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Therapists' Experiences With Integrating Neurofeedback Into Therapy for Complex/Developmental Trauma

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Abstract

Introduction. Trauma has been found to have a significant impact on the brain, particularly when it occurs during developmental years. Some studies have found neurofeedback to be effective for treating symptoms of complex/developmental trauma. There is minimal guidance on integrating neurofeedback into therapy with this population. In this qualitative study, the researcher used interpretative phenomenological analysis to gain an understanding of trauma therapists' experiences with integrating neurofeedback into their clinical work with complex/developmental trauma and how this impacts the therapeutic relationship. **Methods**. Sixteen mental health professionals who self-identified as specializing in complex/developmental trauma and used neurofeedback as part of their therapeutic approach participated in this study. Data collection consisted of a demographic survey and semistructured interviews. **Results**. Analysis revealed five superordinate themes: the process of learning neurofeedback; integrating neurofeedback into trauma therapy; grounded in neuroscience and focused on context; building awareness; and shift in dynamics. **Conclusion**. The results of this study offer practical suggestions for getting started with neurofeedback and integrating it into trauma therapy. Additionally, special considerations when practicing neurofeedback with complex/developmental trauma were identified, including shifts in the therapeutic relationship that occur with the addition of this modality.

Keywords: trauma; complex; developmental; neurofeedback; therapy

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Background

Trauma has been found to have a significant impact on the brain. This is particularly true when trauma occurs during developmental years (Thomason & Marusak, 2017). Due to the increasing body of research demonstrating these impacts, neuroscience-informed approaches have been encouraged when working with trauma survivors in a mental health context (Ross et al., 2017). One approach that more directly addresses the functioning of the brain is neurofeedback, also known as electroencephalogram (EEG) biofeedback. Neurofeedback is a noninvasive training process that uses aspects of classical and operant conditioning to help individuals shift patterns within their brains. Frequency/power neurofeedback, the most commonly used type of neurofeedback and the primary modality explored in this study, focuses on training individuals to increase and/or decrease brainwave frequencies in different parts of the brain (Marzbani et al., 2016). Clinicians conduct initial and ongoing assessments using a combination of objective and subjective data to develop individualized training protocols (Thompson & Thompson, 2016).

Although neurofeedback can be beneficial, if it is practiced by someone lacking appropriate training there is a potential for harm (Hammond et al., 2011). This is especially important to be aware of when using neurofeedback in specialized areas such as trauma therapy, since additional training and experience is necessary to work with this population (Hamlin, 2018). For example, Demos (2019) cautioned that some individuals may experience relaxation-induced anxiety when engaging in neurofeedback training that induces relaxation and

emphasized that trauma survivors may be especially impacted by this.

Trauma is an overwhelming experience that can have a lasting impact on an individual's functioning (van der Kolk, 2014). When trauma is repeated or occurs over an extended period of time, the impact can be more complex (e.g., Herman, 1992; International Society for Traumatic Stress Studies [ISTSS] Guidelines Committee, 2018). Two terms commonly used to refer to prolonged or repeated trauma are *complex trauma* and *developmental trauma*.

Complex trauma is a term used to describe both a type of trauma and a symptom profile, and the definition varies between sources (Van Neiuwenhove & Meganck, 2019). For example, the diagnosis of complex posttraumatic stress disorder (CPTSD) included in the International Classification of Diseases (ICD-11) focuses on symptomology instead of type of trauma (World Health Organization [WHO], 2019), whereas several sources define complex trauma as prolonged and repeated traumatic experiences (e.g., Cloitre et al., 2011; Herman, 1992; van der Kolk, 2014). Developmental trauma overlaps with complex trauma and is used to refer to prolonged or repeated interpersonal trauma that occurs during critical periods of development (van der Kolk, 2005). Attachment rupture is a key component of this type of trauma (Fisher, 2014). Developmental trauma is often referred to as a type of complex trauma (e.g., Sar, 2011; van der Kolk, 2005). For the purposes of this study, the term *complex/developmental trauma* was used to acknowledge the complexities and the impact on development.

Some research has been conducted on the effectiveness of neurofeedback for treating trauma symptoms, and most have found positive results. Panisch and Hai (2018) conducted a systematic review of existing research on using neurofeedback with PTSD. They reviewed 10 studies published between 1991 and 2017 and reported all studies demonstrated a reduction in PTSD symptoms in the majority of their participants who received neurofeedback. A few studies have focused specifically on using neurofeedback to treat symptoms of complex, chronic, and/or developmental trauma (e.g., Frick et al., 2018; Gapen et al., 2016; Rogel et al., 2020; van der Kolk et al., 2016). In their research, Frick et al. (2018) studied a sample of 30 adolescent females with developmental trauma living in a residential treatment center. They found that after 25 sessions of neurofeedback, participants showed improvements in areas including memory, attention, cognitive flexibility, and executive functioning. Van der Kolk et al. (2016) examined the effectiveness of neurofeedback treatment to increase affect regulation and decrease symptoms of chronic PTSD using a randomized, waitlist-controlled trial. They found the clients who received neurofeedback had significant improvements in symptoms and ability to regulate affect when compared to the control group. At the initial assessment all participants met criteria for PTSD within the past month, and at the posttreatment assessment, 72.7% of those who had received neurofeedback no longer met criteria for the diagnosis.

Based on existing evidence, neurofeedback has gained recognition as a modality with potential benefits in the treatment of PTSD. Chiba et al. (2019) suggested neurofeedback can be an effective way to relieve PTSD symptoms without the distress that comes with processing traumatic memories. When considering the phase-based model of trauma therapy, neurofeedback could be easily integrated into the stabilization phase (Gerge, 2020). Regulating and stabilizing the brain can help facilitate engagement in therapy and may help increase receptiveness to interventions in trauma therapy (Aroche et al., 2009; Askovic & Gould, 2009).

There has also been some movement in legitimizing neurofeedback as a treatment for trauma. In the ISTSS treatment guidelines for PTSD, neurofeedback was listed as an intervention with emerging evidence (Berliner et al., 2019). Additionally, the company GrayMatters Health recently received clearance for a device (Prism) specifically intended to treat PTSD. A trial of this device with 79 participants showed a reduction in PTSD symptoms after 8 weeks of interventions, which were maintained after 3 months (Zagorski, 2023).

Integrating neurofeedback into trauma therapy presents several challenges, including the need for additional education. Therapists who choose to add neurofeedback to their practice typically lack a background of extensive education in brain science and technology; therefore, there can be a steep learning curve (Hamlin, 2018; Weiner, 2016). Neurofeedback is typically taught in 4- to 5-day workshops, although multiple authors (e.g., Demos, 2019; Hammond et al., 2011) caution that this is not enough for someone to claim competence. After the initial workshop, it is necessary to continue receiving

education through additional trainings, webinars, and mentoring sessions. It is important for neurofeedback clinicians to select and purchase the necessary equipment and to learn to use the technology involved in collecting and analyzing data. If a clinician wants to specialize in a specific area (e.g., treating trauma with neurofeedback), additional training and experience is necessary (Hamlin, 2018). Needless to say, ethically integrating neurofeedback into clinical practice involves a significant amount of time, energy, and financial resources.

In addition to requiring specialized education, integrating neurofeedback into trauma therapy creates a shift in the therapeutic relationship. Fisher (2014) identified aspects of integrating neurofeedback that impact the therapeutic relationship, including providing education about benefits and risks, the introduction of touch when placing and removing sensors, transference, and the trust that clients are putting in the therapist when working together to change brain patterns. Fisher (2014) pointed out that some of these shifts are especially challenging for trauma survivors and encouraged providers to have open discussions with clients about changes in the therapeutic relationship when introducing neurofeedback.

Other than Fisher's (2014) guidance on how to introduce clients to neurofeedback, there is minimal literature on the process of integrating neurofeedback into trauma therapy. Some other neurofeedback providers have written about the integration of neurofeedback into clinical practice (e.g., Hamlin, 2018; Weiner, 2016), but these do not address the specific challenges that come with treating trauma survivors. There is one qualitative study that examined therapists' experiences with what impacts effectiveness of neurofeedback with trauma survivors (Currie et al., 2014). This study addressed the importance of the therapeutic relationship in neurofeedback but primarily focused on how this impacts the effectiveness of treatment and not on the process of integrating neurofeedback into psychotherapy.

Methods

This study aimed to gain an understanding of trauma therapists' experiences with integrating neurofeedback into their clinical work. A qualitative approach was selected since the goal was to gain an understanding of participants' experiences (Pietkiewicz & Smith, 2012). The qualitative method used in this study was interpretative phenomenological analysis (IPA), an approach that aims to understand participants' individual perspectives instead of trying to identify an objective statement to describe a phenomenon (Smith et al., 1999).

Participants

Sampling methods for this study aimed to access participants who met the following criteria: (a) located in the United States, (b) licensed as a mental health therapist, (c) specialize in working with complex/developmental trauma, and (d) use neurofeedback with psychotherapy to treat complex/developmental trauma. The decision to limit participants to those located in the United States was made due to the preference for a more homogenous sample in IPA studies (Pietkiewicz & Smith, 2012). However, this criterion was removed during the data collection process due to international interest. The researcher determined the sample would still be homogenous enough with the remaining three criteria.

A flyer and written description of the study were posted in two online neurofeedback communities: The International Society for Neuroregulation and Research (ISNR) Listserv, and a Facebook Group titled Neurofeedback Protocol Consultation (Licensed Clinicians Only). The flyer and study description included the researcher's contact information, and individuals interested in participating were asked to reach out via phone or email. A total of 16 individuals participated in the study (see Table 1 for demographic information).

Table 1

Participant Demographics

Variable	Number of Participants (n = 16)
Location	
United States	12
Northeast	4
Midwest	2
Southeast	2
West	4
Sweden	3
Australia	1
Gender identity*	
Female	15
Male	1
Age	
Range (years)	32–78
Mean	51.67
Race and ethnicity*	
White	15
Hispanic/Latino	1

Table 1
Participant Demographics

Years working with complex/developmental trauma	
Range	3–40
Mean	14.31
Years practicing neurofeedback	
Range	>1–25
Mean	7.63
BCIA** certification	
Yes	7
No	8
Working towards	1

Note. *Additional options were provided for gender identity and race and ethnicity but were not included in the demographic table due to no participants selecting them.
**Biofeedback Certification International Alliance

Procedures

Data were collected using a demographic survey and semistructured interviews. All data collection was done online using Qualtrics for the demographic survey and Zoom for the interviews. The demographic data were utilized to gain an understanding of who was participating in the study. This survey included questions about years of experience practicing trauma therapy and neurofeedback, geographic location, age, licensure, gender identity, and race and ethnicity (see Table 1). The semi-structured interviews were conducted using an interview schedule of open-ended questions formulated based on the literature review and research questions. All interviews were video recorded with participant consent.

Data Analysis

During the data collection process, the researcher completed a verbatim transcription of each interview. These transcripts were then printed and used for data analysis. Data in the current study were analyzed using a process based on the steps for interpretative phenomenological analysis identified by Smith et al. (2009). Since interviews were video recorded and transcribed by the researcher, steps of analysis were changed slightly to include a review of the transcript. The researcher adjusted the process outlined by Smith et al. (2009) into the following steps: (1) review transcript, (2) initial read-through and noting, (3) reread and noting, (4) identify emergent themes, (5) look for connections between themes, (6) bracket, (7) repeat steps 1 through 6 with each interview, and (8) look for patterns across interviews. The majority of the analysis process was done using paper and pen, although Nvivo was used during the data analysis process to connect quotes to themes or nodes.

Ethical Assurances

This study was developed and completed as a dissertation at an online university. Approval was obtained through the university's institutional review board (IRB) prior to recruitment and data collection. Informed consent was obtained from all participants prior to participating in the study, and participants were notified they could withdraw consent at any time.

Results

Five superordinate themes emerged during data analysis related to trauma therapists' experiences with integrating neurofeedback into therapy with complex/developmental trauma: the process of learning neurofeedback; integrating neurofeedback and trauma therapy; grounded in neuroscience and focused on context; building awareness; and shift in dynamics. Subordinate themes emerged under each superordinate theme (see Table 2).

Superordinate Theme 1: The Process of Learning Neurofeedback

Participants spoke about their experiences with the process of learning neurofeedback, including how they learned about neurofeedback, what drew them to seek education in this field, and barriers they faced as they were getting started. Based on participants' responses, five subordinate themes emerged: discovering neurofeedback, personal experiences with neurofeedback, the learning curve and ongoing learning, investment of time and money, others' perceptions of neurofeedback, importance of mentoring, finding community, and desire for growth and accessibility.

Subordinate Theme 1.1: Discovering Neurofeedback. Participants shared how they discovered neurofeedback and what factored into their decision to seek training. More than half of participants had learned about neurofeedback through a colleague, family member, or friend. A couple participants had witnessed or heard about a family member having success with neurofeedback, and others learned about it through another source such as a workshop, book, or documentary. Most

Table 2
Superordinate and Subordinate Themes

	Number of contributing participants (*n* = 16)	Percentage of contributing participants (*n* = 16)
Theme 1: The process of learning neurofeedback		
1.1: Discovering neurofeedback	16	100.00%
1.2: Personal experiences with neurofeedback	8	50.00%
1.3: The learning curve and ongoing learning	16	100.00%
1.4: Investment of time and money	12	75.00%
1.5: Others' perceptions of neurofeedback	14	87.50%
1.6: Importance of mentoring	13	81.25%
1.7: Finding community	12	75.00%
1.8: Desire for growth and accessibility	11	68.75%
Theme 2: Integrating neurofeedback into trauma therapy		
2.1: Specializing in neurofeedback and complex/developmental trauma	16	100.00%
2.2: Special considerations with complex/developmental trauma	13	81.25%
2.3: Finding balance	11	68.75%
2.4: Searching for something that works	13	81.25%
2.5: Ability to engage in therapy	13	81.25%
2.6: Benefits for the therapist	9	56.25%
Theme 3: Grounded in neuroscience and focused on context		
3.1: Connecting the physiological and psychological	16	100.00%
3.2: Importance of the therapeutic relationship	13	81.25%
3.3: Cultural considerations	13	81.25%
Theme 4: Building awareness		
4.1: Using multiple sources of information to track progress	13	81.25%
4.2: In-the-moment processing and reflecting	12	75.00%
Theme 5: Shift in dynamics		
5.1: Technology and the therapeutic relationship	7	43.75%
5.2: Touch	16	100.00%
5.3: Working together	13	81.25%

participants were working with complex/ developmental trauma in the mental health field prior to starting neurofeedback, except for two who started practicing neurofeedback prior to becoming therapists.

Participants reported varying responses to first learning about neurofeedback. Some reported feeling skeptical or uncertain in part due to the technological aspect and the anticipated learning curve. Participant 10 shared that her initial reaction was, "I don't need to be a rookie at something else. I don't want to look at a computer." Others expressed feeling curious or hopeful. Participant 2 said, "it sounded like it would calm some of the symptoms that people have that make therapy so difficult." A few participants shared they were not interested when they first heard about neurofeedback, but this shifted when they heard about Fisher's (2014) work with developmental trauma. For example, participant 12 indicated he had heard about neurofeedback but lacked interest until he read Fisher's (2014) book. He said Fisher framed therapy as changing neural systems and working with the brain-body interface, and that "we can try to access that through the mind, through what we call mind, but we can actually get much more direct results if we train it."

***Subordinate Theme 1.2: Personal Experiences With Neurofeedback*.** About half of participants reported personal experiences with neurofeedback; some prior to deciding to seek training in neurofeedback, and others while learning how to practice neurofeedback. For some, having a personal experience solidified their belief in this intervention. Participants used words like "fantastic" and "wow experience" to describe their experiences, and reported experiencing changes in energy levels,

sense of self, and perception of the world around them after training. Some participants indicated their personal experiences solidified their belief in neurofeedback. Participant 4 reported two different experiences during her training. When she trained with a higher frequency protocol, “my energy level went from already pretty high to like, exponential.” The following day she tried a different protocol and explained, “my brain felt like it had been massaged and it was finally where it needed to be.” Experiencing “both ends of the spectrum” convinced her, “if you can do an appropriate assessment and really get a feel for what that person’s nervous system and brain is, you can have significant impact on their life and functioning.”

Subordinate Theme 1.3: The Learning Curve and Ongoing Learning. Participants shared their experiences with learning the neuroscience, physiology, and technology necessary to understand and practice neurofeedback. When describing their initial training, participants used phrases like “completely overwhelming,” “so freaking intimidating,” and “my brain exploded.” Some participants reflected on the lack of education about neuroscience and physiology in their training to become a mental health professional, which resulted in a steep learning curve when learning neurofeedback.

Participants also reflected on the learning curve when taking their knowledge from the initial training (typically a 4- or 5-day intensive workshop) to their clinical practice. Several participants expressed nervousness when beginning to practice with clients. Participant 12 described this as “entering a new world.” Participants reported being in a spot of not knowing. For example, Participant 3 expressed, “I was looking at the screen. I had no idea what I was doing. Absolutely no idea. I forgot that there’s a human there because I was like ‘what is going on here?’” Despite these challenges, participants pushed through, and attributed this their passion and excitement for the field.

Along with the initial learning curve, participants spoke to the need for keeping up with a changing field through continuing education and consultation. Regardless of how long they had been practicing neurofeedback, most participants reported ongoing learning. Participant 13 concisely expressed what many participants implied: “the more I learn, I understand how little I know.”

Subordinate Theme 1.4: Investment of Time and Money. Participants spoke about the investment of time and money necessary when learning and practicing neurofeedback, and several reported expense as a barrier to beginning to practice neurofeedback. Participants mentioned the expense of the initial training, equipment, software, mentoring, consultation, and continuing education. Along with investing money into learning neurofeedback, participants noted the amount of time they have invested. Participants reported spending significant amounts of time learning through independent study, workshops, consultations, and mentoring sessions.

Some participants identified difficulties making a return on their financial investment in neurofeedback. An issue participants identified around this was the lack of consistent insurance coverage for neurofeedback. Although there are billing codes for neurofeedback and some coverage through insurance companies, participants reported difficulties getting reimbursed. In addition, participants shared that when insurance companies did reimburse for neurofeedback, the rates did not make up for the cost of providing the service. Participant 10 explained she was initially excited to discover some insurance companies provided reimbursement for neurofeedback, but then discovered “the hour I get paid $90 for to do therapy is costing me all this money more because of the equipment, and they’re going to pay me less than half.”

Subordinate Theme 1.5: Others’ Perceptions of Neurofeedback. The majority of participants spoke about others’ perceptions or lack of knowledge about neurofeedback as a barrier to their practice. Some spoke about the need to provide education to others around them (e.g., other professionals, colleagues, clients) to help increase understanding. They reported challenges such as invalidation from other professionals due to belief that neurofeedback is “quackery” or misunderstandings of what neurofeedback entails. Some participants attributed this to lack of regulation in the field, resulting in neurofeedback practitioners who “don’t do it properly.” Multiple participants indicated colleagues tended to become less skeptical as they witnessed results. Participants who had been practicing for longer periods of time observed an increase in acceptance of neurofeedback over the years.

A few participants spoke about misconceptions they encountered when introducing neurofeedback to clients. One common misconception participants identified is that neurofeedback is something that is “done to” clients. Participant 6 reported having this

misconception when she began practicing, which she passed onto her clients. She remarked she is now very clear "that it's their brain that's doing the work and to be mindful about that, or to let their brain do it because sometimes people try too hard and then it gets in the way." Participants also reported some clients expressed paranoia about things like electrical currents or the therapist being able to read their minds. Participant 12 expressed that even when he explains to clients there is no electricity or voltage involved in neurofeedback, they sometimes struggle to understand this. He shared, "I might explain it every session and then inevitably, like five sessions in, somebody's like, 'so wait a minute, is there voltage added?'"

Subordinate Theme 1.6: Importance of Mentoring. Participants emphasized the importance of mentoring with a more experienced neurofeedback practitioner as part of their learning process. They identified both individual and group mentorship as beneficial. Participant 11 agreed with the importance of mentoring, while also recognizing that mentors cannot always help when they are not experiencing the client: "you're the one in the room with the client, and whatever you present in the mentoring sessions is always limited and already filtered."

A few participants commented on the accessibility of mentoring due to expense. Additionally, looking for someone who specializes in neurofeedback with complex/developmental trauma limits the pool of mentors to select from, and may come with a higher price. Participants framed mentoring as a necessary investment in themselves and their businesses to ensure they provide high quality services to clients.

Subordinate Theme 1.7: Finding Community. Several participants mentioned building community as an important part of their learning process. Some identified this was especially important to counter isolation they felt when beginning to practice neurofeedback. Participants who had been practicing for longer periods of time reported difficulties finding colleagues who practiced neurofeedback when they got started, which they described as "isolating" and "no fun." Those who experienced community identified it was helpful to find colleagues who were also excited about neurofeedback and spoke to the benefits of being able to "geek out" with others. Participant 5 expressed, "it's just so nice to be in an environment where everybody speaks your language, that people don't look at you like you have five heads."

***Subordinate Theme 1.8: Desire for Growth and Accessibility*.** Many participants expressed desire for growth and increased accessibility of neurofeedback. They mentioned the healing they have witnessed since adding neurofeedback to their practices and expressed hopes that more trauma therapists will get trained to broaden accessibility for clients. Participant 11 expressed, "seeing clients really recovering fully from trauma is something that I rarely saw before with developmental trauma, and I see it now." She continued, "seeing how many people are suffering, and how many people we can reach if more of us are doing neurofeedback, I would just like to encourage other therapists in the trauma field, for benefit of their clients, but for their own benefit as well, for their mental health. Let's embrace neurofeedback."

Some participants articulated the challenges with making neurofeedback accessible and affordable for clients. They acknowledged that clients who have experienced complex/developmental trauma may face additional social or economic barriers to accessing services. Due to the inconsistent insurance coverage of neurofeedback, many clients need to pay out of pocket, which impacts who can access services. A few participants identified difficulties finding a balance between offering sliding scale options and making enough money to cover the expense of being a neurofeedback practitioner. Participant 10 framed accessibility of neurofeedback as an ethical issue, and expressed, "it is an absolutely necessity that what happens next is to make it available regardless of ability to pay."

Superordinate Theme 2: Integrating Neurofeedback and Trauma Therapy

Participants shared their experiences with integrating neurofeedback and trauma therapy. Five subordinate themes emerged under this theme: specializing in neurofeedback with complex/developmental trauma, special considerations with complex/developmental trauma, finding balance, searching for something that works, and ability to engage in therapy.

Subordinate Theme 2.1: Specializing in Neurofeedback With Complex/Developmental Trauma. Participants shared their experiences with finding education on neurofeedback with complex/developmental trauma. Some reported difficulties finding information and research specifically focused on neurofeedback with this population. Half of the participants referenced Fisher's (2014) book as a primary source for learning about integrating neurofeedback and

trauma therapy. Participants who started practicing prior to the publication of Fisher's book reported primarily learning through experiences. A couple participants identified that the lack of available information motivated them to contribute to the field through research or providing trainings.

Subordinate Theme 2.2: Special Considerations With Complex/Developmental Trauma. Participants reflected on their experiences and knowledge about neurofeedback training with clients with complex/developmental trauma, including special considerations with this population. Participants advocated for the need for specialized training and cautioned about harm than can occur if a clinician is not properly trained in working with this population. Several participants used words like "sensitive" or "vulnerable" when talking about the brains of those with complex/developmental trauma. Participants identified noticing that these clients are more sensitive to changes to protocols (e.g., length of training, placement of sensors, adjusting reward bands) than clients with other presenting concerns.

Most participants framed symptoms of complex/developmental trauma as adaptive. They expressed understanding that symptoms that now interfere with clients' functioning were beneficial for survival at some point. Several participants expressed feelings of admiration for their clients and their ability to find ways to self-regulate, even when their attempts to cope were ultimately destructive (e.g., self-harm, drug use). Through this lens of symptoms as adaptations for survival, participants spoke about difficulties clients may experience when change starts to happen. They identified the importance of moving slowly and taking time to process changes with clients. Participant 9 provided an example of one of her clients who experienced fear as she began to see change. She explained, "so much has changed that she is even scared that this change goes too quickly. 'Because who am I,' she asks, 'if I'm not the one who is always thinking about killing myself?'"

Participants also described clients' emotional reactions to the idea of neurofeedback and how this can be impacted by trauma history. Some participants reported encountering skepticism or paranoia from clients around neurofeedback. If clients were willing to try it, Participants shared various approaches they took to minimize discomfort. For example, Participant 11 observed, "sometimes I have to put sensors on myself and train myself just to show them it's not harmful." When clients have a history of torture involving electrocution she explained, "the process is longer. So sometimes it's just to come to the room and just stand at the door and just see equipment."

Subordinate Theme 2.3: Finding Balance. Participants reflected on their process of finding balance between neurofeedback and psychotherapy, both in their practices as a whole and within individual sessions. Some participants identified neurofeedback as a central component of their practice, and reported they prioritize clients who are interested in neurofeedback. A couple participants expressed they would not want to continue working with complex/developmental trauma if they were no longer able to use neurofeedback, which they attributed to the change they have seen since adding neurofeedback to their practices. Participant 4 explained, "[neurofeedback] is the only thing I've seen time and time again to have quick and lasting results."

In terms of balancing neurofeedback and psychotherapy within a session, participants varied in their approaches. Several identified challenges with finding a balance between talk therapy and neurofeedback training in the standard 50- to 60-min timeframe, particularly since neurofeedback involves preparation and cleanup. Some participants identified a preference for starting with neurofeedback and leaving the second half of session for talk therapy. These participants observed changes in their clients' abilities to engage in talk therapy after neurofeedback training. For example, Participant 3 shared, "we do the [neurofeedback] sessions and then we do the therapy, and then we can get to places that before were too much." Other participants reported offering options and encouraging clients to decide how to spend the session time.

Subordinate Theme 2.4: Searching for Something That Works. Several participants commented on clients coming to them for neurofeedback after having tried many other approaches without success. They described clients who seek neurofeedback as "stuck," "desperate for something that works," "seeking relief," and at "the end of the line." Participant 3 noted clients will come in for neurofeedback saying things like, "I tried everything, I'm treatment resistant" and "you're my last hope and I'm going to kill myself if this one doesn't work."

Participants also reported they were searching for approaches that would better help their clients, which is what led many of them to neurofeedback.

Several spoke about recognizing the limits of talk therapy alone throughout their work with complex/developmental trauma. Participant 12 explained, “a number of people are already kind of toasted on doing talk therapy.” He indicated neurofeedback has been helpful because, “I think just the fact that they can do work without really having to directly talk about things, at least at the start, is really appealing.” Other participants echoed this sentiment, and shared examples of clients who were able to get unstuck after adding neurofeedback.

Subordinate Theme 2.5: Ability to Engage in Therapy. Most participants reported noticing changes in their clients’ abilities to engage in therapy after adding neurofeedback to their practice. They identified noticing changes in areas including self-regulation, ability to access and utilize coping skills, ability to engage in deeper therapeutic work, and sense of self. Participant 6 shared she sees the role of neurofeedback as being “to help with the flexibility of the brain to move from one thing to another, and enough stability in the brain to stay with something long enough.” She continued, “but mostly just to be in a good zone to be able to do the therapy.” Along with increased ability to engage in the therapeutic process, participants identified witnessing changes in clients including less frequent hospitalizations, increased ability to engage in interpersonal relationships, and gaining more of a sense of self and identity.

Subordinate Theme 2.6: Benefits for the Therapist. In addition to noticing benefits for clients, several participants reported noticing benefits for themselves because of integrating neurofeedback into their practices. Participant 4 asserted neurofeedback has “helped me significantly with clinician burnout.” She explained, “I don’t know how long I would’ve lasted with the heavy hitters on my caseload if I didn’t have the regulation from neurofeedback.” Participants identified using neurofeedback to help clients learn to self-regulate relieved them from needing to be the ones to regulate them. They expressed benefits including feeling less exhausted, more hopeful, and more able to be present for clients without being pulled into their pain.

Superordinate Theme 3: Grounded in Neuroscience and Focused on Context

Participants identified the focus on neuroscience and physiology in neurofeedback, but shared they make decisions based on this knowledge in the context of the individual client. Context involves identity, relationships, and larger systems. Three subordinate themes emerged under this superordinate theme: connecting the physiological and psychological, individualized approach, and cultural considerations.

Subordinate Theme 3.1: Connecting the Physiological and Psychological. Many reported learning about neuroscience and physiology was beneficial for their understanding of clients’ presentations. Participants identified that focusing on the science behind trauma-related symptoms can help clients feel less stigmatized. Additionally, participants explained they provide education about neuroplasticity to encourage hope. Participant 6 shared she explains to clients, “the brain created a brain to serve whatever your needs were early on, and now the good news is the brain is plastic and we can change it.”

Subordinate Theme 3.2: Importance of the Therapeutic Relationship. Although neurofeedback focuses on physiology, participants identified the relationship as an essential part. Some participants spoke about awareness of their own presence during neurofeedback training. Participant 10 shared, “your warm, curious presence is profoundly healing, regardless of what’s happening in the neurofeedback.” Participants articulated the necessity of building a foundation of trust and identified this as particularly important with clients with complex/developmental trauma. Some participants explained this foundation can help encourage clients communicate more openly about their experiences during training. Participant 5 cautioned about the potential for damaging trust when a training protocol does not go well: “if for whatever reason we make a mistake in choosing a protocol or making a shift, that can actually break the trust pretty quickly.” She added, “we can also gain it back pretty quickly by saying, ‘okay, we did this based on this, and now we know that your body system doesn’t like that so we’re going to do this.’”

Subordinate Theme 3.3: Cultural Considerations. Participants shared their observations about neurofeedback and cultural considerations. A few participants identified they have found the scientific nature of neurofeedback makes it easier to introduce to clients from various backgrounds than traditional talk therapy. Language barriers were mentioned by a couple participants, who shared their experiences working with interpreters during neurofeedback. Participant 11 explained, “with interpreters around, it’s the interpreter that you’re telling—so visual prompts and trying to understand. And we have also

a model of the brain to explain how we're trying to impact on calming the nervous system."

Participants also shared their observations about neurofeedback and gender, race and ethnicity, and socioeconomic status. Some participants expressed an understanding of the impact of difference in the therapy room. For example, Participant 12 explained, "as a male in the field especially I have to be really intentional about how I do things. So I always verbalize what I'm going to do before I do it." A female participant who worked primarily with male clients reported similar awareness of gender when applying sensors to her clients' heads.

Participants acknowledged socioeconomic status as a barrier to neurofeedback, particularly due to inconsistent insurance coverage. Additionally, participants spoke about the impact of not having basic needs met. Participant 5 spoke about the intersection between race, ethnicity, and socioeconomic status in the community she works in. She shared, "I work with children who are Navajo and children from Mexico, as well as the majority of kids being from a low socioeconomic status" and reported noticing her results are "not as good" as what others presented at conferences or webinars. She expressed, "I attribute this to a number of variables including the intergenerational piece and the home environment that my kids live in while we are training." Participants acknowledged that individuals with low socioeconomic status and/or people of color may have a history of experiences that make it challenging to trust providers and highlighted the importance of building the therapeutic relationship. Participant 12 shared he works with several indigenous clients and explained he does "significant work to understand my privilege, understand how white culture is very different from Navajo culture, and to take the time to become identified as an ally before bringing the neurofeedback practitioner side of me into the room." The participants who spoke about privilege in the context of neurofeedback identified this as important to acknowledge due to its impact on the therapeutic relationship.

Superordinate Theme 4: Building Awareness

Participants spoke about neurofeedback as a way to help clients build awareness. Two subordinate themes emerged under this theme: using multiple sources of information to track progress, and in-the-moment processing and reflecting.

Subordinate Theme 4.1: Using Multiple Sources of Information to Track Progress. Participants identified using a mixture of objective and subjective sources to track progress in neurofeedback training. These sources include questionnaires about psychological and physiological symptoms, observation during sessions, client self-report, and gathering information from others who interact with the client. Participants contended having multiple sources of information can be especially important when clients struggle to observe and report their internal experiences, which can often be the case when someone has experienced trauma. When observing clients during sessions, participants spoke about looking for "nuances" and "subtleties" in facial expressions and body language.

Subordinate Theme 4.2: In-The-Moment Processing and Reflecting. Participants spoke about building in-the-moment awareness with clients through processing and reflecting throughout neurofeedback training. Participant 14 commented, "clients, especially clients with trauma, are not tuned into their bodies and their brains at all, or very little." She shared she helps build awareness by "educating them, then training, educating them more." Participants framed helping clients build awareness as part of the therapeutic process. Some participants reported they pause training when they notice something shift to help clients make connections. Participant 11 provided an example of how she would encourage clients to build awareness during a pause: "now beta is going up, those are fast frequencies. I'm wondering what is happening in your body in this moment."

Superordinate Theme 5: Shift in Dynamics

Participants reflected on shifts in dynamics that occurred when they integrated neurofeedback into their practices. Three subordinate themes emerged: technology and the therapeutic relationship, touch, and working together.

Subordinate Theme 5.1: Technology and the Therapeutic Relationship. Participants spoke about the impact of bringing technology into the therapeutic relationship. Some identified difficulties adjusting to having technology in the room, especially at the beginning. Participant 3 shared, "it's nerve-wracking when you sit in front of the computer and you have to make sure everything works. But it's like, 'yes, let's work with the human.'" Some participants reported clients also had difficulties adjusting to the addition of technology in the relationship. Participant 12 explained, "if I was a client, I think would feel pretty invalidated if I came in to see somebody that I actually had a relationship with and all they wanted to do was have me do

some computer stuff.*"* Participant 15 noted some of her clients chose to discontinue neurofeedback and return to talk therapy "because they're hungry for that connection, that human connection." She explained with neurofeedback, "we're not making eye contact. They're staring at a screen and they're tired of screens. So that can be a neurofeedback barrier."

Subordinate Theme 5.2: Touch. Participants addressed the impact of the touch involved in neurofeedback, which can be particularly sensitive when working with complex/developmental trauma. Some participants spoke about shifts in the therapeutic relationship with the addition of touch. For example, Participant 10 described touch as "equalizing," and explained, "for most of my clients I think it's disarming in a really positive way. Like, it's a vulnerable position and it's also kind of protected in a way, cause they're looking away from you." A few participants reported adjusting their approach to applying sensors to reduce client discomfort, including demonstrating putting sensors on themselves first or coaching clients through applying the sensors themselves if they prefer not to be touched by the clinician. Participant 4 identified, "ears are really sensitive and actually can be a pretty intimate touch area. So usually in the beginning I'll ask people if they want to clean their ears off, and I'll show them how to put the ear clips on."

A few participants explained they view clients' reactions to touch as an assessment and pointed out the potential for the touch to be healing. Participant 11 observed changes she has seen over time in clients' response to touch: "for many clients initially touch is not desirable. And I could see them cringing when you try to rub their ears, especially touching earlobes." She explained, "but over time touch becomes therapeutic and really important." Similarly, Participant 6 spoke about touch with a client whose past experiences with touch were primarily violent: "he still will sometimes be tearing when I put on the [sensors], and I touch him very gently, and sometimes I linger that touch because I want him to have different experiences.*"* In terms of their own experiences with touching clients, some participants identified feeling "awkward" at first. However, several participants used words like "sacred" and "special" when describing applying sensors to their clients' heads and ears.

Subordinate Theme 5.3: Working Together. Participants identified neurofeedback as a collaborative process between clinician and client and emphasized the importance of engaging the client. They used words and phrases like "team effort," "warm closeness," and "doing this together." Participant 12 explained he tries to "make it as collaborative of a process as possible. And I think that's been key. And anytime someone feels like it's being done to them, those people tend to drop out pretty quickly." Similarly, Participant 10 described, "it's a collaborative feeling and a warm closeness that I prefer to the formality of therapy."

Discussion

This study aimed to gain insight and understanding into trauma therapists' experiences with integrating neurofeedback into their clinical work with complex/developmental trauma. In this section, the five superordinate themes identified in this study are examined in connection to existing literature. These interpretations are based on the patterns and themes that emerged throughout the process of analyzing the 16 semistructured interviews.

The Process of Learning Neurofeedback

When sharing about their experiences with learning neurofeedback, participants identified barriers and factors that were helpful with the learning process. Barriers included the learning curve, investment of time and money, and others' perceptions of neurofeedback. Existing literature on neurofeedback echoes participants' sentiments about the steep learning curve, with several sources commenting on the lack of training in neuroscience and technology in mental health education programs (Chapin, 2016; Hamlin, 2018; Weiner, 2016). The literature also supports participants' reports that the learning curve is ongoing with the need to continue learning after the initial training (e.g., Demos, 2019; Hammond, 2011). The initial and ongoing learning also involves significant investments of time and money; on top of paying for trainings, clinicians need to purchase or rent the necessary equipment and software (Hamlin, 2018). Due to these factors, Chapin (2016) described integrating neurofeedback into therapy as a "challenging, time-consuming, and expensive endeavor" (p. 156).

Existing literature supports participants' reports about skepticism that exists about neurofeedback, including attributing the effects of neurofeedback to placebo (e.g., Thibault & Raz, 2017; Thornton, 2018). Although empirical research on neurofeedback does exist, it is criticized for not being rigorous enough (Luctkar-Flude et al., 2018). The skepticism and criticism of existing research has been correlated with lack of insurance coverage due to neurofeedback being viewed as experimental (Hamlin, 2018; Hammond et al., 2011). Orndorff-

Plunkett et al. (2017) commented, “despite growing interest, there persists a level of distrust and/or bias in the medical and research communities in the USA toward neurofeedback and other functional interventions. As a result, neurofeedback has been largely ignored, or disregarded within social neuroscience” (p. 2). Additionally, although clinicians can become certified in neurofeedback through BCIA, this is not a requirement to practice neurofeedback (Hammond et al., 2011), meaning the level of training and mentoring providers have can vary significantly.

Despite these barriers, participants expressed dedication to the neurofeedback field and hopes for the future, and some were motivated by the barriers they faced to contribute to the field to help future clinicians. Similarly, Currie et al. (2014) reported the trauma therapists who participated in their qualitative study expressed hope for the future of neurofeedback. They wrote, “participants described the neurofeedback field as being ‘cutting edge,’ ‘growing exponentially,’ ‘up and coming,’ and having ‘endless possibilities’” (Currie et al., 2014, p. 230).

Factors that participants identified as helpful during the learning process included mentoring, building a community, and their excitement for the field. Mentoring was emphasized as an important part of learning and developing in the field by participants, which aligns with existing literature (e.g., Hammond, 2011; Weiner, 2016). Hammond (2011) explained that part of the importance of mentoring, particularly early in the learning process, is to reduce the potential for harm that can occur when someone provides neurofeedback without sufficient training. As clinicians gain experience with neurofeedback, mentoring can eventually be replaced with peer consultation (Weiner, 2016). Connecting with colleagues in the neurofeedback community was identified as helpful by several participants, particularly to counter isolation they experienced when starting to practice. Having access to community also provides opportunities for peer consultation.

Integrating Neurofeedback into Trauma Therapy

In terms of integrating neurofeedback into therapy with complex/developmental trauma, participants spoke about the need for specialized training in this area. Existing research has demonstrated differences in structure and functioning of the brain in individuals with complex/developmental trauma (e.g., Edwards, 2018; Marinova & Maercker, 2015; Thomason & Marusak, 2017). For example, complex/developmental trauma has been associated with increased amygdala activity, a part of the brain found to play a role in detecting threats (Edwards, 2018; Gerge, 2020; Thomason & Marusak, 2017). Therefore, it is important for clinicians who specialize in neurofeedback with complex/developmental trauma to learn about the impact of trauma on the brain as part of their education.

Completing thorough initial and ongoing assessments to determine protocols is essential for neurofeedback with any client, but with complex/developmental trauma there are often comorbidities and difficulties with self-reporting that create additional complexities (e.g., Fisher et al., 2016; Lanius et al., 2015). Research on the brain activity of traumatized individuals has shown heterogenous results, and there has not been any specific EEG biomarker for trauma-related disorders discovered (Fisher et al., 2016). For this reason, there is no set approach to neurofeedback with complex/developmental trauma and an individualized approach is necessary (Fisher, 2014; Fisher et al., 2016). There have been attempts at identifying biomarkers and protocols for PTSD, including the creation of the Prism device by GrayMatters Health to specifically target areas of the brain that are typically impacted by trauma (Zagorski, 2023). More research will be necessary to determine if interventions like Prism are applicable in cases of complex/developmental trauma.

Several participants observed that clients with complex/developmental trauma who came for neurofeedback had typically already tried several other therapeutic approaches with minimal success. Participants spoke about recognizing the limitations of talk therapy alone, which is part of what led them to seek additional ways to help their clients and to find neurofeedback. They identified that, although talk therapy was helpful to an extent, clients struggled to get unstuck and some felt burnt out with talk therapy. Several participants noticed their clients were more able to engage in the therapeutic process after the addition of neurofeedback. This aligns with existing literature, which found once clients’ brains were more regulated and stabilized, they were more receptive to interventions in trauma therapy (Aroche et al., 2009; Askovic & Gould 2009; Askovic et al., 2017). Helping clients learn to regulate their brains can create more ability to self-regulate throughout the therapeutic process (Bell et al., 2019), and this physiological regulation can be particularly helpful prior to attempting to engage in trauma processing (Othmer & Othmer, 2017). Neurofeedback can also provide a way to work on reducing trauma-related symptoms without diving into trauma processing,

which can be especially helpful if a client lacks the skills necessary to go into deeper work (Chiba et al., 2019).

Grounded in Neuroscience and Focused on Context

Neurofeedback was identified as grounded in neuroscience and physiology while also acknowledging the client's context. All participants spoke about the focus on neuroscience and physiology that comes with neurofeedback and how this has impacted how they view complex/developmental trauma. Despite this shift in focus, participants recognized the importance of context when applying this knowledge to individual clients. Context includes interpersonal relationships, larger systems the client is a part of, cultural background, and other factors that play into the client's identity.

Several participants identified using psychoeducation about the brain and physiology to help destigmatize symptoms and externalize trauma. This lens acknowledges that human physiology is designed to promote survival and has built in systems that activate when a threat is present (van der Kolk, 2014). In stressful situations physiological changes occur in the brain and body that are useful for threatening environments in the short term, but long term this can have negative impacts on development and functioning (Thomason & Marusak, 2017). Some participants asserted learning more about the neuroscience and physiology of trauma convinced them further of the importance of having a physiological component to trauma therapy. This relates back to participants' comments on the limits of talk therapy alone.

The therapeutic relationship was identified as an important part of neurofeedback when integrated into trauma therapy. Some participants spoke about the therapist's presence and attunement as a component in the healing properties of neurofeedback. Participants reported paying attention to how they are showing up in the room with clients and trying to create an environment where they feel safe enough. Leddick (2015) addressed the importance of creating a sense of safety in order to open the possibility for change, "the patient's CNS [central nervous system] must actually assess the present context and itself as safe enough and requiring fewer of said constraints in order for change to occur" (p. 121).

Participants also identified having a foundation of trust in the therapeutic relationship was beneficial when integrating neurofeedback into their work with complex/developmental trauma. They shared their approaches for this, including taking time to introduce neurofeedback, having open conversations about the process, and encouraging clients to speak up during the training if anything does not feel right. Fisher (2014) noted that it requires a certain amount of trust for clients to allow the therapist to look at and train their brain. Building trust in the therapeutic relationship with clients with complex/developmental trauma can be challenging since this type of trauma often involves negative experiences with interpersonal relationships (McFetridge et al., 2017; Van Nieuwenhove & Meganck, 2019).

When speaking about working with clients with complex/developmental trauma from different backgrounds and cultural groups, some participants identified areas they feel influence neurofeedback training. Several participants identified the impact of socioeconomic status on clients' abilities to access neurofeedback. Since neurofeedback is inconsistently covered by insurance companies, the potential out-of-pocket expenses create barriers for those who do not have the financial means to cover what insurance does not. Participants also identified engagement in therapy can be challenging for clients who live in a state of ongoing stress and whose basic needs are not being met. Gender was addressed by a couple participants, specifically related to the touch that is involved when applying sensors to clients' heads. Both participants commented on their experiences of touching clients of a different gender than themselves and identified staying mindful and being intentional in these interactions. A couple participants spoke about their experiences working with interpreters with clients who spoke a different language, one of whom identified this as a challenging part of her work. Finally, a few participants spoke about race and ethnicity. A couple participants who identified as White recognized clients of different races or ethnicities may be hesitant to trust White providers due to factors including differences in power/privilege and historical incidences of mistreatment of communities of color in healthcare settings.

Meyer and Zane (2014) examined the impact of cultural elements on clients' experiences with mental health services by having clients (n = 102) complete questionnaires. They found that for clients from marginalized racial and ethnic groups having a therapist of the same race or ethnicity was associated with perceiving services as accessible

and perceived quality of care. This was also marginally associated with overall satisfaction with services. Applying this information to neurofeedback, having diverse providers could help clients from marginalized communities perceive neurofeedback as more accessible. No information could be found on the demographics of providers in the neurofeedback field; therefore, the ability to access diverse providers is unknown. There has been research on provider demographics in other related fields. For example, the American Community Survey examined data from 2005 to 2013 and found that although there was growth in psychologists from marginalized racial and ethnic groups over the years, they continue to make up less than one fifth of psychologists (Lin et al., 2015). Although psychologists are only one type of mental health professional, this suggests diversity is limited in the mental health field.

Cultural considerations are minimally covered in existing literature on neurofeedback. In a review of existing EEG research, Choy et al. (2022) identified a lack of recruitment and retention of participants who are members of minority groups. They identified one barrier to inclusion in EEG research is hair type. The methods commonly used to record EEG data require contact with the scalp and are most effective with short or thin hair. This can lead to exclusion of participants with thick, curly, or braided hair due to obtaining less clear EEG recordings. Choy et al. (2022) pointed out that this often leads to exclusion of participants of African or Caribbean descent from EEG research. The authors recommended trying alternative types of electrodes to collect data and reported some efforts in this direction (Choy et al., 2022, pp. 17–18).

Currie et al. (2014) reported therapists in their qualitative study identified multicultural factors had minimal impact on neurofeedback outcomes with the exception of socioeconomic status. Fisher (2014) wrote about the potential for neurofeedback to be accepted where typical therapy is not: "psychotherapy is a Western tradition that is sparsely practiced in the rest of the world. Neurofeedback is cross-cultural: it doesn't depend on language, verbal processing, or cultural bias" (p. 247). The Biofeedback Certification International Alliance (2016) has a section on multiculturalism and diversity that encourages providers to seek education and work to recognize beliefs and biases. In this section they wrote that professionals who are certified through BCIA "are encouraged to recognize that, as cultural beings, they may hold attitudes and beliefs that can detrimentally influence their perceptions of and interactions with individuals who are different from themselves ethnically, racially, in sexual orientation, or gender identity" (BCIA, 2016, p. 2). Harvey et al. (2015) wrote about the importance of making sure individuals in underserved or marginalized groups have enough information about biofeedback to make informed decisions and suggested having information available in different languages to increase accessibility.

Building Awareness

Participants reported using a variety of methods to track progress and change, such as self-report measures, observation and attunement, involving a family member or significant other, and monitoring EEG. When someone has a history of complex/developmental trauma, their ability to recognize and identify body sensations and emotional states is often impaired (Fisher, 2010; Lanius et al., 2015; van der Kolk, 2014). Due to this, participants identified helping clients build awareness as part of the therapeutic work in neurofeedback.

Existing literature supports the connection between neurofeedback and building awareness. Neurofeedback has been connected to mindfulness and meditation, as these approaches focus on building awareness in the present moment (e.g., Baldini et al., 2014; Brandmeyer & Delorme, 2013). Bagdasaryan and Quyen (2013) spoke about building awareness as a part of neurofeedback: "the major task is to support the subject in the process of introspection and self-discovery to achieve control over neural activity" (p. 7). They also wrote about the importance of connecting first- and third-person data in neurofeedback. Hammond (2011) advocated for the use of objective assessment (e.g., examination of raw EEG data or a quantitative electroencephalogram [qEEG]) to supplement less objective assessment measures when determining protocols for neurofeedback. These sources support participants' approach of using multiple sources of information for tracking progress and focusing on helping clients build awareness.

Shift in Dynamics

Participants identified a shift in dynamics that occurred when they integrated neurofeedback into their work with complex/developmental trauma. Standard talk therapy involves clients and therapists sitting across the room from each other and engaging in conversation. With neurofeedback added to therapy, technology and touch are added to the therapeutic relationship. The therapist is not

only paying attention to the client, but also watching a computer screen. Participants shared their experiences with introducing technology into the therapeutic relationship and reported some clients struggled to adjust to the change in dynamics. Some spoke about the potential of getting pulled into the technical aspects and focusing less on the therapeutic relationship, especially when getting started. The impact of bringing technology into the therapeutic relationship is addressed in existing literature. Fisher (2014) wrote about some of her clients' reactions to having computers as part of their therapy. She wrote, "if you are bringing neurofeedback into an established setting and established relationship, the computers can feel like intruders" (Fisher, 2014, pp. 141–142). Leddick (2015) called the computer a "third" in the relationship and expressed this presence "requires attention and holds therapeutic potential" (p. 132).

A second shift in the therapeutic relationship is the addition of touch. Participants shared their experiences with this change, including their approach to introducing touch into the relationship, thoughts on potential healing qualities of the touch involved in neurofeedback, and ways of working with clients who are uncomfortable with being touched at all. Overall, participants indicated they are intentional about touch and mindful about clients' reactions. Since complex/developmental trauma is often interpersonal, touch can be an especially sensitive issue (Fisher, 2014). Existing literature acknowledges these challenges and also addresses the potential for the touch involved in neurofeedback to be beneficial. For example, Fisher (2014) posited that therapists "may in fact have a unique opportunity, in pasting the sensors on and then taking them off and cleaning the paste off the head, to rehabilitate touch for some patients, to remind them of, or introduce them to, nurturing touch" (p. 101). Leddick (2015) also wrote about the potential for touch to have nurturing qualities.

Overall, neurofeedback was identified by participants as a collaborative process and several expressed feeling a sense of working together with clients. They reported involving clients in decisions about the process when appropriate. Participants spoke about making sure clients understand neurofeedback is not something being "done to them," and emphasized the importance of choice. Some reported noticing clients are more likely to drop out if they feel like neurofeedback is being done to them. Research by Currie et al. (2014) found the therapists in their study also identified neurofeedback as a team effort, with the client and therapist working together to determine if protocols are appropriate. Part of working together in neurofeedback is identifying what the client hopes to see change and developing goals to work towards (Weiner, 2016).

Implications

Participants' accounts of what was beneficial when getting started could serve as guidance for trauma therapists hoping to add neurofeedback to their practices. Finding community and working with a mentor are two factors participants identified as most helpful, which is supported by existing literature (e.g., Hammond, 2011; Weiner, 2016). Identifying barriers to learning and integrating neurofeedback could help therapists understand the barriers and challenges they may encounter to make an informed decision regarding the appropriateness of neurofeedback. The barriers and challenges mentioned most frequently by participants were the learning curve, others' perceptions or stigma of neurofeedback, and the investment of time and money. These challenges align with those referenced in existing literature (e.g., Chapin, 2016; Orndorff-Plunkett et al., 2017; Thornton, 2018; Weiner, 2016). Having additional guidance for clinicians starting off with neurofeedback will be beneficial for the field. For example, the results of this study suggest having access to mentoring and building community with others who are learning and practicing neurofeedback would be an asset to clinicians interested as they begin integrating neurofeedback into their practices.

In addition to getting started with neurofeedback in general, the results from this study offer practical suggestions for integrating neurofeedback into therapy with complex/developmental trauma. Therapists who hope to specialize in this area should seek specialized education. Several participants shared that Fisher's (2014) book was one of their main resources for specialization. Additional resources for specializing that participants mentioned were webinars, existing research, and mentoring with someone who specializes in neurofeedback with complex/developmental trauma. Therapists will also need to learn about the neurobiology and physiology of trauma.

On top of these educational needs, participants shared special considerations with complex/developmental trauma and the ways they address these. One of these considerations is touch, which can be a sensitive issue with clients with complex/developmental trauma (Fisher, 2014).

Having a conversation with clients about the touch involved in neurofeedback provides space to process through any concerns or emotions related to this. When applying sensors to clients' heads, talking clients through the process can help them understand what is happening. For example, therapists can let clients know when and where on their head they are going to touch before doing so. For clients who cannot tolerate being touched, participants came up with ways of adjusting the process. One way of doing this is teaching clients how to apply the sensors to their own heads.

Another consideration with complex/developmental trauma is the potential of clients having difficulties noticing and expressing internal experiences. Individuals with a history of complex/developmental trauma may lack interoception or struggle with alexithymia (Fisher, 2010; Lanius et al., 2015; van der Kolk, 2014). This can create challenges since neurofeedback relies at least partially on self-report for progress tracking. A few methods participants used for gathering information when clients struggled with awareness were focusing on physical symptoms (e.g., headaches, bowel movements), getting observations from a significant other in the client's life, and observing changes in the client's behavior and mannerisms. Awareness can be built over time by processing and reflecting in the moment during neurofeedback training. For example, if the therapist notices a shift in the raw EEG or in the client's facial expressions, they can check in with the client about what they are experiencing. Multiple participants in the current study reported pausing the training to when they noticed a significant change to process with clients.

Neurofeedback integrated into therapy can be viewed as a collaborative relationship between therapist and client. Selecting protocols involves gathering background information and speaking with clients about their current concerns and goals. Contextual factors are also important to consider, including factors that may impact a client's ability to consistently attend sessions (e.g., transportation, insurance coverage), and whether they are subject to ongoing chronic stress. Clients remain active participants throughout the training process by providing reports on what they notice during and after sessions. Participants in the current study emphasized the importance of following the client's lead when using neurofeedback with complex/developmental due to their experiences that this population has more sensitive brains. If a client reports negative side effects after a protocol (e.g., headaches) the therapist may want to look at adjusting or changing the protocol.

Neurofeedback may be perceived as a modality that shifts attention away from relationships; however, the results of this study demonstrate the relational aspects of neurofeedback. Although neurofeedback focuses on physiology and involves adding technology into the therapy room, the therapeutic relationship remains an essential part of the work. Building a therapeutic relationship with individuals with complex/developmental trauma can be challenging due to difficulties trusting resulting from traumatic experiences in interpersonal relationships (McFetridge et al., 2017). Participants spoke about the benefits of having a foundation of trust when integrating neurofeedback into work with complex/developmental trauma, which indicates therapists should focus on building this foundation with clients.

Family members and other significant people in a client's life can be included in neurofeedback by providing their observations throughout the training process. A few participants who worked with children and adolescents shared their experiences with involving parents and guardians. Some participants who worked with adults also reported reaching out to significant others (with consent from the client) to share their observations. This can be particularly helpful when working with complex/developmental trauma, since internal awareness and ability to self-report are often limited (e.g., Fisher, 2014; Lanius et al., 2015). Neurofeedback can also involve larger systems. For example, two participants provided therapy and neurofeedback in a school setting, which allowed them to communicate with teachers about their clients' behaviors. Similarly, one participant worked in a residential treatment center and commented on the benefits of getting observations and reports from staff members.

In addition to the ability to get progress reports about clients, incorporating neurofeedback into systems such as schools and residential treatment centers can help increase accessibility. The participants who worked in public schools were able to get funding to provide services to clients who otherwise would not be able to access this kind of help. Neurofeedback was an integrated part of the therapy services they provided, so cost was not a barrier for clients like it can be in other settings. Offering neurofeedback in these types of settings can also increase accessibility by bringing services to the client. For example, students who received services in a school setting do not need to worry about finding

transportation to appointments. Assessing for barriers to clients' abilities to access and consistently participate in neurofeedback training (e.g., expense, transportation, ongoing stress in the home environment) could provide insight into ways to increase accessibility.

Limitations

Limitations of this study include recruitment methods and reliance on interpretation. In order to participate in the study participants needed to reach out to the researcher and did not provide any incentive (financial or other) for participation, meaning participants had to be motivated enough to take the initiative. The reliance on interpretation in qualitative research creates challenges with appraising quality of data and analysis (Dixon-Woods et al., 2004). Although the primary researcher attempted to bracket biases and experiences by maintaining reflexive notes throughout analysis, fully controlling for biases is nearly impossible. The primary researcher is White, raised as female, and lives in the United States, which may play a role in how results were interpreted. This researcher is also a trauma therapist who offers neurofeedback, and inevitably holds assumptions and biases that could impact development of research questions, interview questions, and interpretation. Member checking was used to increase credibility by emailing participants their transcript and a list of themes that arose from the initial interpretation. They were given the opportunity to reach out to the researcher with any comments or questions about the transcript or interpretations. No follow-up comments or questions were received from the participants regarding the transcripts.

Future Research

Overall, there is limited research (quantitative and qualitative) on integrating neurofeedback into therapy with complex/developmental trauma. A mixed methods or quantitative study on integrating neurofeedback with therapy for complex/developmental trauma is recommended to expand on the information gained in this qualitative study. Larger-scale research on this process could be helpful for producing additional guidance on seeking education to specialize in neurofeedback and complex/developmental trauma, developing competence, and integrating neurofeedback with trauma therapy. In addition to getting started with neurofeedback, it would be beneficial for future research to examine the ongoing process of using neurofeedback as a part of trauma therapy (e.g., when to add neurofeedback, assessing progress, and modifying protocols). Future research could also examine clients' experiences with neurofeedback integrated into trauma therapy, including any changes to the therapeutic relationship and the impact of touch. This could provide additional insight for the integration process. Additional research on the relational aspects of neurofeedback integrated into trauma therapy would also be beneficial. The current study examined this through therapists' perspectives using a qualitative approach. Future research could include quantitative or mixed methods studies in this area from both the therapist and client perspectives.

Two additional areas for future research are touch and cultural considerations and how these show up when integrating neurofeedback into therapy with complex/developmental trauma. In the current study, participants shared their experiences with the touch involved in neurofeedback and special considerations around this with complex/developmental trauma. Touch is addressed minimally in existing literature (e.g., Fisher, 2014; Weiner, 2016).

Cultural considerations are also minimally addressed in existing literature. In the current study, socioeconomic status was a cultural factor that several participants identified as having an impact on neurofeedback and trauma therapy due to expense and inconsistent insurance coverage. This finding was supported by some existing literature (Currie et al., 2014). Other factors were discussed by participants in the current study but were not addressed in existing literature. Additional research on cultural considerations in neurofeedback is necessary in general, along with more specific research on cultural considerations with complex/developmental trauma.

Many participants in the current study expressed they hope to see more accessibility in the future. In order for insurance to more consistently cover neurofeedback as a part of trauma therapy, more outcome-based studies will likely be necessary. For this reason, future research on the effectiveness of neurofeedback with complex/developmental trauma would be beneficial. There are a few existing studies in this area (e.g., Frick et al., 2018; Rogel, et al., 2020; van der Kolk et al., 2016) that can provide inspiration and guidance for future research. Participant 11 shared challenges she had with conducting research trials due to participants lacking trust for the process and struggling with the lack of choice they had in their treatment. This will be

important to keep in mind when developing future studies in this area.

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