaching skills to really make things accessible to people in a way that's affirming. But also had a guy tear up when I, like last week when I was telling him about just like window tolerant stuff and polyvagal stuff, I was like, Hey, I think you're really overlying on external orienting and what if we pay attention to more of internal, pieces.

Participants discussed the importance of assessing client interest in and ability to comprehend neuroscience concepts, to tailor neuroeducation to each unique client. Participants used their unique counseling skills to make neuroeducation accessible for clients, meeting clients where they are to provide information that is comprehensible and affirming. Neuroeducation can help with client understanding of symptomology to build self compassion and reduce shame and guilt and garner buy-in through more meaningful understanding of other interventions, but the depth and complexity of neuroeducation must depend on each unique client's interest and ability to understand concepts. Counselors must find ways to present relevant information to make it accessible depending on the individual needs of each client.

**How Clients are Introduced to Concepts/Examples in Session (Typical).** In this subcategory, eight participants discussed how they introduce clients to relevant neuro-informed concepts during the therapeutic process, including examples of language and techniques used in session (i.e. metaphors and the use of visual aids). For example, Hayley used neuroeducation to

help clients understand why the work they're doing is good for their nervous systems and how their brain is working. She provided neuroeducation about the reptilian and mammalian parts of the brain, and how they function differently:

Yeah, because I want to talk about how, like, why it's good for people and I will explain to them why. I'm like this is what it does for your nervous system and this is how your brain works. And I do provide education about the two different parts of the brain, the reptilian and the mammalian and how they function differently and when reptilian is going crazy, mammalian can't work.

Elizabeth explained that all her clients get some version of neuroeducation:

At the beginning phases, I try to at least teach some basic versions of that. I do have a handful of clients that they're already familiar with it. Especially, I would say attachment theory is so fun on Instagram. I would say a handful of my clients are familiar with relationships in that way of, "Okay, yes, how I was raised is impacting me now." While also teaching, there's the experience that your body's having that once it's getting into your rational and analytical brain, we're able to slap a label on it but there's things happening before that. Really trying to actually rephrase, like "We're not doing mindfulness for Zening out but can we start to get more familiar with what is it that my body is experiencing before I know it?" There is a good chunk of teaching just about organization of the brain and some processing there. In Daniel Siegel's hand model, most of my clients get some version of that at some point, especially in teaching emotional regulation to really emphasize, you're not, anyways, treatment planning.

Jamie stated that being able to educate clients about what is happening in the brain and body during a traumatic experience and what is causing trauma symptoms "goes a really long

way...to normalizing" their experiences for them so that they don't think "what's wrong with me? Why can't I get over this?" Rachel reported that she explains the brain to clients and what is happening with the autonomic system, the parasympathetic, and the general nervous system. Melanie provided some examples of how she introduces neuroeducation in session, to facilitate buy-in and understanding:

I guess the way that I would introduce or describe orienting, and this is maybe like how I pitched it at some point for her was, sometimes when we're working with neuroception, so I might say like, Hey... Okay, I'm gonna use the language. Hey client, when we're thinking about this polyvagal ladder, this is just one way to understand how our stress response works and how we're gonna respond to our environment. And what happens is we have this little ticker inside that's judging, like, Hey, is this thing safe? Is it threatening or is it... Like, is my life in danger? And so when that ticker is correct, and it's picking up on cues from your internal viscera and your external environment, when the inside ticker has an accurate appraisal of what... How you need to respond, you move right through something, you clear it. If that gets off kilter or if you get into a pattern stress response, then it might like really just start making assumptions about your environment or about your internal cues that don't actually fit.

Melanie also provided psychoeducation around energy and facilitating client ability to notice valances of their experiences, "Other types of psychoeducation I've done with her around some energy wells ... And being able to notice positive, negative and neutral balances to their experience". Similarly, Alexandra provided some neuroeducation around energy wells, being able to notice balances to their experiences they may have struggled to identify on their own:

And we might also be looking for glimmer moments that she doesn't recognize on her own for when she is actually regulated. Not because she's dissociated [laughter] but because she's actually regulated.

Three participants discussed specific metaphors they use for neuroeducational purposes with clients. Diane, for example, uses a hurricane as a metaphor to illustrate the chemistry in the body to demonstrate that the idea of chemical imbalances in the brain is too simplistic, that there's a lot more going on. Melanie introduces orienting and neuroception to clients with a “ticker” analogy.

When we're thinking about this polyvagal ladder, this is just one way to understand how our stress responses works and how we're gonna respond to our environment. And what happens is we have this little ticker inside that's judging, like 'hey, is this thing safe? Is it threatening or is it...like, is my life in danger?' And so when that ticker is correct, and it's picking up on cues from your internal viscera and your external environment, when the inside ticker has an accurate appraisal of...how you need to respond, you move right through something, you clear it. If that gets off-kilter or if you get into a pattern stress response, then it might like really just start making assumptions about your environment or about your internal cues that don't actually fit.

Jamie reported that she describes "on some level, at least...some of the parts of the brain involved" in trauma experiencing and trauma symptoms. She used an analogy of home computers: "If you had a home computer and you would have to defrag it every now and then because the hard drive would get so fragmented that it wouldn't operate efficiently" to explain neuro-informed trauma treatment to clients. She also uses a smoke detector analogy to "paint a visual picture" with clients and says "when the smoke detector goes off, it doesn't look around

and say, oh is the building on fire? Or did somebody burn popcorn in the microwave? It just alarms" She stated that being able to tell clients about what is happening in their brain and being able to explain the biological processes that happen is the most impactful neuroscience concept. Continuing the smoke alarm metaphor, she explains to clients that "when this happens, it happens so fast and it just floods your system with close to 1500 different chemicals and hormones" and explains that the brain is working, but it's "not working so well."

Three participants discussed the use of visual aids in helping clients understand relevant neuroscience concepts. Diane has created what she calls a "a map of nervous system functioning" that she uses with clients. She used the map of the nervous system map to talk to clients about the nervous system states. Hayley also used visual aids to illustrate for clients, to help them understand their nervous system states. She referenced a bell curve diagram to help clients understand arousal and freeze states. Lindsey also reported using visual aids to illustrate for clients and help them understand their nervous system states:

And so I introduce that from the beginning, actually up my board with my drawing [laughter] So my personal clients get probably like a 20-30 minute rundown of what we're doing and how it works from a brain perspective. My other clinicians that work for us use the hand model. So everyone who comes here at least gets this explanation of things.

In this subcategory, participants discussed specific ways in which they engage in neuroeducation with clients. They provided examples to illustrate what neuroeducation can look like in a session, explaining and illustrating concepts in ways that are accessible for individual clients, including the use of metaphors, visual aids, and accessible ways of explaining complex neuroscience concepts, tailored to individual clients.

## **Domain 6: Attitudes and Beliefs**

In the sixth domain, participants discussed their personal attitudes, beliefs, feelings, and perspectives about the integration of neuroscience into clinical practice with trauma survivors. The following categories emerged from this domain: a) clinical importance, b) power of neuro-informed counseling approach, c) barriers to integration, d) comfort level, c) therapist enthusiasm.

### ***Clinical importance (Typical)***

Eight participants expressed their strong belief in the clinical need for neuro-informed trauma counseling, the integration of neuroscience into the counseling field, and increased accessibility of relevant resources. Melanie discussed her belief that neuroscience "underpins everything we do as a relational helping field; if we don't include it in our clinical work or teaching, we're "just talking about a shell of a thing". Melanie also believed that it is coming from "a gross place of negligence" to not have awareness of these neuro-informed elements and what is happening in the physiology of a client. She described it as a "mismatch" that neuro-informed counseling isn't more pervasive in counselor training and practice. Similarly, Alexandra believed neuro-informed trauma classes should be required for every counseling student and that every counseling educator should be talking about trauma in a neuro-informed way.

Rachel would recommend a board certification in trauma-informed care, and to be able to have a true specialization in neuro-informed counseling. She believed that any program, whether CACREP or APA, needs to have a neuro-informed counseling baseline:

There needs to be a neuro-informed understanding baseline because no matter what theoretical orientation you are ascribing to, you're working with the brain. And you're

working with not just the brain, the whole body...which is going to involve the central nervous system...And so I don't see how we can't know this information...[neuro-informed counseling] needs to be in every single program.

According to Courtney, neuro-informed counseling "just makes sense." It is about understanding connections between other fields in relation to the complaints, concerns, and frustrations that our clients experience:

We're still staying in our lane without trying to cross into some sort of medical field. But understanding how much is related, and then the part that I feel like is my responsibility is just doing the research and understanding the connection. And then being able to bring that in to enrich what I do with clients.

Participants discussed the clinical importance of neuro-informed counseling, expressing beliefs that all trauma counseling should be neuro-informed, and that counselors without this information can potentially cause harm. They discussed the belief that neuroscience underpins everything counselors do and that counseling should be inherently neuro-informed.

### ***Power of Neuro-Informed Counseling Approach (Typical)***

Eight participants discussed the power and impact of a neuro-informed counseling approach in the field and in the world. Rachel described the counseling theories as "coming to life" for her and seeming to "really fit" as she learned about counseling and neuroscience. She explained that "incredible is not even the word that begins to describe" this type of work. She found trauma work to be "incredibly meaningful" and believed it "shouldn't be hard for [clinicians] to keep growing in [their] practice in order to provide this essential service so that people can live more fully and healthily which will...We're interconnected. That's going to impact the world".

Hayley believed that healing from trauma can be beautiful; the idea that trauma is anything that overwhelms the system validates people's experiences. Every system is different, and the idea that something that's traumatic for one person, may not be for another, is inclusive and validating and supportive of people's lived experiences:

...Every system is different and it verifies that, it validates people's experience of like, "Just because it's not traumatic to you, it doesn't mean it's not traumatic to me because our systems are different," and I think that's so much more inclusive and validating and supportive. So I go with that.

According to Courtney, EMDR and neuro-informed trauma work can be extraordinary. Similarly, Elizabeth expressed, "This is so important," and that this neuro-informed information "needs to get out there." Lindsey discussed that the brain is "the deep space of the human body," and incredibly complex. She believed that people don't want to be in pain, they don't want to suffer, but they don't always know how to do things differently. She believed simply talking about trauma isn't the answer from a neuro-based perspective, "So that's how I show up to do this work and why I think more people should learn about how the brain works." Participants expressed strong beliefs in the importance and power of a neuro-informed approach and the impact it can have on clients and society as a whole.

### ***Barriers to Integration (Typical)***

Eight participants expressed frustration regarding what they perceived as barriers to the integration of neuroscience into their own trauma counseling practice and the counseling field at large. Bethany felt a responsibility to seek out the relevant information, but felt disheartened that there is not more guidance, that they had to "try to figure this out," when it comes to learning about and integrating neuroscience into clinical practice.



Jamie wished there were more requirements from CACREP to have more neuro-informed training. Especially in working primarily with trauma. She reported she has seen clients who will come from another clinician who "definitely was not trauma-informed."

And I wish they also would do a little more to maybe protect that term. Not like 'I read a paper about trauma once and now I'm trauma-informed' because there's a lot of damage being done by helpers trying their best to help."

Alexandra believed the counseling field is "woefully behind" in the way counselors are being trained, that it is "shameful right now because we are not training them with the knowledge that they need." She believed neuro-informed trauma classes should be required for every counseling student and that every counseling educator should be talking about trauma in a neuro-informed way. Students seem surprised to learn about neuro-informed conceptualizations of clients' presenting concerns. She believed it is a disservice to students that CBT and brief solution focused interventions are dominant in the evidence base that they access. As a counselor educator herself, she has done her best to educate students on neuro-informed trauma counseling by herself. She believed she is providing "real, real basic neurobiology." She would love to provide more advanced training and resources, but believed, without more resources, what she is doing is better than nothing.

Lindsey also believes that academia is "far behind" in the ways counselors are being trained. After consulting a counseling theories textbook with one paragraph on EMDR, Lindsey believes theories textbooks should have a whole chapter on EMDR, as well as neurofeedback, somatic experiencing, and other more current modalities. In fact, Lindsey believes the field may be doing harm by not being more up to speed on neuro-informed practices:

I think it's one of the biggest weaknesses of our field and other forms of therapy, is that we are one directional. So we know a lot about how the thing happens and we know very little about how... What happens after and then how to undo it. So I think that's a big weakness in what's available to counselors and how... Why they're... They don't use it more is because like, for instance, people know what the amygdala does and they know what happens in the trauma, but they don't understand the interaction of cortisol and norepinephrine later and the central executive network and how it's supposed to come back on.

Relatedly, Jamie and Rachel both spoke to the veracity of available neuro-informed trainings. Rachel felt frustrated that there are so many resources for neuro-informed counseling, but not every resource is a valid resource, and people don't always know how to evaluate the resources available. Rachel stated that a lot of trainings are "mismarketed", which she found frustrating. She stated that therapists are putting aside time and money to do a training, and it's frustrating when something is offered at a basic or uninformative level. Moreover, Rachel believes the evidence-base needs to expand as she finds many of the evidence-based interventions are not applicable to their clients of color or are not culturally informed. A lot of interventions "don't fit, they're not a good fit", so there needs to be more of a base of understanding neuro-informed counseling interventions from a multicultural lens.

Elizabeth felt a "fair amount of frustration and anger and...disappointment" for colleagues who don't have this information to offer because this information has been around, but is not being effectively, widely disseminated. Relatedly, Melanie has experienced difficulty having neuro-informed research published in counseling journals as a bridge of neuro-informed counseling and believed it seemed like this is a niche area of counseling. The rejections have

happened for a measure she got a lot of "practical positive feedback on". Similarly, Lindsey reported that the lack of progress with APA, ACA, and the counseling field feels frustrating, and echoed the difficulty of having relevant neuroscientific research published in counseling journals. She stated that many counselors are not interested in doing the research in a lab; they want to interact relationally with people. She hoped that counselors can take on the role of translating neuroscience information for clients, and also believed that even if there is difficulty getting certain research published, it can be released on the internet and via social media for free, which gave her hope, but remains a barrier to the expansion of neuro-informed counseling approaches.

Participants reported frustration and anger at the scarcity of neuro-informed counseling in the field. They discussed the lack of guidance, requirements, and standardization as a barrier to integration. The time and money required to pursue relevant training were also perceived barriers, as well as a dearth of verified, reputable trainings. Participants also discussed beliefs that counselor education is behind in neuro-informed education and that counseling journals' reluctance to publish certain relevant research poses another barrier. Awareness of these beliefs could contribute to future research to work towards remedied these perceived barriers to neuroscience integration into the counseling field.

### ***Comfort Level (Typical)***

Five participants spoke to the idea that they feel competent integrating neuroscience into their clinical work, with a desire to continue learning more. Alexandra felt competent to integrate neuroscience into her clinical work:

I would say that I feel very much like I'm not a neurobiologist or [laughter] a neurologist, so I feel like I know just enough to be a little bit dangerous [laughter], but also enough to be somewhat competent. I don't know, somewhere in there.

Alexandra didn't believe she would benefit from a full neuroscience course, as that is not the extent of information clinical work requires, but she believed there would always be more to learn. She believed the understanding she has is good but does sometimes struggle with "imposter syndrome" when integrating neuroscience into clinical work. Similarly, Bethany felt "moderately comfortable" integrating neuroscience into their clinical work, because there is so much to learn. Hayley also felt confident with the neuroscience knowledge they have but is continuously seeking new information to continue learning as new information comes out. Courtney has primarily done research on the neurobiology of trauma, specifically early childhood developmental trauma. She feels there's is a gap in their understanding, with a lot more to learn to continue to fully embrace neuro-informed counseling.

Following this trend, Melanie felt good about what she does, but she doesn't know if neuroscientists would "count" what she does. She thinks it is a little "watered down." Although she believes she has a "pretty in-depth understanding from [the counseling] field", she doesn't know how it would sound to someone who's lifework is neuroscience. She feels confident in how she does therapy and incorporates the body into therapy. She feels confident in the information she shares in psychoeducation, but is always looking to learn more. Rachel was also comfortable with a neuro-informed approach and open to learning more. She stated "there's so much to the way we are created as human beings alone that is unknown to us, yet we live in it every day, which is fascinating and...that's strange that we don't know as much about ourselves," which is why she believed it's important to always keep learning. Participants all reported

different levels of neuroscience training and knowledge, but all discussed the belief that there is always more to learn. Participants reported feeling comfortable integrating the neuroscience knowledge they do have while also feeling gaps exist in their knowledge base.

### ***Therapist Enthusiasm (Typical)***

Five participants discussed their enthusiasm for this neuro-informed approach to trauma counseling. Melanie and Elizabeth both reported they felt really "fired up" and excited to talk about neuro-informed counseling. Melanie continued that it "makes a lot of sense" and yet "there's an argument that's still needing to be made" on behalf of neuro-informed counseling. Elizabeth also reported a "fair amount of frustration, and anger, and disappointment" for colleagues who don't have this information to offer because this information has been around and, she believes, should be more widely accessible. She reported feeling excited about neuro-informed approaches and connecting with other "neuro nerds". It's "neat to be human" and to understand how we are built. She believed this approach is so important and the information needs to get "out there".

Rachel reported feeling excited about what the field is going to uncover or grow in understanding and feels passionate about neuro-informed counseling topics. Courtney reported she has embraced neuro-informed counseling with "a big hug" She was excited about neuro-informed counseling and excited about research to continue moving the field in a neuro-informed direction. She reported she is happy others are embracing this approach as well.

Lindsey's first psychology class in college was bio cognition and behavior, and she thought it was "about the coolest thing I had ever learned." She reported she has been "hooked" on neuroscience since then. She stated that she has a lot of hope for the profession moving forward. Training is only the first part of learning to use neuro-informed approaches. The rest of

the learning happens with clients, consultation, and ongoing practice. Lindsey wanted counselors and counselors in training to feel less intimidated by neuroscience, to show up and start helping people, learn the information and then get consultation. "It's a brain who wants help. You can help them. Just start there." Participants believed enthusiastically in the importance of a neuro-informed approach. This enthusiasm was moderated by frustration with the barriers that exist to integration and dissemination of relevant and important information. There was a balance among participants between frustration, disappointment, and even some anger, with excitement, and hope for the future of the counseling field.

## CHAPTER V: DISCUSSION

There currently exists an undeniable push for the integration of neuroscience into the counseling field (Beeson & Field, 2017; Goncalves & Perrone-McGovern, 2014; Myers & Young, 2012; Russell-Chapin, 2016; Russo, 2021), including the realms of research (Beeson & Field, , 2017; Beeson, et al., 2019; Goncalves, & Perrone-McGovern, 2014) supervision (Miehls, 2014; Russell-Chapin & Chapin, 2020), education (Beijan et al., 2021; Busacca et al., 2015; Duenyas & Luke, 2019;) and clinical practice (Beeson & Miller, 2019; Field, 2014; Field et al. 2015, 2016, 2017). Trauma is a focus of clinical practice that has received particular attention as an area that is heavily influenced by neuroscientific research (Field, Jones, et al., 2017; Fonzo et al., 2010; Mahajan, 2018; Russell-Chapin, 2016; Weiss, 2007), with mental health professionals experiencing an incursion of clients presenting with symptoms related to trauma (Absher et al., 2021; Cénat & Dalexis, 2020; Pappa et al., 2020; Webber et al., 2016). It is known that traumatic experiences negatively impact the nervous system (Fonzo et al., 2010; Giaretto, 2019; Jones et al., 2017; Levine, 2010; van der Kolk, 2006) while counseling has been proven to impact the brain and nervous system in positive, prosocial ways (Gonçalves & Perrone-McGovern, 2014; Karlsson, 2011; Penadés et al., 2013). While there is a call for competency in this area, there exists little standardization, organization, education, or guidance from the field at large for clinical mental health counselors seeking to integrate neuroscience into their clinical work. As such, the intersection of trauma counseling in clinical practice and the integration of neuroscience into the counseling field represents an important area of exploration.

Given this gap in the counseling field, the purpose of this study was to use Consensual Qualitative Research methodology (CQR; Hill et al., 1997; Hill & Knox, 2021) to explore the experiences of practicing self-described neuro-informed counselors attempting to integrate

neuroscience concepts into their clinical trauma work. The researcher explored training pathways and resources these clinicians have found impactful, as well as perceived barriers they have faced, in their pursuit of neuro-informed practice. Furthermore, the researcher studied how these clinicians have integrated neuroscience into their clinical trauma work, including the language they use in and out of session, clinical conceptualizations of the neurophysiological impact of trauma, and how neuroscience informs assessment, treatment planning, clinical interventions, and clinical outcomes. The researcher also explored self-described neuro-informed counselors' attitudes and beliefs about the integration of neuroscience into the counseling field and clinical trauma work. Thus, the goal of this qualitative exploration was to develop an in-depth and holistic understanding of how counselors are attempting to answer the call to integrate neuroscience into their trauma work and clinical practice.

The results of this study, which are discussed below, may contribute to the knowledge base in counselor training related to neuroscience and the barriers and limitations counselors face in attempting to integrate neuroscience into their clinical practice. These results may also serve as a step towards understanding how counselors are practically integrating neuroscience into clinical trauma work. Importantly, the results of this study indicate that counselors are seeking defined standards and competencies related to neuroscience that do not yet exist, as they do for other specialty areas. The study's findings support the lack of consistency and standardization or guidelines regarding neuroscience training and clinical integration discussed in the existing literature. In this chapter, findings pertaining to the research questions are situated within the broader context of neuroinformed counseling, as are calls for future research. In addition, study limitations, and implications for practice, training, and future research are discussed.



## **Summary of Findings**

For the current study, ten individual interviews were conducted to collect data about practicing self-described neuro-informed counselors' experiences related to receiving training and integrating neuroscience into their clinical trauma work. As a result of these interviews, six domains emerged. Each domain contained between two and five categories. Categories within each domain consisted of zero to seven subcategories. One of four frequency labels was applied to each category or subcategory based on the number of participants who shared experiences that fit into that category. General was applied as a frequency label to categories and subcategories that applied to all participants or all but one participant. Typical was applied as a frequency label to categories and subcategories that applied to at least half of the participants and up to eight participants. Variant was applied to categories and subcategories that applied to two to four participants. Finally, one subcategory, which applied to only one participant, was labeled rare. Table 6 in Appendix G provides a list of all categories and subcategories, their frequency labels, and the participants to which they applied. Table 3 below provides a count of categories and subcategories by frequency label.

## **Exploration of Findings**

Two research questions were addressed through ten individual semi-structured interviews with each counselor participant in the study. The results of the study are organized and discussed based on the context of each research question below. The overall results indicate that there are commonalities among counselors attempting to integrate neuroscience into their clinical trauma work, with nuances between cases given the lack of consistency and guidance around this process in the counseling field. Participants agreed on the importance of understanding the neurophysiological stress response as the basis for neuro-informed practice. To treat clients

holistically, counselors must understand the ways in which the nervous system has evolved to respond to threat, and, particularly, how that impacts trauma survivors. This understanding impacts every aspect of clinical trauma practice, from assessment, case conceptualization, and treatment planning, to intervention, and clinical outcomes.

**Table 3. Number of Categories and Subcategories**

Frequency label	Number of categories	Number of subcategories
General	11	4
Typical	12	14
Variant	0	9
Rare	0	1
Total	23	28

### **Research Question 1**

Research Question 1 asked: What are the experiences of self-described neuro-informed counselors related to receiving training in neuroscience concepts? Overall, the results of the analysis conducted in this study revealed information regarding how counselors, who consider themselves to be neuro-informed in their work, are attempting to integrate neuroscience into their clinical trauma work. This included training pathways and resources they have sought out, as well as gaps in training and barriers they have faced. While the extent of training, neuroscience knowledge, and integration varied between participants, there were notable similarities in experiences across cases. One important similarity was, in fact, the variability in availability and quality of training resources. Participants spoke to the lack of guidance they have received from the field at large, with several questioning the veracity of available trainings and how to choose reputable training resources and pathways, particularly considering the required time, money, and effort. All participants in this study ( $n = 10$ ) described a dispositional interest in

neuroscience as it is relevant to clinical trauma work. Participants described neuroscience training as self-directed or program specific. That is, these counselors have all intentionally sought out neuroscience training and information on their own, and some were enrolled in programs with unique neuro-informed resources and coursework available. Others described their surprise at the lack of neuroscience information available at the graduate course level. Counselors' experiences of relevant coursework and self-directed training are discussed in more detail below. Based on the results of the current study, it can be inferred that neuro-informed counselors face several challenges and shared experiences related to their training in neuroscience concepts.

### ***Standardization of Neuroscience Principles and Training***

There is no widely accepted framework for training counselors in neuro-informed counseling, which can lead to inconsistencies in their education. Participants expressed a desire for more standardized and accessible neuro-informed training to ensure that counselors receive consistent and high-quality education in this area. This study expanded on the previous quantitative research in this area by exploring deeply *how* counselors are being introduced, exposed to, seeking out, and evaluating relevant information to identify the nuances of how counselors may access neuro-informed training, as well as what gaps and barriers may exist. CACREP (2015) and AMHCA (2020) emphasize the importance of understanding neurobiological factors in counseling, but the specific requirements and standards vary. The 2024 CACREP standards are expected to place more emphasis on neuro-informed understanding. The new standards require a neurobiological foundation and etiology of addiction and co-occurring disorders, specifically mentioned in the sections regarding Lifespan Development, Clinical Mental Health Counseling, and Addiction Counseling. To date, AMHCA is the only counseling

association to propose standards related to the integration of neuroscience into counseling practice. These standards were developed by and AMHCA Taskforce (AMHCA, 2016). Counselor education programs and current practitioners have received scant guidance on the most effective methods for cultivating these competences (Field, et al., 2022). While participants expressed a desire for more neuro-informed requirements from CACREP at the graduate course level, they did not mention the AMHCA BBB standards as relevant to their training. This suggests a need for more clearly defined best practices in neuro-informed counseling. Training in these standards need to become more readily available and accessible to counselors. Moreover, counselor educators need more guidance in how to provide relevant education to counselors in training. A taskforce sponsored by leaders in the field could refine the existing, comprehensive BBB standards. Research shows that counselors receive less training in the neuroscience related standards than the others (Russo, et al., 2020). AMHCA is working to develop and pilot a three-tiered training model to assist counselors gain competence in this comprehensive list of standards and competencies. However, counselor education programs may still struggle to fully address training content for all three levels of the model (Field, et al., 2022). Further research should address more specific trainings for each level of the training program, to increase accessibility of high-quality training at the graduate level and beyond.

Table 6 outlines specific resources participants named as relevant and helpful in their self-guided approach to neuro-informed counseling training and practice. Neuro-informed counselors primarily rely on sources such as college courses, scientific journals, books, and continuing education for their neuroscience knowledge. Notably, the training pathways and resources that emerged in this study align with the extant literature describing common neuroscience related training pathways for counselors (Beeson, et al., 2019; Russo et al., 2021),

with counselors accessing neuroscience information through continuing education and self-study (i.e. advanced trainings, books, research articles, webinars) more commonly than at the graduate course level, which was also described in the present study as self-directed or program-specific.

Participants ( $n = 9$ ) engaged in self-study and independent learning to gain neuro-informed knowledge. They sought resources like books, research articles, podcasts, and online materials to enhance their understanding. Some participants ( $n=6$ ) received neuro-informed training through consultation and supervision, especially in modalities like EMDR and Somatic Experiencing. However, these resources can be costly and not easily accessible. All ten participants reported pursuing certifications and advanced training in related modalities like EMDR and Somatic Experiencing, even though these programs may not be explicitly advertised as neuro-informed. Participants noted that their graduate programs often lack comprehensive coursework in neurobiology and neuroscience as it pertains to counseling. Alexandra and Bethany felt that a dedicated course at the graduate level focused on integrating neuroscience into clinical work would be beneficial. Existing literature supports this assertion. Duenyas and Luke (2019) proposed recommendations for developing and teaching a Neuroscience for Counselors graduate course, while Lorelle and Michel (2017) proposed how counselor educators can include neuro-informed topics in a human development course. There is a need to go beyond these conceptual propositions with the development of rigorous training protocols.

Consensus among leaders in the counseling field around the depth and extent to which counselors need to learn and understand neuroscience principles is imperative. Continuing education, including networks, webinars, and shorter-term trainings, played a significant role in these counselors' efforts to stay neuro-informed. However, participants ( $n=8$ ) mentioned the need for more accessible and reliable resources. These counselors faced barriers such as time

constraints, cost, evaluating the veracity and reliability of available trainings, and the challenge of integrating neuroscience concepts into their practice effectively. Lack of consultation, community, and supervision in neuro-informed counseling were also noted as challenges. There is a scarcity of continuing education programs in counseling that cover basic neuroanatomy and physiology. Consequently, there's a need for more offerings in this area to ensure counselors are equipped with foundational knowledge. This preparation is essential for understanding and evaluating applied models based on neuroanatomy and physiology. Without it, counselors may struggle to assess these models and may only possess surface-level understanding when applying them in practice (Field, et al., 2022). This assertion was supported by participants' expressed concerns around the efficacy of existing trainings. It is imperative that counselors have enough neuro-literacy to determine the efficacy and relevance of training modalities, and to be able to integrate neuroscience information into practice in a grounded, meaningful and accurate way.

Neuro-informed counselors are enthusiastic about integrating neuroscience into their practice, however they encounter various challenges related to the availability, accessibility, and reliability of training resources. Standardization and improved access to accurate neuroscientific knowledge are seen as essential for the future of the counseling field. Participants reported limited neuro-informed training at the graduate training level and that counselors are generally not being trained to accurately translate complex neuroscience information into clinical practice. Participants also reported a desire for more community, consultation, and supervision around neuro-informed counseling. According to participants, most trainings with relevant information were not explicitly neuro-informed; participants have found it difficult to evaluate the veracity and reliability of trainings, which are often cost and time prohibitive. Moreover, counselors outside of academic settings do not have easy access to emerging scholarly articles and neuro-

informed resources. In summary, participants identified several common gaps in training and barriers to the pursuit of neuro-informed competence and clinical practice with implications for the future of the counseling field. There is a need for experts in the counseling field to clearly define best practices in neuro-informed counseling, and high-quality training should be prepared and vetted by leading counseling associations. Moreover, counselors need to be prepared to assess the veracity and reliability of available trainings to incorporate relevant neuroscience ethically and accurately.

### **Research Question 2**

Research Question 2 asked: How do self-described neuro-informed counselors integrate neuroscientific findings into their clinical trauma work? Neuroscience can inform every aspect of counseling, from intake, assessment, and rapport building to case conceptualization, treatment planning and clinical outcomes. Beeson and Field (2017) defined neurocounseling 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). The current study used the term neuro-informed counseling. Nevertheless, this approach entails the integration of neuroscientific research findings into the counseling field to inform current practices. Participants expanded on the extant literature with the assertion that neuro-informed counseling necessitates an understanding of the neurobiological impact of trauma. This integration includes assessment, diagnosis, conceptualization, relationship formation, and intervention. This study provided a novel, detailed look into the ways in which

counselors are practically and specifically integrating neuroscience in trauma counseling sessions.

While Beeson and Field (2017) contended that neurocounseling is a specialty within the counseling field, Russell and Jones (2016) asserted that all counselors should have a working knowledge of important physiological and neurological considerations relevant to the counseling field. The findings from the current study support these assertions from the existing literature. Participants described the ways in which neuroscience underpins and influences every aspect of their clinical work, including the language they use, assessment, case conceptualization, treatment planning and goals, and clinical interventions. The current qualitative study expanded on existing quantitative studies (Beeson et al., 2019; & Field et al., 2017) and conceptual literature (Field et al., 2015, 2016), by exploring in depth the ways in which counselors are integrating neuroscience into every aspect of their clinical trauma work.

### ***Neuro-Informed Language in Clinical Trauma Practice***

Existing literature has pointed to differences in terminology used by clinicians and researchers as an obstacle to the clinical integration of neuroscience (Siegle et al., 2019; Strege, et al., 2021), pointing to the importance of an exploration of the language used by practicing neuro-informed counselors. Neuro-informed counseling, as defined in the existing literature and reinforced by the findings of the current study, represents an approach to counseling that integrates principles and knowledge from neuroscience into clinical practice. It encompasses a range of key elements and practices aimed at enhancing the effectiveness of counseling in addressing mental health concerns. The language participants use in the practice of neuro-informed and trauma counseling emerged as an important theme.



### *Neuro-Informed Counseling Definition, Concepts, and Language*

At its core, neuro-informed counseling involves a solid understanding of the neurobiology of mental health concerns, such as trauma. This foundational knowledge enables counselors to comprehend the physiological underpinnings of these issues (Beeson & Field, 2017). The current study reinforces this aspect, as participants highlighted the importance of counselors understanding the neurobiology of trauma as a fundamental element of neuro-informed counseling. For example, Rachel emphasized the importance of counselors understanding the neurobiology of trauma as a foundational element of neuro-informed counseling.

Participants ( $n = 9$ ) discussed the significance of the mind-body connection and body awareness in neuro-informed counseling. They emphasized viewing clients holistically, including consideration of the nervous system's role in trauma. These neuro-informed counselors recognized the intricate mind-body connection and the impact of the nervous system in shaping mental health. Participants adopted a holistic perspective that considers both psychological and physiological factors in clients' well-being. Attachment theory and interpersonal neurobiology were also seen as crucial aspects of neuro-informed counseling ( $n = 8$ ). Counselors discussed the impact of attachment patterns on clients and the importance of attunement and therapeutic alliance in the healing process. Some counselors ( $n = 7$ ) also mentioned specific neuroscience informed concepts that were essential in their work, such as structural dissociation, the HPA axis, cortisol production, and the Adaptive Information Processing (AIP) model.

While there was some consensus on these key elements, there were also nuanced differences among the counselors, reflecting the evolving nature of neuro-informed counseling and the lack of standardized practices in the field. It's important to note that the field of

neuroscience-informed counseling is dynamic and continuously evolving. While there may be core principles, there is also room for individual interpretation and growth among practitioners. The depth and breadth of neuroscience knowledge differed between participants. Understanding neuroscience principles is imperative for counselors, though the depth and extent to which counselors learn and understand neuroscience principles may vary depending on their specific areas of practice, client populations, and even interest in the subject matter. It's essential for counselors to stay informed about relevant research and integrate neuroscience knowledge into their practice in a way that enhances their effectiveness in helping clients. However, it's imperative that leaders in the field reach consensus regarding basic neuro-informed practice competencies that can help to standardize training and guide practice.

Neuro-informed counselors integrate neuroscience by considering the mind-body connection, attachment, and other relevant concepts to provide holistic and effective trauma therapy. Neuro-informed counseling involves a deep understanding of the neurobiology of trauma, a holistic approach that considers the mind-body connection, an emphasis on attachment and interpersonal neurobiology, and the integration of various neuro-informed concepts to better understand and treat trauma. The field is dynamic, with room for individual interpretation and growth. In essence, neuro-informed counseling is a client-centered approach that combines a deep understanding of the neurobiological aspects of mental health concerns with a holistic view of clients' well-being. It emphasizes the integration of neuroscience principles into the counseling process to enhance clinical effectiveness in various aspects, including assessment, treatment planning, intervention, evaluation of outcomes, and wellness promotion (Beeson & Field, 2017). This approach acknowledges the interplay between the brain, the nervous system, and psychological well-being, offering a more comprehensive and nuanced approach to

counseling that can benefit clients facing a range of mental health challenges. Researchers and leaders in the field must take these nuances and practical applications into account as they develop training protocols. Trainings should support clinicians in accurately applying neuroscience into practice from a grounded place, without overburdening clinicians. A set of neuro-informed practice competencies to help standardize training and set realistic minimum expectations around neuro-informed knowledge and skills for clinicians is needed.

### ***Trauma Definition, Concepts and Language***

This study provided insight into the ways neuro-informed counselors think and talk about trauma. Eight participants commonly defined trauma as any experience that overwhelms the nervous system, including both the brain and the body's ability to cope and adapt. This understanding emphasizes the physiological and neurobiological impact of traumatic events. The existing literature introduces a response-based definition of trauma, emphasizing the individual's response and the impact on the nervous system during a traumatic event (Levine, 1997). This perspective aligns with the current study's findings, where neuro-informed counselors commonly defined trauma as experiences that overwhelm the nervous system, impacting both the brain and the body's capacity to cope and adapt. This perspective emphasizes the physiological and neurobiological aspects of traumatic events. Both the existing literature and the current study recognize the challenge of verbal inaccessibility of traumatic memories due to their storage as implicit rather than explicit memories (van der Kolk, 2015; Current Study). This underscores the importance of integrating body-based approaches to address the physiological impacts of psychological trauma.

The existing literature, including the work of Bessel van der Kolk and Peter Levine, underscores the neurobiological impact of trauma on the brain and nervous system and its

implications for clinical practice (van der Kolk, 2006). The literature informs the current study's findings, where neuro-informed counselors recognized the need to consider both physiological, linguistic, cultural, and systemic factors in their understanding of trauma. Seven participants expanded their definition of trauma to encompass a broader range of factors. Alexandra's definition involved experiences that go beyond one's ability to assimilate them into their sense of self, potentially fragmenting one's personality. Rachel referenced the Greek etymology of the word trauma, meaning a wound, and the Native American definition as a wound where the blood does not flow. This highlights the psychological wound aspect of trauma. Diane's perspective was that trauma inhibits movement, whether through generations or in acute traumatic situations, and involves the dorsal branch of the vagus nerve inhibiting movement expressions.

Participants emphasized that trauma is deeply subjective, and what one person experiences as traumatic may differ from another. They acknowledged that trauma can manifest at individual, community, and systemic levels. The definition of trauma encompasses a wide range of experiences, including acute events and ongoing stressors. The current study supports existing literature which emphasizes the subjective and diverse nature of traumatic experiences, recognizing that what one person experiences as traumatic may differ from another (Levine, 1997). This understanding supports a client-centered and culturally sensitive approach to trauma counseling. For example, Courtney differentiated between various types of trauma, such as Adverse Childhood Experiences (ACEs), early life stress, developmental trauma, and general stress. This approach allows for a more comprehensive understanding of trauma, including its neurobiological effects.

In summary, neuro-informed counselors viewed trauma as a complex phenomenon with varying degrees of impact, affecting both the nervous system and one's subjective experience.

They recognized the importance of considering not only physiological responses but also linguistic, cultural, and systemic factors in their understanding of trauma. This comprehensive perspective allows for a more nuanced and holistic approach to trauma treatment and support.

Integrating the findings from the current study with the existing literature on counselors' attitudes and beliefs about the integration of neuroscience into the counseling field highlights the evolving understanding of trauma and its implications for clinical practice. The findings from the current study align with and build upon the existing literature by highlighting the multifaceted ways in which neuro-informed counselors conceptualize trauma. They emphasize the need for a comprehensive understanding of trauma that encompasses both neurobiological and psychosocial factors. This integrated perspective contributes to the evolving conceptualization of trauma in the counseling field, ultimately enhancing the effectiveness of trauma treatment and support.

This expanded understanding aligns with the idea that trauma is not merely an event but a result within the nervous system, shaped by both the individual's response and neurobiological processes (Levine, 1997; SAMHSA, 2014).

A neuro-informed definition of trauma, as derived from the integration of the current study's findings with existing literature, reflects a comprehensive perspective that encompasses both the physiological responses within the nervous system and the linguistic, cultural, and systemic factors contributing to an individual's experience of trauma. This nuanced and holistic approach to defining trauma aligns with the evolving field of neuroscience-informed counseling, which seeks to integrate neuroscience principles into trauma treatment and support, emphasizing both the mind-body connection and the diverse ways individuals may experience and cope with traumatic events. The research findings have significant implications for trauma counseling. An understanding of the neurobiological impact of trauma and the physiological stress response is

imperative to effective intervention and healing for trauma survivors. The field at large must establish the minimum neuro-informed competencies trauma counselors need in order to effectively support their clients' healing. This also necessitates the establishment of high-quality, reliable training protocols.

### *Translation of Neuroscience Language and Concepts for Clients*

Neuro-informed counselors integrate neuroscience into their clinical trauma practice by focusing on effective communication and translation of complex concepts for their clients. The current study expanded on this understanding by exploring in depth how counselors translate complex concepts for their clients. Participants all recognized that their clients may not be familiar with neuroscience, so they simplified complex neuroscience concepts into terms that are easily understandable. They use everyday language rather than technical clinical terms to explain these concepts, to bridge the gap between their own neuroscientific knowledge and their clients' understanding. They saw themselves as translators of neuroscience information, to make it more digestible and relatable to clients. For example, Hayley reported she uses "layperson terms" and non-clinical terminology when discussing neuroscience concepts with clients. This approach helps clients grasp the essential ideas without getting overwhelmed by technical jargon. These layperson terms, however, must be grounded in accurate, basic neuroscience.

These neuro-informed counselors utilized frameworks and theories that provide user-friendly explanations of neuroscience. For example, Polyvagal Theory (PVT) was mentioned as a valuable framework that normalizes trauma responses and helps clients understand their nervous system's reactions. The concept of the hierarchy of the brain, such as Dan Siegel's hand-brain model, is employed as a therapeutic tool to illustrate and teach clients about their nervous system states. Counselors use these models to help clients visualize and understand their

emotional and physiological experiences. The "window of tolerance" was another concept that participants reported teaching to their clients. It served as a reference point for clients to understand their nervous system states during therapy sessions and helps them recognize when they may be operating outside of their optimal range. It is imperative that counselors have accurate neuroscience knowledge and remain close to the hard science so as to accurately translate concepts for clients, even when employing these applied models of neuroscience.

An important aspect of neuro-informed counseling is neuroeducation, brain-based psychoeducation illustrating and teaching the underlying physiological and neurological process of mental functioning and mental health concerns (Miller, 2016). Results of the current study supported the importance of neuroeducation and expanded upon how counselors are integrating neuroeducation into clinical trauma work. Neuroeducation plays a crucial role in neuro-informed trauma therapy, with counselors using various strategies to ensure clients understand the underlying physiological and neurological processes.

Participants (n=7) acted as translators of complex neuroscience information, simplifying it into terms clients can grasp. They adapted the language and complexity of neuroeducation based on the client's comfort and interest level, ensuring that clients can relate to and internalize the information. Participants introduced neuro-informed concepts through various methods, including metaphors, visual aids, and analogies. These tools help clients visualize and understand complex ideas related to the brain and nervous system. Metaphors like hurricanes or smoke alarms, as well as visual aids like maps of the nervous system, are used to simplify and illustrate these concepts effectively. In sum, participants reported that they employ various techniques to introduce clients to neuro-informed concepts effectively.

Participants reported providing clients with an understanding of how their brain works, explaining the differences between the reptilian and mammalian parts of the brain, and emphasizing how these functions impact their nervous systems. Dan Siegel's hand-brain model was one reported example used to simplify these concepts. Participants also incorporated attachment theory, which some clients may already be familiar with due to popular culture, to help them understand how their upbringing influences their current relationships and experiences. Participants focused on teaching clients mindfulness and body awareness and helped clients recognize bodily sensations and experiences before they reach the rational and analytical brain, promoting a deeper understanding of their emotional responses.

Participants employed a range of strategies, including tailored explanations, metaphors, and visual aids, to make neuroeducation accessible and engaging for their clients. These approaches help clients develop a better understanding of their own experiences and the therapeutic process. Overall, neuroeducation is an integral part of neuro-informed trauma therapy, helping clients develop a deeper understanding of their experiences and the therapeutic process. Therapists use a personalized and creative approach to ensure that clients can connect with and benefit from this crucial aspect of their treatment. These neuro-informed interventions collectively create a therapeutic environment where clients feel supported, understood, and equipped with practical tools for regulating their nervous systems and processing traumatic experiences. The emphasis on presence, reframing, mindfulness, and body awareness helps clients on their journey toward healing and growth.

Overall, participants emphasized the importance of effective communication and education in their clinical practice. They acknowledged that they are not neuroscientists but play a crucial role in helping clients navigate and make sense of the neurobiological aspects of their



trauma experiences. The goal is to empower clients with knowledge that can support their healing journey. While counselors are not neuroscientists, it is imperative that counselors have accurate neuroscience knowledge and remain close to the hard science so as to accurately translate concepts for clients. Counselors need to be able to explain the physiological impact of stress and trauma to their clients, as this helps empower clients, reduce shame and blame, improve emotional and physiological regulation, among other benefits. Again, benchmarks for minimum competencies to guide clinicians towards accurate, relevant, necessary information is needed, along with trustworthy training and education opportunities.

### ***Case Conceptualization***

Neuro-informed counselors integrate neuroscience into their clinical trauma practice by adopting a comprehensive approach to understanding their clients' experiences and symptomology. These counselors took a broad, neuro-informed perspective when conceptualizing clients' trauma symptomology and presenting concerns. They discussed the importance of meeting clients where they are from a neuro-informed standpoint, recognizing that trauma impacts the nervous system. This approach has helped them understand clients' responses in the context of their neurobiology. Existing research explored counselors' conceptualization of depression from a neuro-informed perspective (Field, et al., 2019) asking participants specific, directed questions. The current study asked participants open ended questions about conceptualizing specific clients who have survived trauma from a neuro-informed perspective.

Importantly, participants viewed clients' symptoms as adaptive responses to trauma. Participants depathologized clients' symptoms. They understood that the brain and body have learned to respond to threats in specific ways to keep clients safe. This perspective reduced shame and normalized clients' experiences, helping them gain a deeper understanding of their

responses and experiences. Participants integrated neuro-informed principles with various therapeutic modalities. For example, Jaimie and Alexandra combined neuro-informed approaches with Internal Family Systems (IFS) therapy to help clients identify and work with different parts of themselves, bypassing the need for conscious translation of experiences into language. The neurobiology of attachment was another crucial aspect of neuro-informed case conceptualization. Participants recognized that early attachment experiences profoundly impact the nervous system's regulation and that the therapeutic relationship can be reparative in helping clients regulate their nervous systems. These counselors applied neuro-informed thinking to specific client cases, considering how past traumatic experiences influence clients' present responses and behaviors. This involved understanding how clients' nervous systems have adapted to their unique trauma histories. This depathologizing way of conceptualizing trauma responses offers an important consideration for trauma counseling.

An overarching reported goal of therapy, from a neuro-informed perspective, was to help clients heal their nervous systems. This included helping them respond to the present reality rather than reacting to past threats. Counselors emphasized the importance of clients accessing different parts of their brains and not being stuck in survival mode. These neuro-informed counselors incorporated mindfulness and nervous system regulation techniques into their sessions. They focused on helping clients track and regulate their activation levels rather than solely relying on narrative-based therapies. Based on these findings, it can be inferred that neuro-informed counselors integrate neuroscience into their clinical trauma practice by considering how the nervous system responds to past trauma, how it impacts clients in the present, and how therapeutic interventions can help clients regulate their nervous systems for healing and growth.

This approach allows clients to gain a more compassionate and comprehensive understanding of their experiences.

### ***Assessment***

According to existing literature, neuro-informed assessment includes an evaluation of a client's physiological functioning (Uhernik, 2017). Observation and listening skills can be utilized to gather information regarding the client's neurophysiological functioning from the very first contact (Field et al., 2019). Knowledge of neurophysiology can inform assessment, with every detail leading to additional information about the functioning of the client's brain. Observations such as rapid breathing, flushed face and/or neck, rigid posture, quick speech, and psychomotor agitation may be clues to brain dysregulation (Russell-Chapin, 2016). This assessment phase should include both assessment and self-report of current physiological functioning. This may include biopsychosocial history, trauma history, and formal assessment for early attachment disruptions (Uhernik, 2017).

Participants in the current study supported these assertions, and expanded on the nuances and details of what assessment looks like from a neuro-informed perspective. All ten participants reported that assessment includes attunement to their clients' nervous system states during sessions. This ongoing process involves observing and understanding how clients' nervous systems are reacting. Participants reported that they pay attention to clients' body language, eye contact, and breathing patterns during sessions. These cues help in assessing nervous system functioning and the client's level of closeness, comfort, or fear. This attunement helps in treatment planning, identifying fight or flight responses, and recognizing shifts in a client's capacity to deal with trauma work. Informal assessment was also a commonly reported practice (n=7), starting from the initial contact with clients. This includes intake paperwork, verbal

assessments, and scaling questions to gauge emotional distress and nervous system states. Counselors pay attention to the words clients use to describe their experiences and observe any cues that may give insights into symptomology and dysregulation. While some counselors mentioned using formal assessments (n=5) like the Amen Clinic questionnaire or self-report assessments in specific cases, it's not a primary approach for most. These formal assessments can provide a guide to clients' experiences and identify areas of brain activation but are not the main focus.

Participants used nervous system attunement and informal assessment to gauge progress towards treatment goals. They assessed whether clients are ready for trauma processing, their tolerance levels, and whether they are in a ventral vagal state, which is conducive to therapeutic work. Participants expanded on the existing literature with reports that they rely on their own bodily feedback when attuned to their clients. They notice how their bodies respond to what clients share, which can provide valuable insights into the client's emotional state. Participants also mentioned co-regulation, where they and the client impact each other's nervous system states. This involves helping clients up-regulate or down-regulate based on feedback, ensuring they remain within their tolerance levels. In summary, these neuro-informed counselors are integrating neuroscience into their clinical trauma practice through therapist attunement, informal assessment, and ongoing observation of clients' nervous system states. While some use formal assessments when necessary, the focus is on understanding and working with the client's unique experiences and needs in a trauma-informed manner. These are important and novel insights into the use of assessment in neuro-informed trauma counseling.

## *Treatment Planning*

These neuro-informed counselors emphasized the impact of neuroscience on treatment planning for trauma treatment. The existing literature suggests that a neuroscientific perspective shifts treatment goals from changing unwanted thoughts, feelings, and behaviors (top-down processing) to improving emotional and physiological regulation (bottom-up processing; Chapin & Russell-Chapin, 2014; Russell-Chapin, 2016). The current study's findings aligned expanded upon this shift in treatment goals and treatment planning, with important implications for trauma treatment, goal setting, treatment planning, as well as relevant training and education.

Participants emphasized the importance of body-based approaches and a holistic understanding of trauma. Counselors prioritize goals related to improving clients' emotional and physiological self-regulation, focusing on nervous system states, embodiment, and present moment awareness. Goals often include reducing dissociation, increasing presence, reintegration into the community, and helping clients sustain employment. The emphasis is on helping clients become more aware of their nervous system states and learn to regulate them effectively. Counselors work collaboratively with clients to set goals that align with their internal experiences and nervous system states. They explore what clients want their internal experiences to be like and how they want to feel. Goals are tailored to each client's unique needs and experiences.

Trauma treatment should be a collaborative process with clients. Participants stressed the importance of learning the rhythm of what each client needs and being patient with the therapeutic process. Trauma healing was recognized as a complex journey that requires understanding and flexibility. Counselors understood the importance of pacing and timing in trauma treatment. They emphasized the need to resource clients' nervous systems before delving into trauma processing. This involves patience and intentionality to ensure clients are not

overwhelmed or retraumatized by the therapeutic process. Stabilization and resourcing are often the initial steps to build a solid foundation for further work. These findings are in line with existing understandings of trauma treatment, with stabilization as an essential first phase of therapy (Herman, 1997).

Counselors were mindful of the shame that often arises in clients with trauma histories and aimed to create a safe and compassionate therapeutic environment where clients can learn to hold self-compassion and understand that their nervous systems have been chronically overwhelmed. It's imperative counselors understand these concepts to help clients progress and shift coping mechanisms. Counselors acknowledged that trauma treatment is not a one-size-fits-all process. They adapted their approach based on each client's readiness and capacity for trauma work. This often involved focusing on building coping skills, mindfulness, and self-compassion before diving into trauma processing. In summary, neuro-informed counselors place a strong emphasis on setting client-driven goals, understanding the pacing and timing of trauma treatment, and creating a safe and compassionate therapeutic space. Their approach was characterized by adaptability and a focus on helping clients regulate their nervous systems effectively before addressing trauma directly.

### ***Clinical Interventions***

There is little extant literature exploring the interventions and techniques neuro-informed counselors use in their clinical trauma work. Participants in the current study emphasized several key techniques and interventions that play a crucial role in helping clients heal from trauma, that supported and built upon existing literature. Therapist presence and attunement was described by participants as an important clinical intervention (n=8). Therapists prioritized being fully present and attuned to their clients. This means understanding clients' experiences, fostering a strong

therapeutic relationship, and engaging in co-regulation with the client's nervous system. This attunement helps clients feel heard, understood, and safe, which is essential for trauma therapy.

Participants (n=6) also discussed the ways in which they help clients reframe their symptoms as adaptive responses to trauma. They emphasize that the brain and body react in specific ways to protect the individual in dangerous situations. However, these responses may become maladaptive in safe environments. This reframing reduces shame and self-blame and promotes self-compassion. Mindfulness, body awareness, and grounding techniques also emerged as important neuro-informed interventions (n=8). According to participants, these practices help clients connect with their bodies, stay present in the moment, and regulate their nervous systems.

Based on the current study, neuro-informed counselors teach clients mindfulness and body awareness as valuable life skills. This empowers clients to practice these techniques outside of therapy, helping them manage distress and stay connected to their present experiences. Dual attention techniques help clients focus on both areas of discomfort and safety within their bodies. This practice enables clients to anchor themselves in the present moment and respond to current stimuli rather than getting stuck in past traumatic experiences.

According to the results of this study, neuro-informed counselors employ various specialized techniques and methods to help clients heal and process trauma effectively. Three participants used EMDR, an eight-phase treatment modality, to help clients process trauma that is stuck in the brain and nervous system. EMDR utilizes bilateral stimulation to facilitate the processing of traumatic memories. Brainspotting is another technique that participants (n=2) discussed. Participants reported the technique provides versatility and adaptability and involves focusing on specific points in a client's visual field to access and process trauma-related

emotions and memories. Metaphors were used ( $n=3$ ) to help clients understand and relate to their traumatic experiences. For example, Diane used metaphors like "the bubble" to teach clients about emotional and nervous system regulation, helping clients to return to their bubble of emotional regulation in and out of the therapy session.

Somatic practices were reported ( $n = 4$ ) as neuro-informed techniques involving the body to help clients regulate and release stored trauma. These practices may include gentle movements, somatic processing of emotions, and encouraging clients to notice and respond to physical sensations related to trauma. Participants ( $n = 3$ ) reported they incorporate breathwork techniques to engage with clients' nervous systems. Teaching clients specific breathing exercises can help them shift emotions and regulate their nervous systems effectively. Expressive arts and activities, such as artwork, journaling, or sand tray therapy, are used creatively to engage different parts of the brain and help clients process trauma. These activities provide clients with alternative ways to express their feelings and experiences. Rachel reported she uses tapping, also known as Emotional Freedom Technique (EFT), is used by some therapists. This technique involves gentle tapping on specific meridian points on the body while focusing on traumatic emotions or memories.

Interestingly, the techniques discussed by participants were not specifically neuro-informed but were conceptualized that way by participants. These techniques allow therapists to tailor their approaches to individual client needs, providing a holistic and neuro-informed framework for trauma therapy. Each technique aims to help clients process and heal from their traumatic experiences by addressing both emotional and physiological aspects of trauma.



### ***Outcome/Impact of a Neuro-Informed Approach***

The current study sheds light on the profound impact a neuro-informed counseling approach has on both counselors and clients in the context of trauma counseling.

**Counselor Impact.** Participants experienced personal and professional growth through a neuro-informed approach and reported the powerful impact of witnessing the healing journey of clients who have endured traumatic experiences. Furthermore, implementing this approach requires patience and adaptability. Counselors must be prepared for unexpected challenges and address them as they arise. Neuro-informed principles permeate every aspect of counselors' work, from client sessions to supervision and consultation. Participants all reported that neuro-informed counseling has become a foundational framework for their clinical practice.

**Client Impact.** Participants reported that clients benefit from reduced shame and guilt through understanding, acceptance, and self-compassion; they no longer perceive their symptoms as abnormal, which contributes to their healing process. Therapeutic buy-in was another reported benefit and impact of a neuro-informed approach. Clients gained trust in therapeutic techniques and interventions, as neuro-education helped them comprehend the reasons behind their responses. This leads to increased engagement in the therapeutic process. According to participants, clients experienced more significant emotional regulation and less intense emotional reactions. They were able to make healthier decisions and engage in more stable, consistent relationships. Clients also developed a heightened awareness of their nervous system states, regulation, and dysregulation. This awareness empowered them to take control of their nervous systems, promoting better regulation and overall well-being.

Participants observed clients make substantial progress in their lives, such as reintegrating into society, sustaining employment, improving family relationships, and making

healthier choices. They reported feeling more connected and less anxious. Some clients experienced rapid healing from their trauma, especially when they engaged in neuro-informed trauma processing. While grounding techniques and mindfulness helped them become more present and make healthier decisions in their daily lives. In essence, a neuro-informed counseling approach has a profound and positive impact on both counselors and clients. It leads to greater understanding, emotional regulation, and healing for individuals who have experienced trauma, ultimately improving their quality of life.

### **Additional Findings**

Participants emphasized the clinical significance of neuro-informed trauma counseling. They expressed a belief that this approach is essential and underpins everything in the counseling field. They were passionate about the need for counselors to have a neuro-informed understanding of trauma and its effects on the brain and body. Participants discussed the transformative power and impact of a neuro-informed counseling approach. They felt that it helped theories come to life and made their work more meaningful. They believed it had the potential to positively impact clients' lives and, by extension, society, but participants expressed frustration and disappointment with various barriers to the integration of neuroscience into counseling. These barriers included the lack of standardized training requirements, the absence of clear guidance, limited resources, and difficulties in publishing relevant research. They also raised concerns about the need for culturally informed neuro-informed counseling interventions.

Participants showed enthusiasm and excitement for neuro-informed counseling. They expressed a passion for learning and applying neuroscience concepts in their work. This enthusiasm was balanced by their frustration with the existing barriers. While participants felt moderately comfortable integrating neuroscience into their clinical work, they acknowledged

that there was always more to learn. They recognized that neuroscience is a complex field, and they expressed a desire to continue expanding their knowledge. Participants were frustrated by the lack of accessibility of neuroscience research and information in the counseling literature.

The findings from the current study align with and contribute to the existing literature on counselors' attitudes, beliefs, and practices regarding the integration of neuroscience into the counseling field. The existing literature has highlighted several key considerations and challenges in this integration, and the current study provides further insights and context. Overall, participants shared a deep belief in the importance of a neuro-informed approach to trauma counseling and a strong desire to overcome the barriers they encountered. They recognized the potential for significant positive change in the field and were committed to ongoing learning and growth in this area. Participants had varied degrees of training and knowledge in neuroscience as it relates to counseling practice, which points to the lack of clarity and standardization regarding what it means to be a neuro-informed counselor.

### **Limitations**

For this study, the principal researcher aimed to obtain an unbiased representation of neuro-informed counselors learning and application of neuroscience into clinical trauma practice. Accordingly, steps were taken to ensure trustworthiness of the findings. However, the findings that emerged to answer the research questions must be considered in the context of this study's limitations. Limitations that warrant discussion include the research team and researcher bias, a limited sample, and self-report nature of the data.

### **The Research Team and Researcher Bias**

Trustworthiness is a core component of CQR methodology (Hill, 2021). The research team used various measures to maximize objectivity. The use of a research team and auditor,

who all reached consensus at each stage of data analysis was intended to increase the trustworthiness of findings. Both coders and the auditor were trained in the same Counselor Education PhD program, and all identify as white, cis-gendered heterosexual woman in their 30s. Importantly, this positionality may have limited the research team's ability to consider participants' responses from a variety of perspectives. Each coder and the auditor practiced careful bracketing of biases, assumptions, and expectations, prior to and through the duration of the study. This included the drafting of an intentional bracketing statement from each research team member. Both coders and the auditor have experience in trauma-informed clinical practice, education, supervision, and research, and each had varying levels of expertise and familiarity around a neuro-informed approach to counseling. They all innately believe that counseling students and counseling professionals would benefit from a more clearly defined and developed curriculum, but all worked to bracket their own experiences and interpretations to let the participants' words speak for them.

Although each member of the research team contributed a significant amount of time to the study and influenced the outcome of the results, the principal researcher led the process. As a result, the principal researcher conducted all interviews, decided on the nature of interview transcription, and led data analysis. Importantly, the principal researcher's bias, which may have influenced data collection and analysis, other members of the research team, and the writing process, should be considered a limitation, given her enthusiasm and strong belief in the importance of standardization around the integration of neuroscience into the treatment of psychological trauma.

## **Limited Sample**

It is important to note that the sampling and recruitment strategies used in this study likely limited the overall representativeness of the final sample. The small sample size ( $n = 10$ ) limits generalizability. The sample used in this study only included self-described neuro-informed counselors, that is, counselors with a dispositional interest in neuroscience. It is important to note that these results cannot be generalized to the larger counseling field. The self-directed nature of integrating neuroscience into clinical practice indicated by these results makes this a particularly notable limitation. It leaves the experiences of those counselors with less interest in neuroscience in question. The use of purposive sampling from IRB approved list-servs and neuro-informed counseling interest networks reduces the generalizability of the results.

Notably this study's sample was limited due to the participants' demographics. Specifically, all ten participants were female, and the majority were white. The cultural diversity of the sample was limited. Therefore, it is important to consider the degree to which this study's findings represent the experiences of non-white, non-female clinicians.

## **Self-Report Nature of Data**

In this study, participants were asked to self-reflect on their experiences attempting to integrate neuroscience into their clinical trauma work. It is possible that participants' responses to the interview questions were influenced by a desire to be viewed favorably by the researcher and/or pressure to depict themselves, their training, and their work positively. Thus, participants may have limited the degree of transparency regarding their experiences. Moreover, while the interview questions were provided to participants for reflection ahead of the interviews, some participants took more time to prepare and self-reflect than others. Some participants expressed difficulty remembering specifics of trainings, resources, neuroscience concepts, and experiences

during the interview. Future researchers may consider incorporating triangulation into the data to increase the trustworthiness of the results. This may include requesting participants have specific examples of resources named and readily available to share prior to the interview, focus groups, reflective journals, or survey responses. The primary researcher recruited individuals who self-describe as neuro-informed counselors. There is no consensus in the field around what truly qualifies a counselor as neuro-informed in their work; participants had different degrees of training and expertise, which could have influenced the results.

### **Implications for Research, Training, and Practice**

Understanding the neurophysiological stress response is crucial in trauma-informed practice. It allows counselors to comprehend how the nervous system reacts to threats, especially in trauma survivors, shaping assessment, treatment planning, case conceptualization, interventions, and ultimately, clinical outcomes. There is an increasing need for more literature and empirical research exploring and addressing ethical integration of neuroscience in the counseling field. Both the existing literature and the current study emphasize the clinical importance of neuro-informed counseling. Counselors in the current study strongly believed that a neuro-informed approach is crucial for understanding and addressing trauma effectively. This echoes the sentiment in the literature that integrating neuroscience aligns with core values in the counseling field (Beeson et al., 2019). The existing literature has discussed potential ethical concerns associated with the integration of neuroscience, such as the risk of re-traumatization and the tension between hard science and humanistic principles (Wilkinson, 2018), with others responding that neuroscience integration is consistent with the principles of the counseling profession (Beeson & Miller, 2019; Duenyas & Luke, 2019). Participants discussed integrating neuroscience into their clinical practice in ways that inform and enhance the holistic and

humanistic principles of the counseling profession, however, the current study also highlights the need for counselors to be well-informed and competent in neuroscience to avoid potential harm to clients. Participants reported that an understanding of clients' nervous systems, particularly the neurophysiological stress response, is vital to a truly holistic approach to counseling.

Participants were cognizant of their own limitations and gaps in knowledge. Extant literature has identified the persistence of neuromyths among counselors and educators (Kim & Zalaquett, 2019), so it is important counselors are aware of the limitations of their knowledge and understanding. Participants in the current study emphasized the importance of accurate and evidence-based training in neuroscience, expressed a desire to continue learning, and recognized the existence of gaps in their knowledge. Both the existing literature and the current study acknowledge barriers to the integration of neuroscience into counseling. These barriers include the lack of standardized training requirements, limited resources, and difficulties in publishing relevant research. Participants in the current study also mentioned concerns about the need for culturally sensitive neuro-informed counseling interventions. The current study aligns with existing research by highlighting counselors' varying comfort levels in integrating neuroscience into their clinical work. Participants expressed a desire to continue learning and improving their competence. Their enthusiasm for neuro-informed counseling is evident, as seen in their passion for the subject.

The existing literature emphasizes the need for standardization and consistency in neuro-informed counseling training and education (Beijan et al., 2021; Russo et al., 2021). The current study's findings further underscore this need, especially as counselors are eager to learn but face barriers in accessing quality training. In summary, the current study's findings provide valuable insights into the attitudes and beliefs of counselors regarding the integration of neuroscience into

clinical practice with trauma survivors. These findings complement the existing literature, highlighting the importance of addressing ethical concerns, dispelling neuromyths, and working towards standardization in neuro-informed counseling education. Both the literature and the current study emphasize the potential benefits of a neuro-informed approach while recognizing the challenges that must be overcome to ensure its ethical and effective integration into the counseling field.

Continued exploration and evaluation of how counselors are effectively integrating neuroscience into clinical practice is needed. Translational neuroscience is the application of neuroscience to outside fields, or the application of neuroscience laboratory research into the development and application of clinical interventions (Davies et al., 2020). Counselors must be able to translate neuroscience information to accurately integrate it into their research and practice for an effective neuro-informed approach. Counselors are often tasked with accessing and interpreting neuroscience literature from other disciplines (Beijan, 2021). An exploration of neuro-literacy among counselors would be a useful study, that is, how accurately are counselors able to translate neuroscience research in clinically relevant ways. Future research should explore ways to ensure counselors are trained to accurately translate complex neuroscience in clinically relevant and accurate ways. In addition, future research should aim to add to the body of existing neuro-informed counseling literature, to increase accessibility of relevant literature in counseling and to promote the integration of neuroscience through the lens of the counseling profession.

Because this study utilized a relatively small sample of self-described neuro-informed counselors, future research may entail further exploration of counselors' experiences integrating neuroscience into clinical practice. A possible next step in relevant research might expand the



sample of participants to survey a larger and more diverse group of counselors. Further exploration into how counselors are integrating neuroscience into other areas of counseling practice, outside of trauma counseling, such as addictions counseling, couples and family counseling, and multicultural and social justice issues in counseling could be important future studies to add to the neuro-informed counseling literature and knowledge base. Another area of research to explore is the experiences of counseling students related to neuroscience and coursework. Similarly, further exploration of how counselor educators are practically teaching about neuroscience is warranted. For example, a study of the development and implementation of a neuroscience in counseling graduate course would meaningfully add to the relevant literature.

AMHCA is the only counseling association to come out with standards related to integrating neuroscience into counseling (AMHCA, 2020). Interestingly, the AMHCA biological bases of behavior were not addressed by any of the participants in the present study. Although, this is in line with existing research which has shown that counselors reported prior training that addressed neuroscience-related standards significantly less frequently than other standards (Russo, et al., 2021). Future research should explore how and if these AMHCA standards are being applied in counselor training. An exploration of neuro-literacy to explore the accuracy of counselor information would expound upon existing research into neuromyths. Research to explore what counselor educators need to know and training protocols are needed to help inform counselor training and education.

Beijan, et al. (2021) highlighted the need for neuro-informed counseling competencies, as are endorsed by the American Counseling Association in areas including LGBTQIA+ issues, spiritual and religious issues in counseling, multicultural and social justice counseling, and career

counseling. The current study supports the assertion that similar competencies addressing neuroscience could contribute to standards for the use of neuroscience in counseling. A future Delphi study in which a group of neuro-informed counseling experts reach agreement on key concepts and interventions could provide clarity around neuro-informed counseling and contribute to the development of neuro-informed counseling competencies.

Future research studies should explore what counselor educators need to know, and in what ways they may apply the current AMHCA standards to counselor training. The establishment and dissemination of a rigorous and high-quality training protocol will help advance the integration of neuroscience into the counseling field. A delphi study should explore how experts in the field are integrating neuroscience concepts into counselor training. Similarly, a case study of a counselor education course on neuroscience would provide further information for counselor training in relevant neuroscience, exploring how experts in the field are currently teaching counselors to integrate neuroscience into their clinical work. A literature review applying to neuroscience in clinical practice could help further the agenda to understand what counselors need to know about the neurophysiology of trauma. Finally, a case study which explored a trauma counseling session to show what the process looks like from a neuro-informed perspective would shed further light on the subject.

There is a need for consensus and further clarification in the counseling field around what it means to practice in a neuro-informed way. Additional research is needed to continue the ethical integration of neuroscience into counseling practice, education, training, supervision, and research. Ultimately, counselor researchers, educators, and clinicians must understand and consider the impact trauma has on the nervous system and the neurophysiological stress and threat response in humans to holistically address and treat trauma survivors.



## REFERENCES

- Absher, L., Maze, J., & Brymer, M. (2021). The traumatic impact of COVID-19 on children and families: Current perspectives from the NCTSN. *Los Angeles, CA, and Durham, NC: National Center for Child Traumatic Stress.*
- Ali, S. S., Lifshitz, M., & Raz, A. (2014). Empirical neuroenchantment: From reading minds to thinking critically. *Frontiers in Human Neuroscience*, 8, 357. <https://doi.org/10.3389/fn-hum.2014.00357>
- American Mental Health Counselors Association. (2016). *AMHCA standards for the practice of clinical mental health counseling.*
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). <https://doi.org/10.1176/appi.books.9780890425596>
- American Psychological Association. (2017). *Eye Movement Desensitization and Reprocessing (EMDR) Therapy.* <https://www.apa.org/ptsd-guideline/treatments/eye-movement-reprocessing>.
- Austin, M. A., Riniolo, T. C., & Porges, S. W. (2007). Borderline personality disorder and emotion regulation: Insights from the polyvagal theory. *Brain and Cognition*, 65(1), 69–76. <https://doi-org.libproxy.uncg.edu/10.1016/j.bandc.2006.05.007>
- Beeson, E. T., & Field, T. A. (2017). Neurocounseling: A new section of the *Journal of Mental Health Counseling*. *Journal of Mental Health Counseling*, 39(1), 71–83. <https://doi-org.libproxy.uncg.edu/10.17744/mehc.39.1.06>
- Beeson, E. T., Field, T. A., Reckner, J. L., Luke, C., & Jones, L. (2019). Neuroscience research, training, and practice: Adding to or subtracting from counselor identity?. *Journal of*

- Counselor Leadership and Advocacy*, 6(2).  
<https://doi.org/10.1080/2326716X.2019.1617210>
- Beeson, E. T., Kim, S. R., Zalaquett, C. P., & Fonseca, F. D. (2019). Neuroscience attitudes, exposure, and knowledge among counselors. *Teaching and Supervision in Counseling*, 1(2), 1–19. <https://doi.org/10.7290/tsc010201>
- Beeson, E. T., & Miller, R. (2019). Grounding neuro-informed practice in a humanistic framework. *The Journal of Humanistic Counseling*, 58(2), 95–107.  
<https://doi.org/10.1002/johc.12099>
- Beijan, L. L., Prosek, E. A., Jones, L. D., Jackson, D., & Legacy, B. (2022). A consensual qualitative analysis of counselor educators' experiences incorporating neuroscience. *Counselor Education and Supervision*, 61(3), 247–261. <https://doi-org.libproxy.uncg.edu/10.1001/ceas.12234>
- Bergmann, M. S. (Ed.). (2004). *Understanding dissidence and controversy in the history of psychoanalysis*. Other Press.
- Bergmann, U. (2020). *Neurobiological foundations for EMDR practice*. Singer.
- Billeci, L., Tonacci, A., Tartarisco, G., Narzisi, A., Di Palma, S., Corda, D., Baldus, G., Cruciani, F., Anzalone, S. M., Calderoni, S., Pioggia, G., Muratori, F., & Michelangelo, S. G. (2016). An integrated approach for the monitoring of brain and autonomic response of children with autism spectrum disorders during treatment by wearable technologies. *Frontiers in Neuroscience*, 10. <http://dx.doi.org/10.3389/fnins.2016.00276>
- Billow, M., & Weinberg, H. (2014). Book review: The polyvagal theory: Neuropsychological foundations of emotions, attachment, communication, & self-regulation. *International Journal of Group Psychotherapy*, 64(4), 593–600. <https://doi.org/10.1521/ijgp2014644593>

- Bitner, B. (1994). *Revised science attitude scale for pre-service elementary teachers: Re-examined* [Paper presentation]. Annual Meeting of the National Association for Research in Science Teaching Convention, Anaheim, CA, United States.  
[https://archive.org/stream/ERIC\\_ED372958/ERIC\\_ED372958\\_djvu.txt](https://archive.org/stream/ERIC_ED372958/ERIC_ED372958_djvu.txt)
- Boals, A. (2018). Trauma in the eye of the beholder: Objective and subjective definitions of trauma. *Journal of Psychotherapy Integration, 28*(1), 77–89. <https://doi-org.libproxy.uncg.edu/10.1037/int0000050>
- Bohon, C., Weinbach, N., & Lock, J. (2019). A protocol for integrating neuroscience into studies of family-based treatment for anorexia nervosa: An approach to research and potential benefits for clinical care. *Frontiers in Psychiatry, 10*. <https://doi-org.libproxy.uncg.edu/10.3389/fpsyt.2019.00919>
- Briggs, P. C., Hayes, S., & Changaris, M. (2018). Somatic Experiencing® informed therapeutic group for the care and treatment of biopsychosocial effects upon a gender diverse identity. *Frontiers in Psychiatry, 9*. <https://doi-org.libproxy.uncg.edu/10.3389/fpsyt.2018.00053>
- Brom, D., Stokar, Y., Lawi, C., Nuriel, P. V., Ziv, Y., Lerner, K., & Ross, G. (2017). Somatic experiencing for posttraumatic stress disorder: A randomized controlled outcome study. *Journal of Traumatic Stress, 30*(3), 304–312. <https://doi-org.libproxy.uncg.edu/10.1002/jts.22189>
- Brubacher, L. L. (2018). *Stepping into emotionally focused couple therapy: Key ingredients of change*. Karnac.

- Busacca, L. A., Sikorski, A. M., & McHenry, B. (2015). Infusing neuroscience within counselor training: A rationale for an integrally-informed model. *Journal of Counselor Practice*, 6(1), 33–45.
- Carlson, N. R., & Birkett, M. A. (2017). *Physiology of behavior* (12th ed.). Pearson.
- Cashwell, C. S., & Sweeney, T. J. (2016). Jane E. Myers: A life well lived. *Journal of Counselor Leadership and Advocacy*, 3(1), 4–11.  
<https://doi.org/10.1080/2326716X.2015.1092401>
- Cavada, C., & Schultz, W. (2000). The mysterious orbitofrontal cortex. Foreword. *Cerebral Cortex*, 10(3), 205. <https://doi.org/10.1093/cercor/10.3.205>.
- Cénat, J. M., & Dalexis, R. D. (2020). The complex trauma spectrum during the COVID-19 pandemic: A threat for children and adolescents' physical and mental health. *Psychiatry Research*, 293, 113473. <https://doi.org/10.1016/j.psychres.2020.113473>
- Collura, T. F., Zalaquett, C., Bonnstetter, R. J., & Chatters, S. J. (2014). Toward an operational model of decision making, emotional regulation, and mental health impact. *Advances in Mind - Body Medicine*, 28, 18–33.  
<https://login.libproxy.uncg.edu/login?url=https://www.proquest.com/docview/1618193590?accountid=14604>
- Cookey, J., Butterfield, M., Robichaud, C., & Lovas, D. (2018). Integrating clinical neurosciences in a psychiatry residency training program: A brief report with pilot data. *Academic Psychiatry*, 42(2), 217–221. <https://doi-org.libproxy.uncg.edu/10.1007/s40596-017-0756-7>
- Corey, G. (2009). *Theories and practices of counseling and psychotherapy*. Thomson Brooks/Cole.

- Council for Accreditation of Counseling and Related Educational Programs (CACREP). (2015). *2016 CACREP standards*. [www.cacrep.org](http://www.cacrep.org)
- Coutinho, J. F., Perrone-McGovern, K. M., & Gonçalves, O. F. (2017). The use of neuroimaging methodology in counselling psychology research: Promises, pitfalls, and recommendations. *Canadian Journal of Counselling, 51*(4), 327–348.
- Coutinho, J. F., Silva, P. O., & Decety, J. (2014). Neurosciences, empathy, and healthy interpersonal relationships: Recent findings and implications for counselling psychology. *Journal of Counselling Psychology, 61*, 541–548. <https://doi.org/10.1037/cou0000021>
- Cozolino, L. (2010). *The neuroscience of psychotherapy – Healing the social brain*. Norton.
- Cozolino, L. (2010). *The neuroscience of psychotherapy: Healing the social brain* (2nd ed). Norton.
- Crawe, K. (2007). *Neuropsychotherapy: How the neurosciences inform effective psychotherapy*. Taylor & Francis.
- Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage.
- Crockett, J. E., Cashwell, C. S., Tangen, L., Hall, K. H., & Young, J. S. (2016). Breathing characteristics and symptoms of psychological distress: An exploratory study. *Counseling and Values, 61*, 10–27. <https://doi.org/10.1002/cvj.12023>
- Dahlitz, M. (2015). Neuropsychotherapy: Defining the emerging paradigm of neurobiologically informed psychotherapy. *International Journal of Neuropsychotherapy, 3*, 47–69. <https://doi.org/10.12744/ijnpt.2015.0047-0069>
- Dana, D. (2018). *The polyvagal theory in therapy: Engaging the rhythm of regulation*. W. W. Norton & Co.



- D'Andrea, M. (2012). Neuroscience: The newest force in counseling and psychotherapy. In A. Ivey, M. D'Andrea, & M. Ivey (Eds.), *Theories of counseling and psychotherapy: A multicultural perspective* (7th ed., pp. 49-86). Sage.
- Davies, C., Hamilton, O., Hooley, M., Ritakari, T. E., Stevenson, A. J., & Wheeler, E. (2020). Translational neuroscience: The state of the nation (a PhD student perspective). *Brain Communications*, 2(1), fcaa038. <https://doi.org/10.1093/braincomms/fcaa038>
- Dayal, H., Buck, G., & Clandinin, D. J. (2021). A narrative inquiry into counsellor trainees' experiences of working with trauma. *Reflective Practice*, 22(4), 474–487. <https://doi-org.libproxy.uncg.edu/10.1080/14623943.2021.1915268>
- Dekker, S., Lee, N. C., Howard-Jones, P., & Jolles, J. (2012). Neuromyths in education: Prevalence and predictors of misconceptions among teachers. *Frontiers in Psychology*, 3, 429. <https://doi.org/10.3389/fpsyg.2012.00429>
- Demertzis, N., & Eyerman, R. (2020). Covid-19 as cultural trauma. *American Journal of Cultural Sociology*, 8, 428–450. <https://doi.org/10.1057/s41290-020-00112-z>
- Dimitrijevic, A. (2007). Review of understanding dissidence and controversy in the history of psychoanalysis. *International Forum of Psychoanalysis*, 16(1), 55–59. <https://doi-org.libproxy.uncg.edu/10.1080/08037060601160181>
- Duenyas, D. L., & Luke, C. (2019). Neuroscience for counselors: Recommendations for developing and teaching a graduate course. *The Professional Counselor*, 9(4), 369–380. <https://doi.org/10.15241/dld.9.4.369>
- Egan, M., Neely-Barnes, S. L., & Combs-Orme, T. (2011). Integrating neuroscience knowledge into social work education: A case-based approach. *Journal of Social Work Education*, 47(2), 269–282. <https://doi.org/10.5175/JSWE.2011.200900109>

- Eichinger, R. W. (2018). Should we get aboard the brain train? *Consulting Psychology Journal: Practice and Research*, 70(1), 89–94. <https://doi-org.libproxy.uncg.edu/10.1037/cpb0000107>
- Emerson, D. (2015). *Trauma-sensitive yoga in therapy: Bringing the body into treatment*. W W Norton & Co.
- Eres, R., Decety, J., & Molenberghs, P. (2015). Individual differences in local grey matter density are associated with differences in affective and cognitive empathy. *Neuroimage*, 117, 305–310.
- Erk, R. R. (2000). Effective treatment of attention-deficit/hyperactivity disorder: Predominately inattentive type. *Journal of Counseling Development*, 78, 389–399. <https://doi.org/10.1002/j.1556-6676.2000.tb01922.x>
- Essandoh, P. K. (1996). Multicultural counseling as the “fourth force”: A call to arms. *The Counseling Psychologist*, 24(1), 126–137. <https://doi-org.libproxy.uncg.edu/10.1177/0011000096241008>
- Etkin, A., & Cuthbert, B. (2014). Beyond the DSM: Development of a transdiagnostic psychiatric neuroscience course. *Academic Psychiatry*, 38, 145–50.
- Etkin, A., Pittenger, C., Polan, H. J., & Kandel, E. R. (2005). Toward a neurobiology of psychotherapy: Basic science and clinical applications. *Journal of Neuropsychiatry and Clinical Neuroscience*, 17(2), 145–58. <https://doi.org/10.1176/jnp.17.2.145>. PMID: 15939967.
- Fairfax, H. (2007). Testing times: Counselling psychology and the neuropsychological perspective. A personal view. *Counselling Psychology Review*, 22(4), 44–48.

- Fan, Y., Duncan, N., de Greck, M., & Northoff, G. (2011). Is there a core neural network in empathy? An fMRI based quantitative meta-analysis. *Neuroscience and Behavioral Reviews, 35*, 903–911.
- Farmer, R. L. (2009). *Neuroscience and social work practice: The missing link*. Sage.
- Field, T. A. (2014). Integrating left-brain and right-brain: The neuroscience of effective counseling. *The Professional Counselor, 4*, 19–27.
- Field, T. A., Beeson, E. T., & Jones, L. K. (2015). The new ABCs: A practitioner's guide to neuroscience-informed cognitive behavioral therapy. *Journal of Mental Health Counseling, 37*, 206–220. <https://doi.org/10.17744/1040-2861-37.3.206>
- Field, T. A., Beeson, E. T., & Jones, L. K. (2016). Neuroscience-informed cognitive-behavior therapy in clinical practice: A preliminary study. *Journal of Mental Health Counseling, 38*, 139–154. <https://doi.org/10.17744/mehc.38.2.05>
- Field, T. A., Beeson, E. T., Jones, L. K., & Miller, R. (2017). Counselor allegiance and client expectancy in neuroscience-informed cognitive-behavior therapy: A 12-month qualitative follow-up. *Journal of Mental Health Counseling, 39*, 351–365. <https://doi.org/10.17744/mehc.39.4.06>
- Field, T. A., Jones, L. K., Luke, C., & Beeson, E. T. (2018). *Integrating neuroscience into clinical practice and training*. <https://attendee.got-otraining.com/0601m/catalog/>
- Field, T. A., Beeson, E. T., Luke, C., Ghoston, M., & Golubovic, N. (2019). Counselors' neuroscience conceptualizations of depression. *Journal of Mental Health Counseling, 41*(3), 260–279. <https://doi.org/10.17744/mehc.41.3.05>

- Field, T. A., Jones, L. K., & Russell-Chapin, L. A. (Eds.). (2017). *Neurocounseling: Brain-based clinical approaches*. American Counseling Association. <https://doi-org.libproxy.uncg.edu/10.1002/9781119375487>
- Field, T.A., Jones, L. K., & Russell-Chapin, L. A. (2018, February 20). *Behind the book: Neurocounseling: Brain-Based Clinical Approaches*. Counseling Today. <https://ct.counseling.org/2018/02/behind-book-neurocounseling-brain-based-clinical-approaches/#>
- Field, T. A., Moh, Y. S., Luke, C., Gracefire, P., Beeson, E. T., & Russo, G. M. (2022). A training model for the development of neuroscience-informed counseling competencies. *Journal of Mental Health Counseling, 44*(3), 266-281. doi:<https://doi.org/10.17744/mehc.44.3.05>
- Fonzo, G. A., Simmons, A. N., Thorp, S. R., Norman, S. B., Paulus, M. P., & Stein, M. B. (2010). Exaggerated and disconnected insular-amygdalar blood oxygenation level-dependent response to threat-related emotional faces in women with intimate-partner violence posttraumatic stress disorder. *Biological Psychiatry, 68*, 433–441. <https://doi.org/10.1016/j.biopsych.2010.04.028>
- Ford, J. D., Courtois, C. A., Steele, K., van der Hart, O., & Nijenhuis, E. R. S. (2005). Treatment of complex posttraumatic self-dysregulation. *Journal of Traumatic Stress, 18*(5), 437–447. <https://doi.org/10.1002/jts.20051>
- Fuchs, T. (2004). Neurobiology and psychotherapy: An emerging dialogue. *Current Opinion in Psychiatry, 17*, 479–485. <https://doi.org/10.1097/00001504-200411000-00010>

- Fung, L. K., Akil, M., Widge, A., Roberts, L. W., & Etkin, A. (2014). Attitudes toward neuroscience education among psychiatry residents and fellows. *Academic Psychiatry, 38*(2), 127–134. <https://doi.org/10.1007/s40596-014-0034-x>.
- Fung, L. K., Akil, M., Widge, A., Roberts, L. W., & Etkin, A. (2015). Attitudes toward neuroscience education in psychiatry: A national multi-stakeholder survey. *Academic Psychiatry, 39*(2), 139–146. <https://doi.org/10.1007/s40596-014-0183-y>.
- Gallese, V. (2001). The ‘shared manifold’ hypothesis: From mirror neurons to empathy. *Journal of Consciousness Studies, 8*(5–7), 33–50.
- Geller, S. M., & Porges, S. W. (2014). Therapeutic presence: Neurophysiological mechanisms mediating feeling safe in therapeutic relationships. *Journal of Psychotherapy Integration, 24*(3), 178–192. <https://doi-org.libproxy.uncg.edu/10.1037/a0037511>
- Gerritsen, R. J. S., & Band, G. P. H. (2018). Breath of life: The respiratory vagal stimulation model of contemplative activity. *Frontiers in Human Neuroscience, 12*. <https://doi-org.libproxy.uncg.edu/10.3389/fnhum.2018.00397>
- Giaretto, A. (2019). *Somatic Experiencing professional training: Beginning modules*. Chapel Hill, NC.
- Gladding, S. (2001). *Counseling: A comprehensive profession* (6th ed.). Pearson.
- Godoy, L. D., Rossignoli, M. T., Delfino-Pereira, P., Garcia-Cairasco, N., & de Lima Umeoka, E. H. (2018). A comprehensive overview on stress neurobiology: Basic concepts and clinical implications. *Frontiers of Behavioral Neuroscience, 12*, 127. <https://doi.org/10.3389/fnbeh.2018.00127>.

- Goncalves, O. F., & Perrone-McGovern, K. M. (2014). A neuroscience agenda for counseling psychology research. *Journal of Counseling Psychology*, 61(4), 507–512.  
<https://doi.org/6676.2012.00003.x>
- Gonçalves, Ó. F., & Perrone-McGovern, K. (2016). Translating neuroscience into counselling practice transposition la neuroscience dans la pratique du counseling. *Canadian Journal of Counselling and Psychotherapy (Online)*, 50(4), 421–440.  
<https://login.libproxy.uncg.edu/login?url=https://search.proquest.com/docview/1844302866?accountid=14604>
- Gonçalves, Ó. F., & Perrone-McGovern, K. M. (2014). A neuroscience agenda for counseling psychology research. *Journal of Counseling Psychology*, 61(4), 507–512. <https://doi-org.libproxy.uncg.edu/10.1037/cou0000026>
- Goss, D. (2015). The importance of incorporating neuroscientific knowledge into counselling psychology: An introduction to affective neuroscience. *Counselling Psychology Review*, 30, 52–63.
- Goss, D. (2016). Integrating neuroscience into counseling psychology: A systematic review of current literature. *The Counseling Psychologist*, 44(6), 895–920. <https://doi-org.libproxy.uncg.edu/10.1177/0011000016650263>
- Goss, D., & Parnell, T. (2017). Integrating neuroscience into counselling psychology: Exploring the views and experiences of UK-based counselling psychologists. *Counselling Psychology Review*, 32(4), 4–17.
- Goswami, U. (2006). Neuroscience and education: From research to practice? *Nature reviews. Neuroscience*, 7(5), 406–411. <http://dx.doi.org/10.1038/nrn1907>
- Grawe, K. (2007). *Neuropsychotherapy*. Psychology Press.

- Grossman, P., & Taylor, E. W. (2007). Toward understanding respiratory sinus arrhythmia: Relations to cardiac vagal tone, evolution and biobehavioral functions. *Biological Psychology*, 74(2), 263–285. <https://doi-org.libproxy.uncg.edu/10.1016/j.biopsycho.2005.11.014>
- Hase, M., Balmaceda, U. M., Ostacoli, L., Liebermann, P., & Hofmann, A. (2017). The AIP model of EMDR therapy and pathogenic memories. *Frontiers in Psychology*, 8. <https://doi-org.libproxy.uncg.edu/10.3389/fpsyg.2017.01578>
- Hershenberg, R., & Goldfriend, V. I. R. (2015). Implications of RDoC for the research and practice of psychotherapy. *Behavior Therapy*, 46, 156–165. <https://doi.org/10.1016/j.beth.2014.09.014>
- Hill, C. E. (Ed.). (2012). *Consensual qualitative research: A practical resource for investigating social science phenomena*. American Psychological Association.
- Hill, C. E. (2015). Consensual Qualitative Research (CQR): Methods for conducting psychotherapy research. In O. Gelo, A. Pritz, & B. Rieken (Eds.), *Psychotherapy research*. Springer, Vienna. [https://doi-org.libproxy.uncg.edu/10.1007/978-3-7091-1382-0\\_23](https://doi-org.libproxy.uncg.edu/10.1007/978-3-7091-1382-0_23)
- Hill, C. E., & Knox, S. (2021). *Essentials of consensual qualitative research*. American Psychological Association. <https://doi.org/10.1037/0000215-000>
- Hill, C. E., Knox, S., Thompson, B. J., Williams, E. N., Hess, S. A., & Ladany, N. (2005). Consensual qualitative research: An update. *Journal of Counseling Psychology*, 52(2), 196–205. <https://doi.org/10.1037/0022-0167.52.2.196>
- Hill, C. E., Thompson, B. J., & Williams, E. N. (1997). A guide to conducting consensual qualitative research. *The Counseling Psychologist*, 25(4), 517–572.

- Howard-Jones, P. (2014). Neuroscience and education: myths and messages. *Nature Review Neuroscience*, 15, 817–824. <https://doi.org/10.1038/nrn3817>
- Hricko, A. C. (2011). Whole brain integration in the clinical application of somatic experiencing. *The USA Body Psychotherapy Journal*, 10, 24–28.
- Insel, T., Cuthbert, B., Garvey, V. I., Heinssen, R., Pine, D. S., Quinn, K., Sanislow, C., & Wang, P. (2010). Research domain criteria (RDoC): Toward a new classification framework for research on mental disorders. *American Journal of Psychiatry*, 167, 748–751. <https://doi.org/10.1176/appi.ajp.2010.09091379>
- Ivey, A. E., D'Andrea, M. J., & Ivey, M. B. (2012). *Theories of counselling and psychotherapy: A multicultural perspective* (7th ed.). Sage. [http://www.sagepub.com/upm-data/40557\\_2.pdf](http://www.sagepub.com/upm-data/40557_2.pdf)
- Jokić-Begić, N. (2010). Cognitive-behavioral therapy and neuroscience: Towards closer integration. *Psihologijske Teme*, 19(2), 235–254.
- Jones, L. K., Rybak, C., & Russell-Chapin, L. A. (2017). Neurophysiology of traumatic stress. In T. A. Jones, L. K. Jones, & L. A. Russell-Chapin (Eds.), *Neurocounseling* (pp. 61–80). American Counseling Association.
- Jordan, K. (2018). Trauma-informed counseling supervision: Something every counselor should know about. *Asia Pacific Journal of Counselling and Psychotherapy*, 9(2), 127–142. <https://doi-org.libproxy.uncg.edu/10.1080/21507686.2018.1450274>
- Kandel, E. R. (1998). A new intellectual framework for psychiatry. *American Journal of Psychiatry*, 155(4), 457–469.



- Kaplan, D. M., & Gladding, S. T. (2011). A vision for the future of counseling: The 20/20 principles for unifying and strengthening the profession. *Journal of Counseling & Development, 89*, 367–372. <https://doi.org/10.1002/j.1556-6678.2011.tb00101.x>
- Kaplan, D. M., Tarvydas, V. M., & Gladding, S. T. (2014). 20/20: A vision for the future of counseling: The new consensus definition of counseling. *Journal of Counseling and Development, 92*(3), 366–372. <https://doi.org/10.1002/j.1556-6676.2014.00164.x>
- Kaplan, G. A. (2006). Review of *Social determinants of health, 2nd Edition*. In *International Journal of Epidemiology, 35*(4), 1111–1112. <https://doi.org/10.1093/ije/dy1121>
- Karlsson, H. (2011). *How psychotherapy changes the brain*. <http://www.psychiatrictimes.com/psychotherapy/how-psychotherapy-changes-brain>
- Kaur, C. M., Singh, P., Sahni, S., & Punia, C. (2019). Advanced spatially specific neurofeedback for symptoms of depression and its electroencephalographic correlates. *Alternative Therapies in Health and Medicine, 25*(3), 54–63. <https://login.libproxy.uncg.edu/login?url=https://www.proquest.com/docview/2261166217?accountid=14604>
- Kay, J. (2009) Toward a neurobiology of child psychotherapy. *Journal of Loss and Trauma, 14*, 287–303.
- Kilpatrick, D. G., Resnick, H. S., Milanak, M. E., Miller, M. W., Keyes, K. M., & Friedman, M. J. (2013). National estimates of exposure to traumatic events and PTSD prevalence using DSM-IV and DSM-V criteria. *Journal of Traumatic Stress, 26*, 537–547.
- Kim, S. R., & Zalaquett, C. (2019). An exploratory study of prevalence and predictors of neuromyths among potential mental health counselors. *Journal of Mental Health Counseling, 41*(2), 173–187. <https://doi-org.libproxy.uncg.edu/10.17744/mehc.41.2.06>

- Kindsvatter, A., & Geroski, A. (2014). The impact of early life stress on the neurodevelopment of the stress response system. *Journal of Counseling & Development, 92*, 472–480.  
<https://doi.org/10.1002/j.1556-6676.2014.00173.x>
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning development* (Vol. 1). Prentice-Hall.
- Kumar, S. A., Brand, B. L., & Courtois, C. A. (2019). The need for trauma training: Clinicians' reactions to training on complex trauma. *Psychological Trauma: Theory, Research, Practice, and Policy*. <https://doi-org.libproxy.uncg.edu/10.1037/tra000051>
- Laborde, S., Mosley, E., & Thayer, J. F. (2017). Heart rate variability and cardiac vagal tone in psychophysiological research—Recommendations for experiment planning, data analysis, and data reporting. *Frontiers in Psychology, 8*. <https://doi-org.libproxy.uncg.edu/10.3389/fpsyg.2017.00213>
- Ladany, N., Inma, A. G., Hill, C. E., Know, S., Crook-Lyon, R. E., Thompson, B. J., ... Walker, J. A. (2012). Corrective relational experiences in supervision. In L. G. Castonguay & C. E. Hill (Eds.), *Transformation in psychotherapy: Corrective experiences across cognitive behavioral, humanistic, and psychodynamic approaches* (pp. 335–352). American Psychological Association.
- Lambert, M. J., & Ogles, B. M. (2004). The efficacy and effectiveness of psychotherapy. In M. J. Lambert (Ed.), *Bergin and Garfield's handbook of psychotherapy and behavior change* (5th ed., pp. 139–193). Wiley.
- Land, L. (2018). *The knowledge, skills, and attitudes that are foundational to prepare counselors-in-training to provide trauma-informed counseling* [ProQuest Information &

- Learning]. In *Dissertation Abstracts International: Section B: The Sciences and Engineering* (Vol. 79, Issue 11–B(E)).
- Laska, K. M., Gurman, A. S., & Wampold, B. E. (2014). Expanding the lens of evidence-based practice in psychotherapy: A common factors perspective. *Psychotherapy, 51*(4), 467–481. <https://doi-org.libproxy.uncg.edu/10.1037/a0034332>
- Lebowitz, M. S., & Appelbaum, P. S. (2019). Biomedical explanations of psychopathology and their implications for attitudes and beliefs about mental disorders. *Annual Review of Clinical Psychology, 15*, 555–577. <https://doi.org/10.1146/annurev-clinpsy-050718-095416>.
- Leitch, L. (2007). Somatic experiencing treatment with tsunami survivors in Thailand: Broadening the scope of early intervention. *Traumatology, 13*, 11–20. <https://doi.org/10.1177/1534765607305439>
- Leitch, L., & Miller-Karas, E. (2009). A case for using biologically-based mental health intervention in post-earthquake China: Evaluation of training in the trauma resiliency model. *Emerging Mental Health, 11*, 221–233.
- Leitch, L., Vanslyke, J., & Allen, M. (2009). Somatic experiencing treatment with social service workers following Hurricanes Katrina and Rita. *Social Work, 54*, 9–18. <https://doi.org/10.1093/sw/54.1.9>
- Levine, P. (1997). *Waking the tiger: Healing trauma: The innate capacity to transform overwhelming experiences*. North Atlantic Books.
- Levine, P. (2010). *In an unspoken voice: How the body releases trauma*. North Atlantic Books.
- Lewis, L. (2001). Neuropsychotherapy and community integration: Brain illness, emotions and behavior. *The Journal of Head Trauma Rehabilitation, 16*(6), 614.

<https://login.libproxy.uncg.edu/login?url=https://search.proquest.com/docview/213922521?accountid=14604>

Library of Congress. (2022). *Project on the decade of the brain*. <https://www.loc.gov/loc/brain/>

Linden, D. E. J. (2006). How psychotherapy changes the brain - The contribution of functional neuroimaging. *Molecular Psychiatry*, *11*(6), 528–538.

<http://dx.doi.org/10.1038/sj.mp.4001816>

Lithander, M. P. G., Geraci, L., Karaca, M., & Rydberg, J. (2021). Correcting neuromyths: A comparison of different types of refutations. *Journal of Applied Research in Memory and Cognition*. <https://doi-org.libproxy.uncg.edu/10.1016/j.jarmac.2021.03.006>

Lobregt-van Buuren, E., Sizoo, B., Mevissen, L., & de Jongh, A. (2019). Eye movement desensitization and reprocessing (EMDR) therapy as a feasible and potentially effective treatment for adults with autism spectrum disorder (ASD) and a history of adverse events. *Journal of Autism and Developmental Disorders*, *49*(1), 151–164.

<https://doi.org/10.1007/s10803-018-3687-6>. PMID: 30047096.

Lorelle, S., & Michel, R. (2017). Neurocounseling: Promoting human growth and development throughout the life span. *Adultspan Journal*, *16*(2), 106–119.

<https://doi.org/10.1002/adsp.12039>

Lu, H. T., Zhou, Y., & Pillay, Y. (2017). Counselor education students' exposure to trauma cases. *International Journal for the Advancement of Counselling*, *39*(4), 322–332.

<https://doi-org.libproxy.uncg.edu/10.1007/s10447-017-9300-4>

Lu, Y., Wang, C., Su, L., Ma, Z., Li, S., & Fan, Y. (2017). Effects of neurofeedback on panic disorder patients' anxiety. *NeuroQuantology*, *15*(3).

<http://dx.doi.org/10.14704/nq.2017.15.3.1083>

- Luke, C. (2015). *Neuroscience for counselors and therapists: Integrating the sciences of mind and brain*. Sage.
- Luke, C., Beeson, E. T., Miller, R., Field, T. A., & Jones, L. K. (2020). Counselors' perceptions of ethical considerations for integrating neuroscience with counseling. *The Professional Counselor, 10*(2), 204–219. <https://doi-org.libproxy.uncg.edu/10.15241/cl.10.2.204>
- Luke, C., Miller, R., & McAuliffe, G. (2019). Neuro-informed mental health counseling: A person-first perspective. *Journal of Mental Health Counseling, 41*(1), 65–79. <https://doi-org.libproxy.uncg.edu/10.17744/mehc.41.1.06>
- Luke, C., Redekop, F., & Moralejo, J. (2020). From microaggressions to neural aggressions: A neuro-informed counseling perspective. *Journal of Multicultural Counseling and Development, 48*(2), 120–129. <https://doi-org.libproxy.uncg.edu/10.1002/jmcd.12170>
- MacDonald, K., Germine, L., Anderson, A., Christ-odoulou, J., & McGrath, L. M. (2017). Dispelling the myth: Training in education or neuroscience decreases but does not eliminate beliefs in neuromyths. *Frontiers in Psychology, 8*, 1314. <https://doi.org/doi.org/10.3389/fpsyg.2017.0131>
- Magagnin, V., Mauri, M., Cipresso, P., Mainardi, L., Brown, E., Cerutti, S., Villamira, M., & Barbieri, R. (2010). Heart rate variability and respiratory sinus arrhythmia assessment of affective states by bivariate autoregressive spectral analysis. *Computing in Cardiology, 37*(5737930), 145–148.
- Mahajan, M. (2018). Neurobiology of childhood trauma and its implications for therapy. *Indian Journal of Health and Wellbeing, 9*(6), 849–853. <https://login.libproxy.uncg.edu/login?url=https://www.proquest.com/scholarly-journals/neurobiology-childhood-trauma-implications/docview/2157819668/se-2>

- Makinson, R. A., & Young, J. S. (2012). Cognitive behavioral therapy and the treatment of posttraumatic stress disorder: Where counseling and neuroscience meet. *Journal of Counseling & Development, 90*(2), 131–140. <https://doi-org.libproxy.uncg.edu/10.1111/j.1556-6676.2012.00017.x>
- Marsden, Z., Lovell, K., Blore, D., Ali, S., & Delgadillo, J. (2018). A randomized controlled trial comparing EMDR and CBT for obsessive-compulsive disorder. *Clinical Psychology Psychotherapy, 25*(1), e10–e18. <https://doi.org/10.1002/cpp.2120>.
- Marzbani, H., Marateb, H. R., & Mansourian, M. (2016). Neurofeedback: A comprehensive review on system design, methodology and clinical applications. *Basic Clinical Neuroscience, 7*(2), 143–158. <https://doi.org/10.15412/J.BCN.03070208>. PMID: 27303609; PMCID: PMC4892319.
- McHenry, B., Sikorski, A. M., & McHenry, J. (2014). *A counselor's introduction to neuroscience*. Routledge.
- McRae, K., Misra, S., Prasad, A. K., Pereira, S. C., & Gross, J. J. (2012). Bottom-up and top-down emotion generation: Implications for emotion regulation. *Social Cognitive & Affective Neuroscience, 7*, 253–262. <https://doi.org/10.1093/scan/nsq103>
- Miehls, D. (2014). Neuroscience insights that inform clinical supervision. *Smith College Studies in Social Work, 84*(2–3), 367–384. <https://doi-org.libproxy.uncg.edu/10.1080/00377317.2014.924706>
- Miller, R. (2016). Neuroeducation: Integrating brain-based psychoeducation into clinical practice. *Journal of Mental Health Counseling, 38*(2), 103–115. <http://dx.doi.org/10.17744/mehc.38.2.02>

- Miller, R. (Producer). (2017). *Neuroscience and humanistic counseling values: A critical look at the integration of neuroscience in counseling with Brett Wilkinson*. The Thoughtful Counselor. <http://wp.me/p7R6fn-bw>
- Miller, R., & Taylor, D. D. (2016). Does Adlerian theory stand the test of time?: Examining individual psychology from a neuroscience perspective. *Journal of Humanistic Counseling, 55*, 111–128. <https://doi.org/10.1002/johc.12028>
- Miller, R. M., & Barrio Minton, C. A. (2016). Experiences learning interpersonal neurobiology: An interpretive phenomenological analysis. *Journal of Mental Health Counseling, 38*, 47–61. <https://doi.org/10.17744/mehc.38.1.04>
- Mirjana, A., Watters, A. J., Mariano, C., Jorge, A., Harris Anthony, W. F., & Jury, K. (2020). Evaluation of neurofeedback for posttraumatic stress disorder related to refugee experiences using self-report and cognitive ERP measures. *Clinical EEG and Neuroscience, 51*(2), 79–86. <http://dx.doi.org/10.1177/1550059419849170>
- Mischke-Reed, M. (2018). *Somatic psychotherapy toolbox: 125 worksheets and exercises to treat trauma and stress*. PESI Publishing.
- Monte, S. (2013). The birth of the neuro-counselor? *Counseling Today, 56*(6), 32–40.
- Murray, K. (2016). EMDR resource methods for women with breast cancer. *Journal of EMDR Practice and Research, 10*(3), 176–188. <https://doi.org/10.1891/1933-3196.10.3.176>
- Myers, J. E., & Jones, L. (2017). The applications of neuroscience to clinical mental health counseling. In J. S. Young & C. S. Cashwell (Eds.), *Clinical mental health counseling: Elements of effective practice* (pp. 363–387). Sage. <https://doi-org.libproxy.uncg.edu/10.4135/9781071801253.n16>

- Myers, J. E., & Young, S. J. (2012). Brain wave biofeedback: Benefits of integrating neurofeedback in counseling. *Journal of Counseling Development, 90*, 20–28. <https://doi.org/10.1111/j.1556-6676.2012.00003.x>
- National Institute of Mental Health. (n.d.). *Research domain criteria (RDoC)*. <https://www.nimh.nih.gov/research-priorities/rdoc/index.shtml>
- National Institute of Mental Health. (2008). *Criteria initiative (RDoC)*. <https://www.nimh.nih.gov/research/research-funded-by-nimh/rdoc>
- National Institutes of Health, BRAIN Working Group. (2014). *BRAIN 2025: A scientific vision. Brain Research through Advancing Innovative Neurotechnologies (BRAIN)*. Working Group Report to the Advisory Committee to the Director, NIII. <https://www.braininitiative.nih.gov/2025/>
- Navalta, C. P., McGee, L., & Underwood, J. (2018). Adverse childhood experiences, brain development, and mental health: A call for neurocounseling. *Journal of Mental Health Counseling, 40*(3), 266–278. <https://doi.org/10.17744/mehc.40.3.07>.
- Neuhuber, W. L., & Berthoud, H. R. (2022). Functional anatomy of the vagus system: How does the polyvagal theory comply? *Biological Psychology*, Article 108425.
- Nichols, L. M. (2015). The use of mind-body practices in counseling: A grounded theory study. *Journal of Mental Health Counseling, 37*, 28–46.
- Nowack, K., & Radecki, D. (2018). Introduction to the special issue: Neuro-mythconceptions in consulting psychology—between a rock and a hard place. *Consulting Psychology Journal: Practice and Research, 70*(1), 1–10. <https://doi-org.libproxy.uncg.edu/10.1037/cpb0000108>



- Ogden, P., Fisher, J., Del Hierro, D., & Del Hierro, A. (2015). *Sensorimotor psychotherapy: Interventions for trauma and attachment*. W W Norton & Co.
- Oliveira-Silva, P., & Gonçalves, Ó. F. (2011). Responding empathically: A question of heart, not a question of skin. *Applied Psychophysiology and Biofeedback, 36*, 201–207.  
<https://doi.org/10.1007/s10484-011-9161-2>
- Onions, C. T. L., Friedrichsen, G. W. S., & Burchfield, R. W. (1966). *The Oxford dictionary of English etymology*. Oxford, Clarendon P.
- Organization for Economic Cooperation and Development. (2002). *Understanding the brain: Towards a new learning science*. OECD.
- Paige, M., DeVore, J., Chang, C. Y., & Whisenhunt, J. (2017). The trauma-competent clinician: A qualitative model of knowledge, skills, and attitudes supporting Adlerian-based trauma psychotherapy. *The Journal of Individual Psychology, 73*(1), 8–37. <https://doi-org.libproxy.uncg.edu/10.1353/jip.2017.0002>
- Pappa, S., Ntella, V., Giannakas, T., Giannakoulis, V. G., Papoutsis, E., & Katsaounou, P. (2020). Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Brain, Behavior, and Immunity, 88*, 901–907. <https://doi.org/10.1016/j.bbi.2020.05.026>.
- Paret, C., Kluetsch, R., Ruf, M., Demirakca, T., Hoesterey, S., Ende, G., & Schmahl, C. (2014). Down-regulation of amygdala activation with real-time fMRI neurofeedback in a healthy female sample. *Frontiers in Behavioral Neuroscience, 8*.
- Parker, C., Doctor, R. M., & Selvam, R. (2008). Somatic therapy treatment effects with tsunami survivors. *Traumatology, 14*, 103–109. <https://doi.org/10.1177/1534765608319080>

- Payne, P., Levine, P., & Crane-Godreau, M. (2015). Somatic experiencing: Using interoception and proprioception as core elements of trauma therapy. *Frontiers in Psychology, 6*(93), 1–10.
- Pedersen, P. B. (1991). Multiculturalism as a generic approach to counseling. *Journal of Counseling & Development, 70*(1), 6–12.  
<https://doi-org.libproxy.uncg.edu/10.1002/j.1556-6676.1991.tb01555.x>
- Penadés, R., Pujol, N., Catalán, R., Massana, G., Rametti, G., Garcia-Rizo, C., Bargallo, N., Casto, C., Bernardo, M., & Junque, C. (2013). Brain effects of cognitive remediation therapy in schizophrenia: A structural and functional neuroimaging study. *Biological Psychiatry, 73*, 1015–1023. <https://doi.org/10.1016/j.biopsych.2013.01.017>
- Peres, J., & Nasello, A. G. (2008). Psychotherapy and neuroscience: Towards closer integration. *International Journal of Psychology, 43*, 943–957.  
<https://doi.org/10.1080/00207590701248487>
- Ponterotto, J. G., & Casas, J. M. (1991). *Handbook of racial/ethnic minority counseling research*. Charles C Thomas, Publisher.
- Porges, S. W. (2003). The polyvagal theory: Phylogenetic contributions to social behavior. *Physiology & Behavior, 79*(3), 503–513. [https://doi-org.libproxy.uncg.edu/10.1016/S0031-9384\(03\)00156-2](https://doi-org.libproxy.uncg.edu/10.1016/S0031-9384(03)00156-2)
- Porges, S. W. (2007). The polyvagal perspective. *Biological Psychology, 74*, 116–143.
- Porges, S. W. (2011). *The polyvagal theory: Neurophysiological foundations of emotions, attachment, communication, and self-regulation*. Norton.
- Quinones, M. M., Gallegos, A. M., Lin, F. V., & Heffner, K. (2020). Dysregulation of inflammation, neurobiology, and cognitive function in PTSD: An integrative review.

*Cognitive, Affective & Behavioral Neuroscience*. <https://doi-org.libproxy.uncg.edu/10.3758/s13415-020-00782-9>

- Racine, E., Bell, E., & Illes, J. (2010). Can we read minds? Ethical challenges and responsibilities in the use of neuroimaging research. In J. J. Giordano & B. Gordijn (Eds.), *Scientific, philosophical and ethical perspectives in neuroethics* (pp. 246–270). Cambridge University Press.
- Ray, D. C., Hull, D. M., Thacker, A. J., Pace, L. S., Swan, K. L., Carlson, S. E., & Sullivan, J. M. (2011). Research in counseling: A 10-year review to inform practice. *Journal of Counseling & Development, 89*, 349–359. <https://doi.org/10.1002/j.1556-6678.2011.tb00099.x>
- Robbins, S. B. (1985). Left-right brain research and its premature generalization to the counseling setting. *Journal of Counseling & Development, 64*, 235–239.
- Rogers, C. R. (1951). *Client-centered therapy; its current practice, implications, and theory*. Houghton Mifflin.
- Ross, D. A., & Rohrbaugh, R. (2014). Integrating neuroscience in the training of psychiatrists: A patient-centered didactic curriculum based on adult learning principles. *Academic Psychiatry, 38*, 154–62.
- Rossouw, J. G., Eriean, C., & Beeson, E. T. (2019). Building resilience through a virtual coach called Driven: Longitudinal pilot study and the neuroscience of small, frequent learning tasks. *International Journal of Neuropsychotherapy, 7*(2), 23–41. <https://doi.org/10.12744/ijnpt.2019.023-041>

- Russell-Chapin, L. A. (2016). Integrating neurocounseling into the counseling profession: An introduction. *Journal of Mental Health Counseling, 38*(2), 93–102. <https://doi-org.libproxy.uncg.edu/10.17744/mehc.38.2.01>
- Russell-Chapin, L. A., & Chapin, T. J. (2011). *Neurofeedback: A third option when counseling and medication are not sufficient*. [http://counselingoutfitters.com/vistas/vistas1/Article\\_48.pdf](http://counselingoutfitters.com/vistas/vistas1/Article_48.pdf)
- Russell-Chapin, L. A., Kemmerly, T., Liu, W. C., Zagardo, M. T., Chapin, T. D., Dailey, D., & Dinh, D. (2013). The effects of neurofeedback in the default mode network: Pilot study results of medicated children with ADHD. *Journal of Neurotherapy, 17*, 35–42.
- Russo, G. M., Schauss, E., Naik, S., Banerjee, R., Ghoston, M., Jones, L. K., Zalaquett, C. P., Beeson, E. T., & Field, T. A. (2021). Extent of counselor training in neuroscience-informed counseling competencies. *Journal of Mental Health Counseling, 43*(1), 75–93. <https://doi.org/10.17744/mehc.43.1.05>
- Russouw, P. J. (Ed.). (2014). *Neuropsychotherapy: Theoretical underpinnings and clinical applications*. Mediros.
- Ruzek, J. I. (2019). Dissemination and implementation of trauma research findings. *Practice Innovations, 4*(3), 182–193. <https://doi-org.libproxy.uncg.edu/10.1037/pri0000094>
- Schiele, M. A., Gottschalk, M. G., & Domschke, K. (2020). The applied implications of epigenetics in anxiety, affective and stress-related disorders—A review and synthesis on psychosocial stress, psychotherapy and prevention. *Clinical Psychology Review, 77*. <https://doi-org.libproxy.uncg.edu/10.1016/j.cpr.2020.101830>
- Schore, A. N. (2001). The effects of early relational trauma on right brain development, affect regulation and infant mental health. *Infant Mental Health Journal, 22*, 201–269.

- Seigel, D. (2010). *Mindsight: The new science of personal transformation*. Bantam Books.
- Shapiro, F. (2001). *Eye movement desensitization and reprocessing - Basic principles, protocols, and procedures*. Guilford.
- Shapiro, F. (1989). Efficacy of the Eye Movement Desensitization procedure in the treatment of traumatic memories. *Journal of Traumatic Stress*, 2(2), 199–223.  
<https://doi.org/10.1002/jts.2490020207>
- Shapiro, F. & Solomon, R. (2010). Eye Movement Desensitization and Reprocessing. *The Corsini Encyclopedia of Psychology*. <https://doi.org/10.1002/9780470479216.corpsy0337>
- Shapiro, J. R., & Applegate, J. S. (2018). *Neurobiology for clinical social work: Theory and practice* (2nd ed). W. W. Norton & Co.
- Siegel, D. (1999). *The developing mind*. Guilford.
- Siegle GJ, Cramer AOJ, van Eck NJ, Spinhoven P, Hollon SD, Ormel J, Strege M, & Bockting CLH (2019). Where are the breaks in translation from theory to clinical practice (and back) in addressing depression? An empirical graph-theoretic approach. *Psychological Medicine*, 49(16), 2681–2691.
- Simmonds, A. (2014). *How neuroscience is affecting education: Report of teacher and parent surveys*. Wellcome Trust. <https://wellcome.ac.uk/sites/default/files/wtp055240.pdf>
- Slaby, J., & Choudhury, S. (2011). Proposal for a critical neuroscience. In S. Choudhury & J. Slaby (Eds.), *Critical neuroscience: A handbook of the social and cultural contexts of neuroscience* (pp. 29–52). Blackwell. <https://doi.org/10.1002/9781444343359.ch1>
- Strege, M. V., Persons, J. B., Ressler, K. J., Krawczak, R. A., Fang, A., Goldin, P., & Siegle, G. J. (2021). Integrating Neuroscience Into Clinical Practice: Current Opinions and Dialogue

- Between Drs. Jacqueline Persons and Kerry Ressler. *The Behavior therapist*, 44(7), 326–334.
- Steenbergh, T. A., Runyan, J. D., Daugherty, D. A., & Winger, J. G. (2012). Neuroscience exposure and perceptions of client responsibility among addictions counselors. *Journal of Substance Abuse Treatment*, 42(4), 421–428. <https://doi-org.libproxy.uncg.edu/10.1016/j.jsat.2011.09.015>
- Substance Abuse and Mental Health Services Administration. (2014). *Trauma-informed care in behavioral health services*. Treatment Improvement Protocol (TIP) Series 57. HHS PublicationNo. (SMA) 14-4816. Rockville, MD.
- Tang, Y. Y., & Leve, L. D. (2016). A translational neuroscience perspective on mindfulness meditation as a prevention strategy. *Translational Behavioral Medicine*, 6(1), 63–72. <https://doi-org.libproxy.uncg.edu/10.1007/s13142-015-0360-x>
- Tang, Y. Y., & Posner, M. I. (2013). Special issue on mindfulness neuroscience. *Social Cognitive and Affective Neuroscience*, 8(1), 1–3. <https://doi-org.libproxy.uncg.edu/10.1093/scan/nss104>
- Tang, Y.-Y., & Posner, M. I. (2013). Tools of the trade: Theory and method in mindfulness neuroscience. *Social Cognitive and Affective Neuroscience*, 8(1), 118–120. <https://doi-org.libproxy.uncg.edu/10.1093/scan/nss112>
- Taylor, E. W., Wang, T., & Leite, C. A. (2022). An overview of the phylogeny of cardiorespiratory control in vertebrates with some reflections on the ‘polyvagal theory’. *Biological Psychology*, Article 108382.

- Tootle, A. E., & Sperry, L. (2003). Neuroscience applications in marital and family therapy. *The Family Journal*, 11(2), 185–190. <https://doi-org.libproxy.uncg.edu/10.1177/1066480702250168>
- Tryon, W. W. (2016). Integrating psychology and neuroscience: Comment on Schwartz et al (2016). *American Psychologist*, 71(9), 896–897. <https://doi-org.libproxy.uncg.edu/10.1037/amp0000031>
- Uhernik, J. A. (2017). *Using neuroscience in trauma therapy*. Routledge.
- U.S. Department of Health and Human Services. (2003). *President's New Freedom Commission: Achieving the promise: Transforming mental health in America. Final report*. DHHS Publication. <http://www.mentalhealthcommission.gov/reports/FinalReport/FullReport-06.htm>
- U.S. Department of Veterans Affairs. (2016). *How common is PTSD?* <https://www.ptsd.va.gov/public/ptsd-overview/basics/how-common-is-ptsd.asp>
- Usta, M. B., Gumus, Y. Y., Say, G. N., Bozkurt, A., Şahin, B., & Karabekiroğlu, K. (2018). Basal blood DHEA-S/cortisol levels predicts EMDR treatment response 158 in adolescents with PTSD. *Nordic Journal of Psychiatry*, 72, 164–172. <https://doiorg.libproxy.uncg.edu/10.1080/08039488.2017.1406984>
- van der Kolk, B. (2014). *The body keeps the score: Mind, brain and body in the transformation of trauma*. Penguin UK.
- van der Kolk, B. (2019). *Understanding emotional trauma and how to heal it*. Trauma Mind Body Super Conference.
- van der Kolk, B. A. (2002). Posttraumatic therapy in the age of neuroscience. *Psychoanalytic Dialogues*, 12(3), 381–392.

<https://doi-org.libproxy.uncg.edu/10.1080/10481881209348674>

van der Kolk, B. A. (2003). The neurobiology of childhood trauma and abuse. *Child and Adolescent Psychiatric Clinics*, 12, 293–317.

van der Kolk, B. A. (2006). Clinical implications of neuroscience research in PTSD. In R. Yehuda (Ed.), *Psychobiology of posttraumatic stress disorders: A decade of progress* (Vol. 1071, pp. 277–293). Blackwell Publishing.

<http://search.ebscohost.com.libproxy.uncg.edu/login.aspx?direct=true&db=psych&AN=2006-10981-022&site=ehost-live>

van der Kolk, B. A. (2015). *The body keeps the score*. Penguin Books.

Verdejo-Garcia, A., Lorenzetti, V., Manning, V., Piercy, H., Bruno, R., Hester, R., Pennington, D., Tolomeo, S., Arunogiri, S., Bates, M. E., Bowden-Jones, H., Campanella, S., Daughters, S. B., Kouimtsidis, C., Lubman, D. I., Meyerhoff, D. J., Ralph, A., Rezapour, T., Tavakoli, H., ... Ekhtiari, H. (2019). A roadmap for integrating neuroscience into addiction treatment: A consensus of the neuroscience interest group of the International Society of Addiction Medicine. *Frontiers in Psychiatry*, 10. <https://doi-org.libproxy.uncg.edu/10.3389/fpsy.2019.00877>

Walter, H., Berger, M., & Schnell, K. (2009). Neuropsychotherapy: Conceptual, empirical and neuroethical issues. *European Archives of Psychiatry and Clinical Neuroscience*, 259(Suppl 2), S173–S182. <https://doi-org.libproxy.uncg.edu/10.1007/s00406-009-0058-5>

Ward, T., Delrue, N., & Plagnol, A. (2017). Neuropsychotherapy as an integrative framework in counselling psychology: The example of trauma. *Counselling Psychology Review*, 32(4), 18–28.



- Webber, J. M., Kitzinger, R., Runte, J. K., Smith, C. M., & Mascari, J. B. (2017). Traumatology trends: A content analysis of three counseling journals from 1994 to 2014. *Journal of Counseling & Development, 95*, 249–259. <https://doi.org/10.1002/jcad.12139>
- Weingarten, C. P., & Strauman, T. J. (2015). Neuroimaging for psychotherapy research: Current trends. *Psychotherapy Research, 25*, 185–213. <https://doi.org/10.1080/10503307.2014.883088>
- Weisberg, D. S., Keil, F. C., Goodstein, J., Rawson, E., & Gray, J. R. (2008). The seductive allure of neuroscience explanations. *Journal of Cognitive Neuroscience, 20*(3), 470–477. <https://doi.org/10.1162/jocn.2008.20040>
- Weiss, S. J. (2007). Neurobiological alterations associated with traumatic stress. *Perspectives in Psychiatric Care, 43*(3), 114–122. <https://doi-org.libproxy.uncg.edu/10.1111/j.1744-6163.2007.00120.x>
- West, A. (2010). Supervising counsellors and psychotherapists who work with trauma: A Delphi study. *British Journal of Guidance & Counselling, 38*(4).
- West, P. L., & Hamm, T. (2012). A study of clinical supervision techniques and training in substance abuse treatment. *Journal of Addictions & Offender Counseling, 33*(2), 66–81. <https://login.libproxy.uncg.edu/login?url=https://www.proquest.com/docview/1112539222?accountid=14604>
- Wester, K. L., Borders, D. L., Boul, S., & Horton, E. (2013). Research quality: Critique of quantitative articles in the *Journal of Counseling & Development. Journal of Counseling and Development, 91*, 280–290. <https://doi.org/10.1002/j.1556-6676.2013.00096.x>
- Whitehouse, B., & Heller, D. P. (2008). Heart rate in trauma: Patterns found in somatic experiencing® and trauma resolution. *Biofeedback, 36*(1), 24–29.

<https://login.libproxy.uncg.edu/login?url=https://search.proquest.com/docview/208128812?accountid=14604>

Wilkinson, B. D. (2018). The limits of neuroscience in counseling: A humanistic perspective and proposed model. *Journal of Humanistic Counseling, 57*(1), 70–78.

<https://doi.org/10.1002/johc.12067>

Wilkinson, B. D. (2019). A refined and further defined argument on the limits of neuroscience in counseling: Response to Field, Luke, and Beeson and Miller. *The Journal of Humanistic Counseling, 58*(2), 119–134. <https://doi.org/10.1002/johc.12101>

Wood, E., Ricketts, T., & Parry, G. (2018). EMDR as a treatment for long-term depression: A feasibility study. *Psychology & Psychotherapy, 91*(1), 63–78.

<https://doi.org/10.1111/papt.12145>.

Wubbolding, R. E. (2015). The voice of William Glasser: Accessing the continuing evolution of reality therapy. *Journal of Mental Health Counseling, 37*(3), 189–205. <https://doi-org.libproxy.uncg.edu/10.17744/mehc.37.3.01>

Yorke, J., & Bergère, T. (2018). Where the rubber hits the road: Neuroscience and social work. *Social Work in Health Care, 57*(2), 79–94. <https://doi-org.libproxy.uncg.edu/10.1080/00981389.2017.1407861>

Zalaquett, C. P., & Ivey, A. E. (2014). Neuroscience and psychology: Central issues for social justice leaders. In C. V. Johnson, H. L. Friedman, J. Diaz, Z. Franco, & B. K. Nastasi (Eds.), *The Praeger handbook of social justice and psychology: Fundamental issues and special populations; Well-being and professional issues; Youth and disciplines in psychology* (Vols. 1-3, pp. 173–192). Praeger/ABC-CLIO.

Zalaquett, C. P., & Ivey, A. E. (2018). The role of neuroscience in advancing social justice counseling. In C. C. Lee (Ed.), *Counseling for social justice* (3rd ed., pp. 191–203). American Counseling Association Foundation.

## APPENDIX A: SCREENING QUESTIONNAIRE

Please select the most accurate answer to each of the following questions.

1. What master's degree do you have in counseling?
  - a. Master of Science
  - b. Master of Arts
  - c. Master of Education
  - d. Other, please specify \_\_\_\_\_
  
2. What was your concentration?
  
3. Did you receive your counseling degree from a CACREP-accredited program?
  - a. Yes
  - b. No
  - c. Not sure
  
4. Do you hold a PhD?
  - a. Yes
  - b. No
  
5. What is the concentration of your PhD?
  
6. Did you receive your PhD from a CACREP-accredited program?
  - a. Yes
  - b. No
  - c. Not sure
  - d. N/A

7. Do you have any additional graduate degrees? If yes, please specify all your additional graduate degrees list below. Provide the full spelling and acronym of each additional degree (Ex. Master of Public Health, MPH).
- a. Yes (please specify) \_\_\_\_\_
  - b. No
8. What is the concentration of this degree or degrees?
9. Are you currently seeking another graduate degree? If yes, please list below. Provide the full spelling and acronym.
- a. Yes \_\_\_\_\_
  - b. No
10. What is your undergraduate background? Please provide your degree type and major(s)/minor(s) that you studied. \_\_\_\_\_
11. What are your current counseling credentials? Please include your licensure (e.g., LPC, LPCA) including which state(s) in which you have a license to practice and any certifications you hold (e.g., NCC). Please list out the full title of your license and its acronym (Ex. Licensed Professional Counselor Associate, LPCA, NC).
12. Are you currently working with clients individually?
- a. Yes
  - b. No
13. Are any of your clients survivors of trauma?
- a. Yes
  - b. No
14. Do you consider yourself neuro-informed in your work with clients?

- a. Yes
- b. No
- c. I don't know

## APPENDIX B: PILOTED INTERVIEW PROTOCOL

1. What training have you received in neuroscientific concepts?
  - a. What training experiences were most important or impactful for you? For example, trainings you attended, course work completed, etc.?
  - b. Other relevant training experiences?
  - c. What barriers have you faced in gaining access to such information?
  - d. When or how do you feel you've been supported in gaining access to neuroscience information and training?
2. What neuroscientific concepts have you found most impactful in your clinical work?
3. How do you define trauma?
4. Think about your experience working with trauma survivors.
  - e. Have neuroscientific concepts influenced your work with trauma survivors?
    - i. If yes, what neuroscientific concepts are relevant to how you understand and treat survivors of trauma?
5. Think of a recent case of a trauma survivor and tell me about this case.
  - c. How do you conceptualize this client? Please be as specific as possible.
  - d. What are examples of interventions you have used or might use with this client?
  - e. What would success look like for this case?

## APPENDIX C: FINAL INTERVIEW PROTOCOL

Thank you for taking the time for this interview today. Our research team is exploring trauma counselors' experiences integrating neuroscience research and concepts into their clinical work. It is ok to use names or pseudonyms. If you include any identifying information, I can redact that from the transcript. Ok?

The interview should take no longer than 45-60 minutes.

Since we will be talking about an experience that involves trauma, please let me know at any time you feel you need a break.

I invite you to notice what comes up for you in your nervous system as we go through this interview. If anything noticeable comes up, feel free to share that. We have lots of different ways of knowing, and information from all of your ways of knowing are helpful.

1. Where do you currently practice/work with clients? (What type of practice do you engage in currently?) What population(s) do you work with? Is there anything else I should know about your practice?
  - a. Do you advertise your practice using any neuro-informed language?
2. When I say “neuro-informed counseling,” how do you define or think about that?
3. What training have you received in neuroscience or neuroscientific concepts?
  - a. What training experiences were most important or impactful for you? For example, trainings you attended, course work completed, supervision you've received.?
  - b. Other relevant training experiences?
4. How do you define trauma?



5. Think about your experience working with trauma survivors. What neuroscientific concepts have you found most impactful in your clinical work with these clients?
  - a. Have neuroscientific concepts influenced your work with trauma survivors? How so?
    - i. If yes, what neuroscientific concepts are relevant to how you understand and treat survivors of trauma?
6. We are particularly interested in understanding how trauma counselors are integrating neuroscience into their clinical work. So, could you think of a recent case of a trauma survivor you've worked with or are working with?
  - a. Tell me briefly about the clinical setting and the client's background.
  - b. How do you conceptualize this client from a neuro-informed perspective? Please be as specific as possible. Please walk me through your thought process in how you understand/conceptualize this client from a neuro-informed perspective.
  - c. I am going to ask about both initial and ongoing assessment with this client. How did neuroscience influence the initial assessment of this client? Please walk me through your thought process. How did you determine what to focus on? What were your initial observations of the client?
    - i. How did neuroscience influence your ongoing assessment of treatment with this client?
  - d. How did neuroscience influence treatment planning with this client?
  - e. How did or might neuroscience influence interventions used with this client? What is an example of an intervention you have used or might use with this client?

- i. How do you introduce this intervention with this client? Do you explain the neuroscience behind it? Why or why not?
    - ii. Please walk me through the rest of the intervention steps.
    - iii. How did the client respond to this intervention?
  - f. What would success look like for this case?
7. How would you describe your comfort level in applying neuroscience knowledge with trauma survivors?
  - a. What more would you want to learn to feel more comfortable and confident?
8. What do you believe are the key concepts or aspects of neuro-informed trauma treatment?
9. What would you need to further embrace neuro-informed counseling? Some examples include access to accurate neuro-science training, clinical supervision with a neuro-informed supervisor, the ability to consult with other neuro-informed counselors, etc.
10. Is there any other information you believe is relevant to share about this topic that I didn't ask?

What do you notice in your own nervous system now?

I really appreciate the rich information you've shared with me today. Can I re-contact you if we need some clarification about your responses during the analysis process?

Thank you again!

## APPENDIX D: RECRUITMENT EMAIL TO COUNSELORS

Hello!

My name is Patty Hickham and I am a doctoral candidate in Counseling and Counselor Education at The University of North Carolina at Greensboro (UNCG). I am reaching out to invite you to participate in my dissertation study, entitled “Exploring Counselors’ Learning and Application of Neuroscientific Concepts to the Treatment of Psychological Trauma.” I want to gain a better understanding of how trauma counselors who considered themselves neuro-informed are learning about and integrating neuroscience concepts into their clinical work with trauma survivors. This study is under the advisement of my dissertation chair, Dr. J. Scott Young.

Participation will involve a one-hour interview over Zoom

If you are interested in participating, please first complete this brief survey: [LINK]. This survey will take no longer than 10 minutes. At the end, you will be asked to provide an email address and/or phone number that I can use to contact you to schedule an interview. All information that you provide will remain confidential and remain in a secure location known only to me.

These are the inclusion criteria for participating in this study:

1. Identify as a mental health counselor and hold state-appropriate counseling licensure credentials (e.g., LPC, LCMHC, LCMHCA).
2. Graduated from a CACREP-accredited counselor training program.
3. Have been working with clients in a counseling setting as a fully- or provisionally-licensed counselor for a minimum of one year.

4. Identify as neuro-informed in their clinical work and have relevant training and experience which supports that identity.

5. Are currently working as a counselor and with some survivors of trauma.

If you have any questions, please do not hesitate to contact me. Thank you for your consideration!

Patty M. Hickham, MS, LCMHCA, NCC Doctoral Candidate, UNCG

Phone: 504-258-0502

Email: pmhickha@uncg.edu

APPENDIX E: UNIVERSITY OF NORTH CAROLINA AT GREENSBORO IRB  
INFORMATION SHEET

Project Title: Exploring Counselors' Learning and Application of Neuroscientific Concepts to the Treatment of Psychological Trauma

Principal Investigator: Patricia Hickham Tousey MS, LCMHCA, NCC

Faculty Advisor: J. Scott Young, PhD, LPC, NCC, ACS

**What is this all about?**

I am asking you to participate in this research study because we want to better understand if and how neuro-informed counselors learn about and integrate neuroscientific concepts into their work with trauma survivors . This research project will only take about 1 hour and 15 minutes and will involve complete a brief survey lasting about 15 minutes and subsequent interview. At the end of the survey you will be asked to indicate if you are willing to participate in an interview with the researcher that will last approximately one hour. You will be asked to provide your name and an email address and phone number where the researcher can reach you. The researcher will contact you by phone or email to schedule a time to meet face to face or virtually using the online meeting system Zoom. During this interview, you will be asked to answer a set of questions about how you how you conceptualize trauma survivors, and your experiences learning about and integrating neuroscientific concepts into that work. **Your participation in this research project is voluntary.**

**How will this negatively affect me?**

No, other than the time you spend on this project there are no know or foreseeable risks involved with this study.

### **What do I get out of this research project?**

You and/or society will or might help counselor educators understand how to improve counselor access to important trauma and neuroscience information, ultimately improving accessibility and effectiveness of trauma treatment.

### **Will I get paid for participating?**

There will not be monetary compensation.

### **What about my confidentiality?**

We will do everything possible to make sure that your information is kept confidential. All information obtained in this study is strictly confidential unless disclosure is required by law. We will use pseudonyms and redacted confidential information throughout the data analysis and reporting process. Once interviews have been transcribed, any remaining identifying information will be redacted from the transcriptions in order to ensure anonymity. All anonymous interview transcriptions and audio recordings will be stored on a secure, password protected, online storage service used by UNCG (i.e. Box).

**Absolute confidentiality of data provided through the Internet cannot be guaranteed due to the limited protections of Internet access. Please be sure to close your browser when finished so no one will be able to see what you have been doing." Alternatively, add security statement from commercial survey tool used for the study.**

Because your voice will be potentially identifiable by anyone who hears the recording, your confidentiality for things you say on the recording cannot be guaranteed although the researcher will try to limit access to the recording as described in this section.

**What if I do not want to be in this research study?**

You do not have to be part of this project. This project is voluntary and it is up to you to decide to participate in this research project. If you agree to participate at any time in this project you may stop participating without penalty.

**What if I have questions?**

You can ask Patricia Hickham Tousey ([pmhickha@uncg.edu](mailto:pmhickha@uncg.edu); 504-258-0502) or J. Scott Young ([jsyoung3@uncg.edu](mailto:jsyoung3@uncg.edu)) anything about the study. If you have concerns about how you have been treated in this study call the Office of Research Integrity Director at 1-855-251-2351.

APPENDIX F: TABLE 4

**Table F4. Participant Profiles**

Pseudonym	Clinical Setting	Counseling Degree	Concentration	Licensure and Counseling Credentials and Certifications
Jamie	Counseling and Wellness private practice center working with trauma and grief, with children and adults	M.S.	Clinical Mental Health Counseling	Licensed Professional Counselor, National Certified Counselor, Certified Clinical Trauma Professional Level II, Certified Grief Professional, Certified Hypnotherapist
Melanie	Group private practice, working with some survivors or sexual abuse and domestic violence	M.S./PhD	Clinical Mental Health Counseling	Licensed clinical mental health counselor LCMHC, somatic experiencing practitioner SEP
Bethany	Solo private practice seeing clients both in person and virtually. mostly working with young adults, 20-35 age range, individual counseling	M.S.	Clinical Mental Health Counseling	Licensed Clinical Mental Health Counselor Associate, LCMHCA
Diane	Owens and sees clients at an expressive arts therapy center	M.S.	Clinical Mental Health Counseling with focus on body-based healing	Licensed professional counselor, Board-certified dance/movement therapist, Registered somatic movement educator
Hayley	Group private practice providing somatic trauma therapy	M.A./Ed.s /PhD	Clinical Mental Health Counseling/School Counseling	LPC, ACS, NCC



Pseudonym	Clinical Setting	Counseling Degree	Concentration	Licensure and Counseling Credentials and Certifications
Rachel	Private practice working mainly with women of color ranging from age 16-70	M.S./Dmin (in progress)	Clinical Mental Health Counseling	Licensed Clinical Professional Counselor, LCPC, MD; National Certified Counselor, NCC, Graduate Certificate in Addictions Counseling, Certificate of Advanced Study (CAS) in Pastoral Counseling
Elizabeth	Private practice setting working primarily with middle to young adult females and couples, primarily working with presentations of complex PTSD	M.A.	Marriage and Family Therapy	LMFT
Lindsey	EMDR based practice providing trauma therapy as well as EMDR training for practitioners	M.A.	Clinical Mental Health Counseling	Licensed Professional Counselor, LPC, Approved Licensed Professional Supervisor, ALPS, WV; Licensed Professional Counselor, LPC, PA; Licensed Mental Health Counselor, LMHC, NC
Courtney	Director of a family therapy program that's embedded into a school district, working with traumatized and "at risk youth." Also opening up a private practice to work with trauma survivors.	M.A./PhD	Clinical Mental Health Counseling and Marriage and Family Counseling	Licensed Marriage and Family Therapist, LMFT, SC; Licensed Marriage and Family Therapy Supervisor, LMFT/S, SC

Pseudonym	Clinical Setting	Counseling Degree	Concentration	Licensure and Counseling Credentials and Certifications
Alexandra	Small part time practice and associate professor in counselor education. Most clients are referred for EMDR. usually clients who have complex trauma or histories of developmental trauma.	M.A./PhD	Clinical Mental Health Counseling	LCMHC (NC), LPC (PA), NCC, BC-TMH, EMDR certified therapist and EMDR consultant in training

APPENDIX G: DOMAINS AND CATEGORIES

**Table G5. Pseudonym Codes**

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Roman Numeral	Pseudonym
I	Diane
Ii	Alexandra
Iii	Bethany
Iv	Courtney
Ix	Lindsey
V	Elizabeth
Vi	Hayley
Vii	Jamie
Viii	Melanie
X	Rachel

---

**Table G6. Frequencies of Domains and Categories**

Domains	Categories and Subcategories	Cases	Frequency	Participants
1. Training pathways and resources	Self study	9	general	i, ii, iii, iv,v, vii,viii, ix, x
	Consultation and Supervision	6	variant	i, ii, iv, v, vi, ix
	Advanced trainings and certifications	10	general	all
	Certifications	10	general	
	Other advanced trainings	3	variant	iv, v, ix
	Coursework	7	typical	i, ii, iii, v, viii, ix,x
	Continuing education	8	typical	i,ii,iii,iv,v,vii,ix,x
	Networks	5	typical	i, iv,v, ix,x
	Webinars and other Shorter-Term Trainings Without Certification	5	typical	ii, iii, vii, ix, x
	Gaps in training	7	typical	ii,iii,iv,v,vi,viii,ix
2. Neuro-informed definition/language	Translation of neuroscience language for clients	10	general	
	Neuro-informed concepts	10	general	all
	Mind-body connection, body awareness	9	general	i, ii,iii,v,vi,vii,viii,ix,x
	Attachment/interpersonal neurobiology	8	typical	ii, iii, iv, v, vi, viii,ix,x
	Other Important Concepts	7	typical	i, ii, iv, v, viii, ix, x
	Trauma definition/language	10	general	all
	Nervous system overwhelm	8	typical	i, ii, iii,iv,v,viii,ix
	Other ways of defining and conceptualizing trauma linguistically	7	typical	i, ii, iv, v, vi, viii, x
3.Client Conceptualization	Broad Trauma Conceptualization	8	typical	i, iii, iv, v,vii,viii,ix,x
	Case Specific Clinical Formulation	10	general	all
4.Clinical Approach	Assessment	10	general	all
	Therapist attunement	10	general	all

Domains	Categories and Subcategories	Cases	Frequency	Participants
5. Clinical Interventions	Informal Assessment	7	typical	ii, iii, iv, i, v, vii, ix
	Formal Assessment	5	typical	ii, iv, v, vii, ix
	Treatment planning	10	general	all
	Goals	7	typical	ii, iii, iv, vi, ix, viii, x
	Pacing and timing of treatment	8	typical	ii, iii, iv, v, vi, vii, ix, x
	Outcome/impact of approach in counseling	10	general	all
	Counselor	5	typical	iv, vii, ix, viii, x
	Client	9	general	ii, iii, iv, i, v, vi, vii, viii, x
	Therapist presence	8	typical	ii, iv, v, vi, vii, ix, viii, x
	Framing symptoms as adaptive response to trauma	6	typical	ii, iii, iv, i, vii, ix
	Mindfulness/Body Awareness/Grounding	8	typical	ii, iii, iv, i, v, vi, viii, x
	Techniques - more detailed; can include specific language	10	general	all
	EMDR	3	variant	ii, iv, ix
	Brainspotting	2	variant	v, vii
	Metaphor	3	variant	ii, i, vii
	Somatic Practices	4	variant	i, v, viii, x
	Breathwork	3	variant	v, viii, x
	Expressive Arts/Aivities	3	variant	i, vii, x
	Tapping		rare	x
	Neuroeducation	10	general	all
Iterative process	6	typical	ii, iii, iv, v, vi, viii	
Meeting clients where they are and adapting language in session	7	typical	iv, i, vi, vii, ix, viii, x	
How clients are introduced to concept/examples in session	7	typical	iv, v, vi, vii, ix, viii, x	

Domains	Categories and Subcategories	Cases	Frequency	Participants
6. Attitudes and Beliefs	Metaphor	3	variant	viii, vii
	Visual Aids	3	variant	i, vi, ix
	Clinical importance	8	typical	ii, iii, iv, i, v, ix, viii, x
	Power of neuro-informed counseling approach	6	typical	iv, v, vi, vii, ix, x
	Barriers to integration	8	typical	ii, iii, iv, v, vii, ix, viii, x
	Comfort level	5	typical	ii, iii, vi, viii, x
	Therapist enthusiasm	5	typical	iv, v, ix, viii, x

APPENDIX H: TABLE 7

**Table H7. Self-Study Neuroscience Resources**

Self-Study	Individual(s)	Printed Resource	Comments	Participants
Book	Stephen Porges	Polyvagal Theory	Helped "everything fall into place, Porges' book is like the papers he wrote, reiterating the same concepts multiple times in a helpful way	i
Book	Onno van der Hart Ph.D., et al.	The Haunted Self	DID Complex trauma, structural dissociation	i, ii
Book	Miller and Beeson	Neuroeducation Toolbox: Practical Translations of Neuroscience in Counseling and Psychotherapy		i, vi
Book	Bessel van der Kolk	The Body Keeps the Score	says the expressive arts therapies are very helpful, recommends yoga, and talks about a measured protocol	i, iii, vii
Book	Peter Levine	Waking the Tiger		i
Book	Pinkola Estés	Women who Run with the Wolves		i
Book	Bonnie Badendoch	Being a Brain-Wise Therapist	particularly impactful and very geared towards therapists, talking not only about the concepts in general to understand them, but how those concepts can show up in clinically a session and how therapists can really apply that in clinical work with clients.	iii
Book	Field & Ghaston	Neuroscience-informed Counseling for Children and		vi
Book	Dan Siegel	Developmental Interpersonal Neurobiology Textbook		vii
Book	Dan Siegel	Mindsight		vii

Self-Study	Individual(s)	Printed Resource	Comments	Participants
Research Article		NEUROBIOLOGICAL SEQUELAE OF CHILDHOOD TRAUMA: Post-traumatic Stress Disorders in Children.	began to do a ton of independent research on the neurobiological sequelae of early adversity and childhood trauma, which has informed how P does training, supervision, and clinical work.	vi
Research Article	Stephen Porges	The Science of Safety		xi
Research Article	Chamberlain, 2019	"The Network Balance Model of Trauma Resolution"	an article on healing from trauma, and why pause and dual attention stimulation works to heal trauma.	xi
Research Article	Teicher and Samson, 2016	Annual research review: Enduring neurobiological effects of childhood abuse and neglect	"extraordinary"	vi
Resource Influential Individual	Deb Dana'	Polyvagal Ladder		ii
Influential Individual	Bessel van der Kolk			I, xii, vii
Influential Individual	Bonnie Bainbridge Cohen		a dance and occupational therapist, and a yoga teacher, who works with adults to bring them through infant patterning	i
Influential Individual	Stephen Porges			i
Influential Individual	Judith Kestenberg		studied infant movement and noticed developmental rhythms that alternate between "indulging" and "fighting".	i
Influential Individual	Peter Levine			I, ii, vii
Influential Individual	Resmaa Menakem		represent diversity in somatic movement	
Influential Individual	Joy DeGruy		represent diversity in somatic movement,	i



Self-Study	Individual(s)	Printed Resource	Comments	Participants
			(post-traumatic slave syndrome)	
Influential Individual	Isabel Wilkerson			i
Influential Individual	Robert Blythe			i
Influential Individual	Marion Woodman			i
Influential Individual	Kimberlé Crenshaw		Intersectionality	i
Influential Individual	Janina Fischer,			i
Influential Individual	Oliver Sacks			I, iii
Influential Individual	Thomas Field			vi
Influential Individual	Eric Beeson			vi
Influential Individual	Chad Luke		books and articles influential research articles	vi
Influential Individual	Dan Siegel			vii
Influential Individual	Emily Nagoski		an informative resource as she really emphasizes your brain is responding appropriately to abnormal situations.	vii
Influential Individual	Laurence Heller			ii