5-2020

Exploring Counselor Educators’ Experiences With Neuroscience-Informed Counseling Pedagogy

Savannah Rose Cormier

Follow this and additional works at: https://digscholarship.unco.edu/dissertations
EXPLORING COUNSELOR EDUCATORS’ EXPERIENCES
WITH NEUROSCIENCE-INFORMED
COUNSELING PEDAGOGY

A Dissertation Submitted in Partial Fulfillment
Of the Requirements for the Degree of
Doctor of Philosophy

Savannah Rose Cormier

College of Education and Behavioral Sciences
Applied Psychology and Counselor Education
Counselor Education and Supervision

May 2020
This Dissertation by: Savannah Rose Cormier

Entitled: Exploring Counselor Educators’ Experiences with Neuroscience-Informed Counseling Pedagogy

has been approved as meeting the requirement for the Degree of Doctor of Philosophy in the College of Education and Behavioral Sciences in the Department of Applied Psychology and Counselor Education, Program of Counselor Education and Supervision.

Accepted by the Doctoral Committee

_______________________________________________________________________

Heather Helm, Ph.D., Research Advisor

Jennifer Murdock-Bishop, Ph.D., Committee Member

Jennifer Fulling-Smith, Ph.D., Committee Member

_______________________________________________________________________

Tracy Gershwin, Ph.D., Faculty Representative

Date of Dissertation Defense

_______________________________________________________________________

Accepted by the Graduate School

_______________________________________________________________________

Cindy Wesley
Interim Associate Provost and Dean
The Graduate School and International Admissions
ABSTRACT


Human beings have been curious about the mysteries of the brain for centuries (Bear, Connors, & Paradiso, 2007). Modern advances in neuroscience technology and brain imaging techniques have allowed scientists to see the inner workings of the brains of living people, resulting in increased knowledge and understanding of how the brain functions and how learning occurs (Hardiman, 2012; Sousa, 2017). Findings from neuroscience research are rapidly being used to inform practices in fields such as education (Thomas, Ansari, & Knowland, 2018) and professional counseling (Beeson & Field, 2017; Field, Jones, & Russell-Chapin, 2017; Luke, Miller, & McAuliffe, 2019; Navalta, McGee, & Underwood, 2018; Russell-Chapin, 2016). While neuroscience-informed education and counseling are gaining significant attention and helping to enrich their respective fields, neuroscience-informed counselor education, specifically in regards to teaching and training counseling students, has not matched this momentum. In order to improve and advance counselor education it is important for counselor educators to understand how neuroscience can strengthen the educational process of training counselors and incorporate neuroscience principles related to teaching and learning into their work.
The focus of this study was to gain a better understanding of the experiences of counselor educators who use neuroscience to inform their counseling pedagogy and training, specifically their conceptualizations of learning and development, creation of optimal learning environments, and instructional strategies. In this exploration, I hoped to discover meaningful themes in the experiences of counselor educators with neuroscience-informed counseling pedagogy that can support and enhance the field of counselor education. In this phenomenological study, I explored 6 counselor educators experiences integrating neuroscience into their counseling pedagogy. Through multiple interviews and artifact collection, 5 themes were discovered: the neuroscience of learning, the neuroscience of the teaching process, specific methods, neuroscience-informed counselor educator qualities, and beliefs about neuroscience-informed pedagogy. The findings of this study have significant implications for the field of Counselor Education, including greater student learning experiences and outcomes, options for incorporating neuroscience into counseling pedagogy, and specializations in neuroscience-informed pedagogy. Further implications and areas for future research are discussed.
ACKNOWLEDGMENTS

I truly do not have the words to thank everyone who has helped me along this journey. First, to my committee, Dr. Jennifer Murdock Bishop, Dr. Jennifer Fulling-Smith, and Dr. Tracy Gershwin. My Amazons. Thank you all for your support, your wisdom, your challenges, and your friendship. I look up to you all more than you know and am so honored to have had you all walking alongside me during this process. To Dr. Heather Helm. Thank you for being my safe place. Thank you for modeling what it means to be a relationship-focused and caring counselor educator. For showing me how to care deeply for students and still push them to realize the greatness within. Even when I tried to give you every reason to give up on me, you refused. I am so honored to know you.

To Jesse, my fellow Warrior Woman. “Ain’t nothing goin’ stop us from making it happen.” From day one, you have been in my corner and I in yours. You’ve inspired me as a counselor, a counselor educator, a woman, a spiritual being, a new mom, and person in general. Thank you for your friendship and authenticity. To my CounPals. Thank you for supporting me in everything I do and taking care of my heart and soul.

To my family. My mama, the strongest and most amazing woman I know. Thank you for always being there for me when I feel lost and scared. To my best friend, soul mate, and wonderful husband Dylan. How can I possibly thank you enough for all you have done? For me, for us, and for our family. Thank you for never losing your faith in
me throughout all of the ups and downs. And to my son, Bear. Everything I do, I do for you. Mommy loves you so much.

Y'all, we did it!
TABLE OF CONTENTS

CHAPTER

I. INTRODUCTION TO THE STUDY .................................................................1
   - Background
   - Statement of the Problem
   - Rationale and Significance
   - Purpose of the study and Research Questions
   - Assumptions
   - Methodology Overview
   - Delimitations
   - Definition of Key Terms
   - Conclusion

II. REVIEW OF THE LITERATURE ..............................................................18
   - Introduction
   - Professional Counseling
   - Counselor Education
   - Counseling Pedagogy
   - Foundational Neuroscience
   - Neuroscience Implications for Counselor Education
   - Conclusion

III. METHODOLOGY ......................................................................................54
   - Introduction
   - Qualitative Research
   - Epistemology and Theoretical Perspective
   - Phenomenology
   - Researcher Stance
   - Procedures
   - Conclusion

IV. FINDINGS ...............................................................................................100
   - Introduction
   - Participants
   - Results
   - Themes
   - Researcher Process
   - Conclusion

V. DISCUSSION ............................................................................................167
   - Introduction
   - Research Question
   - Discussion
LIST OF TABLES

TABLE 1 - PARTICIPANT DEMOGRAPHICS.............................................102

TABLE 2 - NEUROSCIENCE-INFORMED PEDAGOGY: THEMES WITHIN CATEGORY.................................................................111

TABLE 3 - NEUROSCIENCE-INFORMED COUNSELOR EDUCATORS: THEMES WITHIN CATEGORY.........................................................143
LIST OF FIGURES

FIGURE 1 - VISUAL METAPHOR OF THE THEMES…………………………110
CHAPTER I
INTRODUCTION TO THE STUDY

Modern advances in neuroscience technology and brain imaging techniques have allowed scientists to see the inner workings of the brains of living people, resulting in increased knowledge and understanding of how the brain functions and how learning occurs (Bear et al., 2007; Hardiman, 2012; Sousa, 2017). Findings from neuroscience research are rapidly being used to inform practices in fields such as education (Ansari, De Smedt, & Graber, 2012; Goswami, 2004; Thomas et al., 2018) and professional counseling (Beeson & Field, 2017; Field et al., 2017; Ivey & Daniels, 2016; Luke et al., 2019; Navalta et al., 2018; Russell-Chapin, 2016). While neuroscience-informed education and counseling are gaining significant attention and helping to enrich their respective fields, neuroscience-informed counselor education, specifically in regards to teaching and training counseling students, has not matched this momentum.

Counselor training is a central focus of counselor education programs and counselor educators are responsible for using pedagogical practices that are informed by current scientific knowledge and theoretical understandings of the process of student learning and development (American Counseling Association [ACA], 2014; Council for the Accreditation of Counseling and Related Programs [CACREP], 2016). Additionally, as an essential component of being an ethical educator, counselor educators are required to engage in continuing education to learn current effective and best practices as
knowledge and understanding evolves (ACA, 2014). Neuroscience findings on concepts such as attention, memory, emotions, and overall brain functions provide updated understandings that inform educators on what teaching practices can best support learning (Hardiman, 2012; Jensen, 2008; Medina, 2014; Sousa, 2017) and may support counselor educators in upholding their primary responsibility to be skillful teachers, provide quality training to counseling students, improve the training practices, and advance counselor education (ACA, 2014; “Association for Counselor Education and Supervision [ACES] Information”, n.d.).

In order to improve and advance counselor education it is important for counselor educators to understand how neuroscience can strengthen the educational process of training counselors and incorporate neuroscience principles related to teaching and learning into their work. An exploration of experiences with neuroscience-informed counseling pedagogy that demonstrates an intentional integration of neuroscience into teaching could provide a beneficial framework to support counselor educators’ teaching practices and enhancement of counselor training. The focus of this study is to gain a better understanding of the experiences of counselor educators who use neuroscience to inform their counseling pedagogy and training, specifically their conceptualizations of learning and development, creation of optimal learning environments, and instructional strategies. In this exploration, I hoped to discover meaningful themes in the experiences of counselor educators with neuroscience-informed counseling pedagogy that can support and enhance the field of counselor education.

**Background**

Human beings have been curious about the mysteries and workings of the brain for centuries (Bear et al., 2007). With advances in technology, scientists have been able
to use noninvasive brain imaging techniques to view brains in vivo and learn about the functions and processes of the nervous system of living persons. Rather than ending in resolved answers, this increased understanding of the brain has often led to subsequent questions and continued study. To recognize modern progress in this area, then President George Bush proclaimed the 1990s to be “The Decade of the Brain,” noting a need for continued study by Federal research agencies, scientists, and health care professionals (Bush, 1990). Neuroscientists have expanded on this proclamation, commenting on how neuroscience findings have continued to increase past the 1990s and that perhaps a more accurate decree would be “The Century of the Brain” (Bear et al., 2007). In April of 2013, then President Obama launched a project to increase brain related research and discoveries through the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative, which was followed by a collaborative and multidisciplinary plan from the National Institutes of Health (NIH) to achieve this vision (NIH, 2014). Neuroscience and brain related research are a focus of today’s scientific agenda and goals for the future involve further advancing technologies to better comprehend the dynamic processes of how the human brain learns, remembers, and experiences complex thought.

Neuroscience is a field comprised of several disciplines including biology, psychology, medicine, and chemistry (Bear et al., 2007; Mareschal, Butterworth, & Tolmie, 2013). Similarly, neuroscience includes different fields of study such as molecular, cellular, neural systems, behavioral, and cognitive. The Society for Neuroscience, founded in 1969, represents the largest neuroscience organization in the world and works to advance the study of the nervous system through the collaboration of diverse professionals, provide educational resources and professional development to the
neuroscience community, and promote education of neuroscience to the public community and policymakers (Mission and Strategic Plan, n.d.). With modern neuroscience findings, neuroscientists have been able to recognize the brain’s ability to generate new neurons in adulthood (Eriksson et al., 1998; Lledo, Alonso, & Grubb, 2006) to change and reorganize itself based on experience (Hübener & Bonhoeffer, 2014; Purves & Hadley, 1985), as well as the areas and systems involved in emotions (Adolphs, Damasio, Tranel, & Damasio, 1996; LeDoux, 2012), memory (Scoville & Milner, 2000), and the overall complex functions of a living brain (Bear et al., 2007; Purves et al., 2019).

As advances in technology and neuroscience findings continue to grow, so too does the impact of neuroscience principles on disciplines outside of the field of neuroscience. Education is one field that has been noted to integrate neuroscience and biological principles and findings to better understand neurological processes that inform teaching practices (Ansari et al., 2012; Goswami, 2004; Hardiman, 2012; Immordino-Yang & Damasio, 2007; Mareschal et al., 2013; Sousa, 2017; Thomas et al., 2018). This emerging brain-based educational perspective, referred to as educational neuroscience or neuroeducation, combines research and principles from disciplines such as neuroscience, psychology, and education and has potential to become evidence-based educational practice (Ansari et al., 2012; Carew & Magsamen, 2010; Mareschal et al., 2013).

Educational neuroscience focuses on translating neuroscience findings into principles of how the brain is designed to learn, what teaching methods and strategies will best facilitate this learning, and how to engage learners in the process. The overall goal of the field of educational neuroscience is to promote learning by making teaching more effective (Mareschal et al., 2013).
At this time, a review of the literature related to neuroscience in counselor education pedagogy yielded no results, however the field of professional counseling has integrated neuroscience and neurobiological principles to support and enhance the field and practice of counseling (Badenoch, 2008; Field et al., 2017; Ivey & Daniels, 2016; Luke et al., 2019; Myers & Young, 2012; Navalta et al., 2018; Russell-Chapin, 2016). The increased awareness of the relationship between neuroscience principles and counseling has resulted in the creation of the ACA, Association of Counselor Education and Supervision (ACES), and American Mental Health Counselor Association (AMHCA) neuroscience interest networks; an increase of journal articles, books, and professional conference presentations on neuroscience in counseling; a reoccurring neuroscience column in Counseling Today; and a neurocounseling section in the Journal of Mental Health Counseling. Additionally, the newest 2016 update of the Council for Accreditation of Counseling and Related Educational Programs (CACREP) standards, which delineates specific counselor training standards for accreditation, has more than tripled the number of standards addressing neuroscience and neurobiology from the previous 2009 version of the standards (CACREP, 2009; CACREP, 2016). In these standards, a call for counselor training in biological, neurological, and physiological influences on human growth and development, mental health, addictive and other co-occurring disorders, and disability (CACREP, 2016) is evident. With the demand for professional counselors and their services growing rapidly (Bureau of Labor Statistics, 2018), and the increase in knowledge of neuroscience, it is imperative that those involved in counselor training be informed of neuroscience findings and integrate these into their teaching to train the increasing number of counseling students by accepted training standards (i.e. CACREP, 2016).
The responsibility of training future professional practitioners and ensuring ethical and competent practice of counseling students rests on counselor educators (ACA, 2014; ACES, 2016; ACES, 2019). Consequently, counselor educators have an ethical responsibility to be competent teachers. While counselor educators hold a number of roles— including researcher, teacher, supervisor, and clinician— on average, counselor educators report they spend more of their time teaching or in teaching-related activities (Davis, Levitt, McGlothlin, & Hill, 2006). In alignment with this responsibility, the mission of the Association for Counselor Education and Supervision is to advance the teaching and training of future counselors to improve counseling services for all (ACES, 2011; ACES, 2019). Teaching is described as “where future counselors are made” (McAuliffe, 2011, pg. vii). As such, counselor educators are required to not only be capable and ethical practitioners but also knowledgeable and skillful teachers that intentionally ground educational practices in pedagogical foundations (ACA, 2014). While counselor education pedagogy literature articles number in the hundreds, Barrio Minton, Wachter Morris, and Bruner (2018) report that most articles focus on teaching techniques (48.12%) rather than pedagogical practices (21.80%). Importantly, articles on teaching and learning represented that smallest proportion (9.77%), consistent with Barrio Minton, Wachter Morris, and Yaites previous study in 2014.

Researchers suggest that an integration of neuroscience principles to inform teaching practices can enhance student learning (Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013; Hardiman, 2012). In one study that used a neuroscience-based perspective to teach neuroscience to counselors, Miller and Barrio Minton (2016) found that using Interpersonal Neurobiology (IPNB) as a framework for teaching IPNB in counseling had beneficial implications for counselor development. Related to learning
IPNB for counseling, participants reported increased compassion, empathy, self and other acceptance, self-awareness, presence, attunement, and confidence as a clinician. Importantly, participants reported the IPNB informed teaching perspective and educational environment, not just the neuroscience content, contributed to these benefits as well as meaningful personal and professional development through safe, experiential, and emotional learning. As the mission of counselor educators involves promoting educational practices necessary in the training of future counselors (ACES, 2011; ACES, 2019), it is essential for counselor educators to consider how neuroscience informed pedagogy can enhance counselor learning and development.

**Statement of the Problem**

The problem addressed in this study relates to the need for research on pedagogy in counselor training, specifically involving the unexplored area of neuroscience-informed counseling pedagogy. While literature suggests that neuroscience-informed teaching may enhance the educational practices involved in counselor training (Hardiman, 2012; Mareschal et al., 2013; Miller & Barrio Minton, 2016; Thomas et al., 2018), neuroscience can appear intimating or confusing to counselor educators (Field et al., 2017) and no studies to date explore the experiences of counselor educators integrating neuroscience into their pedagogy and training practices. In order to better understand and support counselor educators’ integration of neuroscience-informed pedagogy, it is essential to explore their experiences with this phenomenon. The consequences of counselor educators not understanding and incorporating neuroscience-informed pedagogical practices may result in failure to adequately train the increasing number of counseling students, uphold best practices for teaching and client welfare, and advance the counseling and counselor education professions. Additionally, not exploring
these experiences, concurrent to the rising popularity of neuroscience in counseling and education, is likely to lead to further perpetuation of misperceived and inaccurate neuroeducation claims (Dekker, Lee, Howard-Jones, & Jolles, 2012; Hardiman, 2012; Tardif, Doudin, & Meylan, 2015) and failure to support a rigorous and scientifically supported integration of neuroscience in counselor education. An exploration of counselor educators’ experiences with neuroscience-informed pedagogy is necessary in order to understand the complexities involved in the process of intentionally integrating neuroscience concepts and findings into counselor training. This study responds to the responsibility of counselor educators to advocate for empirically supported pedagogical practices that promote the learning and development of counseling students and, thus, increase client welfare (ACA, 2014; ACES, 2016).

While neuroscience-informed pedagogy may enhance the educational practices involved in teaching counseling students, a central goal of counselor educators (ACA, 2014; ACES, 2011; CACREP, 2016), there remains a clear gap in the literature exploring this topic. To uphold the mission of ACES (2011) in promoting the field of counselor education, it is necessary to explore how counselor educators experience the integration of neuroscientific findings in the training of counselors. As neuroscientists continue to gain new understandings of the science of learning, it is essential that counselor educators, as professional educators, use relevant findings to inform their teaching practices. As educators who require students to ground practices in scientific and empirical research, it is essential that counselor educators’ model ethical practice (ACA, 2014) and scientifically ground their teaching practices similarly (ACES, 2016). By exploring counselor educators’ experiences with implementing neuroscience-informed pedagogy into counselor education and training, I hope to identify meaningful themes
that can contribute to an understanding of how counselor educators can enhance their
teaching practices for improved student learning. Therefore, the purpose of this study,
which is expanded upon below, is to explore how counselor educators integrate
neuroscience informed pedagogy into counselor education.

**Rationale and Significance**

The importance and underlying rationale for this study is based on the mission
and responsibility of counselor educators to advance quality professional counselor
education and preparation and incorporate best practices into their teaching (ACES, 2016;
ACES, 2019). Advancement of quality counselor training is a primary focus of the
Association for Counselor Education and Supervision, a Division of the American
Counseling Association, in their duty to promote “the sound professional practice and
high standards” (ACES, 2019, pg. 8) of professional counseling and through this duty,
promote client welfare. Additionally, this responsibility is predicted to increase faster
than average in the near future, as demand for- and thus training of- counselors is
projected to grow 23% from 2016 to 2026 (Bureau of Labor Statistics, 2018). It is
therefore essential to focus on ways of supporting counselor educators in meeting the
demand for increased counselor preparation.

Neuroscience research findings have been used to enhance and support the work
of educators (Hardiman, 2012; Jensen, 2008; Sousa, 2017), counselors (Field et al.,
2017), as well as counselor educators (Miller & Barrio Minton, 2016), and are beginning
to be described as shaping therapeutic best practice standards (Field et al., 2017; Montes,
2013; Myers & Young, 2012). As Hardiman (2012) states, “…all learning indeed occurs
in the brain. In contrast, all teaching does not result in learning; so, while all learning is
‘brain-based,’ all teaching is not” (p. xxi, emphasis in original). Teaching that is informed
from neuroscience principles and concepts translated into education help teachers understand the underlying neural systems involved in learning, enhance their teaching practices, and, thus, assist students with more effective learning (Dunlosky et al., 2013; Hardiman, 2012). Similarly, neuroscience can assist counselor educators in meeting the demands for quality counselor training by informing their understanding of how students learn and how to best conceptualize effective teaching practices from a neuroscience perspective. The intent of the study is not to imply or suggest that counselor educators are not currently providing quality training, but rather to further support how they can continue enhancing student learning through best teaching practices.

This study also works to support the fields of professional counseling and counselor education. Counseling as a mental health field is fairly new, especially in comparison to its older therapeutic counterparts (e.g. psychology, social work, psychiatry). Therefore, the current and future state of the counseling profession depends on counselor educators continually working to develop and strengthen the profession, improve standards for training new counselors, establish best practices in teaching (ACA, 2014; ACES, 2016), and share these experiences with other professionals in counselor education. An increased understanding of counselor educators’ integration of neuroscience findings and principles into counselor training is essential in developing neuroscience informed counseling pedagogy and could lead to enhancement of counselor education, as it has with counseling and education. Therefore, an exploration of counselor educators’ experiences with neuroscience-informed pedagogy may provide a foundational understanding of how counselor educators use neuroscience findings as a means to strengthen their teaching practices, upholding the mission of counselor educators.
Counselor educators are tasked with advancing the professions of counseling and
counselor education through the skillful training of students, as well as the continual
improvement of counselor training practices. In 2013, ACES identified the need for best
practices in teaching and created a Taskforce charged with upholding the commitment of
ACES in “identifying, implementing, and evaluating” pedagogical best practices for
teaching (ACES, 2016, pg. 4). In the creation of this working document (i.e. Best
Practices in Teaching in Counselor Education), the Taskforce provided guidance for
counselor educators in a variety of components involved in teaching, yet named a need
for additional research in this area. Similarly, Barrio Minton et al. (2018) updated Barrio
Minton et al.’s (2014) original content analysis of 230 peer-reviewed counseling articles
on teaching and learning and reported still only a small number of articles focused on
pedagogical practices and even smaller focused on teaching and learning. While both of
these categories increased from the previous 2014 study, indicating a shift in focus on
how counselor educators teach rather than simply what they teach, Barrio Minton et al.
(2018) suggest there is still a need for more research on teaching and learning in
counselor education.

If the ultimate goal of teaching is stimulating learning (Sousa, 2017), increasing
educators’ knowledge about how the brain learns and incorporating these neuroscience
principles into teaching practices can lead to more successful teaching and learning
(Hardiman, 2012; Sousa, 2017). Brain related research has, in fact, resulted in
neuroscience findings that provide increased understanding of how the brain operates and
researchers and educators have worked to use these findings to inform and improve
teaching practices (Hardiman, 2012; Jensen, 2008; Sousa, 2017). Additionally,
neuroscience findings are being used to support the practice of counseling through
scientifically validating essential counseling concepts such as the importance of relationships, holistic wellness, the impact of trauma, and improving counseling practices with clients (Field et al., 2017; Miller, 2016). Collectively, and through emerging studies of the positive influence of neuroscience in counselor education (Miller & Barrio Minton, 2016), there is reason to believe that incorporating neuroscience into counselor education can enhance teaching practices and counselor training.

**Purpose of the Study and Research Question**

The purpose of this phenomenological study was to understand counselor educators’ experiences integrating neuroscience research and concepts to inform overall counseling pedagogy. While some researchers define pedagogy as relating to the teaching of children (Knowles, 1984), for this study pedagogy was defined as the art and science of teaching in general. Since this definition can seem vague, I clarified the definition of pedagogy as including but not limited to: conceptualizations of learning and development; ways of being in relationships with students; facilitation of classroom culture, dynamics, and learning environment; intentional practices and strategies of teaching; and methods for assessment and evaluation. Thus, this study was designed to explore how counselor educators experience the integration of neuroscience principles into their pedagogical teaching practices in counselor education as well as their experience and perceived impact on student’s growth and development. The guiding research question for this research was:

Q1 What are the lived experiences of counselor educators who integrate neuroscience principles to inform their counseling pedagogy?
Assumptions

The formation and design of this study was influenced by multiple assumptions important to make clear. The major assumption guiding this research study is the belief that there are counselor educators currently informing their counseling pedagogy with neuroscience principles. This belief stems from experiences in which I have been a student in counselor educators’ neuroscience-informed courses as well as conversations with other counselor educators at professional conferences about how they inform their courses with neuroscience principles. Further, I have been to a number of professional presentations discussing and demonstrating neuroscience both counseling and counselor training. Thus, though it is not clearly represented in the counselor education research literature, I believe this phenomenon exists and that there are counselor educators willing to participate in my study.

Another assumption guiding this study is the belief that counselor educators and counselor educators-in-training are interested in learning more about neuroscience-informed pedagogy. As a counselor educator-in-training myself, I have been constantly fascinated by the topic of neuroscience integration into counseling and teaching. Further, as an educator in higher education who integrates neuroscience into my own pedagogy, I have been eager to learn more about how other educators, specifically counselor educators, experience and engage in this phenomenon as well. Therefore, I believe there is an interested audience eager to learn more about this phenomenon and incorporate helpful information into their own pedagogical practices. Lastly, I have had several conversations with fellow counselor education students and current counselor educators on neuroscience-informed counseling pedagogy and typically receive feedback on its intrigue and importance for the continued advancement of counselor and counselor
educator training. Thus, while I believe this topic is important for the enhancement of counselor education, I believe other counselor educators do as well.

**Methodology Overview**

To achieve the purpose of this study and answer the research question discussed above, a phenomenological research methodology was used to describe counselor educators’ experiences with neuroscience-informed pedagogy. Researchers using a phenomenological approach seek to explore, understand, and describe the essence of the lived experience with a phenomenon (Merriam & Tisdell, 2016; Moustakas, 1994). Specifically, the phenomenon I sought to explore was the experience of neuroscience-informed pedagogy and how educators use neuroscience-informed pedagogy specifically in counselor education. To inform the research design and methods as well as my analysis of the data, I grounded this phenomenological approach in a social constructionist epistemology as well as a relational-cultural and experiential learning theoretical perspective. A detailed explanation of methodology rational and processes is covered in Chapter III.

**Delimitations**

Delimitations represent the boundaries put in place to appropriately limit this study. First, I wanted to limit participants to only those who identify as a Counselor Educators. Though there are a number of professionals involved in counselor training, such as psychologists, it was essential that participants hold the distinct professional identity of a counselor that is unique from other helping professions. Further, to ensure participants were regularly evaluated as demonstrating quality training standards, participants were limited to only those who currently teach at a CACREP-accredited counseling program. Lastly, though I believe that all effective teaching is consciously or
unconsciously informed with neuroscience principles, only those with first-hand experience of the phenomenon were selected to participate in this study. Specifically, only participants who identify as using, and thus intentionally integrating, neuroscience-informed pedagogy into counselor education were selected for this study.

**Definition of Key Terms**

Throughout this study, I use several terms to discuss the topic under review such as counselor education pedagogy, neurocounseling, neuroscience-informed pedagogy, and more. In this section, I will clarify meanings for these terms.

**Pedagogy.** The art and science of teaching. Includes conceptualizations of learning and development; ways of being in relationships with students; facilitation of classroom culture, dynamics, and learning environment; intentional practices and strategies of teaching; and methods for assessment and evaluation.

**Counseling pedagogy/counselor education pedagogy.** Counselor educators teaching practices and conceptualizations for the purposes of training masters and doctoral level counseling students.

**Neuroscience content.** Specific neuroscience knowledge or content information.

**Neuroscience research/principles/concepts.** Scientific findings from research on the nervous system, specifically for this study, focusing on human beings.

**Neurocounseling.** “The integration of neuroscience into the practice of counseling, by teaching and illustrating the physiological underpinnings of many of our mental health concerns” (Russell-Chapin, 2016, p. 93). While neurocounseling represents specific interventions or techniques counselors can use in their work with clients, it also represents how counselors conceptualize client struggles and growth, their
role and the therapeutic relationship, and how they decide on ways of intervening from a neuroscience informed perspective

**Educational neuroscience** (also referred to as **neuroeducation**). “An interdisciplinary research field that seeks to translate research findings on neural mechanisms of learning to educational practice and policy” (Thomas et al., 2018, p. 1).

**Brain-based teaching.** “The active engagement or purposeful strategies based on principles derived from neuroscience” (Jensen, 2008, p. 4).

**Neuroscience-informed pedagogy.** Intentional pedagogical practices that are based on neuroscience principles and an understanding of how the brain learns best, specifically “how people perceive, process, and remember information” (Hardiman, 2012, p. xxi). Neuroscience-informed pedagogy involves educators use of neuroscience principles to design the learning environment, communicate with learners, their teaching and instructional methods, and the evaluation of learners.

**Neuromyths.** Inaccurate neuroscience beliefs that are misinterpreted or oversimplified from neuroscience research and falsely used in enhance teaching practices. A list of common neuromyths can be found in chapter II.

**Conclusion**

Neuroscience research has grown significantly in the past several decades. Results of this growth include neuroscience findings and understandings of the human nervous system being used to support various fields, such as counseling and education, and enhancing their respective practices. Counselor education, a field that combines knowledge of therapeutic relationships (i.e. counseling) and education to train future counselors, shows evidence of benefitting from neuroscience yet no study to date has
explored this topic. This study seeks to explore the experiences of counselor educators who integrate neuroscience into their counseling pedagogy to support their teaching practices. Understanding the essence of this phenomenon can support the goal of counselor educators to enhance the fields of counseling and counselor education and support the development of counseling students. In the next chapter I will cover the existing literature essential to understanding the concept of neuroscience-informed counseling pedagogy and the findings of this study.
CHAPTER II
REVIEW OF THE LITERATURE

Introduction

In this chapter, I will provide a more in-depth examination of the existing relevant literature that inform this study. The purpose of this chapter is to present the reader with conceptual and empirical literature to support an understanding of the exploration of neuroscience-informed counseling pedagogy. An overview of the development of the counseling profession is key to understanding the role of growth and advocacy for the continuous enhancement of the profession. Therefore, literature on the profession of counseling and counselor education will be reviewed in order to lay the foundation for understanding. Further, the integration of neuroscience into the counseling profession will be discussed. Specifically, neuroscience research and how findings have been incorporated into counseling practices will be reviewed, beginning first with a foundational overview of the brain and functions of select areas. Additionally, key components of educational neuroscience, the translation of neuroscience research into teaching and learning, will be summarized. By reviewing professional counseling, counselor education, neuroscience, and neuroscience-informed counseling and teaching, I hope to establish how the current research and literature that inform this study.
Professional Counseling

Brief Overview of Professional Counseling

In order to fully grasp the importance of integrating neuroscience-informed pedagogy into counselor education it is important to begin with a brief history on the development and growth of the counseling profession. Professional counseling is a field in mental health work that is constantly adapting and progressing with new understandings of the human experience. Evolving from the contributions of other mental health fields (i.e. psychiatry and clinical psychology), the effects of the Industrial Revolution, the vocational guidance movement, and mental health advocacy movements, counseling matured from informal advising to the professional mental health and wellness field it is now (Aubrey, 1977; Kaplan, Tarvydas, & Gladding, 2014; Newsome & Gladding, 2014). Several historical events, including the first public-school guidance system by Jesse B. Davis in 1907 and Frank Parsons’ founding of the Vocation Bureau in Civic Service House in 1908, generated a vocational guidance movement in the United States. From the vocational guidance movement came the need for teachers of counselors, leading to the first university-level vocational guidance course offered by Harvard University in 1911. The professional field of counseling began to further take shape with the formation of the first national counseling association, the National Vocational Guidance Association (NVGA), in 1913 and the first counseling journal, the *Vocational Guidance Bulletin*, in 1915.

The vocational guidance movement continued to surge throughout the following years, as the nation continued to navigate the effects of emotional, traumatic, and life-changing events such as the great depression, World Wars I and II, and sociocultural
injustices. The counselors of this time responded to the needs of society by establishing the certification of counselors in Boston and New York as well as providing psychological testing and “directive or counselor-centered” counseling to support career decisions (Aubrey, 1977, p. 291). The 1940s saw a shift away from directive vocational counseling due to the work of Carl Rogers and his more mental health focused client-centered approach. As stated by Aubrey (1977), “[w]ith Rogers, a sudden change occurred and there was a new emphasis on the techniques and methods of counseling, research, and refinement of counseling technique, selection, and training of future counselors, and the goals and objectives of counseling” (p. 292). The growth and development of vocational and counseling occupations in the 1900s through the 1950s lead to one of the most significant milestones for the counseling profession.

In 1952, the NVGA, along with educators in the National Association for Guidance Supervisors (NAGS), the Student Personnel Association for Teaching Education (SPATE), and the American College Personnel Association established the American Personnel and Guidance Association (APGA) with the goal of bringing together and unifying professional groups interested in counseling related issues (Aubrey, 1977; Newsome & Gladding, 2014; “Our History”, n.d.). APGA was created in an effort to organize counselors from a variety of settings and enhance their professional voice among the various mental health professions, United States legislators, and greater society. Specifically, the creation of APGA differentiated counseling from other helping professions, recognizing counseling as a distinct profession with its own identity, values, and goals (Erford, 2010). Since 1952, the counseling profession has grown and APGA has undergone several transformations including name changes; the addition of branches, regions, and divisions; continuously updated ethical codes; standards of practice and
professional competencies (e.g. multiculturalism; LGBTQ+ counseling practices, research care, and assessment care; spirituality and religion in counseling); changes in licensure and certification; consensus of a definition of counseling and scope of practice; and more. After a final name change to the American Counseling Association (ACA) in 1992, ACA identifies as “an educational, scientific, and professional organization” (American Counseling Association, 2014, p.3) working to promote the advancement of counselors, the counseling profession, and optimal mental health and wellness for the public.

Professional counseling continued to expand and develop throughout the 1960s-2000s, involving an increased focus on developmental perspectives, diversity and multiculturalism, evidence-based counseling, trauma, and professionalism (Newsome & Gladding, 2014). These foci lead to a recognition of the need to advocate and strengthen the counseling professional identity (Kaplan & Gladding, 2011). Kaplan and Gladding (2011) reviewed a number of counseling advocacy efforts including the Association for Counselor Education and Supervision (ACES) conference presentation and publication of Counseling Futures, a summary of survey results from the 1980s to 1990s on probable future trends in counseling (Walz, Gazda, & Shertzer, 1991); the Counselor Advocacy Leadership Conferences of Chi Sigma Iota (CSI), identifying six important themes for advancing the counseling profession as well as obstacles and resources needed (Chi Sigma Iota, n.d.); and the ACA 20/20 Initiative: A Vision for the Future of Counseling (abbreviated 20/20), a task force created to strengthen and unify the counseling profession (Kaplan & Gladding, 2011). 20/20 is comprised of delegates from major counseling organizations including: ACA, American Association of State Counseling Boards (AASCB), American Mental Health Counselors Association (AMHCA),
American Rehabilitation Counseling Association (ARCA), American School Counseling Association (ASCA), ACES, CSI, Commission on Rehabilitation Counselor Certification (CRCC), Council for Accreditation of Counseling and Related Educational Programs (CACREP), Council on Rehabilitation Education (CORE), International Association of Marriage and Family Counselors (IAMFC), National Board for Certified Counselors (NBCC), and more. These delegates collaborated to identify seven critical issues in need of focus: strengthening counseling identity, presenting professional counselors and counseling as one profession, improving public perception/recognition and advocating for professional issues, creating licensure portability, expanding and promoting the research base for professional counseling, focusing on students and prospective students, and promoting client welfare and advocacy (Kaplan & Gladding, 2011, p. 369). These seven issues were summarized and explained in the 20/20 Principles for Unifying and Strengthening the Profession.

The first undertaking from this development was the creation of a consensus-based definition of counseling for all professional counselors (Kaplan et al., 2014). Using a two-round Delphi study with expert delegates to facilitate group consensus, a definition of professional counseling was developed after two years of work. From that work, counseling was defined as “a professional relationship that empowers diverse individuals, families, and groups to accomplish mental health, wellness, education, and career goals.” (Kaplan et al., 2014, p. 366). As noted by Field et al. (2017), this consensus definition highlights important aspects of professional counseling. To begin with, the definition emphasizes a key component to the effectiveness of therapy, which is that at its foundation, counseling is a relationship not just a service job. This relational emphasis stresses what decades of counseling research and literature support, which is that the best
predictor of growth and change for a client is the therapeutic relationship between counselor and client (Lambert, 1992; Norcross & Wampold, 2011; Wampold, 2001). Importantly for this study, neuroscientists recognize the importance of relationships for the human brain (Banks & Hirschman, 2015; Eisenberger, Lieberman, & Williams, 2003; Shore, 1994; Siegel, 2012), a concept that will be further discussed in the neuroscience and counseling section below.

Further, counseling is a relationship that focuses on empowering people with diverse identities through diverse counseling modalities. Specifically, counseling values diversity demonstrated in the different modalities of which clients can receive counseling services, such as individual, family, and group counseling, as well as through the rich diversity encompassed in each client, counselor, and counseling supervisor’s intersectional identities (Ratts, Singh, Nassar-McMillan, Butler, & McCullough, 2016). Lastly, the goals of counseling named at the end of the definition specifically include mental health and education, emphasizing a focus on wellness, development, and knowledge to alleviate presenting concerns. While no definition can perfectly encompass all of the unique and complex aspects of professional counseling, this definition represents the first time a majority of counseling associations have agreed on a definition to present to the public (Kaplan et al., 2014). Like the connection between relationships and neuroscience, the consistency between important counseling components and neuroscience will be further discussed in the neuroscience and counseling section below.

Looking back over the past decade, counseling has grown and thrived as a profession due to those in the field’s ability to develop and integrate newly discovered ideas and understandings. Further, the continuous push for professional identity and growth has kept professional counseling at the forefront of mental health and the
successful training of future counselors. Advancement and growth of professional counseling are such fundamental components of the counseling profession, ACA has incorporated them into its mission to, “enhance the quality of life in society by promoting the development of professional counselors, advancing the counseling profession, and using the profession and practice of counseling to promote respect for human dignity and diversity” (ACA, 2014, p. 2). It is therefore the ethical responsibility of counselor educators to work to promote and develop the field of counseling and to train quality counselors positioned to best serve the public. This ethical responsibility directly relates to how counselor educators ensure quality training of counseling and counselor education students. Recently, researchers in the field of counseling have recognized “a new era of brain-based health and wellness” (Beeson & Field, 2017, p. 71) relevant to the counseling profession. In order to continue growing with the evolving scientific discoveries, it is essential that counselors and counselor educators respond to this brain-based trend with an increased understanding of neuroscience implications for counseling. A discussion of neuroscience-informed counseling can be found below.

**Counselor Education**

As discussed above, the American Counseling Association (ACA) was established through the efforts of professional representatives of several counseling related associations, including the National Association for Guidance Supervisors (NAGS), later renamed the Association for Counselor Education and Supervision (ACES) in 1961 (Aubrey, 1977; Elmore, 1985). Through ACES, individuals who served as supervisors, trainers, and teachers of counselors came to be collectively referred to as Counselor Educators and in this role work to “advance counselor education and supervision in order to improve the provision of counseling services in all settings of
society” (ACES, 2016, p. 4). Since the original inception of the counselor educator title and role, counselor educators have held the privilege and responsibility of teaching, supervising, and training master’s level counseling students, also known as counselors-in-training (CITs), and doctoral level counselor education students. While there may be significant overlap between responsibilities and skills used in counseling and counselor education, counselor education is a separate career within which counselor educators must complete additional degrees (CACREP, 2016); learn and follow additional legal and ethical standards (ACA, 2014; Hutchens, Block, & Young, 2013); act as gatekeepers for the public and the counseling profession (Foster & McAdams, 2009; Schuermann, Avent Harris, & Lloyd-Hazlett, 2018); and receive specialized training in teaching, supervision, research, and leadership (ACA, 2014; ACES, 2011; CACREP, 2016). A more in-depth overview of counselor education is presented here, specifically focusing on select responsibilities of counselor educators and counselor education training standards through CACREP.

Counselor Educator Responsibilities

According to ACA’s 2014 Code of Ethics, counselor educators are professional counselors “engaged primarily in developing, implementing, and supervising the educational preparation of professional counselors” (p.20). As professional counselors and educators, they are held to the same ethical standards as counselors as well as additional standards and responsibilities. For example, ACA’s Code of Ethics outlines the core values of autonomy, nonmalice, beneficence, justice, fidelity, and veracity as well as general guidelines for ethical practice with clients, other professionals, students, and more. These values are embedded in the philosophical underpinnings of the
counseling profession, which include a grounding in a wellness and holistic perspective, developmental and contextual understandings of client concerns, empowerment, and preventative interventions (Eaves, Erford, & Fallon, 2010). The code of ethics also states the mission of ACA and its members (e.g. counselors and counselor educators) is to promote the field of counseling through the advancement of the profession. Section C focuses on professional responsibilities, such as working to “foster the development and improvement of counseling” (ACA, 2014, p.8), using treatment modalities with a scientific foundation, and recognizing

the need for continuing education to acquire and maintain a reasonable level of awareness of current scientific and professional information in their fields of activity. Counselors maintain their competence in the skills they use, are open to new procedures, and remain informed regarding best practices for working with diverse populations (p. 9).

As members of ACA and those responsible for training counselors, counselor educators must uphold the values and standards in their own practice of counseling and in the practice of training future counselors and counselor educators.

Counselor educators are also bound to responsibilities beyond that of a counselor. Section F of the ethical code outlines the responsibilities of counselor educators including the teaching and development of counseling students, supervision of student services to clients and client welfare, evaluation of student performance, gatekeeping and remediation, and serving as role models for professional behavior. Counselor educators are required to be competent and skilled teachers and part of this responsibility includes, “providing instruction based on current information and knowledge available in the profession” (ACA, 2014, p. 14). In order to provide quality training to counseling
students, counselor educators are required to learn and stay up to date on effective practices involved in teaching and education and ground practices in current theoretical and pedagogical knowledge.

Importantly, while counselor educators hold a number of roles and responsibilities, most report that a majority of their time is spent on teaching activities (Davis et al., 2006; Magnuson, 2002; Magnuson, Norem, & Lonneman-Doroff, 2009; Magnuson, Shaw, Tubin, & Norem, 2004), highlighting it as a significant focus of counselor education. In a 2006 study, Davis et al. found that counselor education professors, regardless of rank, spent significantly more time in teaching than in scholarship or service. Specifically, assistant professors reported the most amount of time teaching, at 55%, with associate professors spending 53% and full professors spending 49%. This contrasted significantly with time spent involved in scholarship, 26%-27%, and service, 18%-21%. With a higher percentage of time spent teaching, it seems practical to assume that counselor education programs would also focus significantly on teaching and pedagogy. Unfortunately, researchers have reported that counselor educators are dissatisfied with a lack of focus on preparing them for teaching (Buller, 2013; Hall & Hulse-Killacky, 2010; Hunt & Gilmore, 2011; Waalkes, Benshoff, Stickl, Swindle, & Umstead, 2018), with clear implications for the need for more teaching and pedagogical training.

In their study of counselor educators’ experiences of teaching preparation, Waalkes et al. (2018) found that while most participants took at least one teaching specific course with a practical teaching component in their doctoral program- a consistent finding to that of Barrio Minton et al.’s 2014 study- participants felt a lack of preparation for teaching. Eight of the nine participants reported wanting more focus on
pedagogy and teaching strategies and more than half wanted a “stronger emphasis on teaching,” “more theory-based teaching course work,” and more preparation for “the actual teaching responsibilities they face as counselor educators” (p.75). Importantly for this study, most participants felt as if the lack of teaching preparation stemmed from a lack of intentionality in their teaching and pedagogy training. Without intentional pedagogical practices in place with which to model and teach doctoral students, students were relied upon to seek out teaching experiences and develop skills on their own. Further, the findings from this study suggest a gap and related need for training and modeling of intentional pedagogical practice, which I argue is facilitated in a neuroscience-informed pedagogical approach. While the findings of this and related studies may seem distressing to the field of counselor education, one highlight mentioned in this study is an increase in teaching focus brought on by changes in CACREP standards, discussed in more detail below. Therefore, it appears that while counselor education teaching preparation needs improvement, it is currently on this trajectory.

**Council for Accreditation of Counseling and Related Educational Programs**

The Council for Accreditation of Counseling and Related Educational Programs, or CACREP, was established in 1981 from counseling educational standards put forth by ACES and ACA (“About CACREP”, n.d.). Recognized as an independent agency by the Council on Higher Education Accreditation, CACREP is an accrediting body for master’s and doctoral professional counseling programs that outlines educational standards for “excellence in professional preparation” (see “About CACREP”, n.d., Vision). CACREP’s core values include:
Advancing the counseling profession through quality and excellence in counselor education; ensuring a fair, consistent, and ethical decision-making process; serving as responsible leaders in protecting the public; promoting practices that reflect openness to growth, change, and collaboration; and creating and strengthening standards that reflect the needs of society, respect the diversity of instructional approaches and strategies, and encourage program improvement and best practices (“About CACREP”, n.d., Core Values).

Demonstrating training quality, CACREP program students and graduates tend to score better on the National Counselor Examination (NCE) (Adams, 2006), seek professional credentials (Milsom & Akos, 2007), have fewer ethics violations (Even & Robinson, 2013), and demonstrate a stronger counseling professional identity than non-CACREP students and graduates (Hurt-Avila & Castiollo, 2017). A 2013 study revealed that CACREP program licensed graduates tend to commit fewer ethics violations, with 81.7% of violations coming from non-CACREP program licensed graduates (Even & Robinson, 2013). Further, graduation from a CACREP-accredited program, or program modeled after CACREP standards, is a licensure requirement for several states (ACA, 2016) and often a preference for counselor education faculty positions. With 859 accredited counseling programs reported in 2017 (“CACREP Annual Report”, 2017), CACREP is an influential entity for quality counselor preparation.

Most recently revised in 2016, CACREP Standards outline: program learning environments; evaluation; specialty areas (i.e. additions, career, clinical mental health, rehabilitation, college counseling, couples and family counseling, school counseling, doctoral training); professional practice (i.e. practicum and internships); and the 8 core
areas of professional counseling (i.e. professional counseling orientation and ethics, social and cultural diversity, human growth and development, career development, counseling relationships, group counseling, assessment, and research and program evaluation). Several sections are further broken down to provide additional information on foundational aspects, contextual dimensions, and practice, an example of which can be seen in Appendix F. CACREP standards provide a guide for counselor training topics that counselor educators follow in order to properly train CITs for counseling work.

Important to this study, the CACREP update from the 2009 standards to the 2016 included significantly more references to neuroscience and biological processes in counseling (CACREP, 2009; 2016). Specifically, the 2009 standards included one standard and one glossary definition (see Appendix F) in comparison to the 2016 standards that include eight standards related specifically to neuroscience in professional counseling. For such an increase in neuroscience related counselor training standards, it is surprising to note that no neuroscience related additions were made to doctoral training standards, the future educators who train counselors using these standards. Specifically, I argue that several doctoral standards, particularly those under the teaching section, could appropriately be met by neuroscience-informed pedagogical training. For example, the standards “roles and responsibilities related to educating counselors” and “models of adult development and learning” (p. 35) could both be addressed with a discussion on neurobiological human development and neuroscience research related to neuroplasticity, learning, and memory. Further, the standard related to student assessment could be addressed with a review of neuroscience-informed evaluation of learning, such as portfolios, journals, and performance assessments (Hardiman, 2012). Similarly, Field et al. (2017) make a case that discussion of brain-based counseling practices speaks to
standard 6.B.5.i., “role of counselor educators advocating on behalf of the profession and professional identity” (CACREP, 2016, p. 41) as well as several others (see Field et al., 2017).

Counselor educators are ethically responsible for being informed of effective practices for teaching and training counselors to provide quality services to clients (ACA, 2014). These ethical requirements are reflected in the CACREP training standards for doctoral level counselor education students. Counselor education training programs are intended to prepare students to for work as “counselor educators, supervisors, researchers, and practitioners” (CACREP, 2016, p. 34) and core training areas are broken down into counseling, supervision, teaching, research and scholarship, and leadership and advocacy. Section 6.B.3. outlines the core teacher training standards for counselor educators. Listed in this area are:

- roles and responsibilities related to educating counselors;
- pedagogy and teaching methods relevant to counselor education;
- models of adult development and learning;
- instructional and curriculum design, delivery, and evaluation methods relevant to counselor education;
- effective approaches for online instruction;
- screening, remediation, and gatekeeping functions relevant to teaching;
- assessment of learning;
- ethical and culturally relevant strategies used in counselor preparation; and
- the role of mentoring in counselor education (CACREP, 2016, p. 35-36).

Further, Section 6.B.5 on leadership and advocacy standards outline a counselor educators’ role of advocate for the counseling profession and knowledge of leadership
relevant to counselor education. These standards highlight the importance of counselor educators’ role as educator, mentor, and advocate as well as use of counseling relevant pedagogy, instruction, evaluation and models of learning and leadership.

**Counseling Pedagogy**

Pedagogy is defined as the art and science of the practice of teaching and goes beyond the content areas of what is taught (i.e. eight CACREP core areas) to focus on the philosophies, knowledge, and methods of how to teach (Nelson & Neufeldt, 1998). For this study, pedagogy includes but is not limited to: conceptualizations of how students learn and develop; ways of being in relationship with students; facilitation of classroom culture, dynamics, and the learning environment; intentional practices and strategies of teaching; and methods for assessment and evaluation. As those responsible for the teaching of counseling and counselor education students, counselor educators use pedagogical practices that are informed by current scientific knowledge and theoretical understandings of the process of student learning and development (ACA, 2014; CACREP, 2016). In this section I will review three selected pedagogical theories essential for a discussion of counseling pedagogy: Andragogy, Experiential Learning, and Constructivism. While these three theories do not represent the totality of all pedagogical theories used in counselor education, they have important implications for counselor education as discussed in each section below.

**Andragogy**

Knowles (1984) stated the origin of the word pedagogy comes from the Greek word paid, meaning child, and agogus, meaning to lead. Therefore, he claimed, pedagogy refers to the teaching of children who possess different learning needs and experiences than that of an adult. Knowles proposed a new approach to teaching, called andragogy,
specifically speaking to the teaching of adults based on their unique learning needs. From this belief, pedagogy (the teaching of children) involves the assumptions that children are dependent on the teacher for learning, have little experience to build upon for learning, learn what they are told to learn, have subject-centered needs for the purpose of future learning, and are motivated by external demands (Merriam & Bierema, 2014). Adult learners, however, have different learning needs and the assumptions of andragogy include the belief that adults are independent self-directed learners, have experiences that serve as a resource for learning, learn based on the social roles, are oriented to learn in order to solve problems, and are internally motivated to learn. While the definition of pedagogy in this study does not pertain to the literal Greek translation and aforementioned assumptions of teaching children, andragogy as described by Knowles highlights important characteristics of teaching adult counseling students.

One component of andragogy especially important for counselor education is the philosophical shift in the view of educators from deliverers of subject-based knowledge to process focused facilitators of learning (Knowles, 1984). Adult learners tend to have perceptions of themselves as independent beings who are self-directed and capable. Teaching adult learners as children, as if they lack self-direction, knowledge, and experience, tends to build “tension, resistance, resentment, and often rebellion” from the learner (p. 53). Rather, adults prefer to be treated as partners in learning that are heard, respected, and engaged in collaboration. This value of partnership in learning lends itself to educators being more facilitative in their teaching and working to foster a psychological climate of mutual respect and trust, collaboration, supportiveness, openness and authenticity, pleasure in learning, and humanness. The parallels between these facilitative psychological factors for teaching adults and the counseling value of
autonomy (ACA, 2014) as well as client-centered counseling conditions (i.e. self-
actualization, unconditional positive regard, empathic understanding, and genuineness)
discussed by Carl Rogers (1957) may seem obvious to some. In fact, Knowles names
Rogers, arguably one of the most influential leaders in the field of counseling, as
influencing the andragogical approach by providing essential guidelines for facilitating
learning in adults.

Andragogy represents a natural fit for teaching in counselor education (Young &
Hundley, 2013). Use of andragogy to teach counseling classes, such as psychopathology
(Carpenter-Aeby & Aebe, 2013), group therapy (Pollio & Macgowan, 2010), and
theories (Luke, 2017) have been discussed as being helpful in facilitating student
learning. Andragogy presents philosophical shifts important for respect-based teaching of
all people, not just adults, a philosophy consistent with the values of the counseling
profession (ACA, 2014). Process-based facilitation of learning involves treating learners
with unconditional positive regard and trust that learners will naturally self-direct to their
own meaningful learning (Rogers, 1951). Additionally, learners are not passive recipients
of knowledge but bring current and past experiences that provide rich resources for their
own and other’s learning (Knowles, 1984). Though Knowles’ definition of pedagogy
corresponds solely to teaching children, this study defines pedagogy as the art and
science of teaching all learners. Therefore, andragogy provides useful contributions to the
pedagogical practice of teaching in counselor education.

Experiential Learning
Experiential learning theory pulls from the works of scholars such as Dewey, Lewin, and Kolb on the interconnection of learning and experience (Kolb & Kolb, 2005; Merriam & Bierema, 2014). Succinctly stated by Merriam and Bierema, from an experiential learning perspective, learning is “engaging in, reflecting upon, and making meaning of our experiences” (p.104). Thus, learning involves the process of having experiences in the world, engaging in reflection to make meaning of those experiences, integrating these reflections into new learning and understanding, and using that learning for new behaviors and engagement in future experiences. Importantly, students pull from past learning experiences to inform how they understand and navigate new experiences; however, any new experience often stimulates the need for new learning. Thus, a nonstop cycle of learning from experiences and experience stimulated learning is generated.

Dewey (1963) conceptualized learning as a constant process of using learning from past experiences to inform new experiences for continuous lifelong learning. Further, he saw learning as not just outcomes or the product created, but as the very process itself. In his 1897 pedagogic creed he stated,

The progress is not in the succession of studies but in the development of new attitudes towards, and new interests in, experience… education must be conceived as a continuing reconstruction of experience; that the process and the goal of education are one and the same thing. I believe that to set up any end outside of education, as furnishing its goal and standard, is to deprive the educational process of much of its meaning and tends to make us rely upon false and external stimuli (p.77-80).

Therefore, learning is not centered on producing a letter grade that demonstrates knowledge. In fact, Dewey stated, not all experiences are reflected upon or result in
growth and some experiences may produce harmful effects, what he labeled as “miseducative” (Dewey, 1963, p. 25), or inhibitions from learning. An emphasis on learning for the sake of simply demonstrating knowledge to others creates an external rather than internal motivation that may diminish the natural meaningfulness of learning. This experience may then reinforce the belief that education-based learning is not meaningful and reduce future education-based learning. The role of an educator, therefore, is to facilitate the stimulation of a learner’s natural instinct to pause, reflect, and learn by providing meaningful experiences in the classroom (McAuliffe, 2011).

Kolb (1984) integrated the ideas of Lewin, Dewey, and Piaget and outlined a four-stage model of the experiential learning process: concrete experience, reflective observation, abstract conceptualization, and active experimentation. Further, he discussed several important characteristics essential for understanding experiential learning. Supporting the ideas of Dewey, discussed above, as well as Freire (1970), Kolb posited that learning is meant to be viewed as a process, not as behavioral outcomes. Further, Kolb stated that not only is learning grounded in experience, but it is an active and interactional process of adaptation to the world for the creation of knowledge. Importantly for this study, experiential learning theory has also been discussed as consistent with neuroscience and brain functions (Zull, 2002), as is discussed in Chapter III.

Just as with andragogy, experiential learning has natural applications to counselor education. A large portion of counselor education involves teaching counseling students complex skills (i.e. conceptualization, counseling techniques, multicultural awareness, etc.) they must think about and engage in (McAuliffe, 2011; Young & Hundley, 2013). Importantly, these experiences must be reflected upon and this reflection used for
evaluation, growth, and counselor development. As such, experience-based activities such as out of class experiences, role plays, case studies, and creative exercises are often encouraged in counselor training (Arthur & Achenbach, 2002; Clarke, Binkley, & Andrews, 2017; Giordano, Stare, & Clarke, 2015; Lawrence & Coaston, 2017; McAuliffe, 2011; Nittoli & Guiffrida, 2018). Lastly, reflection, a key component of the experiential learning cycle and counselor development (Skovholt & Ronnestad, 1992), is used in the classroom or in supervision to process these experiences and make meaning of them for future use.

**Constructivism**

Also valuing the experiences of learners, constructivism is a pedagogical approach based on the assumption that learners do not find or receive knowledge from an authority (i.e. teacher), but rather construct knowledge through their own experiences (McAuliffe, 2011; Merriam & Bierema, 2014; Nelson & Neufeldt, 1998). Assumptions of constructivist theory posit that there is not one absolute truth, but rather multiple true experiences, each of which are socially constructed (Merriam & Tisdell, 2016). Humans (e.g. students and teachers) do not discover knowledge, but actively seek understanding of the world they live in and construct knowledge through the meaning interpreted in their experiences. From this approach, learning is seen as a process of meaning-making through deep reflections and dialogues with others about experiences. While knowledge does not exist as an absolute, but is subjective, McAuliffe (2011) states, “lest we descend into total relativism, not all positions are equally helpful or defensible, as determined by a community’s standards” (p. 4). This approach allows learners and educators to engage in vulnerable discussions about the where previous knowledge was constructed and co-construct new knowledge.
A constructivist pedagogical approach offers several important tenants for counselor education. Constructivism centers the experience of meaning-making in the learning process (Merriam & Bierema, 2014) and in doing so learning is acknowledged as a meaning based and emotional experience as well as a cognitive one (Nelson & Neufeldt, 1998). Further, a constructivist approach stimulates self-reflection in students and educators, as knowledge does not come from one source but rather is constructed through the reflective conversations of all in the learning environment. Beliefs are acknowledged to be “the products of the meanings that we make in our social contexts” (Nelson & Neufeldt, 1998, p. 79). Thus, a critical component to a constructivist approach is in deconstructing, or thoroughly examining and questioning, experiences and beliefs about what learners know to fully analyze and reflect on the roots of the belief. This reflective experience often results in new knowledge students are able to use in future experiences. Further, constructivism supports an understanding of the complexity of the human experience by acknowledging that there are often multiple choices and perspectives that are valid (McAuliffe, 2011).

**Foundational Neuroscience**

The human brain is an intensely sophisticated organ that allows people to engage in complex tasks such as consciousness, attention, meaning-making, memory, and learning. While an in-depth investigation of the human brain is beyond the scope of this literature review, a brief outline of brain structures and their functions is helpful in understanding information relevant to this study. For more detailed information readers are recommended to consult introductory professional neuroscience textbooks (e.g. Bear et al., 2007; Purves et al., 2019), student study manuals (e.g. Gowin & Kothmann, 2016), or other neuroscience books (e.g. Dowling, 2018). Below, I provide an overview of
selected brain structures and their related functions as well as the electrochemical process between neurons that allows nervous system communication to occur (as it relates to teaching and learning). I will include in this overview information on the external anatomy of the brain (i.e. hemispheres, lobes, cerebellum), internal structures (i.e. amygdala, hippocampus, thalamus, hypothalamus), and neuronal communication processes (i.e. neurons, synaptic transmission, neurotransmitters).

External Neuroanatomy

The central nervous system, comprised of the brain and spinal cord, can be separated into several parts (Purves et al., 2019), however here I will focus on a select few external surface areas of the brain important for a foundational understanding of neuroscience, starting with the cerebrum. The cerebrum is the structure most often thought of when people envision the brain. It is the most visible and largest part of the brain and consists of the exterior grey matter, referred to as the cerebral cortex [Latin for bark], and the inner white matter (“Cerebral Cortex,” 2009; Sousa, 2017). Noticeably, the cerebral cortex is covered with individualized ridges and grooves called gyri (sing. gyrus), sulci (sing. sulcus), and deeper fissures that separate the brain into different sections (Bear et al., 2007). These gyri and sulci folds allow for more surface area on the brain which increases the number of neurons, brain communication, and, thus, complex abilities. One deep fissure, the longitudinal fissure, separates the cerebrum in half creating the left and the right hemispheres which are connected through a large bundle of fibers called the corpus callosum. These fibers allow the left and right hemispheres to communicate, integrate information, and work together.

A popular neuromyth is the belief that people can be left hemisphere dominant (“left brained”) or right hemisphere dominant (“right brained”), however this belief is not
supported by neuroscience research findings (Davis & Cabeza, 2015; Dekker et al., 2012). Though hemispheric dominance in people is inaccurate, brain scans and several studies have demonstrated that hemispheric specialization of certain functions do exist (Bear et al., 2007; Purves et al., 2019; Sousa, 2017). In the 1960s, split-brain studies, such as those conducted by Roger Sperry and colleagues in which the corpus callosum between the two hemispheres had been cut, brought about the idea of hemispheric specialization, or cerebral lateralization, in functions such as language and spatial abilities (Gazzaniga, 2000; Sperry, 1966). Since then, a number of studies have continued to provide evidence for some hemispheric specialization in brain organization and efficiency (Francks, 2015; Lust, Geuze, Groothuis, & Bouma, 2011; Wang, Buckner, & Liu, 2014). Typically, the left hemisphere of the brain plays a larger role in the processing and production of speech and language, literal and detailed interpretations, as well as “positive” emotions (Grimm et al., 2008; Hecht, 2010; Purves et al., 2019; Sousa, 2017). On the other side, the right hemisphere is more focused on nonverbal interpretations, emotional processing and expression, visuospatial functions, visual images and patterns, and “negative” emotions. Interestingly, the left hemisphere is connected and responds to the right side of the body and the right hemisphere is connected and responds to the left (Purves et al., 2019). Essentially, the left and the right hemisphere play larger roles in different types of processing, seemingly at times acting as if they are two different brains. However, it is important to note these different modes of processing are not exclusionary to one hemisphere or the other and they are often integrated—rather than split— for optimal brain functioning.

Gyri and sulci also divide the brain into four lobes in each hemisphere: the frontal, parietal, occipital, and temporal lobes. Like the specializations in each
hemisphere, the various lobes are specialized for certain functions as well. As the name implies, the frontal lobe is located at the front of the cerebral cortex and extends to the middle of the brain, making it the largest lobe. The frontal lobe, which includes the prefrontal cortex, is considered responsible for a variety of functions such as complex executive functions (i.e. higher-level cognition, problem solving, reasoning, planning, decision making, abstract thought), personality, and language production (Chayer & Freedman, 2001; Purves et al., 2019). At the end of the frontal lobe lies the motor cortex which is responsible for planning and controlling voluntary movement.

Behind the frontal lobe, extending to the back of the brain, lies the parietal lobe which is responsible for somatosensory functions, such as touch, texture, temperature, pain, and spatial awareness and orientation of the body (Purves et al., 2019). Behind the parietal lobe at the very back of the brain lies the occipital lobe, which is responsible for controlling vision and visual recognition. Lastly, the temporal lobe lies along the sides of the brain behind the ears and is responsible for sound and hearing as well as equilibrium, body orientation, and plays a large role in memory formation.

Connecting the brain and the spinal cord, and thus relaying and regulating information to and from the brain and to and from the spinal cord, is the brainstem (Bear et al., 2007). The brainstem is one of the first parts of the brain to develop and it is responsible for regulating vital unconscious processes such as heart rate, breathing, respiration, body temperature, and alertness. It is the most primitive part of the human brain and the most essential for life. Behind the cerebrum and brain stem, at the very back of the brain, is the cerebellum- the motor movement center of the brain. The cerebellum, Latin for “little brain,” looks like a smaller cerebrum as it is also separated into two hemispheres, contains gyri and sulci folds and grooves, and is composed of grey and
white matter (Augustine, 2017). The cerebrum controls motor activity and is responsible for the feedback, coordination, and learning involved in new movements, such as learning to play basketball or the piano for the first time. In addition to complex motor control, research has shown the cerebrum may also play a role in cognition, affect, and reward-related learning (Bostan, Dum, & Strick, 2013; Strick, Dum, & Fiez, 2009).

**Internal Structures**

Below the grey matter of the cortex lies a series of several internal structures necessary for the brain’s complex functioning, often collectively referred to as the limbic system (Bear et al., 2007). These structures include the thalamus, the hypothalamus, the hippocampus, and the amygdala and they control functions we associate with emotion, learning, and memory. Nestled deep in the brain, the thalamus acts as the first stop and relay station for all external sensory information except smell (i.e. sight, taste, sound, touch). As with most internal structures, the thalamus is actually not one structure but a pair on each side of the brain. Each thalamus receives sensory information from the opposite side of the body and directs necessary information to areas on the same side of the brain for further processing and decision making. Similarly, sensory information leaving the brain must also pass through the thalamus in order to be directed to the right place. Between the thalamus and the brain stem lies the hypothalamus and pituitary gland. The hypothalamus plays a major role in processing internal sensory information and is responsible for monitoring and responding to human needs such as food and water intake, sleep-wake cycles, and body temperature. The pituitary gland lies under the hypothalamus and is responsible for releasing hormones into the blood system. A major function of the hypothalamus is maintaining homeostasis through communication with
the endocrine system and responding to threatening situations through the autonomic nervous system.

Another important structure in the response to perceived threat is the almond shaped amygdala. Often thought of as the fear or aggression center of the brain, it is more accurate to say the amygdala monitors and regulates threatening and survival-based signals such as safety, defense, eating, drinking, and procreation (LeDoux, 2012). Upon receiving information directly from the thalamus, the amygdala quickly assess for safety and survival needs and immediately cues a number of responses directed at keeping the person safe. Due to its closeness to the hippocampus - the structure responsible for memory formation and storage - the amygdala has the ability to encode relevant information about survival to memories, giving some memories an implicit (i.e. unconscious) emotional association for quick reaction and vigilance in the future. The hippocampus lies below the amygdala and, as stated above, plays a major role in encoding and storing explicit (i.e. conscious) short-term information into long-term memories. Incredibly, researchers have discovered the ability of the hippocampus to create new neurons into adulthood, a process known as neurogenesis, which has obvious implications for adult memory and learning (Deng, Aimone, & Gage, 2010; Spalding et al., 2013).

**Brain Communication**

The structures discussed above are able to communicate with each other thanks to the intricate communication process enabled by the cells of the nervous system. The nervous system is made of nerve cells, called neurons, and neuroglial cells, often referred to as glial cells (Purves et al., 2019). Though glial cells make up 90% of the cells in the brain and nervous system and greatly outnumber neurons, they are not directly involved
Scientists are still learning about the role glial cells play and while it was originally thought that glial cells existed only as the glue that held neurons together, neuroscientists now recognize glial cells role in “maintaining the ionic milieu of nerve cells; modulating the rate of nerve signal propagation; modulating synaptic action by controlling the uptake of neurotransmitters at or near the synaptic cleft; providing a scaffold for some aspects of neural development; and aiding (or in some instances impeding) recovery from neural injury” (p. 9). Neurons, on the other hand, are known to be an integral part of brain communication through their electrochemical transmission to and from other neurons and cells.

While there are several different types of neurons depending on their anatomy and functions, the typical neuron has an axon, a cell body or soma, varying numbers of dendrites, and a synapse (Bear et al., 2007). Though technically not a part of the neuron, the synapse is the area where a neuron and neighboring structure meet. The synaptic cleft, the microscopic space between the neuron and a neighboring structure, is where important communication occurs. For simplification, neighboring structures- which include other neurons, cells, muscles, and glands- will be referred to as the postsynaptic neuron or structure. Resembling the multiple branches of a tree, dendrites extend from the neuron to receive messages from other neurons and cells. The cell body- or soma- is the central part of the neuron and contains the nucleus, DNA, and genes as well as other important organelles that help the neuron to function. Most neurons have one axon that extends from the soma and ends at branching axon terminals. Inside these axon terminals are tiny bubbles called synaptic vesicles that hold important molecules, discussed below.
Neurons communicate with each other through a process of chemical and electrical signals and action potentials. When not stimulated, neurons remain at what is known as a resting potential—meaning no information is coming into or out of the neuron. However, once electrical or chemical signals reach a neuron, a process can begin that cues what is known as an action potential, stimulating the transmission of information through one neuron to another. While some neurons communicate with each other electrically, most do so chemically. For most neurons, this occurs when the dendrites of a neuron receive information, setting off a reaction that changes the internal positive-negative ion balance. If the positive-negative ion balance—or voltage—reaches a certain threshold, the electrical message is carried by a myelinated (i.e. insulated) axon to the axon terminal and synaptic cleft between the neuron and the postsynaptic neuron. Once the electrical impulse reaches the axon terminal, a process begins that signals the synaptic vesicles held inside to fuse to the presynaptic membrane and release chemical molecules, known as neurotransmitters or neuromodulators, into the synapse. These molecules cross the synapse to bind with channels or receptors on the postsynaptic neuron, providing excitatory, inhibitory, or modulating activity. The postsynaptic cell then converts the chemical message back into an electrical message and progresses through the next neuron.

**Neuroscience Implications for Counselor Education**

**Neuroscience and Counseling**

The relatively new trend of using neuroscience principles in counseling practice has been labeled neurocounseling (Montes, 2013). Russell-Chapin (2016) describes 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. 93). In addition to its psychoeducational use, neurocounseling is also used to understand client concerns; conceptualize effective interventions, treatment planning, and diagnosis; increase internal local of control and motivation; and understand the scientific rationale underlying therapy success, validating what counselors advocate is helpful (Field et al., 2017; Luke et al., 2019; Russell-Chapin, 2016). While an integration of neuroscience into counseling may seem overwhelming, reductionistic, or outside of counseling scope to some counselors (Luke, 2016), other counseling researchers support this integration by pointing to the ways in which neuroscience aligns with and corroborates counseling (Field et al., 2017; Luke et al., 2019). For example, Field et al. (2017) state:

neuroscience can help counselors understand how relationships are forged, leading to deeper and more meaningful working relationships with clients; recognize the persisting impact of systemic barriers such as oppression, marginalization, and trauma on clients’ ability to achieve their goals; and take a wellness and strengths-based perspective that serves to empower clients and increase optimal performance. In order words, neurocounseling is commensurate with the orientation and identity of the counseling profession (p. viii).

Therefore, rather than creating a reductionist approach of the human experience, neuroscience research supports and expands counselors’ views of holistic, developmental, and contextual client concerns (Douthit & Russotti, 2017; Jones, 2017), the power of the empathy and relationships (Ivey, Daniels, Zalaquett, & Ivey, 2017; Wampold, 2001); and the overall effectiveness of counseling.

One of the most significant neuroscience findings that counselors and counseling researchers highlight is experience-dependent plasticity also referred to as
neuroplasticity. Neuroplasticity is “[t]he ability of the brain to alter its structure and function in response to external or internal changes in the environment, including development, learning, memory, brain injury, and disease” (Field et al., 2017, p. 250). Findings from neuroplasticity highlight the adult brain’s ability to change beyond the critical periods of child development, thus, the brain is now understood to malleable or “plastic” rather than rigid and fixed (Hübener & Bonhoeffer, 2014; Purves et al., 2019). Further, neuroscience researchers have documented the brain’s ability to change or reorganize in several areas of the brain (i.e. thalamus, brainstem, hippocampus, prefrontal cortex, cerebellum, somatosensory cortex) based on life experiences. Importantly for counselors, effective counseling resulting in client changes can now be understood as due to the brain’s reorganizing response to the counseling experience. Further, researchers have been able to identify brain changes resulting from counseling experiences (Etkin, Pittenger, Polan, & Kandel, 2005).

One way in which brain reorganizing from counseling experience occurs is through the neuroplasticity concept is known as “Hebb’s law” (Luke et al., 2019). Named after D. O. Hebb, the neuroscientist to first hypothesize the law, Hebb (1949) postulated that repeated reciprocal activity between neurons will strengthen their connection causing them to be associated with one another, while low activity will weaken the connection. This concept has been captured in the easy to remember phrase, “neurons that fire together, wire together” (Siegel, 2012, p. 49). Not only is the concept of neuroplasticity helpful for counselor conceptualization and intervention, but sharing knowledge of neuroplasticity with clients may instill hope and motivation to engage in new behaviors (Miller, 2016).
Another important neuroscience concept for counselors is the understanding that the human brain is inherently social and is organized to be in, and by, relationships with other humans. Essentially, the human brain is predisposed to connect to other humans for survival purposes. As humans develop, relational experiences cause neural firing which facilitates initial brain development as well as changes and reorganization in the brain throughout life (Cozolino, 2016; Siegel, 2012). Ideally, these relational experiences are mostly positive and promote healthy development, effective learning, and an understanding of how to form healthy relationships throughout life. This neuroscience concept further substantiates what we know to be true in counseling: the therapeutic relationship is central to counseling effectiveness (Norcross & Wampold, 2011).

Pulling from evolutionary biology to explain why therapy and therapeutic relationships are effective, Cozolino (2016) posits that the human brain developed social abilities to connect to and understand other humans in order to survive in a dangerous world. In describing two outcomes of this social brain evolution he states,

The first is that we evolved into social animals who are highly attuned to one another’s inner experiences. This sympathetic attunement allows us to influence each other’s thoughts, feelings, and behaviors. The second is that our attachment circuitry remains plastic throughout life… we now know that we participate in the way each other’s brains are built, how they develop, and how they function. (p. 87).

Not only does the neuroscience concept of the social brain support current counseling practice, but some counseling researchers argue it can enhance counseling practice by highlighting the importance of relationships in alleviating client’s suffering (Jordan, 2018). For example, Relational-Cultural theorists pull from neuroscience findings related
to attachment (Hofer, 2006), mutual social influence (Shore, 1994), and effects of social disconnection in the brain (Eisenberger et al., 2003). Collectively, these findings support the theoretical understanding of the importance of relationships and connection for growth, development, and the alleviation of suffering throughout the lifespan (Jordan, 2018).

Neuroscience concepts and findings have important implications for counseling practice. In fact, the newest CACREP (2016) standards name several training standards related to neurobiology in human growth and development, addictions counseling, clinical mental health counseling, and clinical rehabilitation counseling. Lest counselors begin thinking of neuroscience as the answer to all client concerns and struggles, Luke et al. (2019) remind counselors of the limits of neuroscience in counseling and encourage “a healthy dose of skepticism” (p 68). Though much has been learned, there is still a considerable amount about the brain and the neuroscience of behaviors and experiences that scientists do not understand. These unknowns directly relate to neuroscience implications for counseling because, as Luke (2016) states, “[n]euroscience is not a cure-all. It does explain many mysteries about human thoughts, feelings, and behaviors… but thus far, it often brings up more questions than answers. It is not, alas, a miracle cure or magical solution” (p. 6). Further, neuroscience researchers may focus on observations from neuroimaging technology over a person’s subjective experience, a view inconsistent with the beliefs of the counseling profession (Hansen, Speciale, & Lemberger, 2014). Therefore, it is important for counselors to always approach neurocounseling with a holistic person-first mindset (Luke et al., 2019) rather than a reductionist brain-first mindset. Essentially, neuroscience is meant to enhance a counselor’s practice, not minimize or replace it.
Neuroscience and Education

In addition to counselors, educators are also using neuroscience findings to inform and enhance their respective practices (Dunlosky et al., 2013; Hardiman, 2012; Jensen, 2008; Thomas et al., 2018). Informing teaching and educational practices with neuroscience findings is referred to in this study as educational neuroscience and brain-based teaching. To distinguish between the two, educational neuroscience is described as, “an interdisciplinary research field that seeks to translate research findings on neural mechanisms of learning to educational practice and policy” (Thomas et al., 2018, p. 1), while brain-based teaching refers to the “active engagement or purposeful strategies based on principles derived from neuroscience” (Jensen, 2008, p. 4). Essentially, educators use educational neuroscience (e.g. neuroscience research on learning) to engage in brain-based teaching (e.g. pedagogical practices based on neuroscience research). This integration of neuroscience and education may appear obvious to some; for example, a 2011 Excellence in Science report by the Royal Society expressed, “[e]ducation is about enhancing learning, and neuroscience is about understanding the mental processes involved in learning” (p. v). Further, they stated, “[t]his common ground suggests a future in which educational practice can be transformed by science, just as medical practice was transformed by science about a century ago” (p. v). To assist students in learning, it is essential that educators be knowledgeable about neuroscience research related to learning and the implications for effective teaching practices.

Some neuroscience research findings important to teaching expand on those already discussed above related to counseling: neuroplasticity and relationships. Neuroplasticity findings highlight the brain’s ability to reorganize based on experience throughout life (Purves et al., 2019) and are directly related to the process of learning.
Studies of neuroplasticity, such as Laszar et al.’s 2005 study on meditative focused attention, demonstrate the brain’s ability to change simply based on where we focus our attention. Using magnetic resonance imaging (MRI) Laszar et al. (2005) found that people who engage in meditative focus had thicker right anterior insula, prefrontal cortex, and sensory perception areas than the control group. These areas of the brain are associated with attention, emotion, and cognitive regulation, important components for complex learning. Further, studies on multitasking, the opposite of focused attention, demonstrate decreased learning and efficiency (Marois & Ivanoff, 2005). These findings suggest that attention, learning, and brain changes can occur through intentional pedagogical practices that facilitate focused attention rather than task switching.

The importance of relationships for learning lie in the effects of emotions and the relational climate on the learning process. Hardiman (2012) names the emotional climate as brain-target one for the brain-targeted teaching model, due to the interconnection between emotion and learning. Several studies demonstrate the negative impact of stress on complex learning, specifically related to attention and memory (Joels, Pu, Wiegert, Oitzl, & Krugers, 2006; Medina, 2014; Schwabe & Wolf, 2010). Succinctly stated by Medina (2014), “[s]tressed brains do not learn the same way as non-stressed brains” (p.71). Here it is important to make the distinction between the complex learning desired in teaching contexts and stress-induced memories and learning from traumatic events. Unfortunately, some highly stressful events can stimulate the encoding of implicit emotional and safety-related memories, via the amygdala, based on information the brain sees as important for future survival (Cozolino, 2016). In these situations, while stress does not impair memory, an individual does not have control of what learning takes places and make memories are stored.
Importantly, however, some emotional arousal is important for learning and memory. Specifically, positive emotional arousal, rather than negative emotions or neutrality, has been found to increase learning, attention, and engagement (Fredrickson, 2004; Fredrickson & Branigan, 2005; Pirhonen & Rasi, 2017; Rowe, Fitness, & Wood, 2015). In Rowe et al.’s (2015) study on student and educator perceptions of emotions and learning, participants indicated that emotions such as joy/happiness, interest/excitement, love, pride, and relief facilitated learning. Educators were encouraged to use intentional strategies to maximize learning facilitating emotions. Specifically, researchers suggest emotionally stimulating strategies such as promoting interest and excitement through student ownership of learning, connecting learning to real life, facilitating supportive relationships, increasing connection and engagement, establishing predictability in the learning environment, and use of encouraging feedback (Bertucci, 2006; Hardiman, 2012; Rowe et al., 2015)

Several other neuroscience findings relate to teaching and learning, however, a particular challenge for educational neuroscience is in translating and consolidating relevant research into practical applications (Thomas et al., 2018). One model that seeks to accomplish this task is the above-mentioned Brain-Targeted Teaching model by Dr. Mariale Hardiman of Johns Hopkins University (Bertucci, 2006; Hardiman, 2012). Created to assist educators in applying neuroscience research to their teaching practices, the Brain-Targeted Teaching model has been demonstrated to produce several benefits including increased student engagement and outcomes and deeper learning (Bertucci, 2006). The Brain-Targeted Teaching model identifies six domains important for teaching: establishing the emotional climate for learning; creating the physical learning environment; designing the learning experience; teaching for mastery of content, skills,
and concepts; teaching for the extension and application of knowledge; and evaluating
learning (Hardiman, 2012). In each of these domains, Hardiman summarizes
neuroscience research on emotions and in learning, attention and novelty, memory,
creative teaching, and more, culminating in helpful and practical strategies educators can
use for their own teaching practices. Importantly for this study, while several suggestions
are geared toward working with children, Hardiman acknowledges the use of the model
at any education level, specifically including higher education.

Conclusion

In this chapter, I sought to provide a foundational review of important literature
related to neuroscience-informed counseling pedagogy. The importance of understanding
counselor educators’ experiences with this phenomenon is first and foremost rooted in the
understanding of counselor educators’ responsibility to continuously enhance and
advocate for the counseling and counselor education professions. Thus, an overview of
the growth and development of the counseling profession, as well as the roles and
responsibilities of counselor educators for this growth, was discussed. In this review, a
further case for the importance of neuroscience in counselor education was highlighted.
Additionally, three common pedagogies used in counselor education were reviewed.
Further, neuroscience research implications for both counseling and education was
discussed, including specific implications and strategies suggested by researchers. While
the information presented in this chapter is meant to be helpful for understanding the
importance of neuroscience in counselor education and training, the goal of this study is
to understand counselor educators’ experiences with this phenomenon. The
methodological foundation and specific research steps I undertook to accomplish my goal
are discussed in the following chapter.
CHAPTER III
METHODOLOGY

Introduction

The purpose of this phenomenological study was to understand counselor educators’ experiences integrating neuroscience research and concepts to inform overall counseling pedagogy. In this chapter, I provide a description and rationale of the research paradigm, epistemology and theoretical perspective, and methodology underlying this study. I also describe the procedures used for identifying and recruiting participants, data collection methods, and data analysis. To achieve the purpose of this study, a phenomenological qualitative research approach was used to explore the experiences of counselor educators who integrate neuroscience into their counselor education pedagogy. This approach is grounded in a social constructionist epistemology as well as experiential learning and relational-cultural theoretical perspective of how counselor educators construct knowledge and meaning of their experiences through relationships. To capture rich, descriptive information of participant experiences with neuroscience-informed counseling pedagogy, counselor educators who identify as integrating neuroscience into their pedagogy were interviewed and the resulting data analyzed through phenomenological analysis.

Qualitative Research

Research involves systematic information gathering on a specific topic for various purposes. Purposes may include contributing to the knowledge base, such as in pure or basic research, or improving the quality of practice through knowledge, such as in
applied research (Merriam & Tisdell, 2016). Toward such purposes, social science research paradigms are often broken down into quantitative, mixed-methods, or qualitative research (Heppner, Wampold, Owen, Thompson, & Wang, 2016). Each paradigm represents a framework used to guide researchers in conducting their study as they examine research questions.

According to Heppner et al. (2016), quantitative research, stemming from positivism and post-positivism philosophical underpinnings, seeks to quantify relationships between constructs through testing hypotheses via the scientific method. From a belief in a singular reality that can be closely approximated through probabilities, quantitative researchers collect data from sample participants using standardized methods, analyze these data numerically through statistical tests, and draw inferences to the population. Mixed-methods research pulls from elements of both qualitative and quantitative research into a single study to provide multiple ways of contributing to knowledge and understanding. Often, quantitative research is seen as the superior form of research and believed by some researchers to be more rigorous due to its use of systematic scientific methods, randomization, and controlled environments. While quantitative research may be believed to be at the top of a research hierarchy, many researchers in counseling hold the belief that all paradigms have strengths and limitations and certain paradigms are more useful for researching particular phenomena and particular research questions.

A qualitative research paradigm is used to explore, discover, and understand the complex ways that specific individuals make sense and meaning of their experiences in a real-world setting (Creswell, 2013; Merriam & Tisdell, 2016). Distinct from quantitative research, which focuses on a positivist or post-positivist assumption that researchers can
uncover approximations to an absolute truth, qualitative research is influenced by an interpretivist-constructivist philosophical belief that objective reality does not exist but rather that there are multiple realities that are context bound and constructed internally (Crotty, 1998; Wang, 2016). In this way, participant experiences are used to explore and expand our understanding, rather than quantify and measure. The aim of qualitative researchers is to provide rich descriptions of individuals’ experiences with phenomena to gain a deeper understanding of the complexities and meaning involved. As such, qualitative research is the preferred research design for exploring complex human experiences that existing research has not yet explored, for the purposes of understanding the meaning individuals construct (Merriam & Tisdell, 2016). A qualitative paradigm was determined to be the best fit for the current study, exploring counselor educators’ experiences with neuroscience informed pedagogy, as further explored below.

Qualitative research is often used to learn more about an experienced phenomenon that current empirical research, whether quantitative, qualitative, or mixed methods, has not yet explored (Merriam & Tisdell, 2016; Wang, 2016). Using an inductive process, qualitative researchers collect data on a meaningful experience to build up to knowledge, rather than using a deductive process to experimentally test a hypothesis. Also, due to the complexity of the human experience, an inductive use of qualitative data rather than a deductive approach with quantified data is useful in providing an in-depth exploration of participant experiences in order to generate increased understanding of the experience. The in-depth inductive process of qualitative research to build knowledge and understanding was decided to be the most appropriate approach to this research. As discussed in Chapter I, counselor educator experiences with neuroscience-informed pedagogy has not been explored in research and is not yet clearly
understood. Neuroscience principles have been used to inform the fields of counseling and education (see Chapter II), and anecdotal experience indicates that some counselor educators use neuroscience to inform their pedagogical practices. Therefore, an inductive qualitative approach is most useful in exploring and gaining an understanding of counselor educators’ experiences with neuroscience-informed pedagogy to enhance the field of counselor education. Further, the inductive qualitative process allows for rich exploration of meaningful experiences of neuroscience-informed pedagogy, as described below.

An understanding of a counselor educators’ teaching experiences is steeped in the meaning that educator constructs around their experience. Choosing to intentionally inform a teaching philosophy and practice from specific principles adds additional meaning, as counselor educators go through a thoughtful process in determining what they believe is best for teaching and learning (West, Bubenzer, Cox, & McGlothlin, 2013). The interpretive-constructionist philosophy underlying most qualitative research focuses on understanding how individuals interpret, construct, and attribute meaning to their world and experiences in it (Merriam & Tisdell, 2016; Wang, 2016). In explaining this key characteristic of qualitative research, Merriam and Tisdell (2016) write, the focus is to “achieve an understanding of how people make sense out of their lives, delineate the process (rather than the outcome or product) of meaning-making, and describe how people interpret what they experience” (emphasis in original, p. 15). Thus, in seeking to understanding the process by which counselor educators construct and interpret meaning with neuroscience-informed pedagogy I decided the interpretive-constructionist perspective offered from a qualitative approach would be the most useful.
Similarly, a qualitative approach captures the complexity and meaning of these experiences through participant’s open-ended descriptions of their lived experiences, images, observations, or artifacts rather than numerical data (Merriam & Tisdell, 2016). From a qualitative analysis of this data, comprehensive themes, theories, or descriptions are generated that help researchers and research readers better understand the experience. Additionally, it is common for participant words in the form of quotes to be included in the final research report, in order to give voice to the participants, as well as support the findings of the study. Open-ended interviews regarding counselor educators’ lived experiences with neuroscience-informed pedagogy and artifacts were thoughtfully selected as the most useful methods with which to gather important information of the phenomena under study and answer the research question (i.e. what are the lived experiences of counselor educators who integrate neuroscience principles into their counseling pedagogy?). Further, in order to support the main purpose of this study, to enhance the field of counselor education, participant quotes that give voice to counselor educators’ experiences were used. The chosen methods (i.e. interviews, artifacts, participant quotes) are most consistent with a qualitative approach to research, providing further support for a qualitative approach to the current study.

This study was conducted from a qualitative research approach for several reasons. The rich meaningful experiences of counselor educators with neuroscience-informed counseling pedagogy has not yet been explored in empirical research and is not clearly understood. Further, qualitative research methods were intentionally chosen as the most useful way to answer the research questions discussed in Chapter I and support the purpose of the study. Lastly, qualitative research is informed by and embedded in the
constructionist epistemology intentionally chosen for this study, which is discussed below.

**Epistemology & Theoretical Perspective**

Social science research is composed of the methods used to conduct a study (e.g. collect and analyze data), the methodological design, the theoretical perspective informing the methodology, and the epistemological theory of knowledge embedded in the theoretical perspective (Crotty, 1998; Wang, 2016). The theoretical perspective is the underlying philosophical stance and assumptions that inform the methodology, essentially, “how we know what we know” (Crotty, 1998, p. 8). These philosophical assumptions provide guidance for how researchers engage in conducting a study by informing how they see and make sense of the data. Epistemology refers to the theoretical belief of knowledge embedded in the theoretical perspective that supports an understanding of what knowledge is and how it can be known (Wang, 2016). The epistemology and theoretical perspectives used to inform this study are discussed below.

**Epistemology**

Common epistemologies used in social science research include objectivism, constructionism, and subjectivism (Crotty, 1998). Crotty (1998) defines constructionism as “the view that all knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context” (p.42). A constructionist epistemology holds that there is no objective truth to be discovered, but rather, reality is meaningfully constructed through consciousness and relationships as people engage with their world (Merriam & Tisdell, 2016). “[O]bjects in the world…” Crotty states, “may be pregnant with potential meaning, but actual meaning
emerges only when consciousness engages with them” (p.43). Meaning is not completely objective, such as in an objectivist epistemology, or completely subjective, as in a subjectivist epistemology, but constructed by humans as they engage in the world, with the world, and with the objects that exist in the world (Moustakas, 1994). For this study, it is essential to understand that there is no one absolute way of integrating neuroscience into counseling pedagogy. Rather, each participant experience is valued and used to construct the essence of these experiences from several participants.

Further, Crotty distinguishes between constructionism that emphasizes social constructionism (e.g. “the collective generation [and transmission] of meaning” p. 58) and constructivism (e.g. “the meaning-making activity of the individual mind” p. 58). While a constructivist epistemology posits a unique individualistic meaning-making experience, social constructionism acknowledges the inherent social and cultural influences of both the social and natural world (Burr, 2003; Crotty, 1998). As Crotty writes, “It is clearly not the case that individuals encounter phenomena in the world and make sense of them one by one. Instead, we are all born into a world of meaning” (p. 54). Social constructionism is consistent with my belief that participants’ experiences with neuroscience-informed pedagogy is not an individualized experience, but rather a relational and social experience. Specifically, the meaning and knowledge of the phenomenon comes from the relationship educators experience with their students, the context, and the class as a whole. Similarly, the theoretical perspectives and assumptions used to guide this study, discussed in the next section, are more in line with a social constructionist perspective of social and cultural influence of meaning-making.

In this study, both teaching and research are understood to be meaning-rich experiences that can only be understood in the context of relationship. From a social
constructionist epistemology, a person’s reality is constructed from the meaning they interpret from their experiences. Further, meaning is always constructed in and through a relational context. Therefore, the pedagogy and process of teaching by a counselor educator cannot be meaningfully understood without the relationship of educator, student, context, class as a whole, and the collective experiences. Further, my process of researching this teaching experience and understanding the meaning constructed experience is not possible without the reflective conversations between myself as the researcher and my participants. As Crotty writes, “all meaningful reality, precisely as meaningful reality, is socially constructed” (p.55, emphasis in original). A social constructionist epistemology, therefore, supports the belief that teaching from a neuroscience-informed pedagogy is an inherently relational process and, further, that researching this experience is a relationship process as well.

**Theoretical Perspective**

**Relational-cultural theory.** For this study, I pull from philosophical perspectives offered by relational-cultural theory and experiential learning theory, discussed below. Relational-cultural theory (RCT) upholds the importance of relationships by centering the belief that humans grow through and toward relationships throughout the lifespan (Jordan, 2000). From an RCT perspective, the goal of human development is not progression towards separation and independence from others, but rather recognizing the inherent interdependence of people and engaging resiliently and competently in relationships. Increasing connection to others in not dependence, but rather a meaningful and motivating part of the human experience. As Jordan (2018) states, “we need connections to flourish, even to stay alive, and isolation is a major source of suffering for people, at both a personal and cultural level” (p. 3). Meaningful experiences can therefore
be understood as being rooted in our connection to others. This perspective emphasizes the importance of the educator-student relationship in counselor educators’ pedagogical practices. Pulling from an RCT perspective, student growth, and relatedly learning, is understood as rooted in relationships.

Further, RCT theorists note that not all relationships are equal, and some are more successful in helping people grow and develop than others (Miller & Stiver, 1997). These growth promoting relationships are appropriately named growth-fostering relationships and are characterized by an increase in zest and vitality; sense of self-worth; understanding about the self, the other, and relationships; creativity and productivity; and desire for more connections and relationships (Jordan, 2018; Miller & Stiver, 1997).

Growth-fostering relationships, such as those between counselor and client or educator and student, require authenticity and openness to mutual influence. It is through these relationships that both or all involved in the relationship are able to develop, learn, and grow.

As this study specifically seeks to explore the experiences of counselor educators informing pedagogy with neuroscience principles, it is important to note that RCT theorists have found RCT principles to be consistent with neuroscience findings (Jordan, 2018). RCT emphasizes that human beings are wired for connection and thrive in development when in mutual, healthy, growth-fostering relationships. This “wired to connect” belief about humans is consistent with neuroscience findings about the influences of relationships on brain development and functioning (Banks, 2011; Banks & Hirschman, 2015; Shore, 1994). Conversely, social pain, rejection, exclusion, and disconnection result in pain registered in the brain by the same areas that register physical injury (Eisenberger et al., 2003). Social and physical pain is therefore an equal experience
in the brain. Further, findings of neuroplasticity and the reshaping of brains through experiences such as relationships (Cozolino, 2016; Davidson & McEwen, 2012; Siegel, 2012) further support these beliefs. These findings integrated into the theoretical perspective of RCT stress the importance of the educator-student relationships and relational climate in a classroom and its implications for student learning.

**Experiential learning theory.** Experiential learning theory, discussed in Chapter II as a common pedagogical theory used in counselor education, is another theory used to inform this study. From an experiential learning theoretical perspective, learning is a lifelong process of learning from, and reflecting on, experiences (Kolb, 1984). Specifically, Kolb wrote, an experiential learning perspective integrates a holistic understanding of “experience, perception, cognition, and behavior” (p. 21) to better understand the learning cycle. Learning, and thus teaching, is most effective when concrete experience, observations and reflection, abstract conceptualizations and new understandings, and active testing are all involved. Experiential learning theory supports a phenomenological approach to understanding, exploring, and learning about neuroscience-informed pedagogy through participants’ experience of it. Further, though experience is implied in the theory name, experiential learning highly emphasizes the importance of reflection for understanding and learning. Specifically, experiential learning theorists note that without a reflective component, learning may not occur from an experience (Dewey, 1963; Kolb, 1984). Thus, experiences with neuroscience-informed pedagogy is best understood through reflective interviews with participants.

Like RCT, experiential learning theory is consistent with neuroscience principles. Specifically, biologist Zull (2002) uses neuroscience to connect each stage of Kolb’s cycle to a related brain structure and function. For example, the first stage in the
The experiential learning process involves fully engaging in a concrete experience through the sensory areas of the brain. Learners then reflect on this experience and integrate their reflections to create meaningful abstract conceptualizations using the temporal and frontal areas of the brain. Lastly, these conceptualizations must be used to go back into the world and engage in new experiences and problems, which involves the motor cortex and all areas of the brain where the memory is stored. Experiential learning theory provides a helpful understanding for the basis of this study as to how and why neuroscience and learning are connected and a helpful way to explore counselor educators’ experiences with it.

The epistemology of social constructionism and theoretical perspectives of RCT and experiential learning theory are foundational to understanding the design and methods of this study as well as the lens through which the resulting data is viewed. A social constructionist epistemology provides the understanding of knowledge as constructed from the meaning people experience as they engage with the world, not an objective truth that can be discovered. Further, this construction of understanding and knowledge is inherently connected to social influences, as all people exist in a world inhabited by others who have made meaning before us and influenced our understanding. Social constructionism is consistent with the theoretical principles discussed in RCT and experiential learning theory. RCT emphasizes the importance of connections for human growth and development and states growth-fostering relationships are essential for humans to thrive. In much the same way, experiential learning theory emphasizes the important of experience and reflection in the human learning process. The three concepts of experience, relationships, and reflection are intimately tied to an exploration and understanding of learning and teaching.
Phenomenology

Phenomenological methodology represents one approach to qualitative research (Creswell, 2013; Merriam & Tisdell, 2016). While some qualitative approaches focus on the stories participants tell of their life experiences (e.g. narrative research) or the development of a theory from participant experiences (e.g. grounded theory), phenomenology focuses on understanding and describing the essence and meaning of the lived experience with a phenomenon. Phenomenology was found to be an appropriate methodology for this research study and was intentionally selected for several reasons, discussed below.

Finlay (2012) describes phenomenology as, “more than a method,” but as “an open way of being- one that examines taken-for-granted human situations as they are experienced in everyday life but which go typically unquestioned” (p. 173, emphasis in original). As someone with previous experience with neuroscience-informed pedagogy, a phenomenological way of being was helpful for me as the researcher to approach the phenomenon of neuroscience-informed pedagogy with a fresh perspective in order to more clearly understand participants’ experiences. Further, researchers taking a phenomenological perspective strive to focus on the experience itself, often by conducting in-depth interviews with several participants who have first-hand experience with the phenomenon as well as through the process of epoche and bracketing or bridling researcher experiences. To describe the essence of the phenomenon, interviews are transcribed and analyzed using phenomenological analysis, which include horizontalizing the data, clustering themes, and developing textural and structural descriptions of the meanings (Moustakas, 1994). Thus, a phenomenological approach allowed me to
achieve my goal of seeking to understanding the core meaning of counselor educators’
experience of neuroscience-informed counseling pedagogy.

Based on the philosophy of transcendental phenomenology by Edmund Husserl
(1859-1938), phenomenology as a methodology focuses “on the experience itself and
how experiencing something is transformed into consciousness. Phenomenologists are
not interested in modern science’s efforts to categorize, simplify, and reduce phenomena
to abstract laws” (Merriam & Tisdell, 2016, p. 25-26). Instead, researchers taking a
phenomenological perspective seek descriptions of the essential meaningful elements of
participants’ lived experiences with a specific phenomenon in order to better understand
it. To best support a focus on participants’ experiences, Schram (2006) writes that a
phenomenological approach holds several assumptions. These assumptions include the
belief that human behavior “occurs and is understandable only in the context of
relationships” (p.99); reality is tied to consciousness and people's perceptions provide
evidence of the world through their lived experience; meaning is constructed through
language, reflection, and dialogue; and “it is possible to understand and convey the
essence” of a phenomenon (p.99). Thus, for this study, phenomenology is used as a
relationally focused methodology focused on understanding the essence of a phenomenon
through reflective conversations with those who have first-hand lived experience.
Neuroscience-informed pedagogy cannot be understood in isolation from the
relationships and meaning constructed from experiencing it. Rather an understanding
comes from focusing on “what an experience means for the persons who have had the
experience and are able to provide a comprehensive description of it” (Moustakas, 1994,
p. 13). Using Husserl’s philosophy, Moustakas (1994) outlined a methodology of
transcendental phenomenology, describing the core processes of Epoche,
Phenomenological Reduction, Imaginative Variation, and Synthesis, which I discuss below.

Core Processes of Phenomenology

**Epoche.** Epoche is an essential step in the phenomenological process. Epoche, a Greek word that means to refrain from judgment, is described by Moustakas as “a new way of looking at things, a way that requires that we learn to see what stands before our eyes” (p. 33, emphasis in original). Through epoche, I engaged in an exploration of my own experiences with the phenomenon under study. The goal of epoche is to become aware of my presuppositions, judgments, biases, and preconceived ideas regarding neuroscience-informed pedagogy. By increasing my awareness of preconceived ideas related to the phenomenon, I am better able to manage my biases and be transparent in presenting them to readers in a way that protects the integrity of the study. One method of managing researcher biases is through the process of bridling (Vagle, Hughes, & Durbin, 2009). Unlike bracketing, which involves setting assumptions aside, bridling acknowledges that researchers tend to be connected to the phenomenon under study and thus cannot ever fully set aside preconceived ideas and assumptions. The very act of choosing a phenomenon to study is biased because, as Vagle et al. stated, “[c]hoosing a phenomenon of interest is not a neutral decision” (p. 348). Rather, bridling encourages initial and continuous reflexive and critical questioning of my reactions to neuroscience-informed pedagogy, participants, and the research study as a whole throughout the entirety of the process. In this, I must constantly question what I am believing and understanding as I explore this phenomenon.

The process of engaging in epoche is often an intensive meditative experience in which the researcher gives patience and concentrated attention to whatever comes up in
reflection of the phenomenon (Moustakas, 1994). This process requires that I, as the researcher, explore my own experiences with the phenomenon to become aware of my biases, assumptions, and judgments. It is through bridling and the written presentation of my reflections that the reader is able to make informed decisions as to whether my experiences obscured my participant’s voices and the research findings. While I continued engaging in epoche related processes and bridling through reflective researcher journals throughout the research process, my beginning efforts at gaining self-awareness and bridling are described later in this chapter. Through epoche, biases and assumptions were explored and bridled allowing the researcher to more freely engage in phenomenological reduction.

**Phenomenological reduction.** Phenomenological reduction involves a series of steps, discussed here, culminating in a description of the phenomenon. The steps of phenomenological reduction include bridling, horizontalization, clustering themes, and combining themes into a composite textual description. Moustakas (1994) states, “the task requires that I look and describe; look again and describe; look again and describe; always with reference to textural qualities – rough and smooth; small and large; quiet and noisy… descriptions that present varying intensities” (p. 90-91). Bridling also assists the researcher in becoming more aware of how they could potentially stray from their participants experiences with the topic under study, particularly in analysis of the data.

After bridling, the next step is horizontalization in which each participant statement is given equal value. In this step, all data are initially examined as having equal weight and importance (Merriam & Tisdell, 2016). After horizontalization, irrelevant or repetitive statements are removed leaving essential statements and information, what Moustakas (1994) refers to as the “horizons” (p. 97). Finally, horizons are clustered into
themes and organized with coherent textural descriptions of the phenomenon. Moustakas described these descriptions as, “an integration of all of the individual textural descriptions into a group or universal textural description” (p. 180). In this, themes from each participant are combined to describe the essence of the phenomenon. The aim of phenomenological reduction is for me to understand at the essence of a phenomenon by hearing themes of participants’ experiences and distilling the themes into a meaningful description of the experience. Discussion of my specific steps of phenomenological reduction are expanded upon in the procedures section of this chapter. After the process of phenomenological reduction, researchers engage in imaginative variation, described below.

**Imaginative variation.** Imaginative variation involves seeing the phenomenon from different perspectives, “as if one were walking around a modern sculpture, seeing different things from different angles” (Merriam & Tisdell, 2016, p. 27). Imaginative variation seeks to understand the “how” underlying the experience of the phenomenon or the essential structure that influences the experience with the phenomenon (Moustakas, 1994). In this process, I am focused on expanding my understanding of how participants’ experiences with the phenomenon are influenced. Similar to the process of phenomenological reduction, imaginative variation consists of a series of steps, culminating in a description. This is done through careful consideration of the data, coding important statements, clustering codes into themes, and developing individual participant descriptions. However, with imaginative variation, the goal is a structural description, rather than a textural one, that provides an understanding of the influencing structure of participant experiences. Lastly, individual structural descriptions are integrated into a composite structural description from all participants.
Synthesis of composite textural and structural descriptions. As a final step, a synthesis of composite textural and structural descriptions is developed to describe the essential meaning and essence of the phenomenon as a whole. This description encapsulates the common experiences of both what participants describe of the phenomenon and how the context contributed to the experience (Creswell, 2013). It is through this final product of the phenomenological study that readers come to understand the participant’s experience of the phenomenon (Creswell, 2013; Merriam & Tisdell, 2016). Importantly, Moustakas (1994) states that this final product is not actually final as “the fundamental textural-structural synthesis represents the essences at a particular time and place from the vantage point of an individual researcher following an exhaustive imaginative and reflective study of the phenomenon” (p. 100). Rather, the final description is used to better understand the participants experiences of phenomenon within the limitations of time and human understanding.

For this study, I used a phenomenological approach to answer the research question, “What are the lived experiences of counselor educators who integrate neuroscience principles into their counseling pedagogy?” Through the phenomenological processes of epoche, bridling, phenomenological reduction, imaginative variation, and synthesis I hope to co-construct with participants an understanding of the experience with neuroscience-informed pedagogy. Importantly, phenomenology is consistent with the chosen social constructionist epistemology of co-constructing knowledge and relational, experiential, and reflective concepts embedded in the theoretical perspectives of RCT and experiential learning theory. Further, phenomenology is optimal for exploring a not well understood phenomenon from a fresh perspective. In order for me to approach
participants’ experiences with a fresh and reflective perspective, I begin with the process of epoche and bridling.

**Researcher Stance**

Epoche and bridling were described in detail in the Phenomenology section above. Since researchers taking a phenomenological perspective seek to understand lived experiences, it is not uncommon for the researcher to have experienced the phenomenon under study. This is true for me and the phenomenon of focus in this study, neuroscience-informed pedagogy. Several personal experiences and beliefs have influenced my interest in conducting this study. Here I present and further expand on my reflections regarding the phenomenon of neuroscience-informed pedagogy that I briefly introduced in Chapter I. Specifically, I hope to clarify my own experiences with the phenomenon, the assumptions and beliefs that resulted from these experiences, how I see the potential influences of these experiences impacting this study, and steps I will take to manage the influence of my perceptions of the phenomenon.

**Childhood Experiences with Education**

In order to provide context for my beliefs and assumptions, it is important to reflect on my experiences with learning and teaching. The first experiences in education I can remember occurred as a young child in preschool and elementary school. As a shy child who moved around a lot connecting and trusting others- especially teachers- was difficult for me. Additionally, my family moved regularly so I often felt like I was starting over as the new kid at school. I remember struggling to pay attention and therefore learn in class, due to my discomfort, fear, and anxiety in the learning environment. It was as if there were so many other anxiety-related things I was focusing
on, that new information, such as the topics being taught in class, didn’t have room in my brain. I also remember messages I received and internalized at this influential time of my development, including that I was not smart, that I was lazy, and that there was something wrong with me because I could not learn like the other children in class.

A turning point occurred for me in third grade. Third grade student classrooms were located outside of the school building and students had to walk outside to get to their class. I can still recall vivid details of walking outside along the grass and entering my teacher’s classroom, which was full of natural light and warm colorful classroom decorations. The desks were not in traditional rows but instead were in clusters of circles where everyone could see everyone else in class. She also arranged the classroom into smaller areas including the learning area with the chalkboard and our student desks, the reading area with a library and soft bean bags, and a partially hidden area where her desk was located and where students could quietly talk to her without the rest of the class hearing. While her classroom stands out in my memory, what stands out even more is her as a teacher. I remember she smiled often, laughed a lot, and did silly things I had never seen a teacher do. Further, I remember her working harder than any teacher I had ever met to build a relationship with me and help me feel safer and more comfortable. In my experience, other teachers treated all students the same. This teacher found something unique in each student and made sure to find a way for all of our strengths to be useful in class, even the shy children like me. Prior to this experience, I did not feel teachers were invested in who I was. Unlike these other teachers, this teacher would come to me, make eye contact with me, and greet me or tell me goodbye, by name, every school day. Some teachers I’d had simply sent a note home to my parents to try to figure out what was wrong with me, she invited me to her desk for hot chocolate and talked to me to try to
understand why I was struggling and what she could do to help. Whereas other teachers would pressure all students to learn and test the same way, she had varying methods of teaching us to learn and test.

She was creative, in her personality, her classroom design, and in her methods of teaching. In her class, I felt as if learning actually came to life and felt exciting and interesting. The best example of this I can think of is when we covered the topic of the underground railroad in our American History section. Instead of having us sit in our desks and learn from lecture as most teachers in this school did, she created a whole-body and emotional experience to facilitate our learning. First, she told us a developmentally appropriate but emotional story of a former slave’s experience navigating the underground railroad. Inviting people outside of our class to help facilitate, she then offered an optional interactive activity to create a more in-depth understanding of the complexity of navigating the underground railroad. In this exercise, other classes in the school would have a candle drawing in their class window if they were a part of the “underground railroad.” As a white child, I did not understand at the time why adults outside of our class had been invited to facilitate. Now, I understand the risk my teacher took in highlighting such a traumatic topic to our southern Louisiana school and why adults of color, particularly those who identify as African American, were so involved in our class that day.

Students in our class who were comfortable participating picked from a hat and were sorted to be escaping people or sheriffs, while visiting adults acted in the role of free people providing guidance to those of us that were escaping. After hearing the terrifying experience of escaping child, I remember my body filling with fear as I chose “ESCAPING” from the hat. Yet, I also remember immediately looking up to my teacher
and getting a smile and a nod that conveyed she knew I could handle the experience. Further, the adult helpers provided encouragement and made sure I and others who chose escaping felt emotionally safe participating. The fear I felt slowly became replaced with determination; my teacher and others believed in me which made me believe in myself. Even though I was caught by a sheriff and was not able to complete the underground railroad, the emotion-filled experience did not get clouded or lost in my memory as did so many other lessons. While no experience can accurately convey the true horror and experience of escaping slavery to a young white child, this learning experience had a profound impact on my developmental understanding of racial oppression which has impacted my development throughout my life. More than 20 years later, I remember the feelings and lessons associated with this relationally-focused, active, emotional, whole-body learning experience longer than I have remembered any other educational experience in my life. Importantly, I was able to have this learning experience because she created a context in which I trusted in my relationship with her and felt safe and willing to step far outside of my comfort zone.

From these experiences, coupled with what I’ve read in the literature, stem several beliefs and assumptions about teaching. First, I believe in the importance and necessity of relationally-focused teaching and second, that it is the teacher’s responsibility to create a safe relationally-focused learning environment with each student. Without relational safety, I believe other neurological processes can occur that limit how much a student is able to learn. Essentially, without the relationship my third-grade teacher worked to create with me, she could have engaged in creative and active facilitation of learning experiences but the learning would have been less effective. It took the relational aspect for me to feel safe engaging in the creative learning experience. With a classroom culture
of relational safety, I believe learning is effective and memorable if the learning experience is made exciting and meaningful. My third-grade teacher used creative, active, emotional, and whole-body experiences to make learning exciting and meaningful, therefore I have a strong belief in using creative and engaging methods for effective teaching and an assumption that participants will endorse these teaching methods.

Experiences as a Children’s Teacher

While my experiences as a child learner contributed to my understanding of learning and teaching, my first exposure to the integration of neuroscience into pedagogy occurred when I was an enrichment teacher at a school organization called REACH, an enrichment program for summer, after school, holiday care, and preschool. Unlike my fellow colleges, I did not have a background in early childhood education but instead was completing my bachelor of science degree in psychology with an emphasis in child and family studies. Though I did not have a degree in education to support my teaching practices, I had been intensely mentored in the after-school care program by the REACH owner, who had extensive education and experience in teaching. In order to make up for my own perceived deficits, insecurity, and lack of formal education in teaching, I began informal self-education through reading early children’s education textbooks and scholarly articles.

Under the supervision of the owner who was my mentor and supervisor, I began incorporating teaching practices that I was learning, such as informing my teaching through reflecting on how each child constructed their understanding and learning, use of play and creativity in teaching methods, and the importance of active movement in the learning process. Additionally, as a psychology student I felt strongly pulled to the belief
that emotions played a large role in student learning. Most importantly, I recognized that children are not passive learners, but active partners in the learning experience. To be effective, I believed it was essential that I understood how students were understanding and constructing meaning of what I was teaching. As I began intentionally integrating creativity, movement, and reflective teaching practices I began noticing differences in how students learned and responded to me. I was often reported to be one of the students’ “favorite teachers” and parents would often thank me for working so hard for their children. Eventually, I was promoted to “Lead” teacher and began mentoring other teachers at my site and teaching larger groups of students. Reflecting back, one thing that stands out to me was how my site - made of teachers I was mentoring and all of our students - ended up getting the reputation for being the best school. I believe our reputation was a result of my commitment to motivate my fellow teachers to go above and beyond what other sites were willing to do.

While I was evaluated by my supervisor to be an effective teacher, my concern over not having a degree in education fueled me to continue to seek knowledge on how to become an even better teacher. In my quest for improvement, I eventually discovered the concept of incorporating brain research into teaching practices (e.g. Jensen, 2008). I still remember experiencing a series of lightbulb “ah ha!” moments as I read more about how the brain develops and learns. In these neuroeducation books, the writers discussed the neuroscience of memory, emotions, relationships, movement, and more. I began to feel all of my beliefs about teaching and learning, past education in psychology and human development, and effective practices in teaching come together and form a clear picture in my mind. It was in that moment that I believe my passion for neuroscience-informed pedagogy really began to take shape.
Through this research, I also came to understand why my classes, and the classes of those I mentored, excelled over other classes, teachers, and sites. While teachers from other sites seemed to struggle to motivate their students, I was able to get students to take their learning outside of the classroom, translate what they learned into real life experiences, and excel on assignments and other evaluations of learning. Importantly, I also had students who felt safe with me, who would tell me about their struggles, and brainstorm with me on how best to navigate these struggles. All of the methods I was using to enhance my classes were, unbeknownst to me, consistent with recommendations from neuroscience research. From the realization that I was effectively teaching consistent with neuroeducation recommendations emerged a number of additional beliefs about teaching. Specifically, that effective teachers are teaching with neuroscience principles, even if they are not aware that is the case. All learning is brain-based and so all effective teaching is tapping into brain-targeted teaching methods. Specific neuroscience principles that I believe are important for teaching and learning are the relationship, as previously mentioned, but also making learning interesting so that the brain pays attention.

**Doctorate in Counselor Education**

Eventually, I left teaching to pursue my master’s degree in professional counseling, specifically in play therapy and clinical mental health counseling. Throughout my master’s, I did not think much about neuroscience in teaching, though reflecting back now as a trained counselor educator, I realize that my professors employed neuroscience supported teaching practices including relational-focus and safety, use of meaning and emotions for memorable learning, creative and experiential teaching methods, humor and playfulness, and congruency. Much like my third-grade
teacher, my master’s program experiences felt like another significant turning point in my education. I was motivated and eager to learn everything I possibly could about counseling and surprisingly, as someone who struggled with all previous schooling including undergraduate coursework, I finished my master’s degree with a 4.0. This experience filled me with a desire to change careers paths, or rather merge two career paths that I was incredibly passionate about; counseling and education.

After completing my master’s degree, I decided to go back to school to get my Ph.D. in Counselor Education and Supervision, teaching master’s level students how to be counselors or doctoral level students how to be counselor educators. It was during my doctoral program that I found my way back to an interest in neuroscience. One instance occurred in a clinical practicum course. The professor of this class assigned a textbook called *Why Therapy Works* (Cozolino, 2016), a book expanding on the effectiveness of counseling from a neuroscience perspective. While I did not agree with everything the author wrote in this book, the integration of counseling and neuroscience made sense to me. Similar to teaching, all client change is brain-based therefore effective counseling is tapping into neuroscience, whether counselors know it or not.

Most importantly though, neuroscience and teaching were discussed in my “Seminar in Instruction, Pedagogy, and Evaluation in Counseling and Psychology” class. In this class, the professor introduced us to the book *Brain Rules* (Medina, 2014). Through reading this book, my belief that neuroscience could improve teaching practices was confirmed. Reading *Why Therapy Works* and *Brain Rules* and discussing neuroscience implications for counseling and teaching resulted in another belief of mine, that neuroscience-informed teaching should be taught and modeled in counselor education. Specifically, the topic of neuroscience should be taught to counseling masters
and doctoral students, but more importantly neuroscience principles should be modeled to students in order them to be fully effective, which illuminates my belief that congruency between what and how teachers teach is part of its effectiveness. For example, I believe that if counselor educators are teaching students about the importance of an egalitarian relationship in counseling, but then embody a power-over nonegalitarian relationship with students, students are likely to repeat these same relationship dynamics of power with their clients. Students learn not just what is taught to them but what they see their teachers doing.

Lastly, I believe that effective teaching can be further enhanced by intentionally and informing pedagogical practices from neuroscience principles. Once teachers know and understand the underlying processes involved in effective teaching, they can use these more intentionally to further improve their teaching. As a professional counselor and future counselor educator, I also believe in the importance of continuously striving to enhance the practice of counseling and counselor training. Therefore, I believe that it is important for counselor educators to strive for improvement in training in order to best advocate for the advancement of the field of counseling and counselor education.

Navigating My Assumptions

Because I hold the above assumptions, it is important to remain aware of how they might influence this study. One way of enhancing awareness is through reflecting on what I expect participants to say when I interview them. Documented reflection provides myself, my auditor, and the reader, clarity on whether my assumptions obscured the study findings. First, I expected participants to highlight ways they use neuroscience to support relationships with their students. Since I see the relationship and its neurological processes as highly important in teaching in counselor education, I assume other
participants will as well. Second, I expected participants to speak to their use of creative
or experiential teaching methods to make learning interesting. While I believe there are
numerous ways of making learning interesting and memorable, I personally incorporate
creativity and experiential activities therefore I believe that other counselor educators will
do so as well. Last, I expected participants to have noticed improvements in student
learning evaluations and student evaluations of the instructor. Specifically, I believed
participants would name ways they have seen students’ effectiveness increase as a result
of using neuroscience-informed pedagogy.

Due to my assumptions and experiences with neuroscience-informed pedagogy
explored above, I engaged in multiple processes to ensure the highest level of
trustworthiness possible (discussed in detail below). For one, I continued a reflective
process related to bridling throughout this study which was documented in my researcher
journal. In this journal, I detailed my reactions after each interview, transcription, coding
session, and any other important steps in the research process. This journal was reviewed
by my external auditor to provide necessary feedback and clarification on whether my
beliefs are clouding the study and findings. Additionally, I solicited feedback and
impressions from participants through member-checking about the emerging findings.
Further, all research steps and findings were presented to my dissertation chair and
research committee who ensured rigorous methods were used to support the findings.

**Procedures**

Methods for participant sampling and recruitment as well as data collection and
analysis were carefully considered and intentionally chosen for this study in congruence
with the research question, methodology, epistemology, and theoretical perspective
(Crotty, 1998). These methods are described below to further demonstrate rigor (e.g.
trustworthiness, methodological and analytic rigor, and coherence) for this study (Kline, 2008).

**Sampling**

For this study I used purposeful, criterion-based participant sampling procedures (Patton, 2015) in congruence with phenomenological methodology (Moustakas, 1994; Wang, 2016). As opposed to probability sampling which aims to generalize findings to a larger population, purposeful sampling is a nonprobability sampling method in which participants are intentionally selected based on their experience with the topic and in order to gather information-rich details (Merriam & Tisdell, 2016; Patton, 2015). The goal in purposeful sampling is not to generalize results but to gain rich information in exploring a specific topic. Similarly, criterion-based sampling, a specific strategy for purposeful sampling, involves delineating certain criteria or conditions required to participate in the study. For this study, participant criteria are:

- Professional identity as a counselor educator. Primary professional identity as a counselor educator was demonstrated through: a Ph.D. in Counselor Education and Supervision, current employment teaching masters and/or doctoral counseling students from a counseling professional identity, licensure as a professional counselor, and/or membership with professional counseling organizations (i.e. ACA and ACES). This criterion was used to ensure that participants have received training in counselor education; have experience teaching counseling students; and align with the professional values, beliefs, and identity of counselor educators in their training of counseling and/or counselor education students.
- Teach at a CACREP-accredited masters and/or doctoral counseling program. CACREP accreditation implies that counselor education programs have met and demonstrated adherence to a specified set of counselor training standards, specifically with regard to the learning environment, professional counseling identity, professional practice, evaluation in the program, entry-level specialty areas, and doctoral standards (CACREP, 2016). This criterion was used to ensure that participants were teaching in programs that have demonstrated adherence to professionally agreed upon standards for counselor training.

- Access to Skype or related software. This criterion was used to allow participants to participate in the study from locations across the country.

- Self or other identify as using neuroscience to inform pedagogical teaching approaches. While it is a belief of mine that all effective teaching inherently includes neuroscience principles, in order to gain in-depth understanding of the experience of neuroscience-informed pedagogy it is essential that participants have direct experience with the phenomenon being studied. Therefore, this criterion was used to limit the sample to information-rich participants who inform their pedagogy with neuroscience principles in order to best explore this phenomenon.

Due to the possibility that only a limited number of individuals would meet all of the criteria, I also attempted to use snowball sampling (Merriam & Tisdell, 2016) as an additional sampling method to reach data saturation. Through snowball sampling, participants recommended those they believed met criteria for the study to contact me to participate. Though I reached out to five referred potential participants, no participants responded, thus no participants were recruited through snowball sampling.
Recruitment

After Institutional Review Board (IRB) approval, participants were recruited through professional neuroscience interest networks, snowball sampling, and the counselor education and supervision listserv. I began recruiting participants through a recruitment post (see Appendix A) sent ACA’s Neurocounseling Interest Network through ACA Connect and the American Mental Health Counselor Association’s (AMHC) Neuroscience Interest Network. From this recruitment method, I recruited one participant. Next, I used the counselor education and supervision listserv, CESNET-L. The Counselor Education and Supervision Network - Listserv (CESNET-L) is an email forum used by counselor educators in soliciting or sharing resources, engaging in discussion, recruiting participants for research, and other professional conversations (CESNET-L, 2019). From this listserv, I was able to recruit the remaining 5 participants needed to reach data saturation.

In the recruitment email, I outlined the purpose and topic of the research study as well as criteria for inclusion. Interested potential participants who believed they met the criteria were told to email me directly at Savannah.Cormier@unco.edu. The recruitment email also stated that interested potential participants were welcome to email me for any clarification questions regarding the study. Once I received an interest email from a potential participant, I followed up with an email thanking them for their interest as well as a brief screening asking about criteria to ensure they met the requirements for participation (Appendix G). Once it was determined that potential participants met criteria, they were emailed the research consent form (see Appendix B) which was reviewed over the phone or through video conferencing depending on participant preference. After reviewing the consent form and agreeing to participate in the study,
participants signed and dated the document and returned it to me by email. Storage of this document is discussed in data handling below.

Recruitment continued until data reached a point of saturation, or redundancy (Lincoln & Guba, 1985; Merriam & Tisdell, 2016). As suggested by Merriam and Tisdell (2016), I determined that data had reached saturation by analyzing data simultaneous to data collection and listening for when participant answers to interview questions became repetitive and yielded no new information to understanding the phenomenon. Phenomenological researchers suggest a range of around 4-15 participants (Creswell, 2013) in order to reach saturation, therefore I aimed to recruit 6-12 participants. For this study, I determined data had reached saturation after my interview with my 6th participant.

Data Collection

**Demographic questionnaire.** Demographic information relevant to the participant and the study was collected to introduce participants to the readers and provide a contextual understanding of their experiences. While some background information is important in contextualizing participants’ experiences, demographic information that would identify a participant or was not clearly relevant to understanding their experiences was not be used in order to protect the confidentiality of the participant. The demographic questionnaire can be found in Appendix C.

**Interviews.** Semi-structured participant interviews were used as the primary source of data. Phenomenological research typically involves long, informal, interactive interviews in which participants are asked open-ended questions to gather rich information about their experiences related to the phenomenon (Moustakas, 1994). Further, Moustakas suggests that interviews start with a conversation or activity that
relaxes the participant and creates the necessary atmosphere. This was accomplished through the use of an opening interview prompt (see Appendix C) to facilitate comfort with me and to begin exploring the experience with the phenomenon. As suggested by Creswell (2013), interview questions, further discussed below and presented in Appendix C, focused on “what” participants have experienced with the neuroscience-informed pedagogy and “how” they felt this experience was facilitated. All interviews were conducted via audio/visual applications such as Zoom or via phone in a confidential location.

At the start of the first interview, participants were asked to choose a pseudonym to protect the confidential information discussed in their interviews. After conducting each interview, I transcribed interviews verbatim as discussed by Poland (1995), reflected on the transcripts and noted additional questions that came up, and emailed the transcripts to participants for member checking and comments. Specifically, participants were informed that as they reviewed the transcript, they could leave track change comments in the Microsoft Word transcript document about any changes, corrections, or additions that arose as they read their interview. In doing so, participants were able to ensure their experiences were represented accurately and assisted in establishing trustworthiness for the study.

After participants had time to review their transcribed interviews and leave any comments, they emailed the transcript back to me so that I could again review the transcript and continue noting what additional questions I had towards understanding the phenomenon. Once both the participant and I had time to review the first transcript and the additional comments, approximately two weeks’ time, a second interview was scheduled. This second interview was used to ensure that I accurately understood
participant experiences, gather additional information needed for understanding through follow-up questions, and gain clarification from any comments left in the first transcribed interview. Second interviews were also transcribed and sent via email to the participant for checking and comments. As with the first interview, participants were informed that they could leave track change comments in the Microsoft Word transcript document to ensure the transcribed interview accurately represented their experiences. After reviewed, participants emailed the second transcript with any additional comments for me to further review and reflect.

Lastly, a final interview was offered for the main purpose of member-checking to discuss initial descriptions of my emerging findings with participants. Once emerging findings were sent, all participants stated they were congruent with their experiences and a final interview was not needed. Participants were asked to provide any feedback and recommendations for improvement of the findings or language used to describe the findings. One participant noted a language shift from “neuro-ambitious” due to the fact that it seemed to falsely “justify an existing idea that has nothing to do with studies of neurophysiological functioning.” Based on this participants feedback, language was changed to “passionate” and “interested’ in neuroscience to more accurately convey the experience.

**Development of interview questions.** The development of the interview questions was guided by certain aspects that are important to name. Questions were designed to be open-ended and exploratory in nature to facilitate unlimited participant descriptions of experiences in congruence with a qualitative phenomenological methodology. Specifically, questions were developed to focus on: (a) what participants have experienced in regards to neuroscience-informed counseling pedagogy, (b) what
influences their experience with neuroscience-informed counseling pedagogy. These two broad categories facilitated the development of all other interview questions in the interview protocol (see Appendix C). Additionally, an opening prompt was developed in order to create the atmosphere for ease of conversation around neuroscience-informed pedagogy.

**Participant reflection journals.** In addition to interviews, Merriam and Tisdell (2016) discuss the use of researcher-generated documents, such as reflective papers, diaries, or logs created after a study has already begun. For this study, I am using participant reflection journals as another source of data. Within one day after each interview, participants were sent a follow-up email thanking them for their time and asking follow-up questions to share any lingering thoughts or reflections they had after our interview. The follow-up questions can be found in Appendix D. From an experiential learning perspective (discussed above), learning is a repeated cycle of experience, reflection, new understandings, and active experimentation (Kolb, 1984). Thus, after the reflective interview experience, participants may have had new understandings, actions, experiences, or reflections. These understandings, actions, experiences, and reflections are important for understanding the experience of neuroscience-informed pedagogy and were collected in a participant reflection journal. The purpose of this reflection journal was to provide participants an additional method for expressing their experiences with the phenomenon and in doing so collect additional data for triangulation and prolonged engagement with participants.

**Artifacts.** As a third source of data, participants were asked to email me an item they viewed as representing or demonstrating their use of neuroscience-informed pedagogy. Additionally, this item was used to assist in the participant screening process.
Artifacts included: syllabi for one of their courses, a neuroscience-informed assignment with rationale, their teaching philosophy, student written evaluations of their experience in the class, etc. Each participant chose their own item and emailed it to me to further ensure participants met the criteria of using neuroscience-informed pedagogy. Specially, artifacts were used to ensure that participants were teaching from a neuroscience-informed perspective. In reviewing participant artifacts for screening purposes, I looked at learning objectives, rationale, and pedagogical conceptualizations. For data collection, the purpose of collecting participant’s artifacts is to gather additional data on what Merriam and Tisdell (2016) call the “instruments of everyday living” (p. 171), or representations of participants’ everyday teaching life. Additionally, because a participant’s experience with their artifact has subjective meaning, it was important that the artifact not just be collected but it’s meaning was discussed in detail in the second interview. In this way, both the artifact and the participants experience with the artifact were used for data analysis.

**Data Handling**

All interviews with participants were recorded via the digital recording app Voice Memos on my password-protected cellular phone or personal computer. Immediately after recording, audio files were put into a password-protected file on my password-protected computer and saved under the participant’s chosen pseudonym. A separate excel spreadsheet was used to keep track of each participants’ pseudonym, contact information, and data collection progress. This spreadsheet was kept in a separate password-protected file to ensure participants could not be identified by their pseudonym. Audio files were deleted after transcription and participant checking. All transcriptions were conducted by me, as the primary researcher, using Google Docs speech to text.
transcription option. After transcription, I checked written transcripts with audio files for accuracy. During this check, I removed any information that could identify the participant (e.g. names, university affiliation, etc.) and ensured they were saved using the participants’ pseudonym. Per IRB requirements, all data and documents, such as consent forms, participant reflection journals, participant artifacts, and researcher journals were kept in a locked filing cabinet in my researcher advisor’s office, McKee 286.

Data Analysis

Data were analyzed following Moustakas’ steps for phenomenological analysis discussed in his phenomenological research methods text (1994) as well as other qualitative research texts (Creswell, 2013; Merriam & Tisdell, 2016). For clarity, these steps will be discussed in a linear outline below, however, the actual collection and analysis of data involves a recursive, circular process of moving back and forth between and within steps (Creswell, 2013). Throughout the study, I kept a researcher journal where I reflected on my reactions throughout the process, as well as my research decisions and emerging ideas. The following steps represent the data collection and analysis process.

**Epoche and bridling.** Congruent to a phenomenological approach to conducting research, the first step I engaged in involved the processes of epoche, reflection, and bridling (Moustakas, 1994). In this step, I began reflecting on my own experiences with neuroscience-informed pedagogy and the assumptions I hold going into this study. These reflections were captured in my researcher journal that I used throughout the study as my own thoughts, emotions, and reactions arose. These reflections were also used to fine-tune the interview protocol questions through my experience answering them, as well as in constructing my researcher stance, discussed above. Further, my researcher journal
was where I explored my experience following each interview through the reflective journal questions listed in Appendix E. Therefore, while epoche and bridling is listed as the first step, it is meant to reflect the ongoing process throughout each of the following steps.

**Data collection.** The next step involved collecting data through participant interviews, participant journals, and artifacts. Through a flexible semi-structured interview protocol, I engaged participants in an exploratory interview around their experiences of neuroscience-informed pedagogy. After the interview, I continued to add to my research journal as thoughts, additional questions, and reactions come up. After each interview, I engaged in a reflective process around my experience using questions from Appendix E. Similarly, within 24-hours after the interview, I sent participants a follow-up email with reflection questions for participants’ reflection journals (see Appendix D). Participants also sent me an artifact, discussed above, at least one day prior to their second interview.

**Transcribe.** If possible with interview scheduling, prior to conducting another participant interview (e.g. if interviews are scheduled a week or more apart), I transcribed the interview using the Google Docs speech to text transcription option. Google Docs speech to text transcription was used to reduce the time-consuming nature of transcribing while still allowing me to be intimately involved with the data. Once initial transcription was complete, I listened again to the audio file of the interview to cross-check it with the written transcript for accuracy. During this transcription check, I ensured that interviews were transcribed verbatim. All participant identifying information was be removed from written transcripts. These transcripts, along with a key for the transcription symbols, were
sent to participants allowing them two weeks to review, change, correct, or add information.

**Read and re-read transcripts and artifacts.** After participants were given two weeks to review and email their transcripts, reflection journals, and artifacts, an additional coder and I begin reading and re-reading transcripts, reflection journals, and artifacts to begin to get an understanding of the overall meaning described. An additional coder was used for the first several interviews to assist with the trustworthiness of this study. During the initial reading, we engaged in the process of horizontalization where all participant data speaking to the phenomenon was given equal value (Moustakas, 1994). During this step, we each separately read each participant statements with an open mind and receptivity to whatever meaning emerges and noted any comments or questions. I also continued the process of bridling by questioning myself about what information stood out to me and why and added these reflections to my researcher journal.

**Select horizons.** After horizontalization, we read interview transcripts, journals, and artifacts again in order to begin identifying significant meaningful statements that answered the research question. In this process, known as open coding, we separately commented on data that described the experience of neuroscience-informed pedagogy by writing notes, or initial codes, in the document margins. These initial codes included highlighting participant words, a summarization in our own words, or one word or phrase that describes what the participant is expressing. After we each coded two transcripts, we met to discuss the codes we have each independently decided upon to reach consensus. After open coding, codes were pulled out of the data source (e.g. interview transcript, journal, artifact) into a separate document to create the initial codebook. This codebook
was revised throughout the remaining data analysis process but was used to organize emerging codes, categories, and themes.

**Clustering.** Following the steps of Phenomenological Reduction, once all initial codes were organized into a separate codebook, I began clustering codes into themes. Clustering began with discarding any repetitive codes. Afterwards, codes were reviewed to see which may be similar or connected and represented a theme in the experience. Codes, which simply highlight important data, were then clustered, or grouped together, into meaningful themes that get closer to describing the essence of the experience from the data. For example, Merriam and Tisdell (2016) describe the combining of the codes “copy others,” “other women,” and “sister” into the meaningful theme of “learning from others” (p. 206) which captures the meaningful pattern of the three codes. Similar to the above steps, this process was thoroughly documented in my researcher journal specifically in regards to what facilitated my understanding of the creation of themes from clustering codes.

**Return to data.** After the codebook was developed and codes clustered into themes as described in the previous step, I reviewed all transcripts, journals, and artifacts to ensure that the emerging themes were consistent with participant data. If new information that was not currently or adequately described in a theme emerged in the data, additional codes were added to the code book and themes adapted based on this new information. Any additional informational and decisions to add new or adapt old themes was documented and described in my researcher journal.

**Textural descriptions.** Next, I wrote a description of what participants experienced with the phenomenon, pulling verbatim descriptions from participant transcripts (Creswell, 2013). These descriptions are known as textural descriptions which
describe the “what” aspect of the experience with neuroscience-informed pedagogy instead of “how” the experience occurs, which is the following step. Individual descriptions were then be combined to form integrated descriptions from all participants regarding essential qualities of the experience.

**Structural descriptions.** Similarly, in this step I wrote a description of how the phenomenon of neuroscience-informed pedagogy was experienced by participants. This is known as a structural description from each participant’s transcript and focuses on the “how” aspect, or what influences the experience for participants. As with textural descriptions, individual structural descriptions are integrated into a structural description from all participants regarding the underlying structure and influences that contribute to the neuroscience-informed pedagogy.

**Trustworthiness.** Prior to synthesis, all participants had the option to engage in member-checking through the review my initial findings. Participants had an opportunity to discuss these findings through a brief interview or email if participants were not interested in an interview, and provide feedback regarding the accuracy and congruence with their experience. Additionally, I consulted with an external auditor who reviewed my researcher journal, de-identified participant transcripts, codebook, and other data to ensure trustworthiness. All feedback was recorded in my researcher journal and findings adapted as necessary based on feedback. Methods used in this study to establish trustworthiness are discussed in more detail in the section below.

**Synthesis.** In this last step, the textural and structural descriptions were synthesized to create a composite textural-structural description of the meanings and essence of neuroscience-informed pedagogy.
As discussed previously, the data analysis steps reviewed here occurred throughout the research process and were recursive in nature, rather than linear. Participant interview transcripts, reflective journals, and artifacts were reviewed and analyzed continuously throughout the research process in order to better understand participants’ experiences with neuroscience-informed pedagogy. All steps of the data analysis process were documented and described in detail in my researcher journal. Lastly, the findings resulting from the textural-structural synthesis are presented in Chapter IV.

**Trustworthiness**

Rather than positivist/postpositivist concepts of validity and reliability that are incongruent with qualitative philosophical underpinnings, qualitative research focuses on establishing trustworthiness that demonstrates quality and rigor for the qualitative research process and findings (Korstjens & Moser, 2018; Lincoln & Guba, 1985). Procedures for establishing trustworthiness in qualitative research include elements of credibility, transferability, dependability, and confirmability. Credibility relates to the ability of the research findings to accurately represent participant experiences and can be achieved through prolonged engagement with participants, peer debriefing, members checks, and triangulation (Anney, 2014; Korstjens & Moser, 2018; Morrow, 2005). Similarly, transferability involves applicability, and the extent of which readers can transfer the findings of the study to other contexts, achieved through providing detailed, thick descriptions of the participants, the context, and the research process. Dependability relates to reliable consistency, specifically the consistency of the findings across time and other researchers. Dependability ensures that a study can be repeated and similar findings achieved. Dependability is commonly demonstrated through a detailed audit trail and use
of external auditor. Finally, confirmability relates to the ability of the findings to be confirmed and corroborated by other researchers. Much like dependability, confirmability can be demonstrated through an auditor as well as triangulation and researcher reflexivity. Detailed descriptions of the methods utilized to demonstrate trustworthiness in this study are expanded upon below.

**Prolonged engagement.** One method for establishing credibility in a study was through prolonged engagement. Prolonged engagement involves spending a necessary and sufficient amount of time conducting the study with participants so that the researcher is able to build trust with participants, get rich information, gain understanding, and clarify misinformation (Korstjens & Moser, 2018; Lincoln & Guba, 1985). The goal, as explained by Onwuegbuzie and Leech (2007), is “to obtain an adequate representation of the ‘voice’ under study” (p. 239) through lengthy time spent conducting the study with participants. In this study, I prolonged engagement with participants through conducting multiple lengthy interviews, collecting multiple forms of data (e.g. journals and artifacts) to more fully immerse myself in participants’ experiences, and repetitive extensive reviews of participant transcripts and data. By prolonging my engagement with participant experiences, I aimed to build a trusting relationship with participants in which they felt safe sharing rich, detailed information about their experience with neuroscience-informed pedagogy. Similarly, my goal was to gain enough familiarity with their experience that I could pose additional questions to clarify any misinformation or confusion regarding the experience.

**Triangulation.** I engaged in strategies of triangulation for corroborating data. Denzin (1978) discussed different methods for triangulation including data triangulation, investigator triangulation, theory triangulation, and methodological triangulation. In this
study I used data triangulation, by collecting data from various data sources, conducting multiple interviews, participant reflection journals, participant artifacts, and researcher journals. Through collecting data from multiple sources, it was my aim to capture multiple perspectives from participants through different mediums in order to enhance my understanding of neuroscience-informed pedagogy. Additionally, I used an additional coder during data analysis until a codebook was created to decrease the chances of researcher bias interring with data analysis.

**Peer debriefing.** In order to test my emerging understanding of participant experiences and be challenged on my thoughts related to the study, I used peer debriefing. Anney (2014) states peer debriefers are “professionals willing to provide scholarly guidance, such as members of academic staff, the postgraduate dissertation committee, and the department” (p. 276). Thus, I used my dissertation chair as a peer debriefer for this study. Through peer debriefing, I regularly consulted with my chair who engaged with me as “devil’s advocate,” posed “difficult questions about the procedures, meanings, interpretations, and conclusions; and who provides the researcher with the opportunity for ‘catharsis’ by being empathetic with the researcher’s feelings” (Onwuegbuzie & Leech, 2007, p. 244). I used my peer debriefer to push me and challenge me to reflect on my thoughts and reactions and how they may be impacting my interpretation of the data. Similarly, my peer debriefer also served as someone to discuss my emerging ideas off of since dialogue with a trusted source is helpful in my thought process.

**Member checking.** Member checking was used several times throughout the study. Member checking ensures that participants are able to provide me with feedback about the data, procedures, interpretations, and emerging findings. Further, member
checking provides credibility to the study by increasing accuracy to participant voices and experiences from the actual participants themselves. Lincoln and Guba (1985) consider member checking to be “the most critical technique for establishing credibility” (p. 314). In this study, participants were given all of their transcribed interviews to review for accuracy and make additions and changes as necessary to best represent their experience. Additionally, the last interview option was done primarily for the purposes of member checking of the emerging findings. In this, participants had the option to review the composite textural-structural synthesis described above and provide feedback or suggestions for alternative language use.

**Thick descriptions.** The goal of qualitative research is not generalizability in which results from the research sample can be generalized to the larger population. However, it is important for the reader to be able to make decisions regarding the transferability of the findings to their context. Transferability is largely achieved through the use of thick descriptions to illustrate participants, their context, and themes of the experience. Using thick descriptions, I provide rich and detailed descriptions of characteristics about participants experiences and the contexts in which those experiences occur. Through this, my aim was for readers to feel as if they can clearly picture and imagine experiencing the phenomenon with the participant. Thus, readers have a better sense of whether the findings from the study are applicable to their own context.

**Researcher journaling.** As previously mentioned, I used a researcher journal throughout the research process. My researcher journal was used to explore past and current experiences with neuroscience-informed pedagogy, identify assumptions and beliefs, reflect on thoughts and reactions to the study, and clarify researcher bias throughout the study (Korstjens & Moser, 2018). My researcher journal was shared with
my external auditor as well so that they were able to check the progression of my reflections with the themes found and offer feedback.

**Audit trail and auditor.** Throughout the research process, I documented all of the steps taken and decisions made in an audit trail. Audit trails include “detailed chronology of research activities and processes; influences on the data collection and analysis; emerging themes, categories, or models; and analytic memos. The audit trail may then be examined by peer researchers, a student’s advisor, or colleagues in the field” (Morrow, 2005, p. 252). I used an external auditor to examine my audit trail, which included de-identified participant transcripts and journals, participant artifacts, all versions of my codebook, and my researcher journal. Specifically, this auditor was a doctoral student counselor educator who possessed knowledge of teaching and pedagogy, as well as several years of experience, who was able to give feedback regarding information I am missing, biases that may be impacting the study, or additional codes and themes. To ensure dependability and confirmability, the auditor provided feedback and suggestions that were recorded and further reflected upon in my researcher journal. Agreed upon suggestions were added and documented in my researcher journal. Any disagreements or confusions would have been discussed with the auditor in order to reach a consensus, however no disagreements arose. If disagreements would have arisen and could not have been resolved, I would have solicited feedback from the participant themselves.

**Conclusion**

In this chapter, I provided background information on this study’s paradigm; methodology; epistemological and theoretical perspective; methods for participant recruitment, data collection, and analysis; methods for engaging in trustworthiness; and
my own epoche. Further, rationale was given for each element of the study. Much like
Chapter II, this chapter serves to provide a background for increased understanding of the
study for the reader. Findings and discussion presented in the remaining chapters are built
on the foundational information presented in this chapter.
CHAPTER IV

FINDINGS

Introduction

In this chapter, I will describe and illustrate the major findings of this study. The findings emerged from the data collected in response to the guiding research question: What are the lived experiences of counselor educators who integrate neuroscience principles to inform their counseling pedagogy? Data included an initial semi-structured interview and demographic questionnaire; a follow-up participant reflection journal; an artifact representing their use of neuroscience-informed pedagogy; and a second interview to discuss their artifact, discuss lingering thoughts, ask follow-up questions, and ensure accurate understanding of their experience. Data were then analyzed according to the analysis process outlined in Chapter III.

For ease of understanding, I have divided Chapter IV into three sections. In the first section, I will introduce the participants and present their demographic information. In the second section, themes that emerged from the data will be described and illustrated with participant quotes. A summary of these themes and a visual metaphor can be found in Appendix H. Lastly, in the third section, I will discuss my process as the researcher which includes my reactions throughout the study.
Participants

After recruitment and screening, six participants met the inclusion criteria and were selected to participate in this study. Inclusion criteria included: (a) professional identity as a counselor educator, (b) teach at a CACREP-accredited masters and/or doctoral counseling program, (c) access to video conferencing technology, and (d) identify as using neuroscience to inform their counseling pedagogy. Prior to selection, each participant was screened in a phone call to ensure they met criteria, to briefly discuss the neuroscience principles they use to inform their pedagogical approach, and to discuss the study in more detail. Through briefly discussing the neuroscience principles they use to inform their pedagogy, I aimed to identify if any potential participants cited neuromyths in education, rather than well-supported neuroscience research discussed in the literature (i.e. Bear et al., 2007; Hardiman, 2012; Sousa, 2017), to be excluded from this study. As discussed in Chapter II, neuromyths are often used and cited by educators not familiar with neuroscience research and thus did not meet criteria (i.e. identify as using neuroscience to inform their counseling pedagogy). During this screening process, all participants were found to meet criteria. No participants cited neuromyths as their neuroscience support. For the purposes of de-identification and anonymity, all participants either selected or were given a pseudonym which will be used throughout this document. Additional demographic information, by participant, are included below to contextualize the perspective of the participant. After compiling participant demographic information, all participants reviewed and approved their descriptions.
Summary of Participant Demographic Information

A summary of participant demographic information is given here to provide an introduction and quickly familiarize the reader with general information of the participants in this study. Demographic information by participant is provided in Table 1 below. Six counselor educators participated in this study. Half of the participants reported their gender identity as male (n=3) and half as female (n=3). Years teaching ranged from 5-32 years, averaging 12.8 years. Age ranged from 36-65 years. Additionally, through asking participants for any salient identities they wished to include in their write up, participants added white or Caucasian, Cis-gender, gay, and mother and/or parent. University positions by participants included core faculty, Associate Dean, Assistant Professor, Clinical Associate Professor, and Full Professor in Counseling. Again, all participants reviewed their demographic information listed below and gave approval.
Table 1

**Participant Demographics**

<table>
<thead>
<tr>
<th>Pseudonym</th>
<th>Age, Race, Gender Identity</th>
<th>University Title</th>
<th># of Years Teaching</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freya</td>
<td>37-year-old, white, female</td>
<td>Core Faculty</td>
<td>5 years</td>
</tr>
<tr>
<td>Flash</td>
<td>53-year-old, Caucasian, male</td>
<td>Associate Dean</td>
<td>17 years</td>
</tr>
<tr>
<td>Helen</td>
<td>36-year-old, Caucasian, female</td>
<td>Assistant Professor</td>
<td>8 years</td>
</tr>
<tr>
<td>Amygdala1 (Amy)</td>
<td>65-year-old, female</td>
<td>Full Professor</td>
<td>32 years</td>
</tr>
<tr>
<td>Ramon y Cajal (Ramon)</td>
<td>Cis-gender, 36-year-old, male</td>
<td>Assistant Professor</td>
<td>8 years</td>
</tr>
<tr>
<td>EPB (E)</td>
<td>White, Cis-gender, 36-year-old, Male</td>
<td>Clinical Associate Professor</td>
<td>7 years</td>
</tr>
</tbody>
</table>

**Freya**

Freya identifies as a 37-year-old, white, female. She is a core faculty member at her and has been teaching master’s level counseling students both in-person and in online formats independently for two years, and with co-instructors for three years, for a total of five years. She added that her role as a mother to a young child also felt important to include, as brain development and learning became more personal with a young child. She discussed watching her child learn and develop and how she conceptualizes this development from a neuroscience perspective. Freya felt as if most of her training in neuroscience was self-initiated and self-taught, including a psychophysiology class outside of her required master’s program. Throughout our interviews, Freya would often
pull from her own neuroscience research and writings to provide justification for her brain-based teaching.

**Flash**

Flash identifies as a 53-year-old, Caucasian gay male, with roots in the Southern United States. He is an Associate Dean and Counselor Educator with 17 years of teaching undergraduate and graduate master’s students. With a previous career in a medically related field, Flash names pharmacy school as providing the foundation for his neuroscience understanding. Throughout his counselor education training and practice for the past 17 years, he has continued engaging with neuroscience through teaching, workshops, and conducting his own neuroscience research.

**Helen**

Helen identifies as a 36-year-old, Caucasian female. She is an Assistant Professor. She has been teaching undergraduate and graduate master’s and doctoral students for eight years, primarily face-to-face. Helen reports that her training in neuroscience includes hundreds of hours of formal training with Dan Siegel’s Mindsight Institute and Bonnie Badenoch’s emersion in Interpersonal Neurobiology in Counseling. Additionally, she has completed several conference trainings and webinars in neuroscience. She has written several articles on neuroscience in Counseling.

**Amygdala1**

Amygdala1 (Amy) identifies as a 65-year-old female and full who has been teaching master’s students for 32 years. She reports having a wide range of training in neuroscience, including a graduate level neuroanatomy course, neurofeedback, quantitative EEG, and brain dissection. She has written extensively about neuroscience in
Counseling and Counselor Education and Supervision and is a leader in neuroscience at her university and in the Counselor Education field.

**Ramon y Cajal**

Ramon y Cajal (Ramon) identifies as a cis-gender, 36-year-old male and assistant professor. He has been teaching master’s students for eight years in face-to-face and hybrid courses. His neuroscience training includes trainings from the National Institutes of Health (NIH) and the Society for Neuroscience. Additionally, he has read around 25 neuroscience textbooks and has read 3-4 neuroscience articles a week for several years. He has done several neuroscience research studies and written extensively on neuroscience in Counseling.

**EPB**

EPB (E) identifies as a white, cis-gender, 36-year-old male and clinical associate professor who has been teaching master’s students for seven years in synchronous and asynchronous classroom formats. His training in neuroscience started in his undergraduate biopsychology course and continued in his master’s program with his emphasis in Rehabilitation Counseling. He has completed neurofeedback certificate training as well as HeartMath training and has read several books and articles on neuroscience. Additionally, he uses Brainstorm, a continuing education platform for mental health practitioners, as a source of monthly continuing education. Like other participants, EPB has written several articles on neuroscience in Counseling.

**Results**

The data analysis process revealed several themes. In addition to Moustakas’ (1994) phenomenological analysis steps, NVivo 12 (qualitative data analysis software) was used for the coding process. NVivo allowed me to store all transcripts from the first
and second interviews, artifacts, participant journals, and my researcher journal, as well as organize codes. No identifying information was stored in NVivo, as all audio sources and identifying participant information was kept in a separate password protected file on my computer and deleted once it had been de-identifed. As discussed in Chapter III, after first interviews, participants were given a participant journal to capture any additional thoughts and used for data. Only two participants completed participant journals, with the remaining four stating they did not have any additional thoughts to report. Similarly, participants were asked to submit an artifact that they believed demonstrated their use of neuroscience-informed pedagogy. All participants submitted an artifact which was coded with all other data and discussed for additional understanding in the second interview. Participants chosen artifacts included syllabi, teaching philosophies, and a conference proposal to be presented to master’s students.

After recruiting and screening for participants, my process of data collection and analysis as outlined in detail in Chapter III, followed the following steps:

1. First interviews with Freya, Flash and Helen.
2. First two interviews (Freya and Flash) sent to a co-coder. Co-coder and I engaged in independent open coding.
3. Discussed codes with co-coder to reach consensus. Beginning of Codebook created with 140 codes.
4. Coded Helen’s first interview and researcher journals with codes from initial Codebook.
5. First interview with Amy and second interviews with Freya, Flash, and Helen.
6. Coding of first interview with Amy, second interviews with Freya, Flash, and Helen, and researcher journal. Codebook modified with new information and
emergence of two broad categories, Neuroscience-Informed Pedagogy (the phenomenon) and Neuroscience-Informed Counselor Educators (the experiencers).

7. First interview with Ramon and E.

8. Coding of first interviews with Ramon and E, and researcher journal with modified Codebook. No new codes or information emerged. Data saturation was determined to have been met due to consistent repetition of information and no emergence of new information.

9. Codebook updated with the creation of initial themes.

10. Second interviews with Amy, Ramon, and E.

11. Coding of second interviews with Amy, Ramon, and E and researcher journal. Visual metaphor and final themes created.


13. All steps of research process and data reviewed by external auditor for feedback.

14. Findings sent to participants for member-checking.

15. Feedback of auditor and participants reviewed and incorporated into final document.

As part of the research process, I journaled in my researcher journal before and after each first and second interview throughout the study. Additionally, I journaled during interview transcription as thoughts and reactions came up. Once interview transcriptions were complete, I sent participants their interview transcript for member-checking and to allow them to review and expand where they felt necessary. Additionally, any areas where participants believed they may be identified were noted by
participants. Once participants returned their transcripts to me, I reviewed any comments and added information participants felt was important as well as took out noted identifying information. Only two participants ended up sending back their transcripts with comments which included minor word changes to better articulate their experiences and corrected spelling errors. Only one participant noted an area where they believed they could be identified, and this area was removed. No comments resulted in changes to the codebook.

To officially start the coding process, I sent Freya and Flash’s reviewed first interview transcripts to my co-coder for us both to independently engage in open coding. After combining our coded documents, my co-coder and I met via phone to discuss each of our codes and reach consensus on codes and language. Once consensus was reached on each code, I created the first version of my Codebook. This initial Codebook was comprised of 140 codes. As part of my coding process, I also journaled my thoughts throughout the open coding process. My researcher journals included information relevant to the study. Therefore, all of my journals were used as data and also coded. After coding the second interview with Freya, Flash, and Helen and the first interview with Amy, the Codebook was modified with new information and the two initial categories of Neuroscience-Informed Pedagogy (the phenomenon) and Neuroscience-Informed Counselor Educators (the experiencers) emerged. After coding Ramon and E’s first interview, I recognized that no new information or codes were emerging. Rather, Ramon and E’s interviews helped to expand and clarify existing information and initial themes began to emerge. These initial themes were the Neuroscience of Learning, the Neuroscience of the Teaching Process, Specific Methods and Classes, Qualities, and Beliefs. At this point, data saturation was determined to have been met due to consistent
repetition of information and the emergence of no new information. The Codebook was updated to include the initial themes and working definitions of each of them.

Once all data had been collected and analyzed, a visual metaphor of the findings began to emerge in my researcher journal and assisted me in creating the final themes and concepts within each theme. I discussed my visual metaphor and themes with my co-coder to ensure my impressions were consistent with the data. In this discussion, my co-coder and I reviewed each theme with participant quotes and brainstormed language to best label and describe each theme. From this discussion, I organized each theme label, description, and constructs within each theme into a table to be sent to participants for member-checking and feedback. All participants responded that the themes represented their experiences accurately and they had nothing more to add. Additionally, participant feedback suggested that they enjoyed the visual metaphor and believed it was a great addition. One participant suggested a language shift within the theme of Beliefs (from “neuro-ambitious” to “interest and passion for neuroscience”) and this change was made.

All steps of the research process were outlined and discussed in my researcher journal. My research journals, initial findings, and all de-identified participant data were sent to an external auditor for review and feedback. After reviewing everything, my auditor responded with thorough feedback stating they believed I had navigated my assumptions well, used understandable language, agreed with my findings, and suggested minor formatting changes. Lastly, they encouraged me to expand in my final document about my personal and professional relationships with participants, which I then added at the end of this chapter.
Here I will present the final themes, including descriptive participant quotes that illustrate the experience. I have organized the presentation of themes with two categories as follows: themes that describe neuroscience-informed pedagogy (i.e. the neuroscience of learning, the neuroscience of the teaching process, and specifics and methods) and themes that describe neuroscience-informed counselor educators (i.e. their beliefs about neuroscience-informed pedagogy and personal/professional qualities). Within each theme section, I describe the theme and the constructs within each theme. Participant quotes are included to provide a rich understanding of participants perspective of each theme. Additionally, my visual metaphor is included below (Figure 1.) and in Appendix H to illustrate the experience of neuroscience-informed pedagogy. The visual metaphor of glasses emerged in my researcher journal as I worked to conceptualize the final themes. The metaphor of the visual is described within each theme section in an effort to further illuminate the findings. From the data emerged a total of five themes which are described in detail below and can be found in Appendix H.

Figure 1. Visual metaphor of the themes.
Neuroscience-Informed Pedagogy

This first category represents themes that describe counselor educators’ process and methods of neuroscience-informed pedagogy. These themes emerged directly from participant verbal data during interviews or written data in their journals and artifacts that were discussed in the second interview. Within each theme are a number of constructs that make up the theme as a whole. A summary of themes and constructs within this category are provided for the reader below (Table 2.)

Table 2

Neuroscience-Informed Pedagogy: Themes within Category

<table>
<thead>
<tr>
<th>Theme</th>
<th>Constructs within Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuroscience of Learning</td>
<td>Relational</td>
</tr>
<tr>
<td></td>
<td>Emotional</td>
</tr>
<tr>
<td></td>
<td>Personally Meaningful and Interesting</td>
</tr>
<tr>
<td>Neuroscience of the Teaching Process</td>
<td>Planning a Class</td>
</tr>
<tr>
<td></td>
<td>Teaching a Class</td>
</tr>
<tr>
<td>Methods and Specifics</td>
<td>Specific teaching methods used and classes taught</td>
</tr>
</tbody>
</table>

**Neuroscience of learning.** All six participants endorsed the first theme of the neuroscience of learning. All participants spoke about their beliefs of how learning occurs from a brain-based perspective. This created the first theme, the neuroscience of learning, which is defined as beliefs based on participants’ understanding of the neuroscience of how learning occurs from neuroscience research and literature. These beliefs were informed from their personal experiences in connection with their understanding of neuroscience and how the brain learns and remembers. Freya discussed the neuroscience of learning by stating, “[I]t’s sort of a feedback cycle of thinking, okay from a neuroscience perspective, what do I know about how students learn and how can I
incorporate that?” Additionally, three constructs emerged that make up the neuroscience of learning (i.e. relational, emotional, and personally meaningful) and are described below. I viewed the three constructs of the neuroscience of learning as also following the feedback cycle described by Freya, with each having important individual elements but all connecting to each other and making up the neuroscience of learning. These constructs are presented separately below for clarity but seemed inextricably connected in practice. A major focus of this theme is the recognition of how memory occurs and what makes learning memorable.

The neuroscience of learning is represented in the visual metaphor as the frames of the glasses. The frames hold the lenses and glasses in place and support every element of the glasses. Essentially, the neuroscience of learning informs and supports how the participants believe the process of teaching and learning facilitation should occur as well as how they view themselves and others (i.e. students and other counselor educators) as learners. Further, the frames representing the neuroscience of learning are composed of different sections that all work together to create the support needed to uphold the glasses as a whole, much like the various constructs.

**Relational.** Five out of six participants explained the neuroscience of learning and memory in regards to its relational nature. Participants discussed this construct as being both a social experience - between the learner and someone else - as well as new learning occurring in relation to previous learning. For her artifact demonstrating her use of neuroscience-informed pedagogy, Freya chose a teaching statement and a syllabus. In her teaching statement, Freya wrote:

*We only learn new material in relation to what we already know. When in the classroom, I frequently ask students what they already know about the topic, how*
they are currently integrating the material into their understanding, and what they are taking away for future practice.

In our interview, she elaborated further stating:

Knowing how important it is to learn related to what we already know. We’re furthering neural pathways, we’re creating those neural networks, and building from those basic components as they get more and more advanced in that developmental model.

From this relational perspective of the neuroscience of learning, learning occurs by first connecting to what a person already knows or believes and then building off of that learning. In the same vein, Freya also talked about the process of changing beliefs or, “having to unlearn something.” She spoke of how in counselor education it the case is often that students will need to “unlearn” limiting beliefs in order to develop as a professional counselor and support their clients’ growth. This unlearning requires students to change some of their beliefs and be open to replacing them with new ones. Freya discussed how in order for a person to change their beliefs, it is essential to first access and explore the current belief. Once a belief has been brought to mind for exploration, information can be added in the context of the old neural networks or used to change the old neural networks. She explained, “[I’t’s going to be a lot harder if we just launch into something that’s too complex, or doesn’t have any context, or has no meaning. Cause that’s- they’re not going to get it.” Learning, unlearning, and relearning thus occur in relation to what has been previously learned.

Another way that that participants talked about the neuroscience of learning from a relational perspective was in regard to the relationship between the learner and someone else. Helen reflected in her teaching philosophy artifact:
Learning is enhanced in social environments (i.e., learning communities). The brain is a social organ; learning is maximized in the context of human relationships. I will seek to establish a connected classroom in which interaction and collaboration is the norm. I will structure the course to include small group discussions, group presentations, dyad sharing, and other interactive activities.

Succinctly expressed in her first interview, Helen stated, “[F]rom a neuroscience lens, I know that having this human in front of them that’s speaking some truth to that experience is going to stick with them much more than just reading about it in a book.” As relationally wired beings, participants saw student learning as being greatly enhanced when done in the context of relationships with other people.

While participants discussed the importance of student to student connection in things such as small group discussions, peer modeling, feedback, and group presentations, of critical importance to learning is the relationship between the student and the teacher. As Helen wrote in her teaching philosophy artifact:

Students will care more about what I know when they know I care about them and their learning. I believe a sound teacher-student relationship is critical to facilitating optimal learning. I want students to know that I am invested in their learning process. I will seek to know my students by name, maintain accessibility and approachability, and demonstrate genuine interest in their professional growth and development.

Similarly, Ramon wrote in his syllabus artifact:

The relationship between the instructor and the learner is pivotal to ensuring that the learning objectives of the course are met. A trusting relationship helps the learner feel comfortable with taking risks such as trying out new skills or sharing
vulnerable information such as acknowledging mistakes and accepting feedback. Learners perform best when supported and nurtured, such as by the instructor’s recognition of their risk-taking and efforts. As the instructor, I try to pay attention to my working relationship with the learners in the classroom, and check-in periodically about how our relationship is going. This focus on relationship also models a foundational component of effective counseling practice.

Other participants spoke of the connection between relationships in counseling and counselor education, such as Amy who stated, “[W]hether it’s students, or clients, or supervisees, our job is to build rapport with someone. Before you can teach them anything.” Through forming a relationship with students, participants were able to create a sense of safety in the learning environment, allowing for an optimal balance of challenge and support. Helen wrote:

Creating a safe classroom environment is essential to facilitate optimal student learning. Learning is enhanced when students feel less fearful, less self-conscious, and more accepted. Safety frees students to struggle with not knowing, to self-reflect, and to ultimately grow and develop. I will seek to create a learning environment in which students experience acceptance and understanding and are free to express their thoughts and feelings. I will establish and enforce guidelines for responding and interacting respectfully and authentically. I will make my expectations clear and respond to students in a consistent and predictable manner.

Throughout all of the interviews, participants highlighted that not all relationships facilitate learning. While caring and trusting relationships that focus on creating an experience of safety can facilitate learning, Helen noted that, “we are created as humans
to be in relationship and so it helps us learn but it can also distress our learning, it can complicate our learning.” Connecting this experience to her own life, Amy reflected on a harmful relationship with a previous counseling supervisor that she felt had impeded her learning when she was a student:

Every person that came out of his office cried. They were in tears. And I thought, ‘That person is never going to make me cry.’ I would go home and cry, but he is never going to see me cry… [H]e thought the way to teach people was to mold them in the way he thought it should be. And what he didn’t understand is that we now know…we know that in the limbic system, which is our emotional brain, that if I criticize you enough, the whole limbic system is going to shut down. The amygdala is going to go into effect, and I am no longer going to be able to connect to the prefrontal cortex. My inner eye is going to shut down and the polyvagal nerve is going to say, ‘fight, flee, or freeze.’ And so, we’re not listening to anything you’re saying. And so, this all translates to either students or clients.

Or children. Or spouses.

Upon inquiring how she created safety with students, Amy stated, “You look them in the eye. You do as little technology as you can, because we’re already filled with technology. You talk to them in a soothing voice. You do not criticize them a ton, but you do constructive criticism. You ask them, how do you want your criticism?”

While participants endorsed the importance of safety, they also cautioned that a safe trusting relationship does not imply a conflict-free relationship. Laughing, Helen expressed, “Yeah, relationships are not all rainbows and unicorns (laughs).” Participants talked about using their relationships with students to promote growth, including growth through challenge and conflict. Helen continued, “[I]t’s not that we want our students to
be comfortable all the time. They often need to be challenged and pushed- or not pushed but nudged- into an area where they feel some discomfort… we learn a lot through difficulties as well. It’s just about managing that in a useful way.” Through the creation of a safe relationship, participants were able to nudge students into an optimal level of emotional arousal for learning.

*Emotional.* Another construct within the neuroscience of learning that came from four of the six participants was emotional arousal. Participants reflected on how information presented with or that produced emotion was seen as more likely to be registered by the brain as important, thus more likely to be encoded into memory for learning. As E stated, “It’s sort of that giving the brain a reason to learn something.” He viewed learning as being enhanced by giving students an emotional reason to learn, therefore he focused on creating learning experiences that naturally produced emotional arousal. Rather than simply telling students that the information was important to remember, he discussed his use of problem-based learning to create an optimal level of emotional arousal that would naturally motivate students to learn. By simulating a real counseling problem, students experienced a gap in their knowledge and understanding needed to solve it. From a neuroscience perspective, the awareness of this gap situated with the presentation of the problem created a facilitative emotional discomfort that drove students to fill the gap by seeking more information. As E shared:

[I]t’s raising the arousal level by putting some sort of real-world consequences attached to the learning to motivate action. Rather than just passive A+B=C. Like, okay, great, but why do I need to know A+B=C? …[I]t creates the need to know at a neuro-level… there’s some psychological motivation but I would also say some physiological, neurological motivation.
Other participants also discussed the emotional aspect of the neuroscience of learning, expressing that boring information that doesn’t create emotional arousal does not get remembered long-term by the brain. As Helen stated, “I know that if something is not emotionally arousing at all, if it’s boring, then their ability to remember it long-term is going to be much less.” Freya, too, talked about creating opportunities for students to experience emotional arousal. She expressed, “There needs to be some sort of anxiety…to deepen learning.” She elaborated on her rationale of emotional arousal in immersion experiences stating:

[T]hey’re having to go somewhere that might make them a little bit anxious…

Because there’s the relational and emotional component, what they’re learning is actually going to be encoded stronger in their memory systems. So they’re going to be able to retrieve it better.

Similar to the way relationships were discussed above, emotions were also seen as something that could impede learning. Specifically, E stated, “I think if I had to say there’s one contribution from neuroscience that’s been the most important it’s been the arousal piece. And just helping acknowledge the arousal that’s going on internally and how that can interfere with learning.” Participants discussed the importance of an optimal level of emotional arousal or balance so that students were emotionally connected to the material but not emotionally flooded by it. Freya expressed:

That’s one of the pieces I think about the most often related to neuroscience of instructional theory is that the most impactful learning experiences have that optimal amount of anxiety or that optimal amount of emotional content to them. Because if there’s no emotional content, it doesn’t get encoded as important and it doesn’t actually form useful memories. And then of course if there’s too much, it
goes into the implicit system versus the explicit system and its more trauma-based memory than it is retrievable memory.

Helen echoed this perspective stating:

[I]f I’m triggering, for example, trauma memories in a student and they’re too aroused, then they’re probably not going to remember much. Because they’re just going to be so lost in trying to regulate their own experience in the moment… I try to aim to create classroom experiences that hit that middle spot.

Emotional arousal was viewed as existing on a continuum, with enhanced learning occurring for each student at their own individualized “middle spot.” Helen reflected on the difficulty of knowing every students’ emotionally flooding areas expressing, “How can we know what’s going to touch those memory points in everyone? We won’t know.” Rather than forsaking emotional arousal in their teaching, participants discussed the importance of planning teaching moments intentionally, flexibly, observing student autonomic arousal cues, verbally checking in, modeling emotion regulation, and teaching students self-regulation skills.

**Personally meaningful and interesting.** Lastly, the third construct within the neuroscience of learning was endorsed by all six participants. In order for the brain to register information as important to learn, students needed to be interested and care about the material. While relationships and emotions could create interest, an important third aspect of learning interest at the neuro-level was information students could connect to on a personally meaningful level. Often, relational and emotional interest was useful because it connected to something students found personally meaningful. Helen described this aspect saying:
I think people in general are most emotionally aroused when something touches their own personal experience or relevance… So, I teach attachment styles in the human development class and people have their own attachment related experiences, both in childhood and their adult romantic partner relationships. And so, I ask them to reflect on those experiences and to share them in their small groups. And I know that that’s very personal and might toe the line of too emotionally arousing but that it does get them thinking, and talking, and hearing, you know, about others experiences and really trying to make sense of them.

Connecting learning to personal educational and career meaning, Ramon wrote in his syllabus:

Learners often respond best when content knowledge is made practical and relevant to their own educational goals. As the instructor, I should therefore ensure that the learning objectives of the course are relevant to the learner, and that practical examples are provided for content knowledge to be applied.

All participants reflected on the various ways they strove to make class personally meaningful in order for students’ brains to register the information as important. Once information was recognized by the brain as important, it was more likely to be encoded and retrieved later when students were practicing clinicians.

Further, participants discussed the importance of connecting the course content to each students’ personal experience or meaning. Flash asserted:

[E]verybody has the same content. Everybody has the same, you know, assignments and stuff, but everyone needs to come out of it with something that’s valuable to him or her. And it’s going to be different based on your- what you bring into the picture. You know, your strengths and your growing edges, your
deficits or the power you already have and how do you harness that to overcome these deficits.

Learning, while relational, was also an individualized experience based on each students’ previous experiences, interests, and future goals. From a brain-based perspective, Flash highlighted the importance of helping each student find their own individualized meaning and interest in the course. This individualized focus was facilitated by the teacher but seen as the responsibility of the student. For example, Amy assigned students to choose a neuroscience article they were personally interested in and present it to the class. She described the process of discovering students’ individualized personal interests fascinating. She shared:

Oh, we had great articles! It was so much fun to see what each student chose. I mean, it’s a great projective because I think we all choose things that we’re interested in or that impact ourselves. Whether it’s social justice or whether it’s the gut-brain axis, or inflammation and depression. I mean it was just so interesting.

Through this and similar assignments, participants were able to ensure each student found personal meaning in the course content and provided opportunities for students to share their passions and learn from each other.

The neuroscience of learning was one of the first themes to emerge from the data and seemed to be the foundation from which the remaining themes branched off of, as is depicted in the glasses metaphor. As such, it felt important to describe this theme first. Within this theme, the aspects of learning as relational, emotionally arousing, and personally meaningful emerged. All participants reflected on the various ways the neuroscience of relationships, emotions, and personal meaning enhances the learning
process. From their understanding of the neuroscience of learning, emerged the next theme, the neuroscience of the teaching process.

**Neuroscience of the teaching process.** The second theme under the category of Neuroscience-Informed Pedagogy is the neuroscience of the teaching process. As previously stated, the neuroscience of the teaching process is informed by participants understanding of the neuroscience of learning. This theme includes participant reflections around teaching their classes, whether it be in single class session, a single teaching moment, or a whole semester course and was endorsed by all six participants. The teaching process was described as more than just a collection of methods, content, and courses, therefore these specifics are separated and described in the next theme. Rather, this theme captures participant experiences of the underlying process of learning facilitation that they intentionally engaged in based on their understanding of the neuroscience of learning. Essentially, participants collectively discussed a thinking process summarized by Freya, “How do we learn… And thinking about in a really intentional way, how do I actually create that?” She continued:

I think it happens on several levels. One of which being structuring the entire course. And thinking about how to start the course with the scaffolding, and then how to create meaningful assignments that actually have applications and personal learning and personal meaning-making that goes into that. And then the individual learning encounters or class time. Really paying attention to how the students are engaging in the material and being able to adjust your approach…and where do they need to start?
Two constructs within the neuroscience of the teaching process emerged, with several elements housed in each. For ease of understanding, I have separated these two aspects into planning a class and teaching a class and described each below.

The neuroscience of the teaching process is represented in the visual metaphor as one of the lenses of the glasses. Supported by the neuroscience of learning, the neuroscience of the teaching process lens changes how counselor educators view teaching, learning facilitation, and their role as teachers. A major focus of this theme is intentionality and reflection in the teaching process.

**Planning a class.** All six participants shared their intentional thought process and procedures used to develop and plan their classes from a neuroscience perspective. Rather than sequential steps, participants discussed their planning as a more fluid process. Two participants labeled this common planning process as occurring in levels. These levels seemed to include the initial thought processes, stimulation of interest, foundational learning, and addition of layers. Rather than following a rigid sequential order, participants moved back and forth from each progressive level of planning after their initial thought processes. Often, very large amounts of time were spent carefully planning their courses. Ramon, for example, stated, “I would say that, I tend to take course development very seriously. I will take it and work on it for quite a long time. So, that course I probably put in hundreds and hundreds of hours into it.” Similarly, in my interviews with Freya, Helen, Amy, Flash, and E, they would share their continuous reflective thought process and questions they asked themselves before, during, and after her classes. Participants spoke of how, prior to teaching a class, they would reflect on what neuroscience researchers describe as an optimal learning environment and what
assignments, discussions, and activities they could facilitate that would stimulate learning.

First, all participants started with the course objectives and a version of the question “What do I want students to know by the end of this course?” This general question assisted participants in sorting through what information was essential and needed to be highlighted above other information. Freya reflected, “[I]t’s not how do I take this book chapter and condense it to fifteen PowerPoints over a two-hour course, but starting from the end. Making it about what do I want the students take-aways to be.” Highlighting important information was essential from a brain-based perspective, as participants stated the brain could only retain so much information. Participants discussed how it can be easy for counselor educators to get focused on covering all of the material without recognizing the brain’s limits for absorbing information. While teaching all of the material could give the impression of a very knowledgeable teacher or “sage on the stage,” (Freya, first interview) participants did not see it producing enhanced learning. Freya continued:

In my doc program, I was like, “I know all this stuff! Let me tell you about it! I can tell you everything you need to know!” And people were like, “uhh, I don’t care.” You know, just that information dump wasn’t actually translating to any learning. Because it was all about me. It was like, “Let me tell you everything I know.”

Further, Helen talked about how approaching teaching in this way could harm learning by increasing the power differential between student and teacher, making students feel overly intimidated. She shared:
For some students that might garner respect, but for other students it’s just going to make them feel inferior or like, ‘I can never know as much as her, so I’m going to go into that shame place.’ Which is not a learning state either.

E related to this idea of too much information and assignments being unhelpful by stating:

[Is it necessary? Or does it just add another cognitive load to a person’s existing schedule? You know, I think I’ve had to have some harder debates with myself recently about what’s really necessary. Does this just sound good? Is this just a traditional assignment that everybody does? Is it tied to a standard that I have to measure and evaluate? So, I think I’ve had a lot more debates with myself about just how much is enough and trimming the fat that’s not necessary.

By being mindful of the teaching process and starting with the end goal in mind, participants could carefully construct a general picture of what the course would look like and move from “what do I want students to know?” to “how do we get there?”

Informed by the neuroscience of learning understanding that the brain does not pay attention to boring information, the first level of planning involved the stimulation of student interest. Flash stated, “Yeah, I like to shake it up and keep it from being boring… It’s like, oh that’s so boring, but if I did it this way, that would make it interesting again.”

He and other participants discussed various teaching processes they used to stimulate interest to get students engaged, such as E who used problem-based learning to motivate students using the neuroscience of emotion in learning or Amy who used personal meaning. Similarly, Helen talked about starting her classes with a relationally connecting story to stimulate interest. She shared, “I try to start class with a story. Because, you know, one of the things that I’ve come to know is that the human brain really likes stories
and really can remember concepts within the context of stories.” She discussed how she would start her child development class with a children’s book about a boy who believed he was falling apart based on what adults understand to be normal body changes (i.e. ear wax coming out, loosing teeth, etc.). The intention of this book was to illustrate how children have different perspectives based on cognitive development and Helen shared that reading it to her class created interest in students learning about child development.

Flash talked about stimulating interest through the use of visuals and by showing students the end result first. To stimulate interest in learning neuroscience he said:

I often start a presentation or lecture with, “This is the end result. Here’s a really complex picture with brain regions and structures and neurotransmitter pathways, and different color arrows.” And I say, “this is the end process, and by the end of this class or workshop or whatever, we’re going to be there. But we’re not going to start with this. This is just for you to see what the end will be.”

By showing students the end result first, he believed students became interested and their brain was primed for learning the material they would encounter in the future of the course.

Once participants planned how they would stimulate interest, they moved on to planning the foundational learning needed at the start of the class. This foundation consisted of basic concepts to create a framework of understanding in the brain that students could build off of as the course continued. Discussing how he plans and teaches neuroscience, Flash stated, “We start off with me talking about and us discussing basic neurobiology. And we talk about the brain, we talk about neurotransmitters, we build that foundation.” Freya, too, talked about how having a foundation allowed for her to plan more emotionally charged and complex learning further along in the class. In reflecting
on a powerful and vulnerable learning activity in her multicultural counseling class, she stated, “I think it had the impact it did because I had done the foundation and the scaffolding to start the class.” Through thoughtful planning, she had laid foundational information that she could build off of, add layers to, and return to when students became confused or dysregulated.

Lastly, participants talked about planning layers of learning. In discussing how he plans his classes to make them understandable, useful, and interesting from a neuroscience perspective Flash stated, “You’re kind of adding layer after layer and that breaks if off into chewable chunks so that they can understand it.” In order for students to develop complex understandings of topics, layers were added to foundational learning to go from basic knowledge to competent professional. Discussing the neuroscience of scaffolded learning in layers Helen expressed:

I think scaffolding is also something that has some neuroscience support in terms of how we learn and how neuroplasticity occurs, you know. You really don’t jump from no knowledge to mastery. You know, it’s this learning journey. And so, giving students the opportunity to kind of build those neural pathways of self-awareness in these areas, or resonance with someone else, or ability to reflect. Really just kind of intentionally laying down those pathways very early on.

Ramon shared his layering process as:

[Having students first be exposed to something, to read an article or read a book chapter. Then practice it. Practice either using it conceptually or actually demonstrate, like in a group class you’d have them maybe lead a group. And then get feedback. And then, if you can practice independently and get feedback on their independent practice.
By scaffolding and laying learning, participants believed learning could be organized so as not to overwhelm students and shut off learning in the brain. Further, learning could build in complexity to create more informed and competent working professionals.

**Teaching a class.** After planning a class, the process of teaching a class within the neuroscience of the teaching process was endorsed by all six participants. Similar to how I saw planning occurring at levels, teaching a class emerged to me as occurring in circles or cycles. Flash expressed:

> It’s very reminiscent of how neurotransmitters work in the brain. We’ve always got something that builds and we’ve always got something that breaks down or slows down. So, it’s a loop. We can look at this as like a big circle and there’s never an end to it, it’s kind of an infinite circle, spiraling back on itself.

In describing her experience of teaching Freya talked about cycles, “you have little cycles and then the longer cycle.” Little cycles were individual teaching moments that fed into whole class sessions, which in turn fed into longer cycles of the whole course over the semester and the participant’s teacher identity. While participants talked about teaching different courses, the underlying brain-based teaching process remained the same, as Flash described, “[I]t’s pretty much the same. I have the same pattern and routine... So, it’s the same process every time, it’s just, you know, the topic changes.” Within each of the cycles of teaching were various teaching processes of making information understanding and useable, in-the-moment assessment and awareness, flexibility, and challenging. These processes are further illustrated below.

The first important teaching process was making sure information was understandable and useable. Related to intentionality in planning, participants talked about not overwhelming students’ brain with too much unimportant information or
complex jargon. In reflecting on his experiences with people overly immersed in neuro-work, E laughed saying, “I’m just like, ‘do you know nobody else can understand what the hell you’re saying?’” He and other participants discussed how information was only helpful if it was taught in a way that made it understandable and useful for students. Flash discussed the importance of taking complex information and teaching it in a way that was “digestible” to students. He stated:

My thought processes were I get this so how am I going to make this understandable and useable? And that’s kind of always been my perspective, or a place I start from: This is great information but it’s lofty and thick. And how do you break it down to make it useable? …[W]here it’s not over their head. Are they going to tune it out and turn it off?

He elaborated further in his second interview:

By keeping it simple that is changing the way their brain is processing the information. Basically, it goes along with a lot of andragogy and pedagogy, is we learn better if it comes in small chunks. And chunks that build on each other so it’s both just a principle but it’s also a way of learning stuff that’s just complex.

Connecting it to teaching neuroscience content, Flash cautioned, “[H]ow can you simplify it but make it complete so that you maintain the integrity of the topic without making it so complex… that underlying process of understandable, intact… and useable?” A phrase Ramon used of “distilling without diluting,” participants noted the importance of simplifying information in their teaching so that it was understandable and useful, but not overly diluted.

Another process participants discussed was in-the-moment assessment and awareness. This process focused on participants being mindful of both students and their
own emotional and physiological-neurological responses in the moment. Amy discussed her assessment of both students and clients’ physiological responses from the very first handshake. She shared:

[Y]ou might look at their hand, the first thing you see, and their hand is hot and sweaty and their voice is fast, and they don’t look at you. So, you start to assess the client from a whole different level. It’s not a piece of paper. It’s not a story. It’s a physiology. And from there you begin to have a better picture.

Flash connected to this informal assessment process:

In many ways, it’s the way I would assess a child in the play room. I’m going to respond based on what I’m seeing. And I’m going to figure out pretty quickly what specific things trigger you or send you down a dysfunctional path. And I’m going to try to stay away from those and try to get my methods across so you get the most out of this course, you know?

Participants discussed how they observed their students to assess engagement/disengagement, dysregulation, and more to optimize their teaching moments, like Helen who stated she works to, “adjust my teaching along the way as I look out and see how much they’re taking in and what their energy level is like.” Freya shared a teaching moment when a student appeared to get uncomfortable with a topic and how she navigated the situation, “And then one student sort of bounced out and completely derailed the conversation onto something else. And it was like, ‘Okay! Let’s actually stop and look at what’s going on here.’ And bringing it back to the moment.” By being mindful of their students’ responses, participants were able to gain awareness into students’ internal experiences and modify their teaching accordingly.
Related, participants also spoke about their attention to their own internal processes and implicit responses. For example, Helen talked about the importance of personal awareness in stating, “there’s an element of reflection on your part as well of how do I respond when I’m challenged?” She discussed moving past personal awareness to recognizing when you as the teacher get dysregulated or respond from your implicit memory system.

I think that that is so true from a neuroscience lens. We are always experiencing the world through this perceptual bias and responding to the world through this implicit kind of- and that’s from a neuroscience lens- the implicit memory is having actually much more of an influence on an interaction than we are aware of and that kind of our explicit conscious awareness is attuned to.

To Helen, it was important to be “aware of my response and kind of what I’m working on and I have to regulate that so I can really be present for the experience with the student.”

Further, she acknowledged that dysregulation or implicit responses on her part could impede student learning if she was not aware. She stated:

From an understanding of interpersonal neurobiology and understanding the role that relationships and interpersonal connections have on our experience… if a student is struggling and I’m in that relationship with them, I’m playing some role in that. And I need to own that and evaluate.

Participants recognized that both they and their students were human and as such neurological processes could impair teaching and learning if the physiologically linked response was not observed and navigated from a brain-based perspective.

By being aware of student engagement or dysregulation, participants were able to employ a flexible teaching process and adjust their approach according to the needs of
their students. In her teaching philosophy, Freya stated, “I see the classroom as a constant feedback loop in which I am adjusting my pace and delivery to engage students in the best way possible.” She elaborated in our first interview:

> Being able to kind of plan for that ahead of time and then also make adjustments in the classroom based on watching students’ autonomic arousals and how engaged are they? How connected are they? And do I need to dial it back a little bit? Do I need to push them a little bit harder?... So, it’s not just ‘Alright, I have my PowerPoint and I’m going through this slide and this slide’ but being able to make adjustments of either backing up and providing some of that foundation. Realizing that okay students already got this. Let’s jump ahead to something else. Or there seems to be some interest happening that is related to something I’m going to do like in the future, does it make sense to hold that or is there enough of an opening now where we could go that direction instead?

This flexible teaching process required them to be knowledgeable in their topic so that they were able to teach based on what was needed by students and the class and not what had been simply memorized.

Flash and E talked about their use of flexibility and working with students based on the ways that they learn best. E stated:

> Like, okay, you’re probably not going to learn the best in this way, what are some other ways that we might find that we can get you to the same outcome?... How do I reduce sort of unnecessary apprehension associated with a grade? Or for people that that’s the only motivating thing then how do I use that? And I think that’s where that sort of regulation piece comes in. For some, this is what
motivates them, for others this is what paralyzes them. And I think that there’s an individualized component.

While he stated, “I would love to be a little more flexible each quarter to quarter. But given the way it’s set up and we have so many different instructors, it can’t be as flexible as I want it to be” he mentioned several ways he works in flexibility within his courses as much as he can. One way he mentioned incorporating flexibility was by allowing students to decide how they wanted to take their quizzes. He shared students were allowed to choose if they wanted to study and take a quiz without any resources, if they wanted to use their resources in an open-book style, and if they wanted to take their quiz multiple times or just once. Flash, too, talked about making assignments flexible so that, “everybody’s going to get what they need out of the assignment.” Through the use of a flexible teaching process, students were able to choose which process worked best for the way they learned.

Flexibility, however, did not mean that students were not challenged and held accountable. Participants talked about the importance of challenging students and holding them accountable to help them learn and become great counselors. E stated, “[H]ow are we going to help people if we’re the only ones telling them that they have these limitations?... I think I can still be flexible with having some non-negotiables.” Helen, too, wrote in her teaching philosophy:

Teachers should provide sufficient challenge and support to facilitate student learning. I believe moving students from more rigid and limited ways of knowing to more flexible and evaluative ways of knowing is critical in counselor education. Students must be challenged to consider multiple perspectives, tolerate
ambiguity, and think critically. In the process of being challenged, students also need to believe they can be successful in their learning.

She and other participants discussed how they make their non-negotiables clear to students, through clear expectations in the syllabi, transparent discussion, reinforced boundaries, and one-on-one conversations with students as needed. By having something clearly written in their syllabi, participants believed it allowed them something to pull from to remain in their integrity.

Rather than creating irreparable distance with students, Helen stated:

I think students respect you when you do hold them accountable…I want a good relationship with the students, I want them to know I care about them, but similar to being a parent that doesn’t mean they’re always going to like you. And sometimes the closest relationships are one in which there has been some conflict or some negative feelings that are then talked through. So, I think that is part of the shift I’ve had to make is I’ve needed to try to care less whether they like me or not, and stick to my principles of ‘I’m doing the things I’m doing, I’m asking what I’m asking of students, for a reason.’ And so, when they’re not doing it, or when they do it poorly, I need to hold them accountable, even it’s going to make them not like me in the short run.

Amy discussed the importance of relationship and developmental level when challenging and holding students accountable stating, “I have to give criticism developmentally. That’s really important I think.” Sometimes this required her to spend more time focusing on the positives prior to suggesting feedback, however she stated, “the more safe the relationship is, the more succinct criticism I can give.” By holding students accountable and challenging them Ramon reflected that students took the work more seriously and
generally enjoyed the learning experience more. In discussing one of his more difficult assignments he stated, “The students do take it pretty seriously and will talk about struggles. And they embrace it in general. And talk about that being one of the better parts of the class in many ways.”

**Methods and specifics.** The last theme in this category encapsulates the specific methods, classes, and information participants used from a neuroscience-informed perspective and was endorsed by all six participants. Depending on their own educational experiences, participants were split on whether or not they felt Counselor Educators used neuroscience-informed teaching methods. In discussing neuroscience-informed teaching methods, some participants felt counselor education had moved “towards neuroscience-informed learning” stating, “I think in general, at least the experiences I’ve had in counselor education, [counselor educators] do a pretty good job of that.” Others however, disagreed and stated, “I think in the counseling [education] world we do everything wrong, actually.” Discussing their future writings on this topic, this participant stated, “And I have a [scholarly work] coming out on this and I’m sure people are not going to like it. But, we have to make our students as safe as we make our clients. Emotionally and physiological safe.” Regardless of whether they had experienced other Counselor Educators using neuroscience-informed teaching methods, all participants discussed their own neuroscience-informed teaching methods and content used with their students.

The specific teaching methods, classes, and content are represented in the visual metaphor as the screws that hold the different glasses pieces together. The specific methods, classes, and content were the practical and important pieces needed in order to turn a neuroscience-informed pedagogical perspective into something actionable.
Firstly, participants talked about the different classes they taught using neuroscience-informed pedagogy. Specifically, courses mentioned were:

- Multiculturalism/diversity
- Ethics
- Diagnosis and psychopathology
- Psychopharmacology
- Trauma, crisis
- Research
- Play therapy
- Assessment
- Theories
- Children and adolescents
- Human development
- Group counseling
- Family and relationship counseling
- Internship
- Various “neuroscience for counselors” courses.

While these were the courses mentioned that participants taught, most stated that neuroscience-informed pedagogy could be used to teach every class since, as Freya stated, “I think it has more to do with how I embody my identity as the instructor more than it has anything to do with the content of the course.” Since neuroscience-informed pedagogy was a philosophical perspective of teaching and learning facilitation most participants saw it as a superstructure that fit onto every class they taught. Similarly, Flash stated “it fits well with pretty much everything.”

E discussed how he uses neuroscience-informed pedagogy to teach his assessment course, not by necessarily teaching neuroscience in his assessment course but by using neuroscience to inform how he teaches his course. Further, he noted that being “neuro-informed” allowed him to use different neuroscience technology in his assessment course.

I might bring in a Brain Map that has z-scores and compares brain functioning to the normative database. That’s norm-referenced interpretation of EEG functions. So, I might bring that in to an assessment class because I’m aware of that neuro-element. But it’s the same concepts that we would teach anyway: z-scores, norm-referenced interpretation, same thing. The actual measurement is an EEG though, rather than a Beck Depression Inventory or something like that. Does that make
sense?... I think the best way to sum that up for me is, I’m not teaching them about neuroscience at all. I’m teaching them about norm-referenced interpretation and z-scores. That’s the learning outcome. But the exercise included a Brain Map.

All participants related to E’s use of neuroscience content in non-neuroscience classes. Flash talked about his use of neuroscience content and brain visuals regardless of the course, “Whether I’m talking about complex trauma or whether I’m talking about bullying or whether I’m talking about medication, whatever, creativity in counseling, I’m using the same basic visuals and talking about them from different perspective by topic.”

Ramon and Amy discussed the inclusion of self-regulation in classes such as internship. Ramon stated:

During internship I have weekly check-ins about self-regulation: “Tell me how your sleep is. Tell me how exercise has been the past week. What’s the use of substances been like? Tell me about how your contemplative practice is.” That’s all grounded in neuroscience, because if you look at Therapeutic Lifestyle Changes and there overall impact on everything, from very basic neurotransmission to more complicated things like hypercortisolism, those practices are very very important.

Amy discussed checking in with a student about how his lack of sleep was impacting his professional growth as a counselor stating. “I need them to be as healthy as they can be,” she stated. “They’ll be better counselors! If they’re healthier people. And that’s in our ethical guidelines. ‘Do what’s in the best interest of your client’. Well, I can’t do that if I’m not well.” She also shared how she discusses with students the neuroscience behind how a lack of sleep can interfere with learning:
I teach our students all the time about sleep hygiene. Which then translates into teaching it to our clients. But we need to know what sleep does for us. We need to know what the glial cells do. We need to know that they wake up when you’re in deep sleep and they go in through the spinal fluid and they eat up, you know, toxins in the system.

Ramon discussed the neuroscience of sleep and health, stating, “If you don’t have adequate sleep, you can’t attend, you’re crabby… those things impact how you are with a client.” He continued:

They impact how you show up. And I will cite studies around, for example with sleep, I’ll cite studies sleep deprivation and what that does. And talk about some of the problems with reduced glutamate and BDNF and how it impacts things like long-term depression- and I’ll help the understand the difference between LTD and major depression. I’ll give some of the neuroscience terminology so that they understand why sleep matters. I’ll do the same for exercise, I’ll talk about how, for example, exercise is known to increase BDNF (audio cuts), which is important related to the muscle protein irisin. All of that actually increases hippocampal volume over time, which is good for memory formation. And memory formation is crucial to therapy because you need to remember things over multiple points in time with a client. So, we’ll connect all of that to clinical practice.

Neuroscience content in non-neuroscience-based courses was viewed as helpful from a brain-based teaching perspective because it informed students on how brain-based wellness practices could improve their learning and professional practice.

Participants often stated that, regardless of the course, they found it helpful to share neuroscience research with students in regard to how the brain learns best. Not
wanting to overwhelm students with information unrelated to their course Helen stated, “They probably don’t care that it’s the hippocampus that is more alive, so to speak, or more valuable in terms of memory.” She continued:

I don’t go into, ‘this is the part of the brain or this is the neural system,’ I just talk about, ‘In general, your brain learns best in these conditions.’ And then if they truly are curious, then I’ll share with them more details or I’ll forward them research.

While neuroscience-informed pedagogy was viewed as something that could be applied to teaching every counseling course, Ramon cautioned other counselor educators not to include neuroscience content in non-neuroscience courses when it was not appropriate stating, “If you can’t connect it to the work, it’s not relevant to students…If I just tell them, ‘It helps your memory capacity improve!’ Well, that’s great but unless you connect it to clinical work it’s not relevant to them.”

Participants discussed a wide variety of teaching methods they employed including experiential activities, modeling, neuroeducation (i.e. teaching neuroscience), observing student arousal cues, reflective discussions and writing, problem-based learning, stories, visuals, and those discussed below. While some of methods were considered popular teaching methods, what made them different to participants was their neuroscience of teaching conceptualization. Understanding the neuroscience of the teaching process brought about different intentionality and understanding of these methods, as now their rationale for use was rooted in the neuroscience of learning. For example, use of experiential teaching methods such as student role-plays was understood to be helpful for learning because participants understood that active, sensory-rich, emotional, and relational experiences were encoded better in memory systems. As Helen
stated, “I think that, from a neuroscience lens, I know that having this human in front of them, that’s speaking some truth to that experience is going to stick with them much more than just reading about it in a book.” She continued later in the interview:

We learn more by doing, than by just being a passive recipient of information.
That isn’t going to stick with us as long as learning through a discussion or through writing or reflecting. You know, just all of the different ways we might interact with the material in our field. Doing, you know, actually getting in a room and talking with someone.

Participants often talked about coupled role-plays with reflective discussions to help students connect their experience to something meaningful for the brain to remember. E described this as:

Help people have new experiences and then make meaning out of it. And I think I would say that clinically or educationally. You know, it’s not my job to teach you anything, it’s my job to create an experience in which you learn things about yourself, and the world, and the people you’re going to work with. Same thing in counseling. It’s not my job to fix you, solve you, teach you per say, but to provide you with new experiences through which you learn, explore, understand.

Role-plays and reflective discussions, commonly used teaching methods in counselor education, were understood by participants to enhance learning because they connected to the ways the brain learned best.

Another popular teaching method participants discussed was wellness-based/self-regulation methods. This teaching method was described by participants in several ways. As previously discussed, Amy often talked to her students about wellness and viewed their health as essential for successful counseling practice. She stated, “I really work hard
with my students on self-regulation skills.” Amy and Helen both reflected on various ways they create opportunities for wellness and self-regulation in their classes. Helen shared that during her weekend classes she encourages students to bring tennis shoes to class so that on meal breaks they can walk around the city. “Some people don’t and probably judge me for my over enthusiasm for walking,” she says laughing, “but I try to integrate that in… I try to encourage and even give some chances for them doing things that are going to enhance their ability to be present and to learn.” Along the same lines, Amy used movement in her classes as well. “I think we should stop teaching in a classroom,” she shared:

We sit people in a circle and tell them to sit down and be quiet- it’s ridiculous. I tell my students all the time, “stand up when you need to stand up. If you want to, wander around the classroom.” Because my classes- I don’t know maybe they’re like yours- are 3 hours. So, wander around as you need to. In the summer time, we actually walk together in the class. Probably as counselor educators, as an assignment, we should force people into going to the gym once a week and giving them credit.

Ramon actually does use wellness-based assignments in his classes. In one of his courses, he asks students to complete a semester long Self-Regulation Plan that consisted of tracking their own neuroscience-informed “lifestyle behaviors that support mental health and wellness.” In his one of his syllabi he writes:

As counselors, we act as “holding containers” for the client’s emotions and experiences, so that clients may examine these without fear of judgment or invalidation (e.g., “fix it” problem solving). The weight of the stories that clients share with us can be heavy to bear. We have the ethical responsibility to take care
of ourselves so that we can be attentive, attuned, and empathic. Our self-regulation is thus crucial to the effectiveness of the services we provide to clients. For this assignment, students were required to track sleep, physical exercise, diet, use of substances, and contemplative practice as well as create goals for each of these categories.

Other participants focused more on teaching students specific self-regulation methods in their courses. Whether it be mindfulness, yoga, interoceptive awareness, diaphragmatic breathing, heart rate variability, or the Healthy Mind Platter, all participants included some type of neuroscience-based self-regulation teaching method in their courses. Amy reflected:

I just taught [heart rate variability] Monday night in my crisis class. M wave material, skin temps, diaphragmatic breathing - all those should be taught in our classes. Because our students should be learning in the parasympathetic nervous center mode, not the sympathetic nervous center. And most students who are hyper and are tense about life and grades in general are focusing in the sympathetic nervous system. So, I think all of those things should be done.

Teaching, and more importantly, modeling self-regulation was essential as summarized by Amy who said, “I think we can only take our students as far as we’ve gone ourselves. I think we can only take our clients as far as we’ve gone ourselves.”

Neuroscience-Informed Counselor Educators

The second category represents themes that describe neuroscience-informed counselor educators, such as their underlying beliefs about neuroscience-informed pedagogy and personal and professional qualities. These themes emerged not just from
direct verbal or written data but also indirectly through my researcher journal as I journaled experiences of them as data were collected and discussed. A summary of themes within this category is provided for the reader below (Table 3.)

Table 3

*Neuroscience-Informed Counselor Educators: Themes within Category*

<table>
<thead>
<tr>
<th>Theme</th>
<th>Constructs within theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuroscience-Informed Counselor Educator Qualities</td>
<td>Compassion and Understanding</td>
</tr>
<tr>
<td></td>
<td>Intentionality</td>
</tr>
<tr>
<td></td>
<td>Interest and Passion in Neuroscience</td>
</tr>
<tr>
<td>Beliefs about Neuroscience-Informed Pedagogy</td>
<td>Integration</td>
</tr>
<tr>
<td></td>
<td>Responsibility</td>
</tr>
</tbody>
</table>

**Neuroscience-informed counselor educator qualities.** The first theme of neuroscience-informed counselor educator qualities was endorsed by all six participants. As I sorted through the data, I noticed that all of my participants shared similar personal and professional characteristics or qualities that appeared to be influenced from their experience with neuroscience-informed pedagogy. These qualities were not always directly verbalized by participants but instead reflected back to them by me based on my experiences of them. These qualities are separated below and include compassion and understanding, intentionality, and an interest and passion for neuroscience. To ensure my perspective of them was not overly biased, I checked my impressions both with my co-coder and with my external auditor. Both stated they saw these qualities in my participants as well. For the reader, I have also described my process, with quotes from my researcher journal, in a section below.

Neuroscience-informed counselor educator qualities is represented in the visual metaphor as one of the lenses of the glasses. Much like the other lens, the neuroscience of
the teaching process, this lens is supported by the neuroscience of learning. Rather than changing counselor educators view, it changes who they are. A major focus of this theme is how participants present themselves to the world.

**Compassion and understanding.** The first quality that I noticed was a sense of compassion and understanding, directed at both themselves and at others. This quality was endorsed by all six participants. While compassion and understanding can be a quality seen in a lot of counselors or counselor educators, the difference in my participants seemed to come from an understanding of human functioning from a neuroscience perspective. For example, Freya talked about noticing herself becoming emotionally dysregulated when a student derailed her class stating, “I had a little bit of flooding going on. And being like, ‘whoa, okay, well this isn’t how I thought this was going to go.’” Rather than becoming angry or irritated at the student, she pulled from her neuroscience background to get to a place of compassion and understanding. She named that she had to “attend to my own emotional state so that I could actually be grounded and attuned to the student’s needs.” After noticing her own dysregulation and attending to her own emotional arousal, she was able to understand that her student had derailed the class due to her own anxiety and needed to approach the topic from a safer direction. She described thinking, “Okay, what can we bring back in that is going to be a different way of engaging with the material that’s going to reduce the anxiety response to a more optimal learning zone?” From this place, she was able to compassionately attend to her student’s needs, while still facilitating learning around the topic of discussion.

Another way that participants demonstrated compassion and understanding was in response to their fellow counselor educators, particularly those who hold different points of view around neuroscience. In discussing how some counselor educators resist the
inclusion of neuroscience in counseling and counselor education E stated, “People will criticize it, and that’s fine.” In discussing an occasion where he and another counselor educator engaged in a respectful debate around neuroscience in counseling, he said:

I think we’re both better because of it, honestly. You know, it really had me take a step back and pump the breaks a little bit and really look at that. And I think that was super helpful for me and came at a really important time. And I hope- and I think the same happened on the other side too.

While he was passionate about neuroscience in counseling and counselor education, he held that, “They’re just philosophical tenants still. Like they’re not- there’s no physical manifestation of this thing. So, if you want to consider neuroscience a philosophical stance too, that’s informed by some different science, then I’m okay with that as well.”

Similarly, Ramon expressed, “I don’t think, Savannah, that neuroscience is seen as central enough to be able to say that neuroscience is something that everything else builds off of, which is the way I think of it.” He continued, “I think for a lot of people it would be seen as a specialty.” Both E and Ramon recognized that counselor educators all have different interests, experiences, and passions and extended understanding and respect to those who had different beliefs and interests than them.

Several participants believed that some counselor educators’ resistance to neuroscience stemmed from fear of being incompetent. Flash expressed:

I think there’s some fear behind it because we don’t necessarily own it. We don’t embrace it as the center or a pillar in counseling so there’s some apprehension about using it because people think about ethics. “Am I being ethical? Am I competent? Do I know enough to give valuable information without leaving out something that’s important?”
He continued, “And it’s not necessarily about harming anyone. It’s about, I’m not going to be good enough” ending with, “We’re all perfectionists.” Understanding counselor educators’ need to feel competent, he was able to hold a place for compassion for differing opinions. He also asserted, “The ones that wanted to know more, I could teach them.” He talked about sharing lists of quality resources with any counselor educator wanting to learn neuroscience saying to them, “Here’s the resources, here’s the things that will compliment and help build your foundation so that you can find the place of how this compliments what you’re teaching.” For those aimed at perfection Amy stated:

There still is a faction of people who think- there’s three pockets. There’s a pocket of people who think we shouldn’t be doing this at all. And then there’s a pocket of people who say, “It’s got to say neuroscience. It can’t say neurocounseling.” And then there’s the people who really like the idea of neurocounseling. And I think for me- I’ve already said this to you but, we’re never going to be neuroscientists. Never. Well I’m not anyway, and most people are not.

For Amy and the other participants, integrating neuroscience into their counseling and pedagogy was not about being perfect and becoming a neuroscientist, but rather using neuroscience to enhance what you already do.

Neuroscience helped participants show compassion and understanding to both their students and themselves as well. In describing her experience of neuroscience-informed pedagogy in supervision, Helen shared:

When I’m in supervision and I have a student who is being defensive, from just the little neuroscience I know I can think about, “Okay, they’re perceiving threat right now. Something I’m doing or saying is having their system feeling
threatened and they’re being defensive from that perspective.” Versus “They’re just being defensive because they don’t want to change.” Or maybe I take it personally like, “They don’t like me so they’re rejecting my ideas or suggestions for what they need to do.” I see it more from like, when a person goes into that defensive state it’s because they have some neuro-level of perceived threat. So, what my clinical supervisory, and you can say instructor position, is going to be from that mind frame is going to be, “How can I get into a sense of safety right now so that we can explore what’s going on?” And that might not always be possible, but that’s the lens I’m going to see that interaction through. And that comes directly from my understanding of neuroscience and the threat response and safety system.

Amy shared a neuroscience of safety perspective stating, “That’s what you have to do to help your students feel safe: you have to care. And they have to know that they’re cared for. That I’m not the enemy (laughs). That I’m an ally.” Similarly, E talked about caring for his student’s health stating, “I’ve been really focused on graduate student health lately… Focusing on the whole person as a student.” Not only did he understand that a well student contributes to learning and better clinician practice, but he held a compassionate understanding of his students as people. “Me expecting you to take a 100-question multiple choice exam- like maybe that’s just not as important as feeding your child, and being a single parent, and trying to get your kid to school and all of that stuff.”

E’s compassionate understanding led to him having debates with colleagues as well as himself about what was essential to include in counselor education and what was being done out of tradition.
We have this belief that if I give more assignments, or more content, or more reading, that you’re going to be a better counselor and I don’t know that any of that’s true. I don’t know that there’s a ton of difference between a person who gets a C and a person who gets an A ten years down the road. I don’t really know. I don’t have any evidence to support that, either way. So, I think that’s where it always comes back. Like, how can this person get a C and this person get an A and it doesn’t really mean anything in the long run? So, that’s how I have to think about trimming the fat. And it comes back, for me, to that arousal, anxiety, whole-person sort of view, that is informed by neuroscience. Or I guess, more aware, more sensitive to, because of understanding of the neuroscience of human development, of learning, those pieces.

Powerfully, he continued:

I think it’s the, I don’t know, maybe my own hypocritical nature of like, “Practice self-care. Make time for self-care. But I’m still going to give you all these things to do that are going to create a natural barrier to you doing that.” So, I think one, it’s just me kind of owning that a little bit. And going back to this idea- and in maybe an advising role too, like, “What’s going on around you, in your own life? How are you eating? How are you sleeping?” Like not just, “How are your grades?” But like, how are these other really important basic human needs. And, you know, I- my heart hurts every time someone talks about not sleeping… It’s just like, is that necessary? Does that have to be there? Is that a rite of passage? Is that beneficial? And I just have to have those debates. And I guess part of it comes from, again, that perspective of what’s necessary and what’s not?
Arguing with those who call neuroscience reductionistic, E stated, “One of the reasons I like neuroscience is because of its expansiveness.” He continued, “I think that’s really why I push back against the anti-humanist a little bit more and the people who think it’s reducing because, to me, I think it just expands beyond anything I could ever imagine.”

Rather than being overly scientific and anti-humanist, neuroscience-informed pedagogy seemed to make participants more compassionately aware of their students as individual humans and from that awareness change their classes to support them holistically.

Similarly, participants were more compassionate and understanding with themselves. As Helen stated, “I’m a person too.” Participants aligned around a sentiment Freya shared, that neuroscience “allowed me to be more human. I don’t have to be perfect.” They laughed at themselves when they made mistakes, encouraged students to challenge them, but also took time to care for themselves and attend to their own human needs. In all of this, they ensured they were practicing the principles they were teaching to their studies, as Helen wrote about in her teaching philosophy:

Teachers should model ethical and professional characteristics and behaviors. I refuse to fall in the trap of “do what I say, not what I do”. In my interactions with students, I am always modeling what it looks like to be a professional and ethical counselor, educator, and person. I resolve to be respectful, dependable, intentional, reflective, attentive, and authentic in my interactions with students Ramon agreed, saying that engaging in his own wellness and self-regulation “models to the student that I value walking alongside them. Not asking a student to do something that I’m not willing to do myself, kind of thing.” Freya shared:

If I’m not willing to do that and I’m not willing to model that for my students, it is not fair for me to ask them to do that either. It would create this disconnect in the
learning, in the sense that if I’m preaching one thing and doing something else, I’m creating this tension where they’re learning more from my doing than they are from my saying. So, then I’m not actually teaching them what I want to teach them unless I’m modeling it myself.

Neuroscience helped her, “let go of a lot of ego and perfectionism to be able to that,” acknowledging, “I’m still in the process of working on that.” She expressed, “It’s not something I could have done 5 years ago and I think knowing the neuroscience, knowing the why, as to why that’s so important, has made it easier to do.”

**Intentionality.** Another quality embodied by neuroscience-informed counselor educators was a sense of intentionality. This quality was also endorsed by all six participants. Interestingly, the quality of intentionality was noted by five of the six participants during their second interviews when I asked about additional thoughts from reading their first interview transcript. As discussed throughout all themes previously described, participants spent a thorough amount of time intentionally planning, reflecting, and engaging in practices that were informed by neuroscience. Each participant talked about intentionality in everything they did, like Ramon, who discussed spending “hundreds and hundreds of hours” engaging in careful course development. For E, intentionality meant “trimming the fat” and not giving assignments to students unless it was necessary and essential for their professional development. For Flash, it meant coming from a place of “extensive knowledge” and distilling it down in a “digestible way” for student. For Freya, intentionality meant continuously wondering, “what do I know about how students learn and how can I incorporate that?” For Helen, it meant intentionally incorporating movement into her weekend intensive courses because, “a healthy brain, a brain apt for learning, is a brain that is going to have movement
integrated into the day.” All participants agreed with Amy who stated, “intentionality is super important.” She continued:

[T]hat’s what you have to do. To make things work, you have to be intentional. You have to know what you’re doing is strategic. It’s not just listening to someone and paraphrasing back to them, that’s not effective… It’s rote, rather than truly understanding things.

Neuroscience-informed pedagogy was intentional teaching.

E spoke of how a lot of neuroscience in counseling and counselor education is done retrospectively stating, “I think there’s elements where definitely neuroscience has been used to confirm or provide evidence for something that’s already been done, in retrospect.” However, the more he and other participants learned about neuroscience and its applicability in teaching, the more they were able to use it intentionally in a prospective way. E continued:

Now, I think I design problem scenarios maybe a little bit different. More intentionally, since then… I guess neuroscience has really sort of, one, given some credence and evidence to those old practices, but also sort of enhanced in thinking more directly from an arousal lens as well as sort of a learning lens.

Staying with that quality of compassionate understanding towards herself, Helen expressed, “[I]f someone came in and observed my teaching there would be times where I am behaving in ways that are probably not aligned perfectly with the neuroscience of learning…But it’s an intention that I bring into my teaching.” An aspect of this sentiment was echoed by all participants. Throughout our interviews, they reflected on how, in the moment, they did not always recognize they were operating from a neuroscience-informed pedagogical perspective. Rather, they brought an intentionality to everything
they did in their teaching and only upon reflection did they realize it had been informed by their neuroscience understandings. As expressed by Helen:

It’s hard for me to separate out this is when I was intentionally using neuroscience and this is when I wasn’t intentionally using neuroscience, if that makes sense…

It’s just part of the template that I formed my identity as an instructor and what that was going to look like. So, yeah, it’s a little bit tricky to piece out because it’s so ingrained, I think, in the way that I started my teaching.

To her and other participants, this did not mean they were not intentionality using neuroscience in their teaching, but that neuroscience was so ingrained into their teaching identity that most practices they intentionality engaged in had neuroscience roots.

Freya shared that neuroscience “helps me have more confidence in what I’m doing and in being intentional.” She continued:

You know, drawing from, what does the research evidence say? And then what is the evidence of actually doing it?...When something works, it’s like going, Oh okay! I think I know why that worked! Because this is what the neuroscience says about it!

As discussed above, she and other participants engaged in common teaching methods but brought a brain-based conceptualization of the neuroscience of learning and teaching. She reiterated:

So, it was kind of like a cyclical thing of, okay this is what we do, is there neuroscience to back it up? What does the neuroscience say? Oh, that actually matches up with we’re already doing. And so, finding that the neuroscience says what we do in counselor education programs is good, grounded, evidence-grounded teaching practices. It’s not that we need to go out and do anything
significantly different. It’s more a case of becoming more intentional with what
we’re already doing.

Participants talked about how neuroscience did not directly change what they did by
providing completely opposite or different ways of teaching. Rather, neuroscience
changed what they did by providing them with a new brain-based understanding that
facilitated a new intentional way of teaching.

**Interest and passion for neuroscience.** Though somewhat obvious, all
participants shared an interest and passion for neuroscience and this theme was endorsed
by all six. This quality felt important, however, because this passion and interest in
neuroscience is what seemed to lead to them being neuroscience-informed counselor
educators. Learning neuroscience enough to integrate it into their pedagogical approach
often took several years of self-directed study that only a passion could sustain. Further,
participants talked about how neuroscience was not covered in their masters and doctoral
programs and in order to learn they needed to seek training outside of their required
courses. E was one such exception, having had a biopsychology course in his
undergraduate degree and neurobiology content in rehabilitation counseling training.
Helen, too, had been exposed to neuroscience in her counseling programs through books
by Dan Siegel. Flash was an exception to everyone, having had a previous career that had
trained him in neuroscience. Still for him and all other participants, they had to take it
upon themselves to learn neuroscience applications to counseling and counselor
education. Ramon shared:

I can tell you from my own process it’s taken a lot of- I think I’ve been very
interested in it- but it’s taken a lot of my own digging over a 10-year period. To
get to a place where I feel somewhat competent to teach, and research, and write
about neuroscience. Those are things that weren’t a huge part of my training during master’s or doctoral programs. And I think that’s true for most people.

Specifically, he stated that in addition to attending NIH trainings and conducting his own neuroscience research, he’s read around 25 neuroscience textbooks and reads 3-4 neuroscience articles a week. Neuroscience is not a standard part of counselor and counselor educator training, thus those who want to be neuroscience-informed had to engage several years of additional neuroscience training as the field continued to grow and change.

Helen too spend several hours training in neuroscience. She shared, “I did a 92-hour course with the mindsight institute with Dan Siegel. That was probably my most formal training.” Additionally, she had completed a year-long emersion in Bonnie Badenoch’s Interpersonal Neurobiology in Counseling, conference training and webinars, and training in neurofeedback and biofeedback. E had also done formal training in neurofeedback and biofeedback, as well as reading several neuroscience books and articles over the years, and participating in continuing education from Brainstorm- a neuroscience education community for counselors.

Amy also sought training in neurofeedback and quantitative EEGs, however prior to that she had taken a graduate level neuroanatomy course. In fact, most participants stressed the importance of starting with basic neuroscience classes, such as courses on neuroanatomy and physiology. Without these foundational courses, counselor educators ran the risk of following a pop psychology “interpretation of an interpretation of an interpretation,” as Ramon called it. He stated:

A lot of counselor educators lean too heavily on mirror neurons, which is a one-time finding with monkeys. No human replication. There are other studies that are
more interesting perhaps. Look at speaker-listener neural coupling, which came out in 2010. There’s a good study about that, that talks about how when one persons’ own activation, in response to the listener, you see similar activation on things like fMRI. You also see, at times if the listener is listening very closely, that their own activation can precede the speakers. That information is more useful than mirror neurons, right? But most counselor educators don’t know about that study.

He stressed the importance of receiving training in the basics (i.e. neuroanatomy, physiology, and development) that way counselor educators aren’t “too far removed from the actual neuroscience literature.” Again, a passion and interest in neuroscience was essential because “if you really want to become proficient it takes a lot of time.”

Like Freya, who wrote in her teaching statement, “I find neuroscience-informed pedagogy not only fascinating but also highly effective,” all participants were excited to learn neuroscience. Freya shared she took a psychophysiology class outside of her program simply “because I wanted to.” Similarly, Amy talked passionately about her recent neuroscience training where she got to dissect human brains. She shared, “It was the coolest thing I’ve ever done in my whole life… It was so cool. I got to hold a little tiny amygdala in my hand.” Learning about neuroscience was a lot of additional work for participants, however, they also often felt that it was a lot of fun.

**Beliefs about neuroscience-informed pedagogy.** This last theme reflects the core beliefs participants held about neuroscience-informed pedagogy that seemed to bind their personal and professional qualities with the neuroscience of the teaching process and tie the experience together. This theme was endorsed by all six participants. Though participants discussed a diverse range of teaching methods and courses, these overlapping
essential beliefs about neuroscience-informed pedagogy created a shared experience they all connected to. These beliefs about neuroscience-informed pedagogy were integration and responsibility.

Beliefs about neuroscience-informed pedagogy is represented in the visual metaphor as the nose bridge. These beliefs linked together the two lenses together (i.e. neuroscience-informed counselor educator qualities and the neuroscience of the teaching process) in order for participants to see through both lenses at the same time, creating a clear view of who they are as people and educators.

**Integration.** Throughout our interviews, participants discussed the importance of neuroscience being integrated into counselor education. Integration was endorsed by all six participants. From their perspective, the main tenants and foundational principles they based their counseling and educational practices on did not become replaced with neuroscience, rather it enhanced their understanding of it. As Amy reiterated throughout our interviews, “We are not neuroscientists. And we will never be neuroscientists. Nor do we or I want to be one!” Foundational principles about counselor education remained, with neuroscience integrated throughout, changing the way they experienced these principles. Freya described:

I think it’s interesting for me in weaving neuroscience into what I do in that it- I mean, it does change some things, in some ways. But it more provides the evidence for what I think is good practice anyways. And so, now we have all this supporting information that says from a neuroscience perspective, what we do as good counselor educators actually is what we should be doing.

Neuroscience did not directly change what participants did by replacing it, rather it provided new support and evidence for why a teaching practice was effective.
This “weaving neuroscience into what I do” was echoed by other participants, such as E who gave the example of neuroscience enhancing his understanding of a teaching method he already used, problem-based learning. He shared:

I think probably the best example of that is, I’ve been a fan and done a fair amount of independent study on problem-based learning and project-based learning, that sort of thing... And then once I started researching the neuroscience of learning, that model really aligns pretty well with what neuroscience would say about the learning process. So, I think in retrospect that’s been really useful.

Throughout all of our interviews, participants discussed other learning theories that informed their pedagogy, such as experiential learning, constructivism, and andragogy. Sometimes, participants would begin talking about these theories as separate from neuroscience, like Helen who said, “I mean, this is just principles outside of even neuroscience, just of experiential learning and constructivist education.” However, as our discussions went on, they reflected that neuroscience was so interwoven into how they saw everything that it was impossible to separate. Helen also stated, “It’s just so integrated in the way I see human relationships, and in the classroom- translating it into the classroom- it’s hard for me to separate out.”

E summarized this experience stating:

Your theoretical orientation as an educator guides the way that you integrate neuroscience. Like if you’re a very positivist thinker, then you’re going to talk about it in more concrete terms, as fact. And you’re going to be a little more rigid. If you’re a constructivist, you’re going to still think of it through that social lens and the construction of truth, rather than the dissemination of truth. Like you’re
still going to be that person, integrating any neuroscience findings that you might have.

He continued, “I’m still who I am. My philosophical tenants are still there, bleeding through all of this.” For him, neuroscience had not changed his philosophical beliefs about counselor education, rather, it’s integration gave him “a little more empirical justification for why I always did it that way. And now, I look at it a little differently. With some new terms and some new language.” He gave the example:

From a constructionist perspective, you think about the science of memory now. Memory is unstable, and every time it’s accessed, it changes… You know, “This used to mean this thing to me. Now it’s being de-stabilized and now how are we going to re-stabilize it, re-consolidate it into something new, a new whole.” And I think that’s where some of the brain-based teaching approaches are providing people with some tangible, applicable things to do in that re-consolidation process.

Flash, a counselor educator with a previous medically-related career, discussed integration as “finding the place where both of my backgrounds come together,” where “this medical education can come together with wellness.” He continued:

Without having to just kind of, you know, ignore the first half of a career and take up a new one, it was how do the two play together well? And how do they balance each other? And how are they usable together?

Flash explained that “everyone has an understanding of how we as humans work, but everyone will have some gaps in coverage.” By integrating neuroscience into counselor education, these gaps could become filled because “you can pretty much take any concept now and explain it with a neuroscience principle.” To him, neuroscience could take
different learning theories and explain “why they work and why they may not work” because “we’re at a place where a lot of things have been explained and a lot of those gaps have been filled in.” Neuroscience does not replace counselor education theories and practices, rather its integration fills in gaps in understanding why something worked.

Importantly, all participants saw neuroscience integration as Amy did, as bridging “the brain and behavior.” Ramon stated, “The way that we think about the brain and body has been way too divorced. Way too, what I like to call, compartmentalized. It’s really important to view it all as integrated.” Neuroscience could not replace counselor education principles because:

It’s not enough to understand the functioning of the amygdala or the functioning of the prefrontal cortex if you don’t understand, for example, how the medial prefrontal cortex is able to somewhat mediate, regulate the functioning of the amygdala during fear responses. And that’s what matters. It’s the interactions, the pairing. That’s what often is missed because we tend to talk about compartmentalized functioning. And that’s important for training, which is if you’re going to talk about things like relationships, you need to be talking about all components of that, from the counselor’s ability to form, to the client’s perception or response to.

Integration was key to connecting biological research to counselor education practice and informing how to train counselors for professional practice.

Responsibility. Lastly, participants talked about the responsibilities of counselor educators who integrate neuroscience into their pedagogy. Responsibility was endorsed by all six participants. For one, participants talked about counselor educators’
responsibilities to be informed of how neuroscience research impacts counseling and counselor education. Flash referenced the ACA Code of Ethics stating:

You know, our code of ethics say we have to stay abreast of research. And if we’re going to remain competent and we’re going to continue to be good educators and supervisors, we’re going to have to take note of all of this additional information that supports what we’re doing.

Amy echoed this responsibility of counselor educators, writing in her journal, “I believe it is our ethical responsibility to now share and teach what we know about the brain.” Ramon, too, talked about the importance of reading current neuroscience findings, stating, “I try to integrate newer things that are coming out in the literature as well. That’s the other thing, you know, you have to keep up to date with it.” Staying up to date with neuroscience research was important for incorporating neuroscience implications for counseling as well since:

[The students] are extremely intelligent people and so they don’t want information that’s 5 years old. They’ll say things like, “Hey I read this study that came out like a year ago. Are you familiar with this? Can you talk about it?” And if you’re not up to snuff, they’ll totally lambaste you. So, I have the kind of students who push me to that… If you’re lucky you have students like that who push you. I think that’s one of the real joys of being in academia is just meeting people who stimulate your own learning.

With neuroscience research quickly expanding, participants saw it as essential that counselor educators stay current and well-informed. They wanted to be up to data on what neuroscience research was findings in regards to teaching practices as well as counseling practices.
Another way that participants talked about responsibility was in regards to using well-supported neuroscience research. Specifically, participants stated that neuroscience-informed counselor educators had an ethical responsibility to be critical evaluators of neuroscience research and recognize its limits. For example, Freya discussed how most brain-based teaching research focuses on K-12 education stating, “There’s very little research on neurobiology related to adult learners. It’s a lot focused on K-12. And so, there’s, to some degree, having to make these assumptions about how this is generalizable.” She discussed the importance of hearing findings and going back to the sources inquiring, “Okay, well I think this is good, but what does the science actually say about it?” Ramon shared his concern stating:

One of the things that I believe very strongly in is the importance of - if you’re going to use neuroscience- basing it on the actual data, on the actual stuff around physiology, around stuff around anatomy. My worry is that for a lot of counselor educators, if you go to a conference session, for example, around how do you infuse neuroscience into pedagogy, most conference sessions feel very pop psychology to me. You know, they’ll talk about learning styles, for example, which is pop psych.

Participants noted that as neuroscience is becoming more popular and trendier, there is a risk for counselor educators to fall into pop psychology the trap of “neuromyths.” They cautioned other counselor educators not to blindly incorporate things that sounded like science, but rather check on the science grounding themselves.

E talked about his process of being a responsible and “informed consumer of knowledge” stating:
There’s not been a lot in post-secondary education really, it’s all been primary and secondary education. Which is, I don’t really know how to take that just yet... But I think that’s an interesting component too, like is this true? Am I basing what I’m doing on something that’s “true” enough for me or has enough evidence for me?

He continued later stating:

It’s just so complex that, you know, it’s the whole question of how do you really know anything? And the answer is there’s enough evidence that I’m comfortable with. And I think that that’s ultimately our ethical responsibility is, is there enough evidence that I’m comfortable putting myself out there with this? So, I think that’s kind of a ruler.

Flash described his process of “enough” evidence as being “backed up, supported with at least two good references.” To participants, good references included neuroscience textbooks, PubMed, NIH, The Society for Neuroscience, the Neurocounseling section of the Journal of Mental Health Counseling, and other peer-reviewed neuroscience research articles that demonstrated good reliability and validity.

**Researcher Process**

Throughout the entirety of the study, I engaged in reflective writing that I kept in my researcher journal. In doing so I was able to not only check myself for biases but be held accountable by my auditor. It is through auditor feedback that I was encouraged to write this last section, specifically in regard to my reactions and relationships with the participants.

As previously mentioned, neuroscience-informed pedagogy is a phenomenon that I have experience with as someone who identifies as a neuroscience-informed counselor educator. It was through my own informal training in neuroscience (i.e. attending
neuroscience-based conference presentations, reading neuroscience in counseling and counselor education journal articles, and networking with other neuroscience-informed counselor educators in the field) that I learned about my some of participants. I often described them as “famous,” since I had already learned a great deal from them as an audience member in their presentations and reader of their works. This experience was captured in one of my journal entries prior to interviewing Amy in which I wrote:

It seems so silly but I’m feeling really nervous to talk to Amy. I feel like I have her up on a pedestal. I’ve literally attended her neuroscience presentations at counselor ed conferences. How can I possibly remain unbiased, since she’s someone I learned neuroscience from?

While this entry was written about Amy, this nervousness surfaced before each interview with my participants. My fear of being biased towards my participants often resurfaced after my interviews with them as well. After my interview with Freya I wrote, “Wow. Just wow. I felt so connected what she was saying. Sometimes it felt like she was reading my mind. It makes me wonder if my bias crept into our interview. Was she leading it, or was I?” Eventually my fear slowly decreased as I had more interviews and continued journaling. “I just realized something,” I wrote after my first interview with E:

Of course, I’m going to agree with a lot of what they say, they’re talking about a topic I’m passionate about. That’s literally why I’m doing my dissertation on this. It only makes sense that as they talk, I reflect what I’m hearing based on my understanding, and together we co-construct the reality of this experience. I’m pretty sure that’s the whole point of a human person doing the interview and not a robot. It doesn’t mean I’m biased. And if any biases or leading is there, my auditor will see it. Or my committee will.
Making this connection allowed me to relax into our interview, be more human with them, and allow the data to speak for itself.

From reflecting in my journal, a theme emerged that caught me by surprise. The theme was about the qualities of my participants. After my interviews, I would write about my experience with each participant and I began to notice I was writing about similar qualities over and over. “I notice,” I wrote after my second interview with Amy, “I write a lot about how passionate my participants are about neuroscience.” At first this seemed obvious to me, since the topic of the study centered around neuroscience. However, the more I reflected in my journal the more I realized there was a connection being made that felt important.

It’s not just that they’re passionate now. It’s that they’ve always been passionate. Like they were passionate several years ago, when no one else was, and they’re still passionate now. It’s like another quality. Like neuro-passion or neuro-interest. The reason they’re able to experience neuroscience-informed pedagogy as neuroscience-informed counselor educators is because they have an unrelenting passion for neuroscience that has kept them learning and seeking more knowledge.

I experienced this passion in how they talked about neuroscience-informed pedagogy and realized it made me excited to learn even more about neuroscience.

Another quality that I experienced from them was in regard to their compassion. Participants often talked about their compassion towards other counselor educations, students, and themselves, but I felt this compassion directed at me as well. Embarrassingly, I missed my first interview with Amy due to a cross-country move in the middle of the dissertation process. Already nervous about interviewing to her, I emailed
her in a mortified panic explaining why I had missed our scheduled time. As a very busy counselor educator, I expected her to end her participation in my study due to my unprofessionalism. Instead, she rescheduled with me and even processed what had occurred during our interview. “I figured you were embarrassed,” she said when we met, “It’s okay. It happens.” After my experiences with other busy counselor educators, I could not believe this person that I idealized was being so understanding.

My researcher journal ended up becoming like a diary to me, and surprisingly, invaluable to my data analysis and coding process. After each interview with participants, I would journal my impressions of what stood out. Similarly, during transcribing each participant’s interview, I would again write down things that stood out to me. During coding and data analysis, these journals were coded along with participant data (both interviews, participant journals, and artifacts) and helped me see consistency in my codes. For example, after my first interview with Helen I journaled, “A sense of intentionality stands out.” This was repeated in my journal during transcription of our first interview when I wrote, “Throughout everything she does in teaching she’s very thoughtful and intentional.” Finally, Helen mentioned intentionality in our second interview when I asked about her thoughts after reading her first interview transcript. She stated, “I just think a theme of intentionality kind of came through.” Similarly, it was in my researcher journal that I first began to reflect on my visual metaphor of the glasses saying, “I notice I write a lot about how neuroscience changes how my participants view things. Almost like neuroscience-colored glasses.” My journal also allowed me to feel more comfortable in my interviews as I felt I was able to process any “mistakes” I had made in previous interviews and change them for future ones. For example, after my interview with Flash I wrote:
I worry that at times we talked too much about neuroscience content in classes and not neuroscience-informed pedagogy. I want to make sure I’m clear to participants that I see those as separate things. Content is what you teach, pedagogy is process, how you teach.

From this reflection, I made sure to clarify this with participants moving forward and felt like it made my remaining first interviews and my second interview with Flash and all other participants better.

**Conclusion**

In this chapter I discussed the categories, various themes, and theme aspects that emerged from my data collection and analysis. The themes in the first category were the neuroscience of learning, the neuroscience of the teaching process, and specifics. The themes were organized into a category I called Neuroscience-Informed Pedagogy. The second category of themes were neuroscience-informed counselor educator quality and beliefs about neuroscience-informed pedagogy. These themes were organized into a category called Neuroscience-Informed Counselor Educator Characteristics. Each theme, and the aspects within each theme, were illustrated with descriptive participants quotes. It was my hope that providing rich and descriptive participant quotes that the reader would feel connected to my participants and their experiences of the phenomenon of neuroscience-informed pedagogy. In the next chapter, I will further discuss these findings and connect them the literature discussed in Chapter II.
CHAPTER V
DISCUSSION

Introduction

In this chapter, I will discuss the findings that emerged from the data and the implications they have for Counselor Educators and the field of counselor education and supervision. Specifically, the themes presented in Chapter IV will be discussed as they relate to the existing relevant literature. From this discussion, a deeper understanding of Counselor Educators’ experience with neuroscience-informed pedagogy will be provided and implications will be discussed. Recommendations will be shared that will provide the reader with information on how these findings can be applied to their own teaching. Finally, my perspectives on the limitations of this study will be discussed and I will share ideas for future research that can further expand this topic.

Research Question

Neuroscience research is growing, and findings are being used to support and enhance practices in fields such as counseling (Field et al., 2017) and education (Feiler & Stabio, 2018; Thomas et al., 2018). The purpose of this phenomenological study was to explore and better understand Counselor Educators’ experiences integrating neuroscience to inform their pedagogical practices in counselor education. An understanding of Counselor Educators’ experiences with this phenomenon supports the mission of Counselor Educators to advance counselor training and incorporate best practices into teaching (ACES, 2016; ACES, 2019). Six neuroscience-informed Counselor Educators
participated in this qualitative study and answered the guiding research question, “What are the lived experiences of Counselor Educators who integrate neuroscience principles to inform their counseling pedagogy?” Five main themes emerged from the data: the neuroscience of learning, the neuroscience of teaching, methods and specifics, neuroscience-informed counselor educator qualities, and beliefs about neuroscience-informed pedagogy.

These five themes, and the aspects within, are superficially separated for the purposes of discussion, however, in reality the lived experience of Counselor Educators who incorporate neuroscience-informed pedagogy is dynamic, overlapping, and multifaceted. Neuroscience-informed Counselor Educators have a passion and interest in neuroscience that motivates them to seek out neuroscience training beyond their counselor education training. This passion appears to motivate them long after their initial training and continues to push them to seek new and updated neuroscience information. Further, due to their ethical responsibilities as a counselor and counselor educator, they believe it is also their responsibility to be well-informed on quality research that can enhance their counseling and teaching practices. As they learn, neuroscience principles become integrated into not only their professional practices but their personal way of being. This integration changes the way they view themselves and others, especially in the context of teaching and learning. Below, I will expand on each of these findings in relation to the existing literature. As previously explained, these themes are separated into two categories for ease of discussion, Neuroscience-Informed Pedagogy and Neuroscience-Informed Counselor Educators.
Discussion

Neuroscience-Informed Pedagogy

The first category of themes I will discuss are the themes centering around different aspects of the phenomenon under study, neuroscience-informed pedagogy. Presented in Chapter IV, these themes and the constructs within, represent the pedagogical processes involved in teaching from a neuroscience-informed perspective. Counselor Educators are “skilled as teachers” (ACA, 2014, pg. 14) and have “pedagogical foundations for their work” (pg. 12). These pedagogical foundations are defined in Chapter I as conceptualizations of learning and development; ways of being in relationships with students; facilitation of classroom culture, dynamics, and learning environment; intentional practices and strategies of teaching; and methods for assessment and evaluation.

Neuroscience-informed pedagogy, specifically, includes views of learning and the teaching from a brain-based perspective. As discussed in Chapter I and II, neuroeducation has been researched (Ansari et al., 2012; Goswami, 2004; Hardiman, 2012; Immordino-Yang & Damasio, 2007; Mareschal et al., 2013; Sousa, 2017; Thomas et al., 2018), however, no researchers have looked specifically at how it is used in counselor training and pedagogy. While participants pulled from neuroeducation discussed in previous studies, the way they discussed it and applied it to their work was unique specifically because of the adult learning and counseling focus. Therefore, this study adds to the literature base on how Counselor Educators integrate neuroscience-informed pedagogy into counselor training. In the following sections, I will discuss the themes of the neuroscience of the teaching process, methods and specifics, and the neuroscience of learning and their connection to previous literature and research.
The neuroscience of the teaching process. As discussed in previous chapters, no study to date has looked into the experiences of Counselor Educators who integrate neuroscience-informed pedagogy into counselor training. The current study illuminated several findings consistent with neuroscience and counselor education research and expanded the understanding of this unique phenomenon in several ways. In our interviews, participants were asked to reflect on times they intentionally used neuroscience to inform their teaching. Though a variety of experiences were discussed, these experiences were best described by two overlapping components: their intentional thought processes involved in teaching a class and those involved in planning a class. Participants built their teaching practices on their understanding of the neuroscience of learning, discussed below. With this understanding, they worked to intentionally develop and facilitate courses in ways that supported how the brain learns best.

Planning their courses involved intentional thought processes and questions, such as when Flash stated:

My thought processes were, ‘I get this, so how am I going to make this understandable and useable?’ And that’s kind of always been my perspective, or a place I start from: This is great information but it’s lofty and thick. And how do you break it down to make it useable?

Though participants talked about moving back and forth between planning and teaching, intentional planning was always the first step to effective teaching and participants discussed spending a significant amount of time preparing for their courses. This finding is consistent with previous research that states Counselor Educators spent a great deal of time in teaching and teaching related activities (Davis et al., 2006; Magnuson, 2002; Magnuson et al., 2009; Magnuson et al., 2004), however the current study adds detail to
how neuroscience-informed counselor educators spend their time. Previous studies did not provide detail on how counselor educators engaged in teaching related activities or what they specifically did. In this study, participants discussed specifically how their time was spent planning teaching practices that were specifically informed by the way students’ brains learn best. In particular, neuroscience-informed counselor educators spent time planning from the perspective of stimulating initial interest, setting a foundation, and adding intentional layers in alignment with their understanding of the neuroscience of learning, discussed in further detail below. This planning then led to facilitating neuroeducation aligned (Hardiman, 2012; Sousa, 2017) experiences in the classroom which involved cycles of making the information understandable and useable, challenging students, being flexible, and in the moment assessment.

Participants discussed how initial neuroscience-informed planning lead to more effective teaching practices over the course of the semester, during a single class session, and within a teaching moment. Ramon talked about this when he stated he spent hours on course development, engaging in a variety of practices, such as creating brief video lectures. He stated, “They’re usually about five minutes long, not very long. Because I’ve found that if you make them very long, more than five or ten minutes, that students will just tune them out.” Helen, too, stated:

I really try to limit my lecture time. I know people’s ability to pay attention to someone talking in front of them is limited. So, I try to just really hit key highlights perhaps of material that I want to share, but then I’ll quickly start to break up the lecture with activities that help students apply their learning.

Consistent with neuroeducation research that states the brain has a limited amount of time it can sustain focused attention (Hardiman, 2012; Jensen, 2008; Medina, 2014; Sousa,
participants made sure they planned lectures that were brief, and integrated activities for students to practice what they were learning to build complex neuronal connections. This type of experiential learning is widely used in counselor education (Arthur & Achenbach, 2002; Clarke et al., 2017; Giordano et al., 2015; Lawrence & Coaston, 2017; McAuliffe, 2011; Nittoli & Guiffrida, 2018), however as neuroscience-informed counselor educators, participants named a specific brain-based rationale for their use of experiential learning. Neuroeducation writers assert that movement and whole-body experiences are more likely to be encoded by the brain as important and subsequently remembered (Sousa, 2017). In alignment with this, participants discussed their thought processes in intentionally planning and facilitating classroom activities and exercises that created whole body experiences more likely to be remembered by the brain. From this perspective, teaching was viewed as the facilitation of neural pathways to be used in applied practice of counseling.

**Methods and specifics.** While neuroeducation researchers often discuss the neuroscience of how the brain learns (Hardiman, 2012; Sousa, 2017), rarely are specific methods and specific teaching techniques named. Further, there is no research specifically naming neuroscience-informed teaching methods for adults. Rather, educators must use their own neuroscience understanding to translate research findings into teaching practices (Jamaludin, Henik, & Hale, 2019). Consistent with this practice, participants in this study did not have research or literature on neuroscience-informed teaching practices to pull from and had to rely on their own ability to translate neuroscience research into their teaching practices. Importantly, participants discussed the neuroscience of learning and the related teaching process as a specific neuroscience-informed underlying process, separate from specific teaching methods and courses. With
this process, however, various teaching methods and specific courses were mentioned as being grounded within this process. Counselor Educators are trained in teaching methods and pedagogy (CACREP, 2016), however previous researchers report that pedagogical training is lacking (Buller, 2013; Hall & Hulse-Kilacky, 2010; Hunt & Gilmore, 2011; Waalkes et al., 2018). Contrary to the findings from these studies, neuroscience-informed counselor educators reported a thorough understanding of teaching methods helpful for training counselors. Further, participants discussed how each teaching method they used was intentionally grounded in their understanding of the neuroscience of learning.

In regard to their courses, some participants discussed how neuroscience-informed pedagogy was integrated into their courses due to their courses being neuroscience focused (i.e. Neuroscience for Counselors) or having neuroscience-based topics included in the course (i.e. Trauma). From this perspective, a neuroscience-informed way of being was intentionally modeled to students to assist them in not only learning neuroscience content but experiencing a neuroscience-informed practitioner. While neuroscience-informed pedagogy did not need to include teaching neuroscience content, often participants found themselves including neuroscience content in a spirit of transparency to explain processes to students. Ramon wrote about this stating, “The goal of education is therefore not only to teach content, but to educate learners about the process of learning and help them to understand how they best learn.” To participants, teaching students about neuroscience content lead them to conceptualize themselves and clients differently. Amy stated:

I gave students a case study and I had them diagnose under the DSM 5. And then I taught them some neuroscience. I had them use the same case study and it was
entirely different, because they see the world differently. Once you integrate neurocounseling into your talk therapy, you see the world differently.

Freya saw teaching students about neuroscience content as important because of its relevancy to their work as clinicians, stating, “Here’s all the stuff you might actually teach your clients.” Participants discussed that teaching their students about neuroscience was valuable, simply because it opened their eyes to a new way of conceptualizing themselves, their clients, relationships, and health in general.

While participants felt passionate that learning about neuroscience could be helpful for students, they emphasized the importance of learning it through a neuroscience-informed pedagogical process. Helen stated that she shares original neuroscience research with students if they are interested, but focused more on a neuroscience-informed pedagogical process because “there is a limited value in explanatory information.” She discussed teaching students the Healthy Mind Platter (Rock, Siegel, Poelmans, & Payne, 2012) so that students could understand:

[W]hat are the optimal things that you can be doing that are going to increase your likelihood to learn well. That’s how I kind of frame it to them. So, I talk about the importance of each of those from a neuroscience lens, like ‘This is why sleep is important to your brain. This is why movement is important to your brain. This is why connection is important to your brain.’ So, I provide some of that didactic information so that they understand, but even then they’re going to have limitations. Information doesn’t translate to action always. Like, I know processed sugar isn’t great for most people, and yet I’m still going to eat this ice cream.
Freya shared an experience she had in a neuroscience class stating, “it was semi-useful… if you want an example of really bad teaching, it was that.” In explaining why, she didn’t find it helpful, she stated:

It was so bad. It was a voice-over PowerPoint with a loud fan in the background… and she would pronounce [key terms] in ways that were so unrelated to the term, that half the time I had to be like, ‘What are we actually talking about? I don’t know what you just said.’

Freya and other participants discussed how any content, including neuroscience, removed from a neuroscience-informed and grounded pedagogical process is not effective for learning. Ramon cautioned Counselor Educators to “not apply neuroscience information if it’s not relevant, then to do it and not do a good job of it.” Due to the limits of information, participants felt the process of neuroscience-informed pedagogy was more important.

Outside of specific content, several teaching methods were discussed by participants as being congruent with the neuroscience of learning. Several participants believed the methods they used were already popular in counselor education. These teachings methods include those often cited in counselor education literature such as experiential activities and small group discussions, (Ockerman & Adams, 2019; Young & Hundley, 2013). Others, such as Amy, stated Counselor Educators needed to incorporate more neuroscience aligned teaching methods, such as incorporating more movement and actual wellness activities in their courses (Sousa, 2017). Ramon talked about intentionally designing a wellness-focused assignment in his class and using modeling and discussions to encourage a greater focus on wellness. Regardless of their various methods, participants made sure the teaching methods they used were in alignment with a
neuroscience-informed pedagogical process build on an understanding of how the brain learns (Sousa, 2017).

The neuroscience of learning. The phenomenon of neuroscience-informed pedagogy is built upon participants’ neuroscience understandings of how learning occurs from a relational, emotional, and personally meaningful way. As participants discussed their various experiences with teaching, they were all able to ground what they did back to their understanding of how the brain learns best. Neuroscience researchers note several important concepts of the neuroscience of learning discussed by participants, such as the role of relationships (Cozolino, 2016; Hardiman, 2012; Siegel, 2012) and emotions (Grimm et al., 2008; Hecht, 2010; Purves et al., 2019; Sousa, 2017). Participants highlighted the importance of creating emotionally safe environments through relationships with students in order to optimize learning states in the brain and create meaningful learning experiences. Helen shared that “when [students’] brain is registering safety, they’re going to be more inclined to be in social connectedness, and vulnerability, and risk-taking” making them more opt for deep learning. She continued stating that safety was required to “confront their biases and their wounds” and “explore those parts of themselves,” calling the creation of safety in the classroom an “ethical imperative” for the vulnerable work needed in professional counseling. Further, through this safety she and other participants believed they were able to connect to students personal meaning and values and work with students through their struggles to be more open to different perspectives and experiences. Due to the necessary challenges and self-growth required in counselor training (ACA, 2014), creating an emotionally safe relationship with students helped them to trust their instructors and, as Amy said, “know that they’re cared for. That I’m not the enemy (laughs). That I’m an ally!”
These findings are consistent with neuroscience research and brain-based teaching practices (Hardiman, 2012; Jensen, 2008; Medina, 2014; Sousa, 2017) and adds to the understanding of how brain-based teaching can be applied to working with adults. Hardiman (2012) emphasized the importance of the emotional climate in the learning environment, highlighting the relationship between emotion and learning. She quotes neuroscientist Jill Bolte Taylor who discussed the human fallacy of believing we are rational thinking beings, stating, “Although many of us may think of ourselves as thinking creatures that feel, biologically we are feeling creatures that think” (Taylor, 2006, p. 19). In congruence with participants’ statements, Hardiman discussed the necessity for optimal emotional arousal for learning, noting that too much emotional arousal stresses the brain and too little does not excite the brain enough. Importantly, optimal emotional arousal taps into interest and meaning for students that create deeper learning. A key component in creating this optimal emotional arousal was relationships and safety.

**Neuroscience-Informed Counselor Educators**

The second category of themes I will discuss are the themes centering around those who experience the phenomenon under study, specifically neuroscience-informed Counselor Educators. Counselor Educators are charged with the task of preparing counselors-in-training for the professional practice of counseling (ACA, 2014; CACREP, 2016). While counseling students may be taught by educators from other disciplines throughout their graduate training (i.e. psychologists, researchers, statisticians, etc.), the core training of counseling students rests with Counselor Educators. In this study, the Counselor Educators interviewed were those who identified as integrating neuroscience-
informed counseling pedagogy and are thus considered neuroscience-informed Counselor Educators. By using this label, I was able to clearly distinguish between Counselor Educators that identify as intentionally using neuroscience in their counseling pedagogy from those who do not. As presented in Chapter IV, neuroscience-informed Counselor Educators embody a number of qualities and beliefs that are related to the phenomenon of neuroscience-informed pedagogy. In this section, I will discuss each of these themes and their connection to the literature.

**Neuroscience-informed counselor educator qualities.** Palmer (2007) spoke about the connection between teacher qualities and teaching practices, writing, “We teach who we are” (pg. ix). As I engaged with my participants, who they were began unfolding and the theme of neuroscience-informed counselor educator qualities began to emerge. Haddock (2019) wrote about the various roles and characteristics of effective Counselor Educators stating, “good Counselor Educators possess the power to create conditions that can help counselors-in-training learn a great deal or become a barrier, leaving students learning nothing at all” (p. 1). Participants furthered this understanding of good teaching by detailing how they use their relationships with students to create a felt experience of safety in order to prime the brain for learning. Similarly, Bain (2004) discussed a number of qualities “the best” college teachers share, such as qualities of curiosity, reflexivity, and openness. While my participants were unique and different from each other in a number of ways, they appeared to share a number of qualities that seemed to enhance their teaching practices and be connected to their experience of neuroscience-informed pedagogy. These qualities were presented in Chapter IV as interest and passion for neuroscience, compassion and understanding, and intentionality.
Participants embodied an interest and passion for neuroscience I could feel throughout our interviews that motivated their own continuous learning and education. While continuing education is an ethical requirement for all counselors and Counselor Educators (ACA, 2014), neuroscience-informed Counselor Educators went beyond the “reasonable level of awareness of current scientific and professional information in their fields of activity” (pg. 9). They went beyond their field to study neuroscience research on learning and teaching, which generated an increased intentionally in preparing and teaching their courses. This aspect connected to Bain’s finding that exceptional teachers, “study carefully and extensively what other people are doing in their fields, often read extensively in other fields (sometimes far distant from their own), and take a strong interest in the broader issues of their disciplines” (pg. 16). Further, he found these excellent teachers use their knowledge to be intentional in their practices and “think metacognitively,” which “drives much of what we observed in the best teaching.” Participants added to this finding through their discussions of neuroscience-informed intentionality. Specifically, they discussed their various metacognitive process as intentional thought processes rooted in their knowledge of how the brain learns.

Buller (2013), too, found that passion was a common characteristic in award-winning Counselor Educators and I found this in all of my participants. Neuroscience-informed Counselor Educators embodied passion and interest that made them knowledgeable but also exciting to listen to. Adding to Buller’s finding, participants used their passion and interest to become exceptionally knowledgeable in the fields of counseling and counseling education, however also used passion to become knowledgeable in neuroscience to enhance their teaching practices. Specifically, their passion and interest lead them to read extensively in neuroscience and engage in meta-
reflective practices to be even more intentional in their teaching practices and create deeper learning for students.

Another quality consistent with the literature (Buller, 2013; Hill, 2014; Swank & Houseknecht, 2019) was compassion. The qualities of compassion and understanding at first seemed obvious, since these qualities are parallel to the core facilitative conditions discussed by Rogers (i.e. unconditional positive regard, empathic understanding, and genuineness) (1957). However, these qualities also had a neuroscience intentionality to them, in that participants discussed a neuroscience-based rationale behind their compassion and understanding. This was described in Chapter IV when Freya used her neuroscience understanding of dysregulation and flooding to gain awareness of her emotional reactions and “attend to my own emotional state” so that she could “attune to the student’s needs.” Participants were able to pull from their neuroscience understanding of human nature to better understand both themselves and others and reach a place of compassion during struggles.

These findings suggest a reciprocal relationship with neuroscience research and Counselor Educators’ qualities. While participants likely already possessed the qualities of passion, intentionality, and compassionate understanding from their own personality as well as their professional training as Counselor Educators, neuroscience seemed to enhance and influence these qualities. Specifically, in order for them to become neuroscience-informed, participants first had to maintain a passionate interest in learning neuroscience and its applications to teaching, over the course of several years. Only then could this knowledge be applied to teaching, but specifically, used with the intentionality and compassion participants already possessed. Further, this suggests that neuroscience-informed pedagogy cannot be used by those who have little interest in neuroscience. This
provides important considerations for counselor educator training discussed in the implications section below.

**Beliefs about neuroscience-informed pedagogy.** A separate theme that emerged as I engaged with participants centered around beliefs Counselor Educators held about neuroscience-informed pedagogy. This finding is consistent with counselor education literature, as Counselor Educators tend to hold a number of beliefs about the pedagogy they use to inform their teaching (West et al., 2013). In this study, these beliefs are summarized as responsibility and integration. From participants, a theme of professional responsibility came through in several conversations, as well as the importance of integrating neuroscience, rather than replacing counseling, in order to retain their professional identity. Essentially, participants discussed that in order for neuroscience-informed pedagogy to be effective in counselor training there were certain elements that need to be considered.

The ACA Code of Ethics (2014) includes a number of professional responsibilities for both Counselors and Counselor Educators. Among these responsibilities include recognizing a need for continuing education of “current scientific and professional information in their fields of activity” (pg. 9). In accordance with the ACA Code of Ethics, participants often spoke about the importance for Counselors and Counselor Educators to learn about the latest neuroscience in order to stay current and competent in today’s world. In connection to researchers suggesting the integration of neuroscience can enhance student learning (Dunlosky et al., 2013; Hardiman, 2012), participants shared how their knowledge and use of neuroscience-informed pedagogy enhances the work they do with students. The 2014 ACA code further states, however, that Counselor Educators need to be aware of their professional competence and “practice
only within the boundaries of their competence, based on their education, training, supervised experience, state and national professional credentials, and appropriate professional experience” (pg. 8). Juggling these two ethical responsibilities, participants argued that neuroscience competency is within the bounds of counselor education, as it can enhance student learning and practice.

**Implications**

These findings have significant implications for Counselor Educators wanting to provide neuroscience-informed teaching and learning experiences that benefit students in their development as professional counselors. Participants found that planning and teaching their courses from a brain-based perspective produced greater learning outcomes in students, thus Counselor Educators can use neuroscience-informed pedagogy to improve their teaching practices for increased student learning. Though I did not collect data specifically from students and their experiences, participants often named student experiences in our interviews. Freya shared a student’s evaluation of her teaching in which the student stated that her neuroscience-informed pedagogical teaching forced them to “dive deep into the subject matter, so I knew it well enough.” Ramon also commented on how his teaching process lead students to “take it pretty seriously,” involving students talking about initial challenges but “embrace it in general. And talk about that being one of the better parts of the class in many ways.” Flash, too, shared how using neuroscience-informed pedagogy lead to students having “this thirst for more and more and more.” Therefore, though student data were not directly collected in this study, participants shared second hand student experiences that can be used to inform Counselor Educators interested in neuroscience-informed pedagogy. Specifically, neuroscience-informed pedagogy seemed to facilitate deeper student interest and learning. Related to
the finding of the neuroscience of the teaching process, neuroscience-informed pedagogy may require Counselor Educators to put in additional time and work, however by doing so they may be able to increase students learning.

Counselor Educators who have an interest and understanding of neuroscience should not feel restricted from including neuroscience content in their courses, as long as it serves the learning purposes of the course and is not done in separation from a neuroscience-informed process. E shared his experience of this in teaching his assessment course. He stated that being “neuro-aware” influences his classes by changing the methods and content he includes in his courses. In using neurofeedback technology in his assessment course, he stated:

I’m not teaching them about neuroscience at all. I’m teaching them about norm-referenced interpretation and z-scores. That’s the learning outcome. But the exercise included a Brain Map. Which if someone knows nothing about neurofeedback, they’re not going to bring a Brain Map (laughs).

E included neuroscience-based content to teach students about assessment and used neuroscience-based teaching processes to facilitate interest. In a similar way, Counselor Educators who are interested in neuroscience and in integrating neuroscience into their courses must determine where neuroscience can support and enhance the content of their courses and pedagogical process, not detract from it. If the inclusion of neuroscience-based content does not align with the learning objectives for the course or assignment, Counselor Educators should not include neuroscience simply because they find it interesting.

Participants noted that it seemed most effective Counselor Educators include elements of neuroscience-informed pedagogy into their practices without knowing it, by
focusing on creating relational, emotional, and personally meaningful learning experiences. This is significant in that it implies Counselor Educators who want to integrate neuroscience-informed pedagogy may not need to change much of what they do, rather it may be as simple as a shift in thinking. Freya stated, “[I]t’s already happening. [Counselor Educators] are already doing it.” The neuroscience of learning was often intuitive to participants and made sense to them as things they find students respond well to or things that were helpful for them when they were students. What seems to differentiate good teaching practices from neuroscience-informed pedagogy is simply the awareness of the neuroscience research and the subsequent intentionality. Freya continued:

It’s not, ‘You need to go to this workshop and learn this entirely new way of being an educator.’ It’s, ‘Here’s the evidence, here’s the information, here’s the research that supports what you’re doing. Can you be more intentional with how you do what you’re already doing knowing this information?’

Effective teaching practices were viewed by participants as effective because they worked with the neuroscience of learning, whether Counselor Educators knew why it worked or not. Through the qualities of neuroscience-informed Counselor Educators discussed in a previous section, it is through their own passion and interest in neuroscience that participants were able learn about the effectiveness of the underlying process and, as Flash stated, “fill in the gaps of the why.” To participants, the knowledge of “the why” (Flash) made their teaching practices more intentional. Interested Counselor Educators can use these experiences and thoughts from participants to start their own journey of being more intentional about neuroscience-informed teaching. Specifically,
Counselor Educators are encouraged to look into literature on the neuroscience of learning that explains why certain teaching practices are effective.

Given participant experiences and reflections on how neuroscience enhances their teaching practices, neuroscience-informed pedagogy could be seen as an important model to teach Counselor Educators-in-training. However, without the necessary interest for neuroscience and passion required to continuously seek new neuroscience research, quality neuroscience-informed pedagogy could not be sustained by Counselor Educators. Ramon spoke of this in our first interview when he stated:

It’s not that I don’t think it’s a good idea to include neuroscience into CACREP doctoral standards- part of me likes that. But part of me is also a bit reticent that if we start doing that then you’ll have a gazillion standards around pedagogy. For example, you know, competencies related to trauma, and child and adolescent counseling, and gerontology, and so on. And you’ll have a gazillion standards. So, I don’t- and this is sad for me to say- but I don’t think, Savannah, that neuroscience is seen as central enough to be able to say that neuroscience is something that everything else builds off of, which is the way I think of it. But I think for a lot of people it would be seen as a specialty, a specialization just like child and adolescent or gerontology.

Neuroscience-informed Counselor Educators who want to teach neuroscience-informed pedagogy, therefore, may want to consider neuroscience-informed pedagogy as a specialization within counselor education. Within this specialization, Ramon suggested collaboration with the university’s neuroscience department to ensure adequate training in basics and fundamentals. Further, neuroscience-informed Counselor Educators should
be clear with Counselor Educators in training that neuroscience-informed pedagogy requires continuous learning and an understanding of its limitations.

As discussed previously, participants argued that neuroscience competency is within the bounds of counseling and counselor education ethical responsibilities. Counselor Educators are encouraged to be aware of neuroscience research and literature specifically related to counseling and counselor education (i.e. mental health, wellness, and pedagogy). As Flash shared, if a counselor educator stated they do not use any neuroscience in their teaching, “I’m going to challenge them to show me how they’ve got something completely explained without including something that’s neuroscience related. Because if they start talking about disorders, I’m going to say, ‘That’s neuroscience.’” He and other participants connected neuroscience competency to competencies in other topics, like multiculturalism. Similar to how culture is ingrained and inseparable from counseling, Flash discussed that neuroscience is already ingrained into a lot of what we do in counseling and counselor education and “sometimes it’s just about what you call it.” This is consistent with CACREP’s latest update in 2016 which added several neuroscience training standards for counseling practice (CACREP, 2016). Participants hinted at possible implications that neuroscience competency responsibilities are going to continue to grow in counseling and counselor education. In alignment with the ACA Code of Ethics (2014), as our field continues to develop, it is Counselor Educators’ ethical responsibility to include the most current scientific findings.

Further, Counselor Educators need to be mindful of falling into the trap of “neuromyths” and making sure that the neuroscience used in their professional practice is grounded in quality neuroscience research. Counselor Educators need to be responsible consumers of research and make sure the neuroscience research and literature they are
pulling from is from quality sources. E cautioned Counselor Educators about this when he highlighted “the piece about accuracy” and recommended not “overstating findings.” Echoing other participants, he stated, “are you translating translations or are you going back to original basic science and extrapolating your own conclusions from that?” Ramon summarized this responsibility stating:

I will not give you a response that sounds like- that’s very vague and broad and way too overinterpreted based on neuroscience. That’s a risk, I think, our field has. Which is that we’re far too removed from the actual neuroscience literature. And it’s complicated because if you, you know, if you really want to become proficient it takes a lot of time. To become proficient, through learning the terminology and learning about studies, it takes a while, you know?

As creators, consumers, and teachers of research participants discussed Counselor Educators’ responsibility to be critical consumers of neuroscience applications to teaching and not overstating findings as being all encompassing.

Lastly, as Counselor Educators, it is our responsibility to ensure counseling students are being trained with a counselor professional identity (ACA, 2014; CACREP, 2016). Though they were neuroscience-informed, participants did not see neuroscience as replacing any professional aspects of their counselor identity. Relating to E’s caution above, participants believed it was important to question neuroscience findings and only use it in ways that helped to support counseling and counselor education, rather than accepting every neuroscience finding as fact. As discussed in Chapter IV, Freya talked about this process as “weaving neuroscience into what I do” rather than replacing what she does with neuroscience. Similarly, Amy stated, “We are not neuroscientists and we will never be neuroscientists. Nor do we or I want to be one!” She emphasized that
integrating neuroscience into counselor education does not mean she is trying to or pretending to be a neuroscientist, rather, “I am integrating good, solid, evidence-based research.” This finding suggests that the process of using neuroscience content in counselor training or neuroscience-informed pedagogy in teaching requires an intentional integration into the counseling identity in order for it to be useful.

**Limitations**

As with any study, this study has a number of limitations. The first limitation is the lack of identity diversity in my participants. While participants came from a variety of regions and had different identities that lead to a depth of information, all participants identified as white and cis-gender, which limited the study in certain regards. In an attempt to further diversify my participant sample, I sent out multiple calls for participants, asked participants to recommend other neuroscience-informed counselor educators to participate in the study, and sent out additional emails to potential participants to try to directly recruit them for the study. Unfortunately, race and gender diversity did not change among interested participants, reflecting the lack of diversity within the field of counselor education (CACREP, 2015). Diversity is a core value of counseling and counselor education and enhances our understanding of the human experience with different phenomenon. Greater diversity of race and gender identity may have produced a richer understanding of neuroscience-informed pedagogy. Further, because neuroscience-informed counselor educator qualities emerged as a theme, having more diversity may have expanded this theme to include more qualities.

Another possible limitation to this study includes the use of technology as the sole method of data collection. All interviews were conducted via phone or Zoom video conferencing which allowed me to recruit and hear from participants from a variety of
locations. Additionally, participant journals and artifact collection were done through email. While this form of data collection was intentionally chosen for this study, the use of technology produced gaps in audio and disconnections that disrupted some interviews. Further, not being able to meet in person or observe participants’ teaching may have limited my ability to understand participants’ experiences. In an attempt to minimize the impact of this limitation, I collected data from multiple sources (i.e. two interviews, artifact collection, participant journals) to analyze the data for consistency between participant data. Additionally, I regularly engaged in member-checking through transcript review and reporting initial findings to participants. While I worked to minimize the impact of this limitation, relying on self-report may have limited my ability to observe aspects that did not emerge through self-reflection alone.

A last limitation that came up through conversations with my external auditor was my relationship with and perspective of participants. Since neuroscience in counseling and counselor education is a research and practice interest of mine, I frequently read texts, articles, and attend conference presentations on this topic. Due to this, I was familiar with my participants and their work prior to interviewing them for this study. Throughout data collection and analysis, I had to pay careful attention to ensure the themes that were emerging were coming from the data and not my previous experiences of the participants. Additionally, in my researcher journal I wrote about my experience of feeling almost “star struck” by my participants. Though I engaged in regular journaling to minimize the impact of this limitation, it is possible that because I held my participants in such high regard prior to them being participants in this study that my perspective was impacted. It is important to note that the more time I spent with participants, the more I began to feel like a colleague to them instead of a student. However, I note this as a
limitation because it is possible there were follow-up questions and data I could have missed had I not had previous experience with them.

**Future Research**

Since research on neuroscience-informed pedagogy in counselor education is scarce, there are several directions for future research on this topic. While this study focused on Counselor Educators’ experiences with neuroscience-informed pedagogy, it would be helpful to explore their students’ experiences with this phenomenon as well. Often, participants would note that students seemed to find a neuroscience-informed pedagogical approach helpful for learning, however, this perspective could be enhanced by interviewing the students themselves. Future studies could specifically look at what about neuroscience-informed pedagogy students find helpful and what learning experiences it facilitates in students both during their training programs and after. Additionally, future studies could focus on student learning outcomes to identify if neuroscience-informed pedagogy produces enhanced learning outcomes.

Further, an additional area for future research could be to compare and look at the differences and commonalities between a course taught from a mainly neuroscience-informed pedagogical approach and those taught from a different approach. For one, comparing teacher and student experiences with the different approaches could give insight into the limitations of different pedagogical approaches and where neuroscience-informed pedagogy could enhance or be enhanced by other approaches. Additionally, comparing experiences with different approaches could provide a richer understanding for doctoral students seeking a pedagogical fit for their future teaching identity.

A comment often brought up by participants was the idea that researching neuroscience-informed pedagogy was like “investigating the Wild West” (Ramon, first
interview). Therefore, it was often suggested that an area for future study would involve specifically looking at standards and competencies for neuroscience-informed counselor education. Responsibility was an important aspect involved in the theme of Counselor Educators’ beliefs about neuroscience-informed pedagogy. Specifically, participants believed Counselor Educators who integrated neuroscience into their pedagogy had a responsibility to make sure the neuroscience used was current and grounded in research. Therefore, an important area for future research could involve exploring what neuroscience research is essential for neuroscience-informed Counselor Educators to understand to ensure they are practicing responsibly.

Lastly, this study specifically focused on exploring Counselor Educators’ experiences integrating neuroscience into their counseling pedagogy, however it did not aim to create a useable theory of neuroscience-informed pedagogy. Therefore, a grounded theory study aimed at creating a theory of neuroscience-informed pedagogy could be helpful for those wanting to teach from a neuroscience-informed pedagogical perspective. Specifically, grounded theory would provide insights into “the how” of neuroscience-informed pedagogy rather than participants experiences with the phenomenon.

**Conclusion**

The purpose of this study was to explore and better understand Counselor Educators’ experiences integrating neuroscience into their counseling pedagogy. Through a phenomenological exploration with 6 neuroscience-informed Counselor Educators, I found that neuroscience-informed pedagogy can be separated into two broad categories, composed of 5 major themes. Neuroscience-informed Counselor Educators are created through their experiences learning and integrating neuroscience into their counseling
pedagogy. Importantly, neuroscience-informed Counselor Educators hold a number of personal and professional qualities and beliefs about neuroscience-informed pedagogy that contribute to the process. These qualities and beliefs stimulate a reciprocal relationship in which learning and integration of neuroscience-informed pedagogy is enhanced and enhances them as neuroscience-informed Counselor Educators.

Neuroscience-informed pedagogy includes a foundational understanding of the neuroscience of learning as relational, emotional, and personally meaningful. From this foundation, a neuroscience informed teaching process can be used that focuses on teaching in the way the brain pays attention, remembers information, and creates lasting learning. Finally, specific teaching methods and information are used that align with both a neuroscience informed teaching process and understanding of the neuroscience of learning. The findings gathered in this study contribute to the literature on counselor education pedagogy by improving our understanding of how neuroscience can support and enhance counselor education. Future research studies can be used to further this understanding and create grounded practice and theory of neuroscience-informed pedagogy.
REFERENCES


Association for Counselor Education and Supervision (ACES) Information. (n.d.)
Retrieved from https://acesonline.net/aces-information/


*Philosophical Transactions: Biological Sciences, 359*(1449), 1367-1377.


Siegel, D. J. (2012). *The developing mind: How relationships and the brain interact to shape who we are*. (2nd ed.) New York: Guilford Press.


Greetings Counselor Educators/Colleagues

I hope this email finds you well! My name is Savannah Cormier and I am a doctoral candidate in Counselor Education and Supervision at the University of Northern Colorado. I am conducting a qualitative dissertation study under the supervision of Dr. Heather Helm regarding neuroscience-informed counseling pedagogy. The purpose of this phenomenological study is to understand counselor educators’ experiences informing their counseling pedagogy with neuroscience principles and findings. This study has been approved by the Institutional Review Board at the University of Northern Colorado.

I hope you will consider participating in this study and adding to the research base for neuroscience-informed counseling pedagogy.

Criteria for participation in this study include:
- Professional identity as a counselor education (demonstrated through a Ph.D. in Counselor Education and Supervision; membership in ACES, regional ACES, ACA; or currently teaching counselors or counselor educations from a professional counselor professional identity)
- Currently teach at a CACREP-accredited masters and/or doctoral counseling program (or in the process of CACREP-accreditation)
- Access to Skype or related software
- Identify as using neuroscience in inform counseling pedagogy

For this study, neuroscience-informed pedagogy is defined, “intentional pedagogical practices that are informed from neuroscience principles of how the brain learns best. Neuroscience-informed pedagogy involves educators use of neuroscience to conceptualize student learning and development, design and facilitate the learning environment, connect with learners, engage in teaching and instructional methods, and evaluate learners.”

Participation in this study will include two face-to-face or video (Skype, Facetime, etc.) interviews (lasting approximately 60 minutes) with an additional follow up interview for the purposes of member checking. Any additional thoughts and ideas post-interview are asked to be kept in a participant journal. Additionally, I will ask you to provide a participant chosen artifact to demonstrate neuroscience-informed pedagogy (e.g. syllabi, a course assignment, teaching philosophy, etc.). Total participation should take no more than 2-3 hours of your time.

If you are interested in participating in this study or have any questions, contact Savannah Cormier at Savannah.Cormier@unco.edu. Separately, if you wish to contact my dissertation chair, Dr. Heather Helm, you may do so at Heather.Helm@unco.edu.
Please feel free to forward this e-mail to any individuals whom you think may be a good fit for this study.

Thank you in advance for your interest and assistance in furthering the knowledge base of counseling and counselor education.

Sincerely,
Savannah Cormier
APPENDIX B

RESEARCH CONSENT FORM
CONSENT FORM FOR HUMAN PARTICIPANTS IN RESEARCH
UNIVERSITY OF NORTHERN COLORADO

Project Title: Counselor Educators’ Experiences with Neuroscience-Informed Pedagogy

Researcher: Savannah Cormier, M.S., LPC, RPT, Counselor Education and Supervision
Email: Savannah.Cormier@unco.edu

Research Advisor: Heather Helm, Ph.D., LPC, RPT/S, Counselor Education and Supervision
Email: Heather.Helm@unco.edu

The purpose of this phenomenological study is to better understand the lived experiences of counselor educators who inform their counseling pedagogy with neuroscience principles. You will be asked to answer a demographic questionnaire, submit an artifact of neuroscience-informed teaching, participate in two face-to-face or video (Skype, Facetime, etc.) interviews, as well as an additional interview for member checking. Additionally, you will be asked to record any lingering or additional reflections post-interview. The first two interviews will take approximately 60 minutes and will explore your experiences with neuroscience-informed pedagogy, while the third will likely take less than an hour and will focus on presenting the emerging findings.

Your interviews will be audio-recorded for transcription purposes and deleted after transcription. You will receive a copy of your transcribed interview by email no later than 4 weeks after your interview and will have the option to clarify any areas. Your experiences, along with other members of this study, will be analyzed to develop several core themes and a description of this phenomenon.

All possible efforts will be made to keep your identity and identifying information confidential. Your name will not be shared or published in a report of the data, as you will choose a pseudonym instead. Consent forms will be kept in locked cabinets for minimum of three years and then will be destroyed. Data collected and analysis will be kept in a password-protected file on the researcher’s password protected computer.

There are no known risks to participants. The only known inconvenience is the time it will take to complete the study. You may experience some emotional activation during the interview, and if at any point your participation becomes too vulnerable or feels unsafe, you are welcome to discontinue. The benefits to you include increased self-awareness, a greater understanding of your pedagogical beliefs, and personal benefits of sharing meaningful experiences. Your participation may benefit and add knowledge to the field of counseling and counselor education. No compensation will be provided to participants in this study.

__________________(Participant’s initials)
Participation is voluntary. You may decide not to participate in this study and if you begin participation, you may still decide to stop and withdraw at any time. Your decision will be respected and will not result in loss of benefits to which you are otherwise entitled. Having read the above and having had an opportunity to ask any questions, please sign below if you would like to participate in this research. A copy of this form will be given to you to retain for future reference.

If you have any concerns about your selection or treatment as a research participant, please contact Sherry May, IRB Administrator, Office of Sponsored Programs, 25 Kepner Hall, University of Northern Colorado Greeley, CO 80639; 970-351-1910

Participant’s Signature
__________________________________________Date___________

Researcher’s Signature
_________________________________________Date____________
APPENDIX C

INTERVIEW PROTOCOL FOR INITIAL INTERVIEW
The following will serve as a guide for our interview conversation. Throughout this conversation, I will be asking you to describe your experience, reflecting my understanding, and asking follow-up questions for clarification.

Opening prompt: Think of a time when teaching when you intentionally used your understanding of neuroscience principles for the purposes of counseling student learning. Let me know when something begins to come to mind. Reflect on the student or students involved in the interaction. Reflect on the specific situation or “issue” presented to you. Call to mind the emotions and thoughts that came to you in that moment.

1. Describe the experience you were reflecting on.
   a. What were your feeling in the moment?
   b. What specifically did you do in the situation?
   c. What informed you?
   d. What did you feel afterwards?

2. How would you describe your experience integrating neuroscience into your pedagogy to other counselor educators interested in doing the same?
   a. What motivated you to include neuroscience into your pedagogy?
   b. What do you find meaningful about neuroscience-informed pedagogy?

3. Are there some contexts that you find neuroscience-informed pedagogy to fit better in? What are these contexts and what facilitates the better fit?
   a. What do you find particularly rewarding or challenging?

4. After everything we have discussed, what else would you like to share about your experiences with neuroscience-informed pedagogy?
   a. Are there any questions you expected me to ask that I did not? What are they?

Demographics Questionnaire:
1. Gender identity, age/age range, racial identity, and ethnicity
2. Other identities that you feel are salient
3. Affiliation with counselor education (full, associate, assistant professor)
4. How many years have you been teaching counseling students?
5. Level of students you primarily teach (masters or doctoral)
6. ACES region
7. Training in neuroscience
APPENDIX D

POST-INTERVIEW PARTICIPANT REFLECTION QUESTIONS
Thank you for taking the time to speak with me! I greatly appreciate all of your insights and experiences.

I recognize that thoughts and ideas don’t always just stop once our conversations end. For me, I reflect on our conversation using informal reflection questions and journaling. These questions help me better prepare for other interviews and assist me in the research process. If you’ve had additional thoughts after our conversation, I hope you will share them with me. For ease, I’ve drafted the following two prompts that may be helpful.

After ending our conversation yesterday, did you experience any lingering thoughts or ideas about neuroscience-informed pedagogy? If so, what were these thoughts related to?

Similarly, did you have any new thoughts or ideas that we did not discuss come up about neuroscience-informed pedagogy? If so, what were these ideas?
APPENDIX E

POST-INTERVIEW RESEARCHER REFLECTION QUESTIONS
After each interview, I will take reflective time to ask myself the following questions:

- What thoughts, emotions, reactions experiences came up for me during this interview?
- Am I able to separate between reactions to the content, the situation, and the participant?
- How may any of my reactions may have impacted the study? Was I able to truly hear the participant and ask follow-up questions based on understanding their experience, not adding my own information?
- What additional questions came up for me during this interview?
- How did this interview contribute to my understanding of neuroscience-informed pedagogy?
APPENDIX F

COUNCIL FOR ACCREDITATION OF COUNSELING AND RELATED EDUCATIONAL PROGRAMS 2009 AND 2016 NEUROSCIENCE STANDARDS
2009 Standards

SECTION II

PROFESSIONAL IDENTITY

... KNOWLEDGE

G. Common core curricular experiences and demonstrated knowledge in each of the eight common core curricular areas are required of all students in the program.

...

3. HUMAN GROWTH AND DEVELOPMENT – studies that provide an understanding of the nature and needs of persons at all developmental levels and in multicultural contexts, including all of the following:

...

b. theories of learning and personality development, including current understandings about neurobiological behavior; (CACREP, 2009, p 8-10)

GLOSSARY

...

NEUROBIOLOGICAL BEHAVIOR – the relationship among brain anatomy, function, biochemistry, and learning and behavior. (CACREP, 2009, p 67)
SECTION 2: PROFESSIONAL COUNSELING IDENTITY

COUNSELING CURRICULUM

F. The eight common core areas represent the foundational knowledge required of all entry-level counselor education graduates. Therefore, counselor education programs must document where each of the lettered standards listed below is covered in the curriculum.

3. HUMAN GROWTH AND DEVELOPMENT

3.1. e. biological, neurological, and physiological factors that affect human development, functioning, and behavior (p. 9-10)

SECTION 5: ENTRY-LEVEL SPECIALITY AREAS

A. ADDICTION COUNSELING

1. FOUNDATIONS

1.1. e. neurological, behavioral, psychological, physical, and social effects of psychoactive substances and addictive disorders on the user and significant others (p. 19).

C. CLINICAL MENTAL HEALTH COUNSELING

1. FOUNDATIONS
d. neurobiological and medical foundation and etiology of addiction and co-occurring disorders

2. CONTEXTUAL DIMENSIONS

e. potential for substance use disorders to mimic and/or co-occur with a variety of neurological, medical, and psychological disorders

D. CLINICAL REHABILITATION COUNSELING

1. FOUNDATIONS

e. neurobiological and medical foundation and etiology of addiction and co-occurring disorders

... 

g. potential for substance use disorders to mimic and/or co-occur with a variety of neurological, medical, and psychological disorders

... 

i. impact of biological and neurological mechanisms on disability (p. 25-26).
APPENDIX G

SCREENING FORM
Screening Form

Criteria for inclusion in this study include:

- Professional identity as a counselor educator
  - Do you have a Ph.D. in Counselor Education and Supervision?
  - Are you currently teaching professional counseling or counselor education students?
  - Do you currently hold or are in the process for licensure as a counselor?
  - Do you hold membership with ACA and/or ACES?

- Teach at a CACREP-accredited masters and/or doctoral counseling program
  - Is your program currently hold or is in the process of CACREP accreditation?

- Access to Skype or related software.
  - Do you currently have access to Skype, Facetime, or other video conferencing software?

- Self or other identify as using neuroscience to inform pedagogical teaching approaches.
  - Neuroscience-informed pedagogy is defined in this study as, “intentional pedagogical practices that are informed from neuroscience principles of how the brain learns best. Neuroscience-informed pedagogy involves educators use of neuroscience to conceptualize student learning and development, design and facilitate the learning environment, connect with learners, engage in teaching and instructional methods, and evaluate learners.”
o Briefly describe how you inform your pedagogical practices with neuroscience.

o In what ways do you ensure that you’re using scientifically grounded neuroscience research instead of “neuromyths?”
APPENDIX H

VISUAL METAPHOR AND THEMES
Neuroscience-Informed Pedagogy

Neuroscience of Learning

* Constructs: *
  - Relational.
  - Emotional.
  - Personally Meaning and Interesting.

Neuroscience of the Teaching Process

* Constructs: *
  - Planning a Class.
  - Teaching a Class.

Methods and Specifics

Neuroscience-Informed Counselor Educators

Neuroscience-Informed Counselor Educator Qualities

* Constructs: *
  - Compassion and Understanding
  - Intentional
  - Interest and Passion in Neuroscience

Beliefs about Neuroscience-Informed Pedagogy

* Constructs: *
  - Integration
  - Responsibility
APPENDIX I

INSTITUTIONAL REVIEW BOARD APPROVAL
DATE: May 1, 2019

TO: Savannah Cormier, M.S.
FROM: University of Northern Colorado (UNCO) IRB

PROJECT TITLE: [1426662-1] Exploring Counselor Educators' Experiences With Neuroscience-Informed Counseling Pedagogy

SUBMISSION TYPE: New Project

ACTION: APPROVAL/VERIFICATION OF EXEMPT STATUS
DECISION DATE: May 1, 2019
EXPIRATION DATE: May 1, 2023

Thank you for your submission of New Project materials for this project. The University of Northern Colorado (UNCO) IRB approves this project and verifies its status as EXEMPT according to federal IRB regulations.

Thanks for such a well-written study.

Before you use the consent be sure to update the contact name for IRB to Nicole Morse from Sherry May who has retired.

Best,

Maria

We will retain a copy of this correspondence within our records for a duration of 4 years.

If you have any questions, please contact Nicole Morse at 970-351-1910 or nicole.morse@unco.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within University of Northern Colorado (UNCO) IRB's records.