

VALIDATION OF THE STATE OF MIND QUESTIONNAIRE (SMQ):  
EVALUATING POLYVAGAL EMOTION REGULATION

A Dissertation

by

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BA, Saint Norbert College, 2009  
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This dissertation meets the standards for scope and quality of  
Texas A&M University-Corpus Christi and is hereby approved.

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## ABSTRACT

As counselors address issues of the mind, they inherently intervene with underlying neurobiological mechanisms. The gap between mind and body is closing, with many researchers in Interpersonal Neurobiology (IPNB) calling for efforts to create a new diagnostic framework that focuses evaluation on processes that span mind, body, and relationships. I responded to this call by integrating research from the polyvagal theory (Porges, 2011) and affective neuroscience (Panksepp & Biven, 2012; Panksepp, 2016) to create the *State of Mind Questionnaire* (SMQ). The SMQ is a 42-item self-report diagnostic tool that evaluates the connection between states of mind and theorized regulatory processes correlated with the vagus nerve and affective systems. Three hundred adult participants participated in this study, which was designed to validate the SMQ by correlating the number of regulated and dysregulated states of mind from the SMQ with scores from the Global Severity Index (GSI) from the *Symptom Assessment-45* (SA-45; Maruish, 2004) and exploring the predictive nature of individual states of mind for subscales within the SA-45. Overall, this preliminary study was used to explore if items from the SMQ were effective measures of clinical symptoms.

## DEDICATION

*For everyone everywhere.  
No exceptions.*

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## SECTION I: INTRODUCTION TO DISSERTATION STUDY

“Among the processes that can be influenced by a person’s awareness, healing is one of the most vital... Choices matter, and thus the healing self comes into play” (Chopra & Tanzi, 2018).

The mind is central to counseling. Yet, it was only recently that a working definition of the mind was proposed by Siegel (2012). In collaboration with researchers across multiple fields, including physics, psychology, psychiatry, theology, math, and biology, Siegel (2012) proposed the mind to be a “regulatory function that is an emergent, self-organizing process of the extended nervous system and relationships” (p. AI-51). Using this definition requires counselors to understand that the mind is not simply a mental construct. Instead, it is an “embodied and relational process that regulates the flow of energy and information” (Siegel, 2012, p. AI-51). While there was a time when counselors’ work was compartmentalized to the inner workings of clients’ mental experiences, many researchers now recognize that as counselors address issues of the mind in therapy, they also impact processes within clients’ bodies.

To honor this direct connection between the mind and body, scholars have introduced terminology to better describe this phenomenon, including *MindBrain* proposed by Panksepp and Biven (2012) and *bodymind*, proposed by Chopra and Tanzi (2018). And although the integration of mind-body-relationship as a singular process is, at times, contrary to current popular approaches to conceptualizing and treating physical and mental disease and disorder, there is research to support the communicative qualities of the mind extend throughout the entire body:

Thirty years ago, doctors were suspicious of the mind-body connection, which aroused skepticism because, unlike the heart or a flu virus, the mind is invisible and nonphysical. Today, thanks to decades of research into how the brain communicates with every cell in

the body, trying to find a bodily process that isn't influenced by the mind has become a real challenge. The brain, which was once the emperor of the mind, has been deposed. "Mind" is spread throughout your body. A heart or liver cell doesn't think in words and sentences, but it sends and receives complex chemical messages all the time. The bloodstream, along with the central nervous system, is an information superhighway teeming with traffic as 50 trillion cells contribute to a united goal: remaining alive, healthy, and thriving. (Chopra & Tanzi, 2018, p. 14)

The vagus nerve plays a particularly relevant role in facilitating constant communication between various parts of the body. As the tenth cranial nerve, the vagus nerve regulates homeostatic processes within the body, including heart rate, gastrointestinal motility and secretion, pancreatic endocrine and exocrine secretion, and hepatic glucose production (Pavlov & Tracey, 2012). It is also a major constituent of the inflammatory reflex, which controls immune and inflammatory responses throughout the body. The inflammatory reflex influences the immune system by telling it how much inflammation is necessary to heal. At low levels, inflammation is required to protect the body from infection and heal the body from wounds and illness. At high levels, it compromises the immune system and creates chronic inflammation, which has been shown to be the root of almost every physical and mental disease (Chopra & Tanzi, 2015), including rheumatoid arthritis, inflammatory bowel disease, autoimmune disorders, the common cold, obesity, and depression (Chopra & Tanzi, 2015; Pavlov & Tracey, 2012).

The vagus nerve influences the nervous system bidirectionally and is located between the portion of the nervous system located within the skull (i.e., the brain) and organs located throughout the body. Efferent pathways from the vagus nerve travel to the brain and subcortical organs and influence how they function, whereas afferent pathways to the vagus nerve funnel

electrical and chemical messages from the brain and subcortical organs. As a result of this bidirectional influence, the vagus nerve is equally affected by cortical, cognitive-affective processes and various functions of the organs throughout the body (Chopra & Tanzi, 2018; Porges, 2011, 2017). This means that a person's mental processes can influence the body, and the functioning of the body can influence mental processes.

The vagus nerve's bidirectional influence implies that counselors who conceptualize and intervene at the level of thoughts, feelings, and behaviors, also impact the client's neurobiological processes. Counseling models that separate the mind and body no longer align with contemporary research (Panksepp, 2016). With the emergence of the field of neurocounseling, counselors are joining this effort to integrate a more fluid definition of the mind and body into mental health education, service, and research (Chapin & Russell-Chapin, 2014).

Russell-Chapin (2016) defined neurocounseling as "the integration of neuroscience into the practice of counseling by teaching and illustrating the physiological underpinnings of many of our mental health concerns" (p. 93). One of the most common approaches to neurocounseling involves integrating neuroscience research into counseling practice (Beeson & Field, 2017). Neurocounseling supports counselors and clients in understanding how therapy influences the brain (Russell-Chapin, 2016), facilitates a better understanding of how to conceptualize client problems, and provides counselors with holistic, wellness-based approaches that center on an inherent integration of the mind and body (Field, Jones, & Russell-Chapin, 2017). With this approach to counseling, neurocounselors are uniquely equipped to join medical and neuroscience researchers in expanding the knowledge-base of how counseling interventions capitalize upon the mind-body connection to encourage mental and physical states associated with wellness. This

research study sought to produce validation evidence for the *State of Mind Questionnaire (SMQ)*, an evaluation measure that was built from a new framework of mental health diagnosis that recognizes and evaluates the direct connection between the mind and body.

### **A Note About the Research Process**

The SMQ was built using research on the neurobiological process of emotion according to researchers within the field of Interpersonal Neurobiology (IPNB), a field of study in which scholars integrate research from multiple fields (Siegel, 2012). Areas of research, such as physics, biology, chemistry, and psychology, become consolidated in a manner that can be applied to the human experience. Generally, researchers and scholars within IPNB have proposed that integration and regulation of mind/body systems are at the core of wellness, and that social experiences are at the heart of healthy development (Schore, 2012, Siegel, 2015). The SMQ is the result of several years of my own qualitative research in which I examined and experimented with the framework of emotion suggested by Siegel (2015), the regulatory influence of the vagus nerve proposed by Porges (2011, 2017), and affective neuroscience research by Panksepp (2016) and Panksepp and Biven (2012). I narrowed the review of the literature for this study to focus on these processes as well as other relevant research from scholars within IPNB. In examining this research, I theorized a conceptual model of the process of emotion that could be useful to counselors in applying the research to practice. I then constructed the SMQ from this model.

Conclusions about processes within the mind, body, and relationships from IPNB are based on thousands of clinical trials, brain-imaging studies, comparative research between humans and other animals, medical studies on the vagus nerve and its role in infant bradycardia, and many more. Scholars within IPNB compiled the conclusions from these individual studies to

create useful theories, concepts, definitions, and suggestions for clinical practice that connect the neurological processes of the mind, body, and relationships to aspects of wellness and disease. No singular study would have allowed the researchers to construct such conclusions. As a neurocounselor, my goal was to take the conclusions made by experts in IPNB and use them to create a practical tool for counselors so that research in neurobiology could be easily consolidated and applied to clinical practice and counselor education. The SMQ uses observable states of mind to map out the neurological affective cascade that occurs as a person's responds to significant situations. Illustrating the nervous system's reaction allows counselors to better conceptualize client problems and to target interventions so that they directly impact the neurological systems involved in the response. In my own practice, this has made my therapeutic interventions more effective and efficient, and in my work as a counselor educator, the SMQ has provided me with a framework to easily depict neurological processes and connect them to skill development.

For my research, focusing on individual studies would have prevented me from using the conclusions made by IPNB researchers and would have ultimately limited my ability to build the SMQ. As a result, the research included within this study emphasized the conclusions made by experts within IPNB rather than evidence produced by individual studies. This approach allowed me to build upon the research in a manner that allowed me to construct a useful tool for counselors and counselor educators.

### **The State of Mind Questionnaire**

The purpose of this study was to validate the *State of Mind Questionnaire* (SMQ), a 42-item self-report measure of states of mind that are thematically connected to theorized autonomic expressions of affective systems (Montgomery, 2013; Panksepp, 2016; Porges, 2011, Siegel,

2015). The SMQ is intended to be a diagnostic tool. However, it does not align with the current diagnostic paradigm. Instead, it evaluates the process of emotion and helps counselors target this process to reduce clinical symptoms. When counselors utilize the SMQ, they are evaluating the thoughts, behaviors, and feelings conceptually correlated with seven neurological systems expressed via six autonomic states. Client responses to the SMQ indicate whether these systems are regulated, overactive, or underactive. From this perspective, client problems are not conceptualized as global states, meaning that clients are not “anxious” or “depressed.” Instead, client problems are understood as manifestations of regulated, overactive, and underactive states within the process of emotion across the mind, body, and relationships. Diagnosis becomes more specific, which may allow both counselor and client to observe and change conscious behavior to target regulatory mechanisms in the nervous system. This may make counseling interventions more effective and efficient since treatment plans will be better connected to processes inherent to the mind and body.

### **Emotion as a Mind, Body, Relational Process**

Within the field of IPNB, integration is “the linkage of differentiated elements,” or uninterrupted communication across the mind, body, and relationships (Siegel, 2012, p. AI-40). When individuals achieve integration across these systems, they are less likely to suffer from symptoms of disease and disorder and more likely to experience health and vitality (Siegel, 2015). The primary mechanism of integration is the process of emotion (Cozolino, 2010). Emotion is a continual process that occurs as energy and information are created by and exchanged between the mind, brain, and relationships – what Siegel (2012) called the *triangle of well-being*. The mind regulates the flow of energy and information, while the brain (i.e., the entire body) is the embodied mechanism through which energy and information flow (Siegel,

2015). Relationships then are created as people share and exchange energy and information with one another.

Energy can take many forms, such as verbal communication or the electrical synapse of a firing neuron. Information is what occurs as energy takes on a specific form, such as the words used in verbal communication or the neurotransmitter passed via synapses. When the process of emotion is flowing smoothly between mind, body, and relationships, this is called integration. Integration is a hallmark of wellbeing; it defines a system that is functioning optimally. When a system achieves integration of mind, body, and relationships, a person is less likely to suffer from clinical symptoms.

Emotion is an intrapersonal and interpersonal process that involves affective systems in the nervous system that create energy to adapt to changes inside and outside of the body (Iacoboni, 2008; Panksepp & Biven, 2012; Siegel, 2015). The word *emotion*, by definition, means “to stir up” or “to move out, remove, agitate” (emotion, n.d.), and neurologically, the purpose of the process of emotion is to motivate action. A new field of study, called affective neuroscience, explores “primal emotional affects – [which] arise from ancient neural networks situated in brain regions below the neocortical ‘thinking-cap’” (Panksepp & Biven, 2012, p. x). Exploring these primary processes of affect has revealed that they have a large impact on how a person functions because they enlist multiple areas of the nervous system and directly connect to a person’s ability to act to manage the environment.

Affective systems within the body stimulate motivational energy within the process of emotion (Panksepp & Biven, 2012). By conducting research that compared affective systems between animals and humans, Panksepp and Biven (2012) identified seven affective neural systems in the brain and body that create patterns of energy in the form of arousal: RAGE,

LUST, FEAR, CARE, PANIC/GRIEF, SEEKING, and PLAY. Panksepp (2016) later changed the PANIC/GRIEF system to PANIC. [Note: These researchers preferred to capitalize these systems when labeling the affective systems of the brain, so this formatting will be used in this text to differentiate these systems from other phases and feeling-like qualities of emotion (Panksepp, 2016)]. Each system produces automatic, instinctual impulses in the body that create motivation to take different types of action. The way the motivational energy is ultimately expressed is determined by the state of the autonomic nervous system (ANS; Porges, 2011).

In mammals, including humans, social engagement is a primary component of regulation, and consequently an essential component of regulating the recruitment and expression of primary affect (Porges, 2011). Porges (1991) proposed the polyvagal theory to explain this phenomenon by performing multiple phylogenetic studies which identified the role of the varied activation of the vagus nerve in creating one of three autonomic states in response to stimuli: social engagement, mobilization, or immobilization. As discussed previously, the vagus nerve is the tenth cranial nerve in the central nervous system. Within the process of emotion, it influences a key signaling pathway in the ANS that mediates the sympathetic and parasympathetic branches of the nervous system (Chopra & Tanzi, 2018, Porges, 2011). The sympathetic nervous system (SNS) facilitates a mobilized response to manage environmental changes, while the parasympathetic nervous system encourages a resting, restorative state within the body.

The activation of these states is based on continuous elaborative-appraisal of the internal and external situation (Porges, 2011). Social engagement is activated during a situation that is considered safe. As the state of social engagement encourages regulation, the varied systems within the mind, body, and relationships become integrated and the process of emotion flows uninterrupted. Empowerment emerges, and an individual can act based on motivations produced



by primary affect (Siegel, 2015). The systems that the individual is a part of (e.g., the nervous system, the relationship, the community) then are more likely to become receptive, flexible, and healthy. Regulated systems can take in new energy and information from other systems. They also influence other systems adaptively. Regulated systems are more resilient and resistant to disease and disorder.

Alternatively, the process of emotion can be interrupted (Siegel, 2015). Individual elements and/or systems may become dysregulated (i.e., chronically hyper- or hypo-aroused), consequently causing chaos or rigidity in the form of dysfunctional thought-patterns, tension and inflammation in the body that can lead to illness, and/or conflictual or withdrawn relational patterns (Siegel, 2012). When social engagement is unavailable to manage a situation, the nervous system may activate a mobilized state in which it readies for defensive action (Porges, 2011). However, if mobilization proves to be ineffective, the mobilized energy is shut down through an immobilized response. In a state of immobilization, the nervous system activates a numb, dissociative response that may result in fainting. When immobilization is employed, the coupled dissociative response can interrupt the process of the emotion by disconnecting subcortical systems from higher regions of the brain (Hurliman, Nagode, & Pardo, 2005; Kim, Kroger, & Kim, 2011; Schore, 2012). The process of emotion is truncated, and the systems become dysregulated. When dysregulated, systems become chaotic or rigid, engaging repetitive, automatic patterns that ultimately disempower individuals from acting based on the original affective system that was initially stimulated to manage the internal and external environment (Siegel, 2015). The disruption in the flow of emotion can result in a chronic dysregulated state that leads to symptoms of anxiety and depression. By working with the phases of emotion in

counseling, counselors directly work with the underlying affective mechanisms. Currently there are several frameworks supporting this practice.

### **Bridging the Gap between Research and Practice**

Scholars and clinicians have already applied the polyvagal theory to clinical work. Regulation theory is one theoretical framework that conceptualizes clinical symptoms in terms of the three autonomic states proposed by Porges (1991) in the polyvagal theory. Regulation theory conceptualizes the premise of the polyvagal theory, namely that there are three autonomic states that individuals utilize when managing stimuli: regulation, mobilization, and immobilization. Helping clients maintain a state of regulation leads to symptom reduction and positive outcomes (Montgomery, 2013; Ogden, Minton, & Pain, 2006; Schore, 2012).

Schore (2012) also emphasized the efficacy of psychodynamic theory in bridging the gap between regulation theory and clinical practice. Counselors who utilize psychodynamic theory focus on early childhood relationships and how these relationships impact development and mental health (Teyber & McClure, 2011). They tend to emphasize transference and countertransference as well as the client's emotional experiences in the relationship. Psychodynamic theorists often centralize treatment on the idea that creating corrective emotional experiences within the therapeutic relationship is a primary mechanism of change. This practice is supported by Porges' (2017) research about the role of social engagement in creating a safe, growth-fostering relationship between client and counselor.

Ogden, Pain, Minton, and Fisher (2005) integrated the polyvagal theory into practice by introducing the concept of the *window of tolerance*, which helped counselors conceptualize the bidirectional nature of the polyvagal theory. The window of tolerance is the "optimal arousal zone" for clients to experience the autonomic state of social engagement correlated with

integration (Ogden, Minton, & Pain, 2006, p. 32). Ultimately, this produces a state of regulation and health in the mind, brain, and relationships. If the individual utilizes a mobilized or immobilized response, the client is said to be outside of the window of tolerance. This dysregulated response may be adaptive during instances of trauma, but if repetitively employed, it leads to clinical symptoms of anxiety and depression.

Levine (2008) also applied the principles of the polyvagal theory and the window of tolerance within *Somatic Experiencing®*, his therapeutic approach to resolving trauma. Somatic Experiencing® is a body-oriented approach to counseling that operates on the premise that to resolve trauma, a client must re-experience the dormant mobilization that was truncated through the immobilized traumatic response. Levine encourages clients to physically move during session. This movement helps the client discharge dormant energy to return the client's nervous system to a state of homeostasis. Essentially, counselors who practice Somatic Experiencing® identify clients in a state of immobilization and encourage a mobilized response through movement, which then brings the client's nervous system into a state of social engagement and regulation.

Regulation theory also has been applied to talk counseling. One of the metrics for observing autonomic states within counseling sessions presents through the psychological defenses utilized by the client. Schore (2003b) defined defense mechanisms as “nonconscious strategies of emotional regulation for avoiding, minimizing, or converting affects that are too difficult to tolerate, with an emphasis on dissociation and projective identification” (p. 280). Montgomery (2013) succinctly described them as “modulators of emotional arousal” (p. 36). She highlighted that defenses can be thought of as adaptive ways of coping that have become maladaptive over time and are characterized by an automatic compensation for a more

vulnerable branch of the ANS. Montgomery's (2013) work linked autonomic states of arousal with particular defenses observable within a therapeutic relationship. For example, she proposed that defenses such as self-assertion, humor, and affiliation are homeostatically-balanced (i.e., correlated with an autonomic state of social engagement). Other defenses, such as acting out, controlling, and undoing are considered mobilizing defenses and are correlated with a state of mobilization. Finally, denial, inhibition, and introjection are examples of immobilizing defenses and are correlated with a state of immobilization. Furthermore, Montgomery (2013) developed worksheets for clinicians to assess for these defense mechanisms in counseling. Montgomery (2013) suggested that by helping clients become aware of the use of defense mechanisms, counselors can encourage clients to use homeostatically-balanced defenses, which encourages ANS regulation and reduces clinical symptoms.

### **Statement of the Problem**

Regulation theory is effective in bridging the gap between research on ANS regulation and clinical work (Schore, 2012). However, many of the frameworks that have been created based on regulation theory do not include information about the various affective systems proposed by Panksepp and Biven (2012). The result is that regulation theory still operates on the premise that the entire nervous system enters states of social engagement, mobilization, and immobilization. By continuing to employ a three-tiered model of the polyvagal theory, counselors lose the opportunity to target the more nuanced affective systems correlated with clinical symptoms.

Alternatively, Porges (2011) suggested that Panksepp and Biven's (2012) research on the seven affective systems (i.e., RAGE, LUST, FEAR, CARE, PANIC, SEEKING, and PLAY) could be integrated into the polyvagal theory to explain how each of these systems manifest as

different expressions within each autonomic state, and consequently how each system may influence the underlying processes involved in clinical symptoms.

For example, the polyvagal theory will lead to three different visceral phenotypes for the emotion of fear. One type is characterized by mobilization strategies consistent with features of fight-or-flight behaviors. A second type is characterized by immobilization (e.g., death feigning), a biobehavioral state that, due to metabolic depression, can potentially be lethal for a mammal. In humans this might be observed as fainting, defecating, and/or dissociating. A third type is more cognitive and involves a transitory depression of the social engagement system as a precautionary response to evaluate intentionality behaviors. If behavior is detected as dangerous, then the sympathetic nervous system is activated to support the fight-or-flight mobilization behaviors. All three are “fear” responses, but they have different behavioral topographies and different underlying neurophysiological substrates. (Porges, 2011, p. 279)

Combining the polyvagal theory with affective neuroscience research could produce a more nuanced lens for understanding client problems. Instead of describing symptoms as either simply mobilized or immobilized, it may be more effective to describe them as unique manifestations of different affective systems. For example, instead of describing recurring and persistent thoughts as obsessions, counselors may be able to understand obsessive behavior as perseveration (i.e., a mobilized PANIC response) coupled with helplessness (i.e., an immobilized RAGE response). By connecting thoughts, feelings, and behaviors to underlying neurological mechanisms, diagnosis becomes more specific, less global, and allows for more targeted treatment planning. In this example, the counselor may target the immobilized RAGE response of helplessness by helping the client use more advocacy (i.e., RAGE via social engagement).

While there is evidence to suggest that paying attention to underlying neurobiological mechanisms is effective in promoting positive outcomes in counseling, there is still a disconnect between scientific research practice:

[...] the views of science and clinical practice often approach features of disease and health differently. Science is interested in processes, while clinical practice is often interested in a disease entity or specificity of diagnosis. There has long been an assumption that if you can give the disorder a name, it will lead to improved treatment and will provide a better understanding of the disorder. However, it appears that diagnoses, especially within the area of mental health, have a greater impact on finances of clinicians than on understanding the mechanisms underlying the disorder that would lead to improved treatment. In general, diagnostic labels provide the clinician with the ability to use certain billing codes required by insurance, although labeling psychiatric disorders have had little impact on understanding underlying neurophysiological mechanism. Scientists are less interested in the labels associated with clinical diagnoses and more interested in the underlying processes. (Porges, 2017, p. 74)

Categorizing mental disorder, such as in diagnoses of anxiety and depression, has certainly contributed to effective treatment planning in many regards. However, the current practice of broad categorical diagnosis is no longer aligned with contemporary scientific research about the mind, brain, and relationships which suggests that clinical symptoms manifest as systems within the mind-body process become overactive and underactive. By continuing to utilize categorical and global diagnostic practices in counseling, counselors neglect the complex interplay of multi-layered, nuanced systems that lead to mental health disorders. Neuroscience researchers have proposed counselors need a new approach to conceptualizing symptoms that is more connected

to the underlying neurophysiological mechanisms that cause them. The SMQ is one such approach.

### **Purpose of the Study**

The purpose of this study was to validate the *State of Mind Questionnaire* (SMQ), a 42-item self-report measure of states of mind. States of mind are ways “in which mental processes, such as emotions, thought patterns, memories, and behavioral planning, are brought together into a functional and cohesive whole” (Siegel, 2012, AI-77). Though not an exact conceptual comparison, states of mind can be likened to psychological defenses. Using *states of mind* is an attempt to more accurately describe the expression of emotional processes and to remove any connotations of psychopathology that may be denoted by using the term *psychological defenses*.

I conceptualized the SMQ using research on the seven affective systems proposed by Panksepp (2016). First, I created a map of the affective systems by conceptualizing each of the affective systems as expressed through six different autonomic states (see Appendix F; Panksepp & Biven, 2012; Porges, 2011). I then labeled each of these expressions using 42 states of mind. The questionnaire was then created with items designed to evaluate these states of mind and to reveal how each of the seven affective systems present through six autonomic states. The purpose of this study was to validate the use of the questionnaire in measuring clinical mental health symptoms.

### **Research Questions**

The research questions for this study were: 1) To what extent is the number of regulated and dysregulated states of mind scores on the SMQ related to the global severity index (GSI) scores for the Symptom Assessment – 45 (SA-45; Maruish, 2004)?; and 2) Which of the

individual states of mind in the SMQ predict clinical symptoms as measured by the subscales in the SA-45?

### **Theoretical Foundation**

The measure of interest within this study, the SMQ, was constructed from research on integration and emotion. Siegel (2015) conceptualized integration as the process of emotion in the mind, brain, and relationships. As discussed previously, emotional experiences are directly tied to the process of integration within and across the triangle-of-wellbeing. Researchers in the field of IPNB supported this conclusion and have proposed several theories about how emotion manifests in the mind, brain, and relationships (Iacoboni, 2008; Panksepp & Biven, 2012; Porges, 2011; Schore, 2012). Still, no one really knows for certain the exact processes that make up emotion, nor are researchers certain about the linearity of emotion (Siegel, 2015). However, there is a plethora of evidence from research in IPNB that documents the neurological and interpersonal foundations involved in the process of emotion. I used this research to identify aspects of the research that may be particularly helpful to counselors and counselor educators.

A review of IPNB research revealed several prominent theories related to integration at the level of the mind, brain, and relationship. The research was narrowed to the field of IPNB due to the call by researchers of this field to integrate affective systems theory and the polyvagal theory to develop diagnostic and treatment tools (Porges, 2011; Panksepp, 2016). By combining this research with clinical experience and experience as a counselor educator, I identified a theory of the process of emotion that has proven to be useful in day-to-day interactions, counselor educator pedagogy, and clinical work. While there are many theories that contributed to this integrated theory, four are particularly relevant to discuss here: Montgomery's (2013) conceptualization of psychological defenses within regulation theory, the theory of affective



systems proposed by Panksepp and Biven (2012), Porges' (2011) polyvagal theory, and theories of intersubjectivity and co-regulation (Ammaniti & Gallese, 2014, Porges, 2011; Schore, 2012; Siegel, 2015). Though this research will be further discussed in section two, it is meaningful to connect these theories to levels of the mind, brain, and relationship now to better understand the need for the proposed study.

Montgomery (2013) proposed that certain psychological defense mechanisms influence and are affected by the ANS. She cited nine defenses as homeostatically balanced (e.g., affiliation, altruism, and humor), 23 defenses that may be managed by the sympathetic nervous system (e.g., acting out, omnipotence, and devaluation), and 14 defenses that may be managed by the parasympathetic nervous system (e.g., passive aggression, blocking, and inhibition). Linking psychological defenses to ANS states bridges the gap between psychodynamic theory and neuroscience and is a useful way to connect states of mind with corresponding ANS regulation and dysregulation. In this way, Montgomery's research contributed to an understanding of how emotion manifests within the mind.

Next, Panksepp and Biven (2012) and Porges (2011) proposed two theories that contributed to an understanding of how instinctual mechanisms in the brain (i.e. the body) influence regulation and integration. First, Panksepp and Biven (2012) suggested that there are seven affective neural systems that create patterns of energy in the form of arousal. Each system produces automatic, instinctual impulses in the body that create motivations to act in regard to certain categories of behavior. Each system is linked to different motivational impulses to promote survival: RAGE, LUST, FEAR, CARE, PANIC, SEEKING, and PLAY. Second, Porges (2011) proposed the polyvagal theory, and suggested that the body enacts a bidirectional, automatic response through two ANS branches when it encounters internal and external stressors

(Porges, 2011). Specifically, while the sympathetic nervous system (SNS) branch increases activation in the body via the hypothalamic-pituitary-adrenal (HPA) axis, the parasympathetic branch triggers restoration, nurturing, and growth. The vagus nerve mediates the activation of these branches to produce three energy states: social engagement, marked by regulation and integration of systems; mobilization, which activates the SNS to respond to threat; and immobilization, a shutdown response that automatically collapses the nervous system to cope with overwhelming situations. These theories are useful in understanding automatic physiological mechanisms in the brain that influence the process of emotion.

Finally, theories of intersubjectivity are helpful in explaining how relationships largely impact emotion and subsequent action (Ammaniti & Gallese, 2014; Iacoboni, 2008; Schore, 2012). Generally, scholars who work with intersubjectivity proposed that early childhood relational patterns influence thoughts, behaviors, and even the development of neural networks in the brain, and that these patterns then influence the subjective construction of present day relationships (Schore, 2012). Interpersonal exchanges involve a reciprocal process between people that is largely influenced by unconscious, nonverbal right-hemisphere to right-hemisphere communication (Schore, 2012), as well as attunement and resonance through neurological processes of simulation (Siegel, 2015). Through relationships, ANS regulation and dysregulation are mirrored between individuals via a complex, automatic simulation process called *co-regulation* (Porges, 2011). In this way, theories of intersubjectivity are useful in conceptualizing how the process of emotion occurs within relational systems beyond the individual person.

Integrating these theories with additional research that will be discussed in section two revealed that there may be a nine-phase conceptual model of emotion that may be effective to utilize in clinical work: (a) initial orientation to stimulus, (b) primary appraisal, (c) affective

system activation, (d) elaborative appraisal, (e) arousal, (f) interpersonal integration, (g) vertical integration, (h) bilateral integration, and (i) expression (Ammaniti & Gallese, 2014; Iacoboni, 2008; Levine, 2010; Montgomery, 2013; Panksepp & Biven, 2012; Porges, 2011, 2017; Schore, 2012; Siegel, 2012, 2015). Siegel (2015) outlined many of these phases initially when he proposed that emotion involves shifts in integration. My proposed phases review the individualized research frameworks imbedded within his description of emotion and creates a linearity within the research so that counselors and counselor educators may apply the research to counseling and counselor education. A foundational component of Siegel's conceptualization of emotion relies on the idea that integration occurs as energy and information flows through each phase of emotion without interruption (Siegel, 2015). As emotion integrates multiple systems across the mind, body, and relationships, clinical symptoms reduce, and wellbeing emerges. However, disruption at any phase in the process of emotion can result in dysregulation at the level of the mind as disempowering thought patterns, at the level of the brain as ANS mobilization or immobilization, and/or at the relational level as ineffective, invalidating communication patterns. This theoretical perspective provided the foundation for the creation of the *State of Mind Map* (SM- Map; see Appendix F), the framework upon which the SMQ was built.

### **Significance of the Study**

This study was significant because it filled an important gap between neurobiological research and counseling practice. Scholars and researchers within the fields of neuroscience continue to perform research regarding how to influence mechanisms of the brain to mediate clinical symptoms. Yet, there are still no diagnostic tools based on the research in IPNB that can be implemented in counseling easily, without extensive training, in a cost-effective manner

(Panksepp, 2016). As brain-based research continues, it is important for counselors to integrate these findings into counseling to continue providing clients with the most effective care. The intention of validating the SMQ was to support its use in clinical practice, potentially making it a valid instrument for evaluating integration and bridging the gap between research and practice.

Furthermore, the validation of the SMQ may have significant implications for the field of neurocounseling. Researchers in IPNB have made important contributions to how mental health practitioners understand the development of disease and disorder, and the field is continually expanding to include professionals from various mental health fields and fields of research. Neurocounselors could join this field. The SMQ may play an important role in moving neurocounseling to the forefront of this new brain-based frontier in mental health by making complex information readily available to be used in practice. This study used framework, language, and theoretical perspectives that is cutting-edge and part of a dialogue that spans multiple fields of study. The results from this study could support the movement of counselors from consumers of IPNB research to becoming producers of such research.

Just as licensed professional counselors need access to research on the brain, so too do trainees within masters and doctoral training programs. Neurocounseling is a budding new area of counseling, and it is continuing to grow. Training programs have a responsibility to integrate counseling-related research into graduate program curricula (Council of Accreditation for Counseling and Related Educational Programs [CACREP], 2016; Section 2; E.), and this includes research on the brain. However, because neurocounseling is a new field, there are few faculty who may have had extensive training on neurocounseling theories, treatment approaches, and interventions. To be able to deliver new, evidenced-based theoretical and clinical knowledge in neurocounseling, counselor educators require an easy-to-understand framework through which

to teach complex neurobiological concepts. The SM-Map and the SMQ provide counselor educators with tools to translate neurobiology into useful clinical approaches. This study was an important step toward validating the SMQ so that the next generation of counselors can routinely implement research on the brain into clinical practice.

This study was also significant because it proposed a new diagnostic framework that centers on connecting neurobiological systems to symptoms. This perspective focuses evaluation of mental health on processes, instead of categorized labels, and this practice is more aligned with scientific research (Panksepp, 2016; Porges, 2017). As a result, counselors are empowered to deliver the most relevant client care. Directly addressing neurological processes allows counselors to create treatment plans that address the root causes of symptoms, rather than simply managing them. This can make counseling interventions more impactful, effective, and efficient, which may also make counseling more cost effective for both client and counselor.

Finally, the SMQ does not require extensive training or expensive equipment to apply. The SMQ is an easy-to-use, self-report measurement that produces results indicative of underlying neurological mechanisms without using specialized equipment. With very little training, counselors can easily apply the measurement to any treatment framework. Since the states of mind in the SMQ are directly connected to thematic expressions of affective systems and autonomic states, counselors can use the SMQ to observe states of mind to indicate the state of various regulatory systems in the body. This can then inform various treatment approaches that more effectively address the neurological processes that influence symptoms.

### **Definition of Terms**

#### *Affective Systems*

Subcortical networks in the nervous system that “evoke distinct emotion action patterns,” including SEEKING, RAGE, FEAR, LUST, CARE, PANIC, and PLAY (Panksepp, 2016). Also called *primary-process affects*, *subcortical emotional networks*, and *emotional primes* by Panksepp (2016). The capitalization of the emotional networks is intentional to differentiate affective systems from other terms associated with categorical emotional responses.

#### *Anxiety*

“An internal state of agitation that may be in response to present experience, to anticipating the future, or to reflecting on the past” (Siegel, 2012, p. AI-5)

#### *Appraisal*

“Involves the evaluation of the meaning of an event” (Siegel, 2012, p. AI-5)

#### *Arousal*

“The degree of activation of a system [...] regulation of the degree of activation, of arousal, of various circuits in the brain is fundamental to the process of self-regulation. States can be described as hyperarousal, hypoarousal, and dysregulated arousal” (Siegel, 2012, p. AI-5-AI-6)

#### *Autonomic Nervous System (ANS)*

“Extends from the head down into the body and it regulates heart rate, respiration, and other bodily functions. A basic view of the ANS is that it is made of several branches, including a sympathetic ‘accelerator’ and a parasympathetic ‘brake’ as well as portion of the vagal nerve with its various layers. The autonomic nervous system provides bidirectional neural communication between our visceral organs and our brainstem” (Siegel, 2012, p. AI-9)

#### *Bottom-up*

“...processes that arise from anatomically lower areas (such as the body proper, brain stem, and the limbic areas) and then influence higher regions (the cortex)” (Siegel, 2012, p. AI-11)

#### *Categorical Emotion*

“...stage of an emotional response that follows initial orientation and appraisal-arousal. As these initial stages become elaborated and differentiated, examples of the categorical emotions that arise include anger, fear, disgust, surprise, joy, and shame” (Siegel, 2012, P. A-13)

#### *Chaos*

“... the highly unpredictable, random nature of movement of a system” (Siegel, 2012, p. AI-14)

#### *Co-regulation*

“The process by which two entities mutually influence each other’s states across time” (Siegel, 2012, p. AI-19)

#### *Defense Mechanism*

“...nonconscious strategies of emotional regulation for avoiding, minimizing, or converting affects that are too difficult to tolerate” (Schoore, 2003b, p. 280, as cited in Montgomery, 2013)

#### *Dissociation*

“The process by which usually associated processes are either dis-associated or compartmentalized from one another. Clinical dissociation can result in blocked access to memory and emotions, bodily numbness, or impairments to the continuity of consciousness across states of mind” (Siegel, 2012, p. AI-23)

#### *Dysregulated State of Mind*

A state of mind theoretically correlated with underlying neurological processes that are either chaotic or rigid, marked by autonomic nervous system responses of hyper- or hypoarousal.

### *Dysregulation*

“The inability to attain proper coordination and balance within a system (body, mind, group), leading to excessive arousal or insufficient arousal that are both outside a window of tolerance. Dysregulation is an outcome of impaired integration” (Siegel, 2012, AI-25)

### *Emotion*

“Changes in the state of integration. Within the brain, emotion links various systems together to form a state of mind. It also serves to connect one mind to another. Emotional processing prepares the brain and the rest of the body for action” (Siegel, 2012, AI-27)

### *Emotion Regulation*

“Research on emotion often reveals that emotion as a process is, in fact, fundamentally regulatory and so this term may be somewhat redundant. Seeing emotion as a ‘shift in integration’ helps us see how regulation is fundamental to what ‘emotion is,’ given that integration is a core mechanism of regulation. Areas of the brain involved in emotion regulation are integrative, and they link widely separate regions with one another” (Siegel, 2012, AI-28)

### *Energy*

“A term from physics that means ‘the capacity to do something.’ [...] [For example,] the nervous system functions by way of the flow of electrochemical energy” (Siegel, 2012, AI-30)

### *Expression*

The external, observable verbal and nonverbal communication that manifests based on subcortical motivations produced by neurological affective systems.

### *Information*



“Patterns of energy that carry meaning and ‘stand for’ or symbolize something other than the energy itself” (Siegel, 2012, AI-38)

### *Integration*

“In general, the linkage of differentiated elements. The mind’s process of linking differentiated parts (distinct modes of information processing) in a functional whole is postulated to be the fundamental mechanism of health. Without integration, chaos or rigidity ensue. Integration is both a process (a verb) and a structural dimension (a noun) and can be examined, for example, in the functional and anatomic studies of the nervous system” (Siegel, 2012, p. AI-40)

### *Interoception*

“The ability to sense internal states and bodily processes – through interoceptors located on the heart, stomach, liver, and other organs inside the body – constitutes a sixth sense... This sixth sense represents a functional awareness, with both conscious and unconscious dimension, of what is happening inside the body” (Porges, 2011, p. 76-77)

### *Interpersonal Neurobiology (INPB)*

A term coined by Dr. Daniel J. Siegel in 1999 to describe “a consilient field that embraces all branches of science as it seeks the common, universal findings across independent ways of knowing in order to expand our understanding of the mind and well-being [...] this field explores the ways in which relationships and the brain interact to shape our mental lives. IPNB is meant to convey the embracing of everything in life from society (interpersonal) to synapses (neurobiology)” (Siegel, 2012, p. AI-42).

### *Intersubjectivity*

“the mapping of the other onto the self, reciprocated by the mapping of the self onto the other [...] the neural bases of our capacity to be attuned to the intentional relations of others”

(Ammaniti & Gallese, p. 8-9)

#### *Limbic regions/area*

“Located in the central part of the brain called the medial temporal lobe, these areas include the amygdala and hippocampus, which coordinate input from the higher cortical regions, with streams of input from the lower brainstem and the body proper” (Siegel, 2012, AI-45)

#### *Mind*

“Includes at least three fundamental aspects: personal subjective experience, consciousness with a sense of knowing and that which is known, and a regulatory function that is an emergent, self-organizing process of the extended nervous system and relationships. In this way, a core aspect of mind is defined as an embodied and relational process that regulates the flow of energy and information” (Siegel, 2012, AI-51)

#### *Mirror Neurons*

Specialized cells in the brain that “become activated at the perception of behaviors of others with predictable sequences that enable related areas (the superior temporal sulcus) to create maps of another’s intentional state. Mirror neurons then enable both behavioral imitation and internal simulation of the other. The proposed mechanism of mirror neurons is supported by a number of investigations, but some scientists feel it is not substantiated yet” (Siegel, 2012, p. AI-52). There are different classes of mirror neurons, some which are unaffected by distance between the observer and the subject, some which code the intention of the observed action, and some that are activated by abstract actions (Iacoboni, 2008). “Mirroring of emotion is mediated by action simulation” triggered by mirror neurons (Iacoboni, 2008, p. 122).

### *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)

### *Polyvagal Theory*

A theory proposed by Stephen Porges in which the sympathetic and parasympathetic branches of the autonomic nervous system (ANS) are mediated by two areas of the vagus nerve, the tenth cranial nerve (Siegel, 2012), resulting in one of three autonomic states: social engagement, characterized by ANS regulation and support-seeking behaviors; mobilization, associated with amplified activity in the sympathetic nervous system; and immobilization, which elicits a shutdown response characterized by dissociation and/or fainting (Porges, 2017).

### *Regulated State of Mind*

A state of mind theoretically correlated with underlying neurological processes that are coherent and regulated, marked by activation of the social engagement system or play

### *Regulation*

“To monitor and modify the change of something across time. Monitoring involves the capacity to sense a process; modifying involves the modulation and shaping of that process across time” (Siegel, 2012, AI-67). Within this study, *regulation* is used to describe affect and emotional processes that allow a system to maintain coherence despite necessary adaptations that are made in response to changes in the internal and external environment.

### *Social Engagement System*

A set of circuits within the nervous system employed to coordinate facial muscles with the heart to ultimately produce receptive behaviors to promote connection with other people (Porges, 2017; Siegel, 2012)

### *State of Mind*

“An overall way in which mental processes, such as emotions, thought patterns, memories, and behavioral planning, are brought together into a functional and cohesive whole” (Siegel, 2012, p. AI-77). States of mind consolidate and coordinate mental activity, physiological responses, and behavioral patterns in response to changes in the internal and external environment. In this study, states of mind were used to label expressions of specific neurological mechanisms involved in emotion.

### *Top-Down*

“Processes that arise from anatomically higher areas (such as the cortex) and then influence lower regions (such as the body, the brainstem, and the limbic areas)” (Siegel, 2012, AI-82)

### *Vagus Nerve*

The vagus nerve is the tenth cranial nerve (Porges, 2017). It functions as the mediating nerve between the sympathetic and parasympathetic nervous systems. The vagus nerve connects higher cortical regions in the brain to subcortical areas and organs within the body.

## **Conclusion**

Updated conceptualizations of the mind include recognition that it is directly connected to the body. The SMQ framework uses states of mind that characterize thoughts, feelings, and behaviors and connects them to theorized autonomic and affective states within the body. The SMQ may provide a useful way to begin shifting diagnostic practices away from categorized

labels to describe clusters of symptoms and toward conceptualizations that honor the mind/body connection. In this way, this study is designed to bridge the gap between neurobiological research and clinical practice and to propose a new framework for diagnosis. The results of this validation study could support the use of the SMQ as a more nuanced conceptualization tool for clinical symptoms. Because the SMQ is a self-report measure and is easy-to-use within clinical work, this study could also support its use within counseling and counselor education.

## **SECTION II: REVIEW OF THE LITERATURE**

While scholars from many different fields of study have contributed to the neurobiological understanding of emotion as a process, I narrowed the review of research on emotion to the field of Interpersonal Neurobiology (IPNB) for several reasons. First, this study responded to a very specific call by Panksepp (2016) and Porges (2017) for a framework to understand clinical symptoms in a manner that is connected to underlying neurological mechanisms. In order to respond to this call and to build on their scholarly work, I focused the review of the literature on emotion-based research from the perspective of Panksepp, Porges, and other researchers within the field of IPNB. Incorporating perspectives on emotion outside the field of IPNB was beyond the scope of this study and would have neglected to answer the specific call proposed by these researchers. Second, researchers within IPNB integrate evidence from multiple areas of study, including biology, physics, neurobiology, math, and mental health. Inherently the field of IPNB incorporates varied perspectives and contains a plethora of information that can be translated into meaningful information for professional and personal use. As a result, limiting the review of the literature to the field of IPNB still allowed me to review a large body of varying perspectives on emotion while still following a thematic thread that connects the research for counseling and counselor education. Third, the founder of IPNB, Daniel J. Siegel (2012, 2015), applied a systems approach to understanding emotion which is useful in conceptualizing the holistic, complex nature of emotion within and between individuals. Because this perspective includes the mind, brain, body, and relational aspects of emotion, it encompasses the multiple systems affected by emotional processes. This approach to understanding emotion allowed me to review the multiple dimensions of emotion despite having limited my research to IPNB. Finally, many of the books published within the field of IPNB

were written so that complex medical and scientific information could be consolidated into theoretical frameworks and practical applications utilized by anyone interested in the field. This approach to consolidating, summarizing, and disseminating research made it possible for both counselors and clients to make sense of research within IPNB without having to specialize in it. For example, Porges (2011, 2017) and colleagues performed many individual studies on infants with bradycardia to explore the vagus nerve mechanisms involved in chronic states of immobilization. Each individual study came to important conclusions, but it is only with Porges' summarization of multiple studies that the polyvagal theory emerged. Without this summary, counselors would be unable to apply the research to counseling. For this reason, my review of the literature did not focus on singular studies, but instead was derived from the consolidated research in IPNB from which researchers have made significant conclusions by compiling conclusions from decades of research. In summary, the following literature review, though limited to the field of IPNB, contains a highly integrated narrative of the complex process of emotion according to researchers within IPNB and serves as a summary of their findings written in a manner that can be utilized by counselors and counselor educators. The phases of emotion reviewed in this literature review served as the theoretical foundation for the development of the *State of Mind Questionnaire* (SMQ). In this chapter, I will review the phases of emotion based on contemporary research in IPNB and will conclude with an overview of the theoretical orientation used in developing the SMQ.

### **The Process of Emotion**

Siegel (2015) stated that no one really knows all the specific processes involved in emotion. Still, Siegel suggested that there are some common themes that have emerged from researchers who study emotion. He cited Panksepp and Biven's (2012) view of emotion as basic

motivational drives, Porges' (2011) polyvagal theory of emotion as reactionary states of social engagement, mobilization, and immobilization, and Dodge's (1991) perspective that all informational processing is emotion. Siegel concluded that emotion involves multiple layers of processing, including cognitive processes and physical changes that are constantly interacting with the environment, are influenced by the social environment, and are designed to motivate action. Siegel (2015) ultimately proposed that emotion is "changes in the state of integration" within mind, body, and relationships (p. 148). He suggested that emotion is a continuous, purposeful, non-linear process that involves phases of initial orientation, appraisal, arousal, primary emotional sensations, and differentiation of these sensations in order to ascribe categorical language to emotional sensations. Using Siegel's consolidated description of emotion as a guide, I reviewed the IPNB research to construct a description of emotion that could be useful in counseling and counselor education.

The review revealed a nine-phase process of emotion: (a) initial orientation to stimulus, (b) primary appraisal, (c) affective system activation, (d) elaborative appraisal, (e) arousal, (f) interpersonal integration, (g) vertical integration, (h) bilateral integration, and (i) expression (Ammaniti & Gallese, 2014; Iacoboni, 2008; Levine, 2010; Montgomery, 2013; Panksepp & Biven, 2012; Panksepp, 2016; Porges, 2011, 2017; Schore, 2012; Siegel, 2012, 2015). Though the phases are presented linearly, it is important to keep in mind that emotion is a simultaneous, continual process; any separation between the phases is purely conceptual. As energy and information flows through each phase without interruption, integration between multiple systems occurs and clinical symptoms are reduced (Siegel, 2015). However, disruption at any phase can interfere with this process, resulting in dysregulation at the level of the mind as disempowering thought patterns, at the level of the body as autonomic nervous system (ANS) mobilization or



immobilization, and at the relational level as ineffective communication patterns (Siegel, 2015). The following sections describe each of the phases of emotion.

### **Initial Orientation to Stimulus**

A point from which it is useful to conceptualize the beginning of the process of emotion is the moment at which the nervous system detects a stimulus to which it must adapt (Porges, 2011, 2017). The stimulus can be inside or outside of the body, ranging from something insignificant and seemingly unthreatening, such as a door opening or a slight temperature change in a room, to something significant and dangerous, such as the onset of a virus or a person who becomes physically violent. Chopra and Tanzi (2018) use the word *disruption* to describe such changes. The initial orientation stage activates attentive energy that readies the nervous system to respond to internal and external stimuli (Siegel, 2015). The ultimate goal in the process of emotion for the nervous system is to maintain a state of relative equilibrium in the internal and external environment. The initial orientation phase of emotion simply creates motivation to get more information about the stimulus so that the nervous system can make decisions about how to respond to it. Stimuli can be perceived via eight senses.

The first five senses enable a person to detect shifts in the external environment (Siegel, 2015). Through touch, taste, smell, sight, and hearing, the nervous system takes in and orients to energy and information from the environment. The sixth sense, interoception, enables the nervous system to detect what is happening inside the body. Interoception is the conscious and unconscious awareness of internal, physiological stimuli (Porges, 2011). Both conscious and unconscious interoception is critical for keeping the body in a state of homeostasis. For example, conscious interoception is involved in noticing that the body is hot or cold so that changes can be

made in the environment, while unconscious interoception is necessary to automatically regulate cardiovascular and respiratory systems without requiring awareness.

Stimuli created by mental activity is detected by the seventh sense (Siegel, 2012). Mental activity is a dynamic process that shapes how an individual transforms information into thought patterns. It is both an explicit and implicit process that characterizes an individual's mental life. This activity includes images, thoughts, beliefs, hopes, attitudes, and the like. Mental activity is rich with meaning and memory and is paired with physiological states encoded during past events. Mental activity recreates physiological experiences from the past as an individual directs attention to similar events in the present, recalls similar past events, or thinks about events in the future that are expected to be like the past event (Siegel, 2015).

Finally, the social environment creates a stimulus that can signal an initial orientation response. There are aspects about the social environment that can certainly be detected via the five bodily senses. However, interpersonal information is also detected via the eighth sense, interconnectedness (Siegel, 2012). This eighth sense uses what Siegel (2015) called the *resonance circuits* in the brain to take in social information. The neural network of the resonance circuits includes midline structures, such as the orbitofrontal cortex, anterior cingulate, ventrolateral, and medial prefrontal cortical areas (Siegel, 2015). Mirror neurons also play a key role in resonance circuitry. Mirror neurons are specialized cells in the brain that are correlated with motor and perceptual functions of the nervous system that interpret intention and action from others (Iacoboni, 2008). Mirror neurons enable the nervous system to attune to the physiological experiences of others through a process called *simulation* (Siegel, 2010). Simulation occurs when mirror neurons automatically take in verbal and nonverbal signals from others. This energy and information is then relayed down through the insula, which causes the

subcortical limbic, brainstem, and bodily areas to change. These changes cause the individual's body to simulate the physiological experience of the other person. Next, these subcortical changes can be detected through interoception. The signals move up through Lamina I to the posterior insula where the individual may become aware of the bodily shifts. Yet, it is the final movement of the energy and information into the anterior insula that allows the individual to differentiate their own bodily states from those of others (Craig, 2009). Cozolino (2014) used the term *social synapse* to describe this exchange of energy and information between two individuals.

Energy and information taken in via the eight senses serve as stimuli for the initial orientation phase of emotion. Orientation is simply a state that readies the body to take in more information about the internal and external environments (Siegel, 2015). The second phase of emotion, primary appraisal, enables the body to further appraise the nature of the stimuli.

### **Primary Appraisal**

During primary appraisal, the nervous system evaluates the valence of the stimulus (Siegel, 2015). Using complex processes such as learning and memory, the primary appraisal process determines the quality and nature of the stimulus. The result of primary appraisal may inform which affective systems must be activated in the body to adapt to the stimulus (Panksepp & Biven, 2012). For example, if a child begins to cry, a nurturing adult will appraise the situation to determine whether a caring or reprimanding response is more appropriate. Alternatively, if a person is being attacked, a person's nervous system will appraise the situation and determine whether a fight or flee response is required. In the phase of primary appraisal, the nervous system essentially evaluates the situation and determines which kind of response may be necessary to address it. Then, energy is created through activation of a corresponding affective system.

## Affective System Activation

Affective system activation is the third conceptual phase of emotion. Affective processes originate in the body and create energy and information in the nervous system that motivates instinctual action (Panksepp & Biven, 2012). The motivations can manifest as both a conscious and unconscious processes. There are seven primary affective systems that create patterns of energy in the form of arousal in the body (Panksepp & Biven, 2012; Panksepp, 2016). Each system produces a different type of affective energy in the body by recruiting multiple systems that create motivation to behave in a certain manner.

The affective systems are correlated with activity in the most ancient medial and ventral brain areas, including the hypothalamus, medial thalamus, and the periaqueductal gray located in the center of the brain (Panksepp & Biven, 2012). These lower areas of the brain are directly connected to slightly higher brain regions, such as the amygdala, insular cortex, cingulate cortex, basal ganglia, and hippocampus. These regions activate to create different types of arousal, called *primary-process affects* or *primary affects*. There are seven systems: RAGE, LUST, FEAR, CARE, PANIC, SEEKING, and PLAY (Panksepp & Biven, 2012; Panksepp, 2016). These seven systems activate differentiated instinctual motivations, but it is possible that they are also activated in complex combinations to create more complex, nuanced affective states (Porges, 2011). The affective systems cultivate impulses designed to ensure survival.

The RAGE system enlists a series of systems in the body to motivate defensive, fight behaviors (Panksepp & Biven, 2012). When it links with higher-order cognitions, RAGE may also create positive affect such as those associated with victory. Reproductive impulses, on the other hand, are stimulated by the LUST system, which cultivates sexual arousal. The FEAR system creates energy in the body to flee by creating tension in the body to energize flight

behaviors. It can also trigger a temporary immobilized state (i.e., a freeze state) which, when intensified, ignites projectile motions in the body upon discharge of the frozen energy (i.e., a flee response). The CARE system motivates individuals to touch, caress, hold, and nurture loved ones. The PANIC system is designed to create a low level of panic to motivate a person to seek social support (Panksepp & Biven, 2012; Panksepp, 2016). It is stimulated when people are separated from significant others. The motivation from this system encourages an individual to reach out to others, at times in a panicked, frantic manner, for support in managing psychological or physical pain. The SEEKING system, which may be one of the oldest affective systems evolutionarily, is linked to the motivation to explore novel experiences (Panksepp & Biven, 2012). It cultivates approach behaviors marked by interest and curiosity. Finally, the PLAY system is one of the sources of friendship and is characterized by motivations to engage in rough-and-tumble impulses. It also promotes bonding.

The evolutionary purpose of these seven affective systems is to create varied motivational impulses that ensure survival. Researchers have proposed that elaborative appraisal combined with an arousal process based on factors such as genetic predisposition, temperament, past learning, future expectations, as well as the social and environmental context inform how the nervous system will ultimately act upon the energy and information cultivated by the affective systems (McGilchrist, 2009; Springer & Deutsch, 1993).

### **Elaborative Appraisal-Arousal**

Researchers continue to debate as to whether appraisal and arousal are sequential or simultaneous, though Siegel (2015) suggested it is likely that elaborative appraisal-arousal is a dynamic, simultaneous process. Though the separation of these phases is artificial, discussing

them linearly is conceptually useful to describe this simultaneous, complex appraisal-arousal process.

**Elaborative appraisal.** During elaborative appraisal, the nervous system instinctually evaluates and determines the level of safety presented by the stimuli received during primary appraisal through a process of neuroception. Neuroception is the automatic and instinctual appraisal of the level of threat detected outside of the body coupled with the internal appraisal of the sensory experience inside the body (Porges, 2017). Porges (2017) suggested that appraisal of external stimuli contains only part of the information needed to evaluate a situation. Equally important to the evaluation of safety presented by the external situation is the individual's internal sensory response to the situation. He emphasized that understanding a person's response to an event is more critical than understanding the event itself. Consequently, in addition to recruiting senses that take in information from the external environment, the process of elaborative appraisal also includes information from interoception, the sense that allows an individual to monitor changes within the body. In this way, interoception is an important aspect of neuroception, which renders an immediate, automatic elaborative appraisal of an individual's internal and external environments.

According to Porges (2011; 2017), the conclusion that results from elaborative appraisal conceptually can be divided into three categories: safety, danger, or life threat. An appraisal of safety indicates that the environment is safe enough to use social support to manage the threat of the stimulus. A danger appraisal is signaled when the environment poses a level of threat that necessitates acting beyond the support that can be given by significant others. A life-threatening appraisal occurs when the level of threat posed by the environment is so acute that it overwhelms the nervous system's ability to manage the threat presented by the stimuli. With a life-threat

appraisal, the nervous system determines that it is helpless to defend itself (Levine, 2010). Each of these appraisals is correlated with an ANS state of arousal (i.e., autonomic state).

**Arousal.** Arousal is required to execute action and the quality of the arousal produced by the body is determined by the affective systems discussed previously (Panksepp & Biven, 2012; Panksepp, 2016). Arousal causes the nervous system to create energy and information required to act based on the motivation stimulated by each of the affective systems. Levine (2008) called this the *stress response* and first studied this response with animals in the wild as he observed them discharge dormant energy following acute freeze responses. The ANS is responsible for creating energy and information to manage arousal using two branches: the sympathetic nervous system (SNS) and the parasympathetic nervous system. The SNS heightens arousal in the body, increasing heart and respiration rate, blood pressure, and releasing cortisol into the body via the hypothalamic-pituitary-adrenal (HPA) axis (Catherall, 2004). The parasympathetic branch decreases arousal and activates restorative and growth processes in the nervous system (Porges, 2011). Porges (2011) proposed the polyvagal theory following a series of clinical, phylogenetic trials with infants who experienced bradycardia. Decades of collaborative research revealed that there were important connections between the vagus nerve and autonomic states, and that the vagus nerve is likely the primary mediator of the sympathetic and parasympathetic branches of the nervous system.

The vagus nerve is the tenth cranial nerve in the central nervous system (Porges, 2011). Two branches of the vagus nerve mediate the responses of the SNS and parasympathetic nervous system: the dorsal motor nucleus of the vagus (DMNX) and the nucleus ambiguus (NA; Porges, 2011). The DMNX is located in the dorsomedial (i.e., back middle) medulla of the vagus, while the NA is ventral to (i.e., below) the DMNX. Efferent pathways, which are pathways that exit the

vagus nerve and travel to other parts of the body, from the DMNX vagus are associated with passive functions, and Porges referred to this branch as the *vegetative vagus*. Efferent pathways from the NA are associated with voluntary functions like attention and communication. Porges (1991) called this branch the *smart vagus*.

In the polyvagal theory, Porges (2011) suggested that varied activation of the DMNX and NA creates three autonomic states based on elaborative appraisal: social engagement, mobilization, and immobilization. Social engagement is activated with a safe appraisal and is linked to a complex neural network that encourages and maintains social connection with others. This state is largely influenced and mediated by the striated muscles of the face and head via facial expression (Porges, 2017). The myelinated supradiaphragmatic vagus is also involved due to its regulatory influence on the heart and bronchi. Therefore, facial expressions, heart rate, and breath patterns directly influence and are influenced by the state of social engagement. The autonomic state of mobilization is correlated with increased activity in the sympathetic nervous system and is activated with a danger appraisal of the environment (Porges, 2011). The autonomic state of immobilization is the result of a life threat appraisal, and results in a vasovagal response that shuts down systems in the body. In this state, the nervous system may trigger a dissociative or faint response.

The remaining phases of emotion differ according to the autonomic state employed: social engagement, mobilization, or immobilization (Porges, 2011). As I continue to describe the process of emotion according to research within IPNB, I will use each autonomic state to detail the remaining phases of emotion: (f) interpersonal integration, (g) vertical integration, (h) bilateral integration, and (i) expression.



**Social engagement.** The autonomic state of social engagement (SE) is stimulated when elaborative appraisal mechanisms determine that the environment is safe enough to use social support to express the motivation cultivated by the affective system (Porges, 2011). For example, in a state of social engagement, the RAGE affective system would motivate a person to express anger or indignation. This requires both external and internal appraisal mechanisms to make this determination. External sensory appraisal (i.e., touch, taste, smell, sight, and hearing) must determine that the external environment can be safely managed using social engagement, and interoception must determine that the internal sensory motivations can be safely expressed using social engagement. SE is marked by prosocial behaviors and facial cues. In SE, the NA inhibits the influence of the SNS on the heart to create what Porges (2011) called the *vagal break*. This braking inhibits mobilized defenses and encourages the nervous system to engage in social interaction to manage stimuli. For SE to be activated, an individual must have access to empathic, attuned significant others from which to receive this support (Ammaniti & Gallese, 2014; Porges, 2011; Schore, 2003b; Siegel, 2015).

***Interpersonal integration during social engagement.*** The process of emotion does not occur within an individual nervous system. Instead, emotion is an interpersonal process that greatly influences and is the result of complex neurobiological processes that create a flow of energy and information between people (Ammaniti & Gallese, 2014; Siegel, 2010, 2015). Ammaniti and Gallese (2014) called this *intersubjectivity*, while Porges (2011) called this *co-regulation*. Intersubjectivity and co-regulation are integral in the process of emotion, child development, and the management of mental health disorders associated with ANS dysregulation (Panksepp, 2016). Jung (1912/2003) initially proposed this concept as the *collective unconscious*.

However, contemporary scholars now call this automatic, unconscious, interpersonal communication *social synapse* (Cozolino, 2012) or simulation (Siegel, 2010).

For a state of SE to be maintained, the individual must be able to connect to a trusted other. The trusted other must use presence, attunement, resonance, and trust (PART) in the communication with the individual (Siegel, 2010). The trusted other must be present and open to the experience of the individual and must attune to the subcortical communication that is exchanged during expression. Attunement requires the trusted other to be aware of their own subcortical communication within themselves to detect the mirrored physiological shifts that occur during the process of simulation. The trusted other must then resonate with these physiological sensations without distortion, which requires them to consciously feel the sensations triggered by simulation, to differentiate their own physiological sensations from those triggered by simulation, and to accurately name the experience for the individual. The trusted other then must communicate empathy and understanding in a trustworthy manner. If PART occurs between the individual and the trusted other, the individual's nervous system is more likely to vertically integrate the energy and information of the affective system from subcortical areas of the brain into the right hemisphere. This is because the individual's nervous system remains in a state of social engagement.

***Vertical integration during social engagement.*** Social connection that produces an autonomic state of SE cultivates a state which allows the energy and information in an individual's nervous system to flow uninterrupted bottom-up and top-down (Porges, 2011; Siegel, 2015). In a state of SE, vertical integration occurs as the energy and information from affective systems flows up toward the prefrontal cortex. From subcortical regions, the flow of the energy and information triggered by the affected system connects in the middle prefrontal cortex

(mPFC; Schore, 2012). When an individual is in an interpersonal connection with a trusted other, the regulatory functions of SE encourage energy and information to move through the mPFC into the right hemisphere without distortion or dissociation (Critchley, 2005; Siegel, 2015). The right hemisphere is associated with holistic, abstract processing of energy and information (Siegel, 2012). Schore (2003a) suggested that the right hemisphere is the structural system in the brain associated with the unconscious, and it largely influences a person's thoughts, feelings, and behaviors. Even though energy and information are integrated into the right hemisphere at this point, the motivations provided by the affective systems are still outside of consciousness. Integration into the left hemisphere is required for the individual to become aware of the subcortical affective system activation.

***Bilateral integration during social engagement.*** Researchers have observed a semi-linear progression of energy and information between the right and left hemisphere using brain imaging technology. The right hemisphere limbic areas receive energy and information associated with affective systems from the subcortical areas of the body earlier than the left hemisphere (Bukalina, 2005). Only when the information travels to the left hemisphere will an individual become conscious of it. Researchers have not yet determined a universal explanation for the experience of consciousness (Siegel, 2015). However, Siegel (2015) described one helpful approach by noting that the dorsolateral prefrontal cortex (PFC) plays an important role in facilitating consciousness:

In this perspective, perceptual representations from external and internal stimuli are functionally connected within an area of the brain called the dorsolateral prefrontal cortex [ . . . ] Neural activation profiles can be linked to the activity of the dorsolateral prefrontal cortex and give the internal sensation of being within an attentional focus of

consciousness [ . . . ] [the dorsolateral prefrontal cortex] is thought to act by linking items together within conscious awareness, where they can be focally attended to and manipulated. (p. 159)

Coordinated activity between the dorsolateral PFC and the left hemisphere produce conscious awareness of sensory experiences and internal motivations that can then be labeled with language.

Categorical emotions emerge as language is paired with the motivation signaled by affective system activation (Siegel, 2012). For example, the feeling-state of anger may be used to label motivations triggered by the RAGE system. The area of the brain correlated with the assignment of language is Broca's Area, located in the left hemisphere (Catherall, 2004). Siegel (2015) suggested that assigning language to affective experiences using a categorical emotion is highly influenced by different aspects of human diversity (e.g., age, gender, race, ethnicity). However, researchers have revealed that there are commonalities in the physiological states produced by affective experiences (Nummenmaa, Glerean, Hari, & Hietanen, 2014). Commonly identified names for these states include joy, sadness, fear, guilt, and anger (Greenberg & Goldman, 2008; Ivey, Ivey, & Zalaquett, 2014; Siegel, 2015). To continue the process of emotion without interruption, it is important to ascribe a categorical emotion that accurately corresponds to the primary affective system that was originally stimulated. Naming the quality of motivation produced by the affective system empowers an individual to accurately express the energy stimulated in the nervous system (Lieberman, Eisenberger, Crockett, Tom, Pfeifer, & Way, 2007).

***Expression during social engagement.*** Following the assignment of congruent language to the affective system motivation, an individual can consciously act to manage the external

environment which triggered the process of emotion. Levine (2008) suggested that the physiological energy and information created by the arousal process must be discharged to maintain a healthy nervous system. Discharging the energy reduces the level of arousal and returns the body to a state of regulation. In a state of SE, this requires reaching out to others for support and expressing the affective information. As the individual expresses the affective system motivation through words or bodily movement, the nervous system discharges the original energy created by the affective system to manage the stimulus. The nervous system then will return to a state of homeostasis, thereby fulfilling the goal of the process of emotion: to act to manage stimuli that could potentially disrupt homeostasis.

Montgomery (2013) suggested that there are at least nine psychological defenses individuals can express to encourage a state of social engagement: self-observation, self-assertion, internalization, altruism, sublimation, humor, affiliation, anticipation, and suppression. These defenses encourage nervous system regulation and integration, and are called *homeostatically-balanced defenses* (Montgomery, 2013). These psychological defenses are observable via thought patterns, physiological sensations, and interpersonal behaviors; the latter two of which can be observed by others. If balancing defenses are utilized to express the information from an affective system, the individual's nervous system stays regulated. This regulated flow of energy and information from the subcortical regions of the brain to higher regions enables the motivation of the affective system to stay accurate to its original intention.

Again, even though the process of emotion has been discussed linearly, the differentiation between each phase is conceptual. The nervous system's attempt to maintain a state of homeostasis is an ongoing, fluid process which is directly affected by ongoing elaborative appraisal processes. As the level of safety and threat posed by external and internal stimuli

continually fluctuate, the ANS shifts accordingly to congruently express the motivations triggered by the underlying affective systems. Although a state of SE is ideal for health and wellness, it can also be adaptive for the ANS to temporarily shift into states of mobilization and immobilization as necessary.

**Mobilization.** The autonomic state of mobilization is another form of arousal utilized by the nervous system to manage stimuli. It is engaged when elaborative appraisal-arousal determines that a stimulus creates danger for the individual (Porges, 2011; 2017). This signals that the threat of the stimulus is larger and requires more energy and output to manage than simply reaching out to others. As a result, the nervous system must create levels of arousal in the body to prepare for mobilized action. In mobilization, the NA releases the vagal brake on the SNS, which stimulates the HPA axis to release stress hormones into the body (Porges, 2011). The nervous system then utilizes these hormones to manifest a fight, flight, and/or freeze response (Scaer, 2014). Overall, the states of SE and mobilization can be differentiated by the regulatory mechanisms that act upon the heart. While the nervous system is in a state of SE, the facial muscles primarily serve as regulatory mechanisms upon the heart. In a state of mobilization, the NA releases the brake which normally mediates the impact of the SNS on the heart (Porges, 2011). Once the vagal brake is released, the SNS is free to create a state of mobilization.

In fight or flight responses, mobilization increases heart and respiration rates, blood pressure, glucose levels, and cortisol levels (Levine, 2010). Blood is pumped to the large muscles in the arms and legs to prepare for gross motor functions of defense, such as fight or flight. An autonomic state of mobilization cultivates a high level of arousal which is designed to fulfill the motivation created by the affective system triggered by the stimulus (e.g., RAGE may elicit a

fight response while FEAR may elicit a flee response). The freeze response is also a result of the state of mobilization (Levine, 2010; Porges, 2011). A freeze state enlists similar autonomic energy as fight/flight by increasing heart and respiration rate, blood pressure, as well as levels of glucose and cortisol. However, the freeze response is marked by a state of paralysis in which the body becomes motionless (Scaer, 2014). This serves at least two survival functions. First, the freeze response can extend the elaborative appraisal stage of emotion. Lengthening the elaborative appraisal stage enables the nervous system to gather more information about the stimulus while still preparing to act to resolve it. Second, the freeze response induces a state of paralysis that may prevent motion that would otherwise be detected by a predator or attacker. However, the preparatory energy created by the freeze responses still allows the body to act quickly in the event that the level of threat reduces to a point where the situation suddenly becomes resolvable through fight or flight.

***Interpersonal integration during mobilization.*** Mobilization may occur when co-regulation with a trusted other is either unavailable or irrelevant. The SE system is predisposed to be the first-response to manage stimuli. However, if there is no trusted other available for co-regulation or if the event poses physical threat despite social support that may be available, mobilization is required to manage the threat (Porges, 2017). A trusted other may not be available for co-regulation because they are absent. However, misattunement can also elicit a mobilized response (Porges, 2011; Siegel, 2010). When another person cannot resonate and articulate empathy with the affective state of an individual, the individual's nervous system may elicit mobilized defenses to compensate due to its recognition that social support is unavailable. Alternatively, mobilization can be activated when an environmental or social threat surpasses

what could be managed even through social connection (e.g., a physical attack, a natural disaster).

***Vertical integration during mobilization.*** The autonomic state of mobilization facilitates vertical integration in a similar manner as SE. Again, the mPFC determines how the energy and information from the affective systems flow to the right hemisphere (Schore, 2012). In a state of mobilization, the mPFC integrates the information into the right hemisphere without distortion and dissociation. The right hemisphere receives the energy and information first and processes it in a holistic, abstract manner. This unconscious encoding encourages preparation for expression and action based on the affective system.

***Bilateral integration during mobilization.*** From the right hemisphere, the energy and information then crosses into the left hemisphere where it can enter into consciousness as it makes contact with the dorsolateral prefrontal cortex (Siegel, 2015). As the motivations presented by the affective system become conscious, Broca's area is recruited to assign a categorical name to the feeling state produced by the affective system. The type of mobilization required will differ based on the quality of threat posed by the stimulus, and the categorical label will change accordingly. A motivation to fight may be labeled as anger, while a motivation to flee may be labeled as fear. While fight and flight responses are both mobilized responses, any quality of response that increases activity in the SNS, such as guilt, playfulness, or a sense of victory, can also emerge during mobilized responses.

***Expression during mobilization.*** Due to the heightened energy stimulated during mobilization, expression during mobilization typically involves large movements of the body. Unintentional or intentional action may occur because of mobilization. Unintentional action may be elicited as the environment creates a situation that requires immediate physical action. At



times, these responses can be instantaneous. For example, the startle response occurs outside of a person's awareness and conscious control and is designed to immediately withdraw the body from a dangerous stimulus, such as a hot stove (Scaer, 2014). The startle response can stimulate fight or flight behaviors, such as raising one's arm to block an attack or immediately running away from a stimulus. On the other hand, action may involve more consciousness, such as advocating for oneself or setting boundaries with a partner. As the motivational impulse from the affective system is discharged through expression and action, the energy created by the stress response resolves and the nervous system once again returns to a state of homeostasis (Levine, 2010).

Mobilization is an adaptive autonomic state if there is no distortion or dissociation of the affective system motivation (i.e., the expression of the affect is congruent to the affective system motivation; Porges, 2017). In this case, the homeostatically-balanced psychological defenses emerge. However, there are some psychological defenses that can be employed when the affective system motivation becomes distorted or dissociated in the mPFC. When this distortion occurs, defenses such as acting out, idealization, and sexualization emerge (Montgomery, 2013). Using these defenses to express affective system information perpetuates activity in the SNS; the mobilized response stays activated. Over time, chronic use of these psychological defenses may result in clinical symptoms related to overactivity in the nervous system.

**Immobilization.** The third energy state, immobilization, is stimulated when elaborative appraisal-arousal determines that the environment is life-threatening (Porges, 2011; Porges, 2017; Siegel, 2015). The processes of neuroception determine that the level of threat in the environment is determined to be too high to be managed with social support or behaviors associated with mobilization. Porges (2011) suggested immobility may be a result of depression

of the NA input on the vagus nerve that is simultaneous with a swell of DMNX activation. In a mild state, immobilization lowers the heart and respiration rates, lowers blood pressure, triggers inflammatory responses in the body, and releases chemicals in the body to reduce pain (Porges, 2011). Dissociation also occurs, disconnecting neural activation associated with consciousness from subcortical areas of the body to reduce pain and future recall of a traumatic event that ignited the response (Siegel 2012, 2015). In a more acute state, the DMNX area of the vagus nerve stimulates a vegetative response designed to feign death. In this case, immobilization elicits a vasovagal response which induces fainting. The vasovagal reflex greatly decreases blood pressure and causes a person to temporarily lose consciousness. This enables a person to mimic death so as to ward off predators. The person falls, typically flat on the ground. This is adaptive in that it also allows blood and oxygen to continue to flow to the brain even though the person is not conscious. The autonomic state of immobilization greatly affects how the energy and information cultivated by the affective system is integrated throughout the brain and body.

***Interpersonal integration during immobilization.*** Similar to mobilization, a state of immobilization emerges if a trusted other is either unavailable or irrelevant in managing the life threat posed by a stimulus (Porges, 2011, 2017). Even if a trusted other is available, if the trusted other is not emotionally attuned to the individual, the relationship will lack the resonance between the two nervous systems required for co-regulation (Porges, 2011; Schore, 2012; Siegel, 2010). Because an individual's survival depends on social connectivity with others, this interpersonal disconnect can be equated to a life threat according to the nervous system. Other life-threatening situations that cannot be managed by acting, such as assault, rape, natural disasters, or witnessing violent crimes, also can elicit an immobilized response.

***Vertical integration during immobilization.*** The autonomic state of immobilization negatively affects how energy and information flow from subcortical regions of the nervous system into higher areas of the brain. As an immobilized response is employed, the nervous system shuts down by numbing and perhaps fainting (Porges, 2011, 2017; Siegel, 2012, 2015). To mediate the pain and terror presented by the life-threatening stimulus, the nervous system begins to numb the body and disconnects the person's conscious awareness from the physiological sensations experienced during the event through dissociation. Dissociation is correlated with activity in the anterior cingulate cortex (ACC) and orbitofrontal cortex (Hurliman, Nagode, & Pardo, 2005; Kim, Kroger, & Kim, 2011), and ultimately disconnects activity in the lower regions of the brain, such as the brain stem and bodily areas, from higher regions of the brain, such as the cortex. Siegel (2015) likened mechanisms of dissociation in the limbic region to a process that assigns a negative meaning to the physiological information in the lower regions of the nervous system, and this evaluation thereby prevents the physiological sensations of the affective system from being consciously experienced. Dissociation disrupts the flow of energy and information between lower regions of the brain and the cortex, so the motivation from the affective system cannot accurately travel to the right and left hemispheres for further processing.

***Bilateral integration during immobilization.*** The right and left hemispheres typically create a functional whole as they holistically and linearly unite energy and information from subcortical regions (Bukalina, 2005). This integration is disrupted during a state of immobility because communication from lower regions of the brain is separated from the cortex. Consequently, the right and left hemispheres cannot create conscious, functional conclusions about the affective system motivation. Without the holistic, regulating functions of the right

hemisphere coupled with the language assigned in the left hemisphere, a person cannot take the action that is required to manage the stimulus. The left hemisphere is particularly important in neural integration because it assigns language to the physiological sensations associated with an event. The language then allows an individual to act aligned with the affective system. Creating a narrative of language that is aligned with the motivation of the affective system is an important part of creating explicit memory (Siegel, 2015). Without the explicit memory assigned in the left hemisphere, the event becomes encoded in implicit memory and is inaccessible via explicit, logical, linear processes (Fishbane, 2013). This is the case in events that are encoded as traumatic within the nervous system (Levine, 2010; Siegel, 2015). Instead of being aware of feelings and motivations associated with the instinctual response evoked by the stimulus, in a state of immobilization, a person's nervous system may assign a categorical emotion of shame to the physiological shutdown response of immobility. Shame is characterized by gaze aversion, hiding the face, and a state of withdrawal (Schoore, 2013). It creates interpersonal separation and disrupts the sense of self (Catherall, 2004). This response may be adaptive in instances of trauma because it corresponds with the purpose of immobility: to avoid acting to minimize damage done by the stimulus. In situations where a person is helpless, such as during childhood neglect or sexual trauma, shame may prevent the individual from acting against overwhelming forces. In this way, it is adaptive because it may prevent the person from taking action that would make the situation worse. However, this initial adaptive response can become disempowering as it is reactivated during future events that the nervous system determines to be similar as the original event, even though the person may be able to act to manage the new event. Assigning a categorical emotion of shame prevents a person from expressing the motivational impulse that was originally

presented by the affective system. As a result, the energy becomes dormant in the nervous system.

***Expression during immobilization.*** Just as there are psychological defenses associated with ANS regulation and mobilization, there are defenses that may be managed by the parasympathetic nervous system, which is associated with the shutdown response in immobility (Montgomery, 2013). Defenses such as introjection, asceticism, denial, and intellectualization may decrease levels of affective system activation of the body, consequently creating and perpetuating a state of immobilization. Again, these defenses may be adaptive in instances of trauma. However, chronic expression of defenses that promote immobilization can lead to clinical symptoms, particularly symptoms that are associated with underactivity in the nervous system.

### **Top-Down Influence on Emotion in Counseling**

Although the process of emotion has been presented here linearly from subcortical regions of the brain to higher regions, emotion is both a bottom-up and top-down process in the nervous system (Siegel, 2015). Executive functioning in the PFC, cognitive activity, and conscious changes in behavior can all influence the process of emotion (i.e., top-down influence; Siegel, 2010; Siegel, 2015). Specifically, cortical changes created by mental processes influence how the vagus nerve relates to organs located lower in the body (Chopra & Tanzi, 2018; Porges, 2011). By consciously influencing the psychological defenses used to manage a situation, people can exhibit direct influence over their autonomic state (Montgomery, 2013; Porges, 2017). In time, repeated conscious influence on subcortical regions activate the process of neurogenesis, which grows more cells associated with the firing pattern and eventually may lead to myelinated synaptic connections that increase the likelihood that the pathway will fire again.

As one repeatedly utilizes homeostatically-balanced defenses, the person can encourage a regulated autonomic state in the nervous system (Montgomery, 2013; Schore, 2012). For example, a present, attuned, resonant, trusting (PART; Siegel, 2010) relationship between a parent and child can encourage activation of the social engagement system and facilitate top-down interconnectivity between higher regions of the brain and lower regions of the brain, thereby encouraging a regulated, integrated autonomic state (Porges, 2011; Schore, 2012; Siegel, 2015). Over time, this encourages synaptic connections that make using homeostatically-balanced defenses easier; this encourages healthy development both mentally and physically. Alternatively, as one learns that mobilized or immobilized psychological defenses are necessary to manage situations, that person will elicit a dysregulated autonomic state in the nervous system. For example, chronic misattunement, abuse, and neglect by a parent to a child will teach the child's nervous system that mobilized or immobilized defenses are necessary to cope. In time, the child's nervous system will develop connections in the nervous system that make using such defenses easier and quicker, eventually leading to symptoms of anxiety, depression, and traumatic stress.

The process of neurogenesis occurs throughout the lifetime (Siegel, 2015), and counselors can encourage regulatory changes in clients like that which occur in a developing child through the therapeutic relationship (Schore, 2012). A relationship characterized by PART can ultimately influence the development of synaptic connections and pathways in the nervous system associated with regulated autonomic states within the ANS. Through the therapeutic relationship, counselors can directly impact the client's ability to maintain a regulated autonomic state by influencing the process of emotion at different stages, particularly at the phase of somatic and cognitive experiences. Counselors who pay attention and intervene at the somatic

level can effectively intervene in the process of dysregulated emotional responses, thereby impacting the nervous system and the client's ability to maintain a state of regulation.

Counselors who target psychological defenses and connect them to the process of emotion may assist clients in shifting from thoughts, feelings, and behaviors associated with dysregulation to those of regulation by targeting psychological defenses explicitly. Repeatedly encouraging the use of homeostatically balanced defenses can directly target the autonomic states associated with regulation (Montgomery, 2013). This can encourage the growth of pathways that make it more likely the client will utilize balancing behaviors outside of counseling (Schore, 2012).

Ultimately, this shift can reduce clinical symptoms such as anxiety, depression, and traumatic stress. Understanding the capacity to influence the autonomic state of a client's nervous system through top-down processes highlights the need for counselors to focus on aspects of affective processes in counseling to assist clients in ameliorating symptoms.

### **Summary of Emotion**

In summary, emotion is a never-ending process designed to create impulses that motivate action linked to survival. Although it is impossible to understand all the neurobiological nuances of the process of emotion, it is helpful for counselors to develop a conceptual description of the process that can be translated for clinical use. In the previous description of the process of emotion, I have suggested one such summary of the research that includes nine conceptual phases of emotion: (a) initial orientation to stimulus, (b) primary appraisal, (c) affective system activation, (d) elaborative appraisal, (e) arousal, (f) interpersonal integration, (g) vertical integration, (h) bilateral integration, and (i) expression (Ammaniti & Gallese, 2014; Iacoboni, 2008; Levine, 2010; Montgomery, 2013; Panksepp & Biven, 2012; Panksepp, 2016; Porges, 2011, 2017; Schore, 2012; Siegel, 2012, 2015). The nervous system takes in information via

eight senses, appraises it, and then activates a corresponding affective system that motivates particular action to manage the internal or external stimuli. These affective impulses travel from subcortical regions in the nervous system to the dorsolateral prefrontal region of the cortex, where the individual can become conscious of the motivation. This process of bottom-up integration influences how the individual might express the motivation. The action ultimately taken by the person is based on elaborative-appraisal processes influenced by past learning, what is possible given the situation, and the social environment. The appraisal results in three different thematic conclusions: safety, danger, or life threat. This results in a corresponding autonomic state of arousal: social engagement, mobilization, or immobilization. In a state of social engagement, the expression and action taken by the individual is congruent with the original affective motivation. In mobilization, the expression may be congruent, but if the energy and information is distorted, it may lead to symptoms of chronic mobilization. In a state of immobilization, the expression of the motivation produced by the affective system is truncated and the body shuts down to lessen the impact of the life-threatening event. Understanding the relationship between expression and autonomic state is important for counselors because clinical intervention directly influences phases within the process of emotion and can greatly impact health, disease, and disorder.

### **How the Process of Emotion Influences Health and Disorder**

A primary characteristic of a mental disorder emphasizes the connection of behavioral and psychological patterns to neurophysiological dysfunction (American Psychiatric Association, 2013). Autonomic states are directly tied to mental health and disorder, including anxiety, depression, and traumatic stress (Chopra & Tanzi, 2015; Koenigs & Grafman, 2009; Maes, et al., 2012; Slavich & Irwin, 2014; Siegel, 2012, 2015). Chronic regulated affective states



are linked to wellness, whereas dysregulated affective states are linked to disease and disorder. With repeated use, the neural pathways associated with social engagement, mobilization, and immobilization can become thicker as the brain employs mechanisms of neuroplasticity through processes of neurogenesis and myelination (Siegel, 2015). Neurogenesis involves the production of new neurons that encourage synaptic firing in areas of the brain. When neurons become myelinated, a fatty tissue around the axons allows electrical impulses to travel faster. The result is that the pathways associated with the varied autonomic states become more likely to fire. “The increased probability of firing a similar pattern is how the network ‘remembers’” (Siegel, 2015, p. 47). Chronic firing of mobilized and immobilized affective systems is linked to clinical symptoms (Schoore, 2012), and manifest as maladaptive thought patterns, behaviors, and interpersonal communication patterns.

The ANS also plays a primary role in mediating the immune system and inflammatory reflex (Pavlov & Tracey, 2012). The vagus nerve is a primary mediator of the inflammatory reflex – a neurochemical feedback loop that determines the level of inflammation required for the brain and body to stay healthy. When this feedback loop is interrupted because of insufficient communication between the afferent and efferent arms of the vagus nerve, the inflammatory reflex is interrupted, and chronic inflammation can result. Chronic inflammation has been linked to multiple disorders, including depression, irritable bowel syndrome, insulin resistance, sepsis, rheumatoid arthritis, obesity, and autoimmune disorders. Because of the direct connection between the ANS and the inflammatory reflex, chronic dysregulated autonomic states such as mobilization and immobilization lead to chronic inflammation. Managing inflammation has been shown to greatly reduce the risk of multiple lifestyle diseases (Chopra & Tanzi, 2016), and researchers have demonstrated that one way to do so is to regulate the ANS via the vagus nerve

(Pavlov & Tracey, 2012; Schore, 2012). In this way, the process of emotion is not only correlated with mental health symptoms, but it also directly influences a state of health or disease within the body.

Counselors can impact the process of emotion, and consequently the activation of the vagus nerve and inflammatory response, by targeting different phases of emotion. Yet, as discussed previously, processes associated with neuroplasticity and neurogenesis can make it difficult for clients to transition from states of mobilization and immobilization to social engagement. Clients whose childhood necessitated mobilized and immobilized responses to cope will have developed thicker, quicker neural pathways associated with anxiety, depression, and traumatic stress (Siegel, 2015). This can make developing new behaviors associated with social engagement challenging. However, the same quality of neuroplasticity that created the pathways associated with dysregulation can also be utilized to help individuals move toward more regulated autonomic states. Counselors can help clients create repeated states of social engagement and play expressions within the counseling relationship, which can cultivate neural pathways associated with regulation and integration (Porges, 2017). This encourages regulated states in the mind, body, and relationships, thereby cultivating health and wellness. In this way, counseling has the potential to make a significant impact on a client's mind/body system.

Throughout this chapter, I have provided evidence that by recognizing and targeting psychological defenses in counseling, counselors can impact the underlying autonomic states that are connected to clinical symptoms associated with anxiety, depression, and traumatic stress. Yet, in order to integrate this practice into counseling and counselor education, counselors need theoretical frameworks and measures that explicitly connect observable states associated with psychological defenses to specific autonomic states. Currently, there are several approaches and

assessments available; however, there are still no frameworks that are based on the comprehensive process of emotion that I have outlined here.

### **Frameworks Connecting Regulatory Systems to Practice**

Hoffman, Rice, and Prout (2015) introduced a manualized psychodynamic approach that connected defense mechanisms to emotion regulation. Regulation-Focused Dynamic Psychotherapy for Children (RFP-C; Hoffman, Rice, & Prout, 2015) is a model used to address externalizing disorders in children associated with maladaptive emotion regulation mechanisms, and it can be applied to such problems as oppositional defiant disorder (ODD) and disruptive mood dysregulation disorder (DMDD). The RFP-C approach combines psychodynamic theory and behavioral therapy to explore how defense mechanisms influenced children's clinical symptoms. The authors conceptually connected underlying regulatory systems in the brain and body to observable behaviors and provided evidence that RFP-C is effective with both children and adolescents (Hoffman, Rice, & Prout, 2015). RFP-C highlights the role of emotion in managing externalizing symptoms, so it is aligned with evidence that supports focusing on the process of emotion to reduce clinical symptoms. However, the scope of utilizing RFP-C in counseling is limited to working with children and adolescents. The framework with RFP-C also does not connect to the research on how different affective systems are expressed via varied autonomic states. Additionally, RFP-C is a manualized treatment, but it does not propose a framework for evaluation. Finally, the psychodynamic language employed in this approach likely precludes counselors who do not identify with psychodynamic theory from utilizing this approach in clinical work. Consequently, counselors still need a tool for evaluation that integrates a focus on affective system expression that can be used with adults and is not directly tied to any one theoretical orientation.

Andrews, Singh, and Bond (1993) proposed an assessment based on defense styles. The 40-item Defense Style Questionnaire (DSQ-40) was developed as a self-report measure of defense mechanisms. The original instrument consisted of 87-items, though scholars have reduced the measure to 40-items to increase clinical application and construct validity (Andrews, et al., 1993). Counselors can deliver the assessment to clients and cumulate the responses from 40 items to reveal categorical results that indicate that a client is using a mature, immature, or neurotic defense style to cope with stressors. Identifying immature or neurotic defense styles can help counselors teach clients how to replace these defenses with more mature styles. However, the DSQ lacks a theoretical connection to research in neuroscience. The defense styles within the DSQ are not connected to autonomic states of social engagement, mobilization, and immobilization, and they are not connected to affective systems research. This limits a counselor's ability to utilize the DSQ to understand and target underlying neurological mechanisms that contribute to symptoms. Additionally, the DSQ is most effectively utilized by counselors who employ a psychoanalytic or psychodynamic perspective of psychological defenses, and counselors who employ other theoretical orientations may not find the DSQ useful in counseling. Although the DSQ may be an effective assessment of psychological defenses, the lack of connectivity to neuroscience research indicates that counselors still need such an assessment.

Finally, Montgomery (2013) introduced a three-tiered categorization of psychological defenses based on the polyvagal theory. Defenses such as self-assertion, altruism, and sublimation are correlated with a homeostatically-balanced autonomic state. Mobilization is correlated with defenses such as acting out, undoing, and sexualization, while immobilization is correlated with defenses such as dissociation, repression, and passive-aggression. Montgomery

(2013) created worksheets to help counselors and clients identify and work with the defenses in counseling. By answering questions about and exploring the consequences of observable thoughts and behaviors, clients and counselors explore how manifestations of psychological defenses implicate the regulated or dysregulated state of underlying neurological processes. Montgomery proposed that helping clients employ homeostatically-balanced defenses encouraged a regulated autonomic state that promotes wellness, and the framework effectively connects psychological defenses to autonomic state in a manner readily applicable to counseling. However, the categorical distinctions between psychological defenses is based on a three-tiered model of regulation, one that is connected to social engagement, mobilization, and immobilization. It does not include a more nuanced expression of different affective systems within each autonomic state, and this limits its specificity in assessing and addressing regulatory processes of emotion that vary thematically. Furthermore, the reliance on psychological defenses as the observable mechanisms for measurement and treatment limits the applicability of this approach for counselors who do not identify with psychodynamic theory. Consequently, there remains a need for a measurement tool and theoretical framework to bridge the gap between affective systems research (Panksepp & Biven, 2012; Panksepp, 2016) and the polyvagal theory (Porges, 2011, 2017), and to make this framework readily available for counselors from multiple theoretical orientations. The SMQ may fill this gap between research and practice.

### **Theoretical Framework**

The theoretical framework utilized to develop the SMQ is rooted in the affective and autonomic state research discussed previously. Although the vagus nerve activates three global autonomic states within the nervous system, the expression of these states will vary based on which affective system is recruited during an emotional response (Porges, 2011). Porges (2011)

proposed that a more nuanced expression of states is possible based on how each state is linked with biologically based behavior:

1. Social engagement: a state dependent on a well-defined social engagement system. This system promotes positive social interactions, reduces psychological distance, and promotes a sense of safety between people.
2. Mobilization – fight-or-flight: This state supports fight-or-flight behaviors and requires an increase in metabolic output.
3. Play: a blend of the above. Play is a hybrid state requiring features from both states of mobilization and social engagement.
4. Immobilization – life threat: This state is associated with life threat and is characterized by a reduction of metabolic output and shutdown behaviors. This primitive neural circuit works fine for reptiles but is potentially lethal in mammals.
5. Immobilization without fear: This state is associated with prosocial and positive states that require a reduction of movement without the massive reduction of metabolic resources. This circuit recruits pathways from the immobilization circuit and is used during nursing, childbirth, and reproductive behaviors and digestive and restorative processes. (p. 278)

Porges (2011) proposed that these five states illustrate how vagus nerve activation may mediate the expression of the seven affective systems proposed by Panksepp and Biven (2012). Additionally, Panksepp and Biven (2012) suggested that “although there are distinct emotion systems, each characterized by specific affects and behaviors, they frequently interact in complicated ways” (p. 190). For example, RAGE and FEAR, although characterized by fight and flight responses respectively, typically interact with the other affective systems to produce more

complex emotional processes to cope with nuanced stimuli. It is possible to thus separate Porges' proposed fight or flight states into two different expressions: affective expressions paired with the RAGE system (i.e., the fight response) and affective expressions paired with the FEAR system (i.e., the flight response). Consequently, I propose that it may be theoretically useful to conceptualize each of the seven affective systems as having six different categorical expressions via six autonomic states: a) the affective system expressed via an autonomic state of social engagement; b) the affective system expressed via an autonomic state of play; c) the affective system expressed via an autonomic state of mobilized FEAR; d) the affective system expressed via an autonomic state of mobilized RAGE; e) the affective system expressed via an autonomic state of immobilization without fear; and f) the affective system expressed via an autonomic state of immobilization due to perceived life threat (i.e., with FEAR).

Just as Montgomery (2013) correlated psychological defenses with autonomic states in her three-tiered model of psychological defenses, I suggest that it may be possible to specifically assign psychological defenses according to each of the proposed nuanced expressions of the affective systems via the six autonomic states. However, *psychological defense* as a term no longer aptly describes the mechanisms that are utilized to express these states. Rather than defenses against painful affect, the proposed expressions are states of mind that correlate with underlying neurological processes. States of mind are ways “in which mental processes, such as emotions, thought patterns, memories, and behavioral planning, are brought together into a functional and cohesive whole” (Siegel, 2012, AI-77). Consequently, I propose using *state of mind* to replace the term *psychological defense* as it more accurately captures the phenomenon that emerges through the expression of autonomic and affective states. Furthermore, it is my hope to normalize the use of states of mind in everyday interactions, rather than to conceptualize

such expressions as defenses against painful affect. In summary, within the SMQ, I proposed states of mind to describe each of the expressions based on seven affective systems expressed through six different autonomic states. This resulted in 42 states of mind conceptually connected to underlying neurological mechanisms.

Within the SMQ model, I created states of mind based on the autonomic expressions proposed by Porges (2011) of the affective systems (Panksepp, 2016). The result was that each of the seven affective systems (i.e., CARE, FEAR, LUST, PANIC, PLAY, RAGE, and SEEKING) was assigned a state of mind correlating with each of the six autonomic states: a) a state of mind associated with the affective system in an autonomic state of social engagement; b) a state of mind associated with the affective system in an autonomic state of play; c) a state of mind associated with the affective system in an autonomic state of mobilized FEAR; d) a state of mind associated with the affective system in an autonomic state of mobilized RAGE; e) a state of mind associated with the affective system in an autonomic state of immobilization without FEAR; and f) a state of mind associated with the affective system in an autonomic state of immobilization due to perceived life threat (i.e., with FEAR). Overall, this conceptualization revealed 42 states of mind that may be useful in describing expressions of underlying neurological systems within counseling and counselor education.

### **Introduction to the SMQ Model**

The SMQ is a 42-item questionnaire that assists clients and counselors in identifying which states of mind clients use to manage situations. The primary purpose of the SMQ is to propose an alternative diagnostic framework rooted in Interpersonal Neurobiology research for counselors and counselor educators. In the current diagnostic paradigm, client problems are conceptualized by identifying symptoms that can be observed, clustered, and categorized.



However, this approach does not honor the connections symptoms have to underlying neurological mechanisms. The result of this practice is that many clients receive co-morbid diagnoses because similar symptoms manifest across multiple disorders. It may be more effective to diagnose clients in a manner that captures the complex interplay of regulated, overactive, and underactive systems within the body.

Indeed, the vicissitudes of life being what they are, with each of us bombarded by a diverse set of emotional challenges, it will be next to impossible to prove that any emotional disorder is due simply to a single emotional system, not to mention a single chemical imbalance. Most people will reflect several emotional imbalances, explaining why the concept of “comorbidity” is so common in psychiatry. This essentially means that more than one psychiatric syndrome occurs at the same time. Take depression, which is often accompanied by excessive psychological pain, anxiety, angry irritability, as well as diminished urges to seek and pursue other life interests. Indeed, the term “depression” is very ambiguous, implying both generalized malaise and sickness. A more accurate description would need to address the emotional systems involved and the ways that their over- and underarousal contribute to the clinical symptoms [...] (Panksepp & Biven, 2012, p. 191).

The SMQ is based on an alternative diagnostic paradigm that assumes that clinical symptoms are the result of complex, ever-changing affective systems that can be expressed via regulated, overactive, and underactive autonomic states. Each state of mind within the SMQ is theoretically connected to thematic survival behaviors associated with each of the seven affective systems proposed by Panksepp (2016) (i.e., CARE, FEAR, LUST, PANIC, PLAY, RAGE, and SEEKING) as expressed via the six autonomic states proposed by Porges (2011). Within the

SMQ framework, health and wellness is characterized by regulated states of mind that are theoretically connected to regulated autonomic states, whereas clinical symptoms are characterized by overactive and underactive states of mind that are theoretically connected to mobilized and immobilized autonomic states. This practice directly connects client experiences with affective processes in the body. In this way, the proposed paradigm shift within the SMQ responds to a call from researchers for a new framework for assessment and intervention which focuses on affective processes rather than diagnostic categories:

We suspect that scientific psychiatrists, at some time in the future, may have little need for the diagnostic categories presently used, as we begin to understand emotional problems in terms of better descriptions of imbalanced brain emotional systems and an understanding of the many neurochemical changes that can lead to affective distress.

We are just beginning to understand the massive complexities of the underlying neuroanatomies and neurochemistries. A future biological psychiatry that works well along more specific affective psychotherapeutic interventions will probably be based on knowledge that more readily links to the actual emotional experiences of patients.

(Panksepp & Biven, 2012, p. 191)

Connecting certain patterns of the mind to certain patterns of the body essentially maps out the thoughts, feelings, and behaviors associated with correlated neurological mechanisms in the body. Diagnosis thus becomes more connected to neurological processes, which empowers counselors to more accurately conceptualize client symptoms and lessens the gap between diagnosis and treatment.

## How to Use the SMQ

Clients complete the 42-item SMQ self-report questionnaire when they or the counselor can identify a situation that is causing them stress (e.g., an argument with a family member, feeling depressed for several days). Once the situation is identified, clients respond to each of the 42 items within SMQ while keeping the situation in mind. For each of the 42 items, clients indicate to what extent (i.e., *strongly agree*, *agree*, *neutral*, *disagree*, or *strongly disagree*) each item (e.g., *I put others down in this situation and it makes me feel better; I have no idea how to manage this situation sensitively*) describes their approach to the identified situation. Responses of *strongly agree* or *agree* indicate that the client is using the identified state of mind to manage the situation. Responses of *disagree*, and *strongly disagree* indicate that the client is not using the identified state of mind to manage the situation. A response of *neutral* may indicate that it may be useful for the counselor and client to discuss the particular item. The counselor can then plot the results on the SM-Map (see Appendix F). The SM-Map connects each state of mind to the autonomic state and affective system associated with the state of mind. This helps to illuminate which affective systems are being expressed as regulated (i.e., in a state of social engagement or regulated play) or dysregulated (i.e., mobilized with FEAR, mobilized with RAGE, immobilized without FEAR, or immobilized with FEAR). Once the states of mind are mapped, the counselor can determine how to use this information in treatment planning.

**Why the SMQ focuses on specific situations rather than symptom clusters.** The SMQ allows counselors and clients to evaluate the states of mind a client uses to respond to a specific situation. This allows counselors to conceptualize the client problems in a way that aligns with the process of emotion, which as described earlier, conceptually begins when the nervous system is exposed to a stimulus which triggers the initial orientation phase.

Various scholars have coined terms to define the nervous system's shift because of changes to the internal and external environment. Chopra and Tanzi (2018) described this fluctuation as *disruption*, "any health threat: an invading virus or bacteria, a physical wound, a stressful event, distortions at the cellular or genetic level, mental distress, and the like" (p. 21). These disruptions can be experienced in the client's present with no connections to the client's past experiences. However, often stimuli that create mobilized or immobilized responses in the nervous system are remnants of events experienced in the past. Experiences that are encoded through a dissociated, immobilized response are implicitly encoded somatically and have no explicit narrative which would help clients to understand why such a shift would occur (Siegel, 2015). Cori (2008) used the term *trigger* to describe "anything that sets [the client] off emotionally and activates memories of [the client's]" past (p. 30). These moments can easily be overlooked in the client's day-to-day life as they are often subtle. They can also be overlooked within counseling sessions. Yet, these moments are important because they indicate that something has changed within the process of emotion. This presents an ideal opportunity for counselors to intervene to encourage a regulated response to the situation.

Instead of evaluating a client's overall symptom profile and targeting clusters of symptoms, counselors who use the SMQ narrow the focus for counseling to specific situations so as to work alongside the process of emotion. By identifying a situation that has disrupted the nervous system's equilibrium, both counselor and client become more able to understand the event that is triggering the symptoms in the first place. The results from the SMQ illustrate which states of mind the client is employing to manage the situation. Because the states of mind are connected to underlying affective and autonomic processes, the results from the SMQ can then be used to map out the body's response to the situation. This practice increases client's self-

awareness and equips both counselor and client to better understand how to shift the client's thoughts, feelings, and behaviors toward more regulated states of mind to regulate the process of emotion. In time, this can directly influence the process of emotion through top-down intervention. This approach makes use of the natural regulatory processes that are embedded in the body. Ultimately, this allows the client's mind and body to align to encourage the natural healing response of the body, which researchers now believe to be a very powerful healing tool (Chopra & Tanzi, 2018).

Because each state of mind is connected to not only an autonomic state, but also an underlying affective system, counselors can use the results from the SMQ to target specific states of mind in counseling. Mapping the states of mind on the SM-Map allows the counselor to conceptualize the clients' coping strategies in a manner that reveals the underlying regulatory systems involved. States of mind associated with social engagement and play could indicate that the client is utilizing a regulated approach to manage the situation. Counselors can highlight these coping strategies as sources of strength in managing the situation and can discuss with clients how to continue employing these strategies as the client continues to manage the situation. For example, if the client is employing *support-seeking* effectively in the situation, the counselor and client can identify additional sources of social support to be used moving forward. Alternatively, dysregulated states of mind will indicate that the client is utilizing mobilized or immobilized autonomic states to manage the situation, and it is possible that clinical symptoms could emerge from using these coping strategies. Counselors can help clients explore the costs and benefits of continuing to utilize the state of mind, and to ultimately decide if the client would prefer to replace the dysregulated state of mind with the regulated state of mind correlated with the underlying affective system and autonomic state. For example, if the SMQ results indicate

that the client is utilizing *helplessness* (i.e., RAGE immobilized with FEAR), the counselor may help the client to understand why *helplessness* may initially feel effective (e.g., it is a way of maintaining social support that is perceived to be critical). The client and counselor may also explore how shifting into the regulated version of that affective system, such as *advocacy* (i.e., RAGE in social engagement), could help to reduce clinical symptoms by encouraging the recruitment of the social engagement system in managing the situation.

Counselors can approach this shift for clients in several ways according to their theoretical orientation. The results of the SMQ do not require a specific counseling approach, but rather serve as a framework for informing treatment plans to target neurological processes of affective regulation. The overall goal is to help clients consciously replace dysregulating states of mind with states of mind that encourage regulated autonomic states. Counselors who utilize psychodynamic theory may focus on how clients learned to employ dysregulated autonomic states during childhood and may help clients discuss how to shift relational patterns in the present by using more regulated autonomic states. Counselors who utilize cognitive-behavioral theories may focus on the thoughts and behaviors associated with each state of mind and may ultimately target a client's thought patterns and behaviors to align them with regulated autonomic states.

I have used the SMQ with a wide variety of clients, including children, adolescents, and adults who struggle with symptoms of anxiety, depression, and traumatic stress. I have similarly used the framework of the SMQ to teach and illustrate key themes within neurological research for counselors-in-training. I have cumulated several years of qualitative data that demonstrate the efficacy of using the SMQ. However, this study is the first effort to create quantitative evidence for using the SMQ in counseling and counselor education.

## **Conclusion**

As energy and information flow from initial orientation to stimulus from expression without interruption, integration occurs between the systems involved in emotion. This leads to a reduction in clinical symptoms and increased levels of wellbeing. Alternatively, the process of emotion can be disrupted at any phase. This results in dysregulation at the level of mind as distressing thought patterns, in the body as ANS mobilization or immobilization, and can contribute to relational conflict. In this conceptual consolidation of the literature, to stay healthy, the quality of the motivation produced by neurological affective systems must be in alignment with the expression of it. Although there are several frameworks which acknowledge and influence how expression is connected to neurological mechanisms, none of them contain a measure that is connected to research within IPNB. I developed the SMQ, a measure of states of mind, to bridge this gap between research and practice.

### SECTION III: METHODOLOGY

The purpose of this study was to validate the *State of Mind Questionnaire* (SMQ), a measure of polyvagal emotion regulation as indicated by states of mind. As reviewed in Chapter One and Chapter Two, the SMQ was developed within a theoretical framework of emotion as an integrative process of mind, body, and relationships. In this chapter, I will review the methodology used for the study to validate the SMQ.

#### Methodology

In this study, I utilized a quantitative research design. Quantitative research within counseling focuses on measurable, quantifiable variables (Adams & Lawrence, 2015). Quantitative research designs include descriptive, correlational, and experimental designs (Adams & Lawrence, 2015). The study was correlational and predictive in nature. To establish convergent validity of the SMQ, I utilized the Symptom Assessment – 45 (SA-45; Maruish, 2004) for comparison. Specifically, I compared the global severity scores (GSI) provided by the SA-45 to determine how clinical symptoms related to the number of regulated and dysregulated states of mind.

I also explored the predictive nature of individual states of mind for five subscales of clinical symptoms within the SA-45 using multiple regression analysis. I identified anxiety, depression, obsessive-compulsive, hostility, and interpersonal sensitivity as conceptually relevant when compared to the SMQ. The SMQ is not designed to measure paranoia, phobia, psychoticism, or somatization, so these subscales were omitted from analyses. Because this study is exploratory by nature, I needed to run correlational analyses to first determine which states of mind would be added to the predictive model. This initial analysis provided evidence that certain states of mind may be predictive of the subscales within the SA-45. First, I ran correlational



analyses to compare all SMQ items (i.e., states of mind) to each of the subscales. I then took SMQ items with statistically significant correlations larger than .30 and used stepwise entry to load the correlated states of mind into the corresponding subscale. The analyses revealed predictive models for each subscale.

Participants for this study included 300 individual adults. All participants were individual adults over the age of 18. The sample included people who reside in the United States of America and was stratified per the United States Census data in terms of age, gender, and race. The stratification was designed to promote diversity and accurate representation of the population of interest. Upon receiving Institutional Review Board (IRB) approval from a South Texas university, I collected data from participants using an online survey administered through the Qualtrics, Inc. software platform. The survey contained 92 items. First, the survey included an information sheet describing participants' rights within the study. By proceeding to the questionnaires, participants expressed their consent to participate in the study. They then completed a brief demographic questionnaire containing questions about age, gender identity, and race, and then continued to complete the SMQ and SA-45. During data analysis, I employed correlational analyses to explore the strength and direction of the relationship between the states of mind in the SMQ and clinical symptoms as identified in the SA-45.

### **Research Questions**

The research questions for this study were as follows:

Research Question 1: To what extent is the number of regulated and dysregulated states of mind scores on the SMQ related to the global severity index (GSI) scores for the Symptom Assessment – 45 (SA-45)?

Research Question 2: Which of the individual states of mind in the SMQ predict clinical symptoms as measured by the subscales in the SA-45?

### **Development of the SMQ**

DeVellis (2017) proposed guidelines for instrument development in seven steps: (a) determine what is to be measured; (b) generate an initial item pool; (c) determine the format for measurement; (d) have the items reviewed by experts; (e) consider inclusion of validation items; (f) evaluate items; and (g) optimize scale length. The last two steps, evaluate items and optimize scale length, were designed to facilitate exploratory factor analysis, which was not a good fit for the SMQ given that the results of the questionnaire are categorical, not global nor cumulative; states of mind are either present or absent. However, the first five steps still applied. These steps are detailed below with descriptions of how each step was executed in the development of the SMQ.

#### **Determine What is to be Measured**

DeVellis (2017) suggested that scale development should be well-grounded in theory. I discussed the theoretical foundations of the SMQ in Chapter Two. Here, I will describe how the constructs of states of mind were identified for measurement. I developed the SMQ over the course of several years practicing counseling, teaching counselors-in-training, developing curriculum for an accredited masters in counseling program, and supervising masters level counselors. Employing principles of heuristic inquiry proposed by Moustakas (1990), I moved through a recursive process that aided in determining what was to be measured, eventually leading to the development of the SMQ.

**Initial engagement.** Initial engagement involves focusing on an area of interest (Moustakas, 1990; Patton, 2015). By engaging with a phenomenon, the researcher brings to life a

question that triggers passion and interest. The research question in heuristic inquiry is “What is my experience of this phenomenon and the essential experience of others who also experience this phenomenon intensely?” (Patton, 2015, p. 118). Through self-dialogue, intuition, tacit knowing, and focusing (Gendlin, 1978), the researcher uses an internal frame of reference to identify a focus of inquiry. Usually this inquiry is open-ended, self-directed, and related to the researcher’s personal experience.

As a masters counseling student, I was trained in emotion-focused psychodynamic theory. The academic curriculum emphasized the role of relationships, attachment, and emotions on mental health. Additionally, I was immersed in clinical work throughout my entire time in the program. During my nine-month practicum, I primarily worked with trauma survivors and learned how trauma is encoded into the body. Then, my experience in my nine-month internship further introduced me to the affective neurobiological underpinnings of stress and trauma. It was these initial introductions into clinical work and neuroscience that stimulated my interest in the process of emotion. By the time I graduated with my masters degree, I had begun to formulate a research question: What is emotion? This question became a source of inquiry over the next several years in my career as a counselor, counselor educator, and researcher.

**Immersion.** Once the research question is identified, a researcher moves into a phase of immersion (Moustakas, 1990; Patton, 2015). The researcher begins to interact with the question through lived experience and “virtually everything connected with the question becomes raw material for immersion” (Moustakas, 1990, p. 28). The researcher follows intuition to identify clues about the sources of energy and knowledge within tacit dimensions of the phenomenon.

Once I had formulated the research question regarding emotion, I immersed myself in it. Upon completing my masters degree, I began working as a full-time counselor in a two-year

family therapy fellowship at a mental health institute. I also began teaching in a masters program in counseling. In my clinical work, I explored emotions with my clients and educated them about the neurophysiological foundations of emotion as I continued researching emotion in the Interpersonal Neurobiology (IPNB) literature. I learned that emotion was a process that facilitated and affected interpersonal attachment through mirrored integrative states that could be truncated during trauma, resolved through meaningful relationships in counseling, and become a healing mechanism for mind, body, and relationships (Ammaniti & Gallese, 2014; Cozolino, 2014; Greenberg & Goldman, 2008; Iacoboni, 2008; Levine, 2010; Ogden, 2006; Porges, 2011; Porges, 2017; Schore, 2012; Siegel, 2012). I also taught what I learned to masters-level counselors-in-training and implemented neurocounseling theories and techniques into clinical supervision of trainees' trauma work. As this was occurring in my professional life, I paid astute attention to my own emotions and the emotions of others in my personal life as well.

**Incubation.** In the incubation phase of heuristic inquiry, the researcher retreats into a resting period (Moustakas, 1990). New understanding of the phenomenon emerges as distance is created between the researcher and the phenomenon, and this retreat allows for new insight to emerge. A significant period of incubation occurred for me during the summer after completing the family therapy fellowship. I began working as a staff counselor but had time to transition between positions. Professionally, this time was a period of rest from my clinical work and work as a counselor educator. The summer months allowed me to step away from my research, consolidate what I had learned, and allow for illumination to emerge.

**Illumination.** The process of illumination emerges naturally from periods of incubation (Moustakas, 1990). As the researcher enters a state of receptivity, insight flows. New

understandings about core qualities of the phenomenon begin to crystalize as dimensions that may have been overlooked are brought to light.

I experienced a major illumination related to emotion as I stepped back into my role as a full time counselor and counselor educator. I already understood the research on mirrored affective states, and had immersed myself in research regarding primary and secondary emotions as well. In observing my clinical work, I noticed that a pattern was beginning to emerge in the way primary and secondary emotions were employed by my clients to manage situations in their lives. Specifically, emotional categories appeared to unfold for clients in an order that was related to the level of defensive protection afforded by the emotion. As I further explored how the polyvagal theory (Porges, 2011; Porges, 2017) and affective systems research connected (Panksepp & Biven, 2012; Panksepp, 2016), I began to understand how categorical expressions of feeling-states were related to specific instinctual action based on mobilized, regulated, or immobilized responses. I created a hierarchy of categorical emotions based on the level of defense provided by each category from most defensive to least defensive. I was beginning to notice in my clinical work and in supervising masters-level counselors that when clients were mobilized or immobilized physiologically, each of these categorical emotions would be expressed in varied thought patterns and interpersonal behaviors. By integrating Panksepp and Biven's (2012) work with Porges' (2011) suggestion that each affective system would be expressed through multiple autonomic states, I began to connect psychological defenses with theoretical manifestations of how the varied expressions of the autonomic states would appear in clinical work. As commonalities emerged in my observations, I constructed various frameworks for how to categorize the varied expressions. I cross referenced the frameworks I created with counseling literature, research from IPNB and various medical fields, and the expressions of

affective states I observed in my clinical work and in supervising masters-level counselors. This began to move me into a phase of explication.

**Explication.** Moustakas (1990) proposed that explication occurs as the researcher begins to understand the phenomenon in a manner that allows for explanation. “In the explication process, the heuristic researcher utilizes focusing, indwelling, self-searching, and self-disclosure, and recognizes that meanings are unique and distinct to an experience and depend upon internal frames of reference” (Moustakas, 1990, p. 31). Overall, a comprehensive depiction of the phenomenon emerges from explication.

As I continued to teach and counsel, I refined the framework to categorize the expression of affective systems via autonomic states. Explication emerged as I transitioned into a position in counselor administration where I developed and launched an online masters program in counseling while still teaching and counseling. Through curriculum development, teaching, and clinical work, I oscillated between my framework, emerging research, and the experiences of my clients and supervisees. Teaching students and clients about emotion allowed me to develop effective language for how to express my understanding of the phenomenon. Moustakas (1990) noted that this emergence of new understanding and ability to communicate about the phenomenon is a hallmark of explication. During the explication phase, I moved more fully into the general knowledge of emotion in order to better compare my theory with what was already understood. What crystalized for me during this time was that clients’ expression of the affective systems manifested based on autonomic state, and I was noticing commonalities that were effective to highlight when working with clients. However, my work did not synthesize until I left the agency where I worked to pursue a doctoral degree in counselor education.

**Creative synthesis.** Creative synthesis occurs as the researcher begins to explicitly communicate what has been learned during the inquiry (Moustakas, 1990). Through stories, poems, art work, or other forms of representation and communication, the researcher expresses what has emerged in the research (Patton, 2015). The synthesis becomes a comprehensive depiction of key themes, core constructs, and important meanings from the inquiry.

The first assignment in my doctoral program required me to create a literature review. I used this assignment to synthesize the research on emotion in a manner that responded to a call by researchers to construct an understanding of the process of emotion that linked together the polyvagal theory (Porges, 2011, 2017), affective systems research (Panksepp & Biven, 2012; Panksepp, 2016), psychological defenses (Montgomery, 2013), and co-regulation and intersubjectivity (Ammaniti & Gallese, 2014; Porges, 2011; Schore, 2012). Overall, the review revealed a conceptual summary of the process of emotion as an integrative process that engages mind and body, and includes transmissions of energy communicated consciously and unconsciously within interpersonal relationships. An important insight that I gained from the literature review was that the congruence between the expression of the affective system and the motivation cultivated by it was key to cultivating a regulated state of wellness. Montgomery's (2013) work in connecting psychological defenses to the autonomic states of social engagement, mobilization, and immobilization inspired me to begin connecting psychological defenses to the emerging expressions of the affective systems via autonomic states. However, I ran into two challenges during this process. First, many of the traditional psychological defenses did not conceptually fit with the theorized underlying neurological mechanisms. This required me to construct new terms to describe thoughts, behaviors, and feeling-states theoretically associated with each autonomic expression of the affective states. To create the new terms, I explored

literature on psychological defenses, terminology typically associated with specific clinical symptoms, and constructs used in counseling when observing clients. Consequently, some of the terms within the framework are familiar to counseling work. However, others are terms I have proposed that may more specifically describe affective expressions.

Second, there appeared to be a conceptual difference between the construct *psychological defense* and the affective system expressions I was observing. A traditional interpretation of psychological defenses would suggest that they are utilized to defend against painful affect, whereas the phenomenon I was observing appeared to simply be an expected, necessary fluctuation in the expression of affect based on requirements posed by the internal and external environment. Therefore, *psychological defense* no longer aptly applied to the theorized framework. Instead, I decided to use *states of mind* to describe the observable expressions of underlying affective system activation via autonomic states. Siegel (2012) described states of mind as ways “in which mental processes, such as emotions, thought patterns, memories, and behavioral planning, are brought together into a functional and cohesive whole” (p. AI-77). This definition aligned with my observation that the expressions were functional representations of the theorized underlying neurological phenomenon, so I used this term to better describe the conceptual expressions I was creating. The result of this stage of creative synthesis was the *State of Mind Map* (SM-Map; see Appendix F), which depicted seven affective systems expressed as states of mind via six autonomic states. The next step was to work toward validating the theoretical framework.

**Validation.** A researcher can engage in validation of heuristic inquiry in a number of ways. There are no guidelines for how to validate findings in heuristic methodology; instead, the researcher must determine the most fitting means of evaluating the validity of the data



(Moustakas, 1990). Verification can occur through collaboration with participants/co-researchers through interviews, surveys, and other qualitative measures. Quantitative measures can also be employed. The process of validation is a recursive process of reviewing what was initially discovered by the researcher and comparing it to generalized findings beyond the internal frame of reference (Patton, 2015). What emerges is an expression of the core essence of the experience.

I have engaged in multiple forms of validation of the SM-Map. I validated the SM-Map first through collaboration and conversation with health and wellness professionals. In speaking with counselors, counselor educators, and medical professionals, I confirmed and refined many of the states of mind within the SM-Map. Through my own educational work, clinical work, and ongoing research of neurobiological affective processes, I similarly validated the states of mind by comparing them to the lived experiences of students, supervisees, clients, and aspects within the literature. Initial validation allowed me to systematically determine core themes that captured the phenomenon of emotion regulation and integration, and to feel comfortable in my assertions that the SM-Map may hold potential as an alternative diagnostic framework for understanding clinical symptoms. Qualitative validation led me to seek out methods for validating the SM-Map quantitatively. In order to validate the SM-Map in such a manner, I needed to create a quantifiable measure for the identified construct for scale development: states of mind.

I utilized Moustakas' (1990) phases of immersion, incubation, illumination, explication, creative synthesis, and validation to determine that states of mind would be the construct of interest for measuring polyvagal emotion regulation. Once I determined that states of mind would be the construct to measure, I followed DeVellis' (2017) recommendation for scale development and began generating an item pool.

## Generate an Item Pool

DeVellis (2017) recommended that the items in a scale must reflect the scale's purpose. The purpose of the SMQ is to measure states of mind correlated with affective system expression via autonomic states. To generate items for the SMQ, I created items that described thoughts, feelings, and behaviors typically associated with regulated, mobilized, and immobilized autonomic states and applied this knowledge to the thoughts, feelings, and behaviors typically associated with the varied expression of the affective systems (Watson & Spurgeon, 2009). For each of the seven affective systems, there were six states of mind: 1) a state of mind associated with the affective system in an autonomic state of social engagement; 2) a state of mind associated with the affective system in an autonomic state of play; 3) a state of mind associated with the affective system in an autonomic state of mobilized FEAR; 4) a state of mind associated with the affective system in an autonomic state of mobilized RAGE; 5) a state of mind associated with the affective system in an autonomic state of immobilization without FEAR; and 6) a state of mind associated with the affective system in an autonomic state of immobilization due to perceived life threat (i.e., with FEAR). I categorized the states of mind according to their type of expression. For example, the affective system of PANIC is characterized by the following states of mind: 1) outward expression (autonomic state of social engagement; SMQ item: *I'm able to talk about this situation easily*); 2) inward reflection (autonomic state of play; SMQ item: *I think about this situation sometimes and this reflection is useful to me*); 3) reaction formation (autonomic state of mobilization with FEAR; SMQ item: *I tend to alter my response to the situation according to what I believe will be most accepted by others around me*); 4) perseveration (autonomic state of mobilization with RAGE; SMQ item: *I think about this situation all the time; I find it difficult to stop*); 5) inhibition (autonomic state of immobilization

with FEAR; SMQ item: *It's difficult for me to express any feelings toward others about this situation*); and 6) absent-mindedness (immobilization without FEAR; SMQ item: *I often lose sight of the situation or may forget the situation is happening*). Once I created the initial item pool, I determined which format to use for measurement.

### **Determine the Format for Measurement**

The SMQ items were integrated into a Likert scale response format. For each of the seven affective systems, there were six associated states of mind, each one associated with a different autonomic expression. Each state of mind was represented by a statement within the questionnaire. To complete the SMQ, respondents identify a situation to reference in response to each item. Then, for each item, they respond by marking either *strongly agree*, *agree*, *neutral*, *disagree*, or *strongly disagree*. Their responses to each item indicate the presence of the state of mind in their coping strategies to resolve the situation.

SMQ items are scored by reviewing whether there is an indication of the state of mind being used to manage the identified situation. Responses of *strongly agree* and *agree* indicate that the state of mind is likely being utilized. Responses of *neutral*, *disagree*, and *strongly disagree* indicate that the state of mind is likely not being utilized.

In counseling, the results from the SMQ can be plotted on the SM-Map (see Appendix F) to reveal which affective systems may be regulated or dysregulated. Counselors and clients can then discuss the results in relation to the identified situation. Counselors can use the SM-Map map to target therapeutic interventions to help clients use fewer dysregulated states of mind and more regulated states of mind to address the identified situation. Researchers in IPNB have proposed that shifting into regulated states of mind is likely to lead to ANS regulation, reduce

clinical symptoms, and encourage integration of mind, body, and relationships (Levine, 2010; Montgomery, 2013; Schore, 2012).

### **Have Initial Item Pool Reviewed by Experts**

Following initial development of the SMQ items, I utilized expert review to evaluate the items as DeVellis (2017) suggested. The experts were two counselors who were trained in psychodynamic approaches to counseling. The first expert was trained in psychodynamic and dialectic behavioral approaches related to ANS regulation. The second expert has worked in the counseling field for over 30 years and routinely integrates neurobiology research into counseling work. I compiled a table to elicit feedback from the expert counselors (see Appendix G). Within a table, each state of mind was defined and paired with an item. There was also a column for commentary. I delivered this table, along with the SMQ instructions, to the two expert counselors. These reviewers provided feedback on each item. I reviewed their feedback and made item revisions for the SMQ accordingly (see Appendix H). All of the items were retained, but reviewer feedback included revisions for 14 of 42 states of mind.

### **Consider Inclusion of Validation Items**

As stated in Chapter Two, the SMQ is a measure of states of mind. To evaluate the validity of the SMQ, I selected the Symptom Assessment – 45 (SA-45; Maruish, 2004; see Appendix E) for comparison. I selected the SA-45 because it has high quality psychometric properties and because the subscales allowed for easily identifiable categories of symptoms. Furthermore, it is a self-report instrument that can be administered by counselors without extensive training, so the applicability of the SA-45 aligned with that of the SMQ, providing an effective comparison measure. The subscales allowed me to explore how individual states of mind related to specific symptom clusters and the global severity index (GSI) within the SA-45

provided a total score that provided a quantifiable measure of symptoms. Specifically, I compared the GSI scores in the SA-45 to the number of regulated and dysregulated states of mind indicated as present within the SMQ. I also explored which states of mind predicted five of the subscales within the SA-45: anxiety, depression, obsessive-compulsive, hostility, and interpersonal sensitivity.

### **Administer Items to a Development Sample**

**Participants.** I collected data from 300 individual adults by employing Qualtrics, Inc. Qualtrics is a web-based survey company that provides software and project management support to conduct survey research, evaluations, and other data collection activities. I used the Qualtrics software to create the survey for this study and employed a Qualtrics project manager to recruit participants from various sources, including targeted email lists, website intercept recruitment, member referrals, customer loyalty programs, permission-based networks, and social media. The participants were over the age of 18, reported proficiency in reading English, and attested to feeling comfortable using computer-based questionnaires. The sample was stratified per United States Census Data on age, gender, and race to create a sample representative of the United States population.

Individuals over the age of 18 were included to ensure all participants could legally agree to informed consent. Individuals who reported proficiency in reading English were included to ensure adequate understanding of the items presented in the survey, which was written in English. Individuals who attested to feeling comfortable using computer-based questionnaires were included to control for differences in using the online modality for taking the survey. These inclusion criteria were designed to control for threats to internal validity. Verification of participants' dates of birth were validated via third-party verification measures. Proficiency in

English and comfort-level of using computer-based questionnaires were verified through items within a demographic questionnaire. Completed surveys were verified by a project manager at Qualtrics, Inc. to have met the stratification requirement, and any surveys that did not meet the inclusion criteria were excluded from the study.

**Sampling procedure.** Individuals in the study were incentivized to participate by Qualtrics, Inc. The form of incentive varied between participants; however, each participant was made aware of the individualized incentive prior to consenting to participate in the study. Some examples of incentives included, but were not limited to, SkyMiles, points toward retail outlet discounts, cash, and gift cards. Participants were invited via email or prompted on the survey platform to participate in the study. Participants were provided a hyperlink that described the incentive offered and then they were navigated to the survey.

**Measurement of constructs.** The following measures were implemented for this study based on their relevance to the subject of emotion regulation, measures of symptomatology, validity and reliability of the scores, and fit for administration via online software.

**Demographic questionnaire.** I gathered personal information from participants using an anonymous demographic questionnaire (see Appendix C). The questionnaire items elicited responses regarding age, gender identity, and racial identity from participants. These demographics were identified to confirm that the sample was stratified based on age, gender, and race, and to also adequately describe the sample. I also inquired about proficiency of reading English and comfort-level regarding computer-based questionnaires. These items were utilized because of their potential influence on factors related to internal validity as mentioned previously.

***State of Mind Questionnaire.*** The *State of Mind Questionnaire* (SMQ; see Appendix D) is a 42-item self-report measure of states of mind. Each state of mind is linked with one of the six autonomic expressions of each of the seven affective systems (Panksepp & Biven, 2012; Panksepp, 2016; Porges, 2011). Each statement represents thoughts, feelings, and behaviors related to each state of mind. For each item, participants were asked to indicate if they strongly agreed, agreed, were neutral, disagreed, or strongly disagreed with how the item described their approach to resolving a situation they identified as stressful and significant. When participants strongly agreed or agreed with the items, they indicated the presence of the state of mind in their coping strategy. When participants reported they were neutral, disagreed, or strongly disagreed, they indicated the absence of the state of mind in their coping strategy. It is important to note that the category of *neutral* was included in the questionnaire to accommodate how affective systems are expressed via autonomic states. Each affective system can be expressed in six ways, so it is possible a singular affective state may only be expressed via one or two autonomic states. Consequently, many states of mind will not be utilized together in managing a situation because the system is being expressed through alternative autonomic states. It was therefore necessary to include an option of *neutral* to account for this quality of affective system expression. For scoring purposes, it is more prudent to characterize a *neutral* response as indicative that the client is not using the state of mind, rather than to erroneously assume that a state of mind is present when it is not. However, in a clinical setting, it may be practical for counselors to explore such responses qualitatively so as to gain more clarity about why the client categorized the presence of the state of mind as neutral. This may lead to further discussion about the client's relationship with the identified state of mind and consequently may inform how the counselor advises the client to shift behaviors to utilize more regulated states of mind to manage situations. The results

of the SMQ then can be plotted using the State of Mind Map (SM-Map; see Appendix F). The Map can be used in counseling to help client shift toward using more regulated states of mind to target the underlying affective systems and promote autonomic states that are correlated with health and wellness.

***Symptom Assessment-45 Questionnaire.*** The *Symptom Assessment-45 Questionnaire* (SA-45; Maruish, 2004; see Appendix E) is a 45-item self-report questionnaire designed to measure nine domains of psychological symptoms. It can be administered via paper-and-pencil or as a computer-based assessment. Results of the SA-45 provide scores for nine clusters of symptoms: anxiety, depression, hostility, interpersonal sensitivity, obsessive-compulsive, paranoid ideation, phobic anxiety, psychoticism, and somatization. Two global scales, the Global Severity Index (GSI) and the Positive Symptom Total (PST) are also provided. Lower scores indicate fewer symptoms on each scale, while higher scores indicate more symptoms. Test-retest reliability was reported for the subscale, with scores ranging from .49 to .84 ( $Md = .79$ ; GSI = .84) for adults. Anxiety (.49) and Somatization (.63) had the lowest test-retest reliability of all the subscales. Internal consistency scores of the nine subscales ranged from .74 to .87 ( $Md = .81$ ) and .73 to .91 ( $Md = .86$ ) for adult non-patient and inpatient samples respectively.

***Procedure.*** I obtained Institutional Review Board approval (see Appendix A) from a South Texas university prior to conducting this study. Once approval was given, I compiled the demographic questionnaire, SMQ, and SA-45 into a single survey on the Qualtrics software platform. I employed a Qualtrics project manager to recruit a sample of 300 individual adults that was stratified on age, gender, and race per United States Census Data. The project manager emailed each potential participant a hyperlink as part of an invitation to participate in the online



survey. In this email, participants were also told which incentive they would receive as a result of participating in the study.

Potential participants who clicked on the link were directed to the first page of the survey, which included an information page about the nature of the study (see Appendix B). This page included an invitation to participate in the study, informed consent details, a description of the purpose of the study, potential benefits and risks of participating in the study, and a description of how the results would be used. Because no identifying information was necessary for this study, participants were not required to sign a consent form. However, the information page stated that by clicking to the next page, they consented to participate in the study. Following the informed consent, participants viewed counseling resources that participants could utilize in the event they experienced emotional distress during the survey. They then completed a brief demographic questionnaire, the SMQ, and SA-45. Once the participants completed the survey, they were again directed to a page that provided counseling resources to utilize in the event they had experienced emotional distress while taking the survey. The survey concluded by thanking the participant for engaging in the study.

**Data Analysis.** This section describes how the data was analyzed, including a discussion of power analysis, preliminary analysis, and primary analysis.

***Statistical power analysis.*** Prior to finalizing the required sample for the study, I determined the sample size needed to establish a moderate effect size. Researchers differ in their recommendations for number of subjects in instrument development. Comrey (as cited in DeVellis, 2017) categorized samples of 100 as poor, 200 as fair, 300 as good, 500 as very good, and 1,000 as excellent, while Tinsley and Tinsley (as cited in DeVellis, 2017) suggested a more specific recommendation of 5 to 10 participants per item. In totaling the number of variables for

the study, I included the 42 items from the SMQ. This resulted in a total of 42 variables. Using this total, I determined that a sample of 300 people would result in a sufficiently powered study.

***Preliminary analysis.*** The Qualtrics project manager performed initial data screening for the data to ensure that all surveys were validly completed and that they met stratification requirements. By employing a speed timing test and initial completion screenings, the project manager ensured that there were no missing data and that each survey was completed in reasonable relation to the estimated time. This screening eliminated the need to replace any missing values. Following this initial screening, I also checked the surveys to ensure they have been completed validly and that there were no missing data.

***Primary analysis.*** The primary analyses for this study included correlational analyses to explore the interrelatedness of regulated and dysregulated states of mind within the SMQ for clinical symptoms within GSI scores from the SA-45.

***Research question 1: Correlational analyses.*** I performed the primary correlational analysis for this study using Statistical Package for the Social Sciences (SPSS) 25 software. First, I created a new variable that transformed the Likert scale results for each state of mind into dichotomous categorical variables to indicate whether the state of mind was present (i.e., responses of strongly agree and agree) or absent (i.e., responses of neutral, disagree, and strongly disagree). I then created a variable which represented the computed totals for the number of regulated states of mind and dysregulated states of mind that were indicated within the SMQ for each participant (see Appendix I). I also created a variable which represented the computed totals for the number of dysregulated states of mind that were indicated within the SMQ for each participant. I then ran two separate correlations to compare the number of regulated states of

mind to GSI scores from the SA-45 and the number of dysregulated states of mind to GSI scores from the SA-45.

*Research question 2: Multiple regression analysis.* Since this study was exploratory in nature, I first explored correlations between all states of mind and each of the identified subscales within the SA-45 (i.e., anxiety, depression, obsessive-compulsive, hostility, and interpersonal sensitivity). A common benchmark for loading factors in factor analysis is to load those with statistically significant ( $p < .05$ ) correlations over .30 (Field, 2013). I followed this guideline. This resulted in six states of mind loaded into the model for anxiety (self-shaming, doubt, avoidance, perseveration, devaluation, and panic); thirteen for depression (self-deprivation, self-shaming, pleasure-seeking, inhibition, doubt, avoidance, perseveration, devaluation, tactlessness, indirect support-seeking, idealization, panic, and helplessness); seven for obsessive-compulsive (self-shaming, doubt, avoidance, perseveration, idealization, panic, and helplessness); three for hostility (doubt, devaluation, and helplessness); and nine for interpersonal sensitivity (self-shaming, pleasure-seeking, doubt, avoidance, perseveration, devaluation, idealization, panic, and helplessness). I then ran a stepwise multiple regression analysis to predict subscales from the SA-45 from the combinations of states of mind from the SMQ.

### **Limitations and Delimitations**

There were several limitations and delimitations to the study. One limitation to the study was the potential fatigue caused by the number of questions each participant needed to complete. Including the demographic questionnaire, the SMQ and SA-45 presented each participant with 92 response items. Fatigue may have affected how the participants completed the survey, and this may have posed a threat to internal validity. There was one control in place to manage this

limitation. A speed timing test was employed to evaluate the validity of the participants' responses, and the minimum time for completion was set to eight minutes. This time cut-off was based on data during the soft launch phase of the study. If participants clicked through the survey under eight minutes, the results from their survey were not included in the final sample. This controlled for the validity of the responses, and also eliminated questionnaires that may have been clicked through quickly due to fatigue.

Second, the online administration of the measures made it challenging to control for extraneous variables. Given that the participants did not complete the measures in-person, it was difficult to determine if external factors impacted completion of the survey (e.g., noise, interruptions, influence from others). Other extraneous variables may have included the participants' emotional state when completing the measures, which could have affected the results. The inability to control or account for such variables may have limited the internal validity of the study.

### **Delimitations**

Delimitations are any component of a research study that the researcher has chosen to implement, regardless of any limiting factors they may present (Creswell, 2014). One delimitation of this study was in regard to the formatting of the SMQ and SA-45. Both are self-report measures. As with all self-report measures, factors of social desirability and pressure to conform may produce skewed results in this study. Although I performed other validity checks, there were no controls for social desirability in this study. Despite the issue of social desirability, I used self-report formatting. I did so due to the SMQ's utility in facilitating self-awareness and insight for clients. By having the SMQ be a self-report measure, I hope to make it a tool for

clients to be able to evaluate their regulatory and integrative elements on their own, as well as with their counselors.

Another delimitation of this study was the choice to administer the survey via online software. Although this approach presented the limitations discussed previously, it allowed me to deliver the survey to a larger sample than would have otherwise been possible. Administering the measures online also allowed me to stratify the sample according to U.S. Census Data, thereby making the initial research on the SMQ more valid across different demographics.

Finally, a third delimitation of this study was that the sample was not intentionally stratified to include individuals who have been diagnosed with clinical mental health symptoms. This may have interfered with the effectiveness in exploring how effective the overall results in the SMQ would be in determining whether someone met diagnostic criteria within the current diagnostic paradigm. However, I chose not to seek out a clinical population for two reasons. First, obtaining a sample with clinical symptoms would have necessitated accessing a more vulnerable population, which could have influenced the number of participants readily available for an online survey. Second, since the SMQ contains regulated states of mind, it is effective in measuring not only clinical symptoms, but also states associated with wellbeing. It is quite possible that the SMQ will capture evidence of dysregulation within people who would otherwise go undiagnosed. It is possible that the SMQ will be a more nuanced, specific measure that can identify aspects of regulated and dysregulated mechanisms that are currently omitted from the diagnostic manual due to the fact that such mechanisms do not meeting the current clinical threshold. Narrowing the sample to only participants with clinical symptoms would not have effectively validated this dimension of the SMQ.

### **Section Summary**

In this section, I have discussed the development of the SMQ, including the clinical work, heuristic inquiry, and scholarly research upon which it was built. Feedback from experts allowed me to revise items in the SMQ, resulting in the final questionnaire that was utilized in this study. I then used correlational and multiple regression analyses to explore how the results from the SMQ compared to results from the SA-45 to produce evidence for validating the SMQ.

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### **Preface to the Summary Manuscript**

This study was designed to evaluate the relationship between states of mind in the *State of Mind Questionnaire* (SMQ) and clinical symptoms as measured by the *Symptom Assessment – 45 Questionnaire* (SA-45; Maruish, 2004). The follow summary manuscript includes an overview of the study, a review of relevant literature, and results from correlational and multiple regression analyses. The manuscript concludes with a discussion of the results and suggestions for future research. The title of completed dissertation was changed to reflect the diagnostic potential of the SMQ.

In identifying a journal for article submission, I reviewed academic journals within counseling that focused on both neurocounseling, assessment, and clinical applications given the emphasis of the SMQ on these aspects of counseling. I sought a journal that had previously published articles related to the budding field of neurocounseling and the development of new assessments for counselors and counselor educators, while also holding a target audience of practitioners, educators, and researchers. I chose the *Journal of Counseling and Development* (JCD) as my target journal. As the flagship journal for the counseling profession, JCD emphasizes contemporary articles that are applicable and relevant to today's counseling community. Given the cutting-edge nature of neurobiological research behind the SMQ, the stratified United States sample used in my study, and components of my manuscript that applied the SMQ to counseling, my manuscript aligned well with the JCD mission: to “inform counseling practice with diverse client populations in a variety of settings as represented by the membership of the American Counseling Association (ACA)” (ACA, 2012).

## **SECTION IV: SUMMARY MANUSCRIPT**

Validation of the State of Mind Questionnaire (SMQ):

A Polyvagal Paradigm for Diagnosis

## Abstract

The *State of Mind Questionnaire* (SMQ) assesses symptoms using polyvagal theory and affective systems research. This study explored construct validity of the SMQ using the *Symptom Assessment – 45* (SA-45; Maruish, 2004). Participants who indicated more regulated states of mind, also reported fewer symptoms. Furthermore, several predictors were identified for SA-45 subscales. Results suggest it may be helpful for counselors to encourage clients to utilize regulated states of mind to reduce clinical symptoms.

Key words: neurocounseling; polyvagal theory; assessment; interpersonal neurobiology; affective neuroscience



## Validation of the State of Mind Questionnaire (SMQ):

### A Polyvagal Paradigm for Diagnosis

Counselors and counselor educators focus on thoughts, feelings, and behaviors, all of which represent mechanisms of the mind. Siegel (2012) proposed a definition of the mind as a “regulatory function that is an emergent, self-organizing process of the extended nervous system and relationships” (p. AI-51). From this viewpoint, the mind is no longer considered to be separate from the body, but instead an “embodied and relational process that regulates the flow of energy and information” (Siegel, 2012, p. AI -51). Recognizing this shift in perspective, scholars have introduced terminology reflecting the inherent connection between mind and body, including *MindBrain* from Panksepp and Biven (2012), and *Bodymind* from Chopra and Tanzi (2018). With this shifting paradigm, it seems imperative for counselors to recognize that interventions targeted at the mind simultaneously impact underlying neurological processes in the body.

The integration of mind and body is a common practice in neurocounseling. Russell-Chapin (2016) defined neurocounseling as “the integration of neuroscience into the practice of counseling, by teaching and illustrating the physiological underpinnings of many of our mental health concerns” (p. 93). Some neurocounselors incorporate biological measures into clinical practice, such as heart rate monitoring, galvanized skin response (GSR), and neurofeedback (Chapin, 2017; Russell-Chapin, 2017). These physiological indicators help to more specifically target thoughts, behaviors, relational issues, and brain waves that correlate with physiological dysregulation. In doing so, counselors are able to help their clients more intentionally alter behaviors to influence the regulatory systems connected to their symptoms. Perhaps most commonly, neurocounselors integrate findings from neuroscience research into practice. In this

way, neurocounselors have joined medical and neuroscience scholars in researching the mind/body connection.

Still, there remains a gap between how counselors diagnose and conceptualize client problems and the research on the underlying neurological processes involved in wellness and disorder. The current diagnostic paradigm embedded within the fifth edition of the American Psychiatric Association *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-5*; 2013) emphasized the categorization of symptom clusters. Yet, members of the *DSM-5* task force acknowledged that the *DSM-5* criteria are simply descriptions of the expression of mental disorders and admitted that during the development of the *DSM-5* “a complete description of the underlying pathological processes [was] not possible for most mental disorders” (APA, 2013, p. xli). One of the problems with this paradigm is that “mental disorders do not always fit completely within the boundaries of a single disorder. Some symptom domains, such as depression and anxiety, involve multiple diagnostic categories” (APA, 2013, p. xli). This predicament indicates there may be a need for a model that better connects mental health symptoms with correlated underlying neurological mechanisms to produce a more accurate diagnostic framework.

Researchers within the field of Interpersonal Neurobiology (IPNB) have called for new frameworks of diagnosis based on processes rather than categorizations (Panksepp, 2016; Porges, 2011, 2017). A central practice within IPNB is to examine the ways in which the brain and relationships influence mental and physical life ranging from the interpersonal (i.e., family, culture, society) to the neurobiological (i.e., electrochemical processes within the brain and body proper), and scholars have recognized that current diagnostic practices do not necessarily align with research in this field. Porges (2017) emphasized that while counselors focus on

categorization, “[s]cientists are less interested in the labels associated with clinical diagnoses and more interested in the underlying processes” (p. 74). A more accurate diagnostic framework “would need to address the emotional systems involved and the ways that their over- and underarousal contribute to the clinical symptoms” (Panksepp & Biven, 2012, p. 191). Utilizing emotion-focused research from these scholars within IPNB may prove effective in constructing new mind/body diagnostic frameworks that recognize the integrative process of mind, body, and relationships.

### **Emotion as an Integrative Process**

Emotion is a non-linear, continual process which influences and responds to changes within states of integration at the level of the mind, brain (i.e., the nervous system which extends throughout the entire body), and relationships (Siegel, 2015). Even when limited to the field of IPNB, research on emotion is vast. For this study, I reviewed the literature on emotion within IPNB to develop a conceptualization of emotion that could be useful to counselors and counselor educators to employ in diagnostic practices. The review revealed a nine-phase process of emotion that spans mind, body, and relationships: (a) initial orientation to stimulus, (b) primary appraisal, (c) affective system activation, (d) elaborative appraisal, (e) arousal, (f) interpersonal integration, (g) vertical integration, (h) bilateral integration, and (i) expression (Ammaniti & Gallese, 2014; Iacoboni, 2008; Levine, 2010; Montgomery, 2013; Panksepp & Biven, 2012; Porges, 2011; Porges, 2017; Schore, 2012; Siegel, 2012; Siegel, 2015). Although described linearly here, it is important to recognize that emotion is a simultaneous, never-ending process and separation between the phases is purely conceptual for applying the research to practice.

Within this framework, the process of emotion occurs when the nervous system initially orients to stimuli that mark changes in the internal and external environment (Siegel, 2015). The

situation is immediately appraised by the nervous system and an affective system is recruited to produce a motivation to act to manage the stimuli. Panksepp (2016) suggested there are seven affective systems: CARE, FEAR, LUST, PANIC, PLAY, RAGE, and SEEKING. (Note: The capitalization of the affective systems is used to differentiate these systems from other terms associated with emotion). The motivational impulses that evolve from these affective systems are designed to ensure survival. Through elaborative appraisal-arousal, the autonomic nervous system (ANS) determines the level of threat presented by the stimulus as safe, dangerous, or life threatening (Porges, 2011, 2017). A corresponding level of arousal follows to produce an autonomic state: social engagement, mobilization, or immobilization, respectively.

The vagus nerve, the tenth cranial nerve, mediates two branches of the nervous system to produce autonomic states that facilitate responses to changes in the internal and external environment, resulting in either social engagement, mobilization, or immobilization (Porges, 2011, 2017). The social engagement system enables the nervous system to enter a receptive, open state in which states of arousal and restoration are primarily regulated via social interactions (Wagner, 2016). The sympathetic nervous system is employed to mobilize fight, flight, or freeze responses, and the unmyelinated vagal circuit stimulates immobilized, dissociative responses to overwhelming stimuli. Porges (2011) suggested that each of the seven affective systems could be expressed differently through varied autonomic states: a) the affective system expressed via an autonomic state of social engagement; b) the affective system expressed via an autonomic state of play; c) the affective system expressed via an autonomic state of mobilized FEAR; d) the affective system expressed via an autonomic state of mobilized RAGE; e) the affective system expressed via an autonomic state of immobilization without FEAR; and f) the affective system expressed via an autonomic state of immobilization due to perceived life

threat (i.e., with FEAR; Porges, 2011; Author, 2018). The interpersonal environment is important, and the presence of a trusted other can encourage social engagement, whereas the absence of effective social support may necessitate a mobilized or immobilized response. The autonomic state influences how the motivational impulses from the affective system are vertically and bilaterally integrated into consciousness, and ultimately influences how the impulses are expressed as states of mind (Schoore, 2012; Siegel, 2015). States of mind are ways “in which mental processes, such as emotions, thought patterns, memories, and behavioral planning, are brought together into a functional and cohesive whole” (Siegel, 2012, AI-77), and in this model, they may serve as observable representations of the autonomic state. For mind, body, and relationship to integrate, it is critical for the motivation of the affective system to match the expression of it through states of mind. For example, the RAGE system could be effectively expressed as anger. However, distortions can also occur due to mobilized or immobilized autonomic states. Dysregulated states can distort the expression of the affect, influencing the state of mind which is expressed. Such a response can create clinical symptoms (Schoore, 2012; Siegel, 2015). Currently, there are several frameworks acknowledging and influencing the connection between observable states in the form of psychological defenses and underlying regulatory mechanisms.

### **Frameworks Connecting Regulatory Systems to Practice**

Hoffman, Rice, and Prout (2015) developed Regulation-Focused Dynamic Psychotherapy for Children (RFP-C), which is used to manage externalizing disorders, such as oppositional defiant disorder (ODD) and disruptive mood dysregulation disorder (DMDD), linked to emotion regulation mechanisms. This framework is limited to use with children, does not include a framework for evaluation, and is limited to application by counselors who identify with

psychodynamic theory. Andrews, Singh, and Bond (1993) introduced the 40-item Defense Style Questionnaire (DSQ – 40), a self-report measure of defense mechanisms. This model includes an evaluation and measures expressions likened to states of mind, but it is not linked to research on autonomic states. This limits a counselor's ability to use the DSQ to link symptoms to neurological mechanisms. Finally, Montgomery (2013) connected the polyvagal theory to psychological defenses, effectively combining research on autonomic states and their expression. However, this framework neglects to include research on the seven affective systems which cause expressions to vary thematically based on motivational impulses from neurological processes. Additionally, this model uses *psychological defenses* as the construct for expression, which likely limits the applicability of the model for counselors who do not utilize psychodynamic theory in practice. As a result, there remains a need for a measure that bridges the gap between observable states which are correlated to affective systems (Panksepp & Biven, 2012; Panksepp, 2016) and varied states of arousal as conceptualized in the polyvagal theory (Porges, 2011, 2017).

### **Purpose of the Study**

The purpose of this study was to validate the *State of Mind Questionnaire* (SMQ), a 42-item self-report measure of states of mind that are thematically connected to theorized varied autonomic expressions of neurological affective systems (Montgomery, 2013; Panksepp, 2016; Porges, 2011, Siegel, 2015). The SMQ is intended to be a diagnostic tool. However, it was built upon an alternative paradigm for diagnosis that assumes that symptoms result from ever-changing reactions from the autonomic nervous system (ANS) to respond to internal and external environmental changes. Within the SMQ model, wellness is marked by regulated autonomic states, and symptoms are representative of overactive and underactive states with the ANS. The

SMQ was built upon one of the primary principles within IPNB, integration: “the linkage of differentiated parts” within and between individuals (Siegel, 2012, p. AI-40). Integration is both a process and structural feature within the nervous system and between individual people, and is encompassed by emotion (Siegel, 2015). As a person utilizes a regulated state of mind, they align the motivational impulse of the affective system with the expression of it, effectively regulating the process of emotion across systems of the mind, body, and relationships. As a person utilizes a dysregulated state of mind, the energy and information from the motivational impulse of the affective system becomes distorted as the ANS engages mobilized and immobilized states of arousal. Systems of the mind, body, and relationship become disconnected, and clinical symptoms may emerge. The SMQ was developed using these assumptions following several years of heuristic research.

### **Scale Development**

Scale development must be grounded in theory to determine constructs for measurement (DeVellis, 2017). The review of the process of emotion within the field of IPNB revealed the theoretical foundation for this study. To identify an accurate construct for measurement, I moved through phases of heuristic inquiry proposed by Moustakas (1990): initial engagement, immersion, incubation, illumination, explication, creative synthesis, and validation.

During initial engagement, I began to define the phases of emotion. By immersing myself in the process over several years as a counselor, counselor educator, and administrator, I explored how the literature on emotion within IPNB was applicable in the counseling room, classroom, and within curriculum development. Spending time with the data during an incubation period allowed me to enter the phase of illumination with the recognition that for individual to maintain wellness, the expression of emotion must be congruent with the instinctual

motivations cultivated by affective systems. Through teaching, I explicated the process linearly. My work culminated in the creation of the *State of Mind Map* (SM-Map), a chart that includes 42 states of mind as they are theoretically correlated with the expression of seven affective systems (Panksepp & Biven, 2012; Panksepp, 2016) via six autonomic states (Author, 2018; Porges, 2011). In the final phase, validation, I gathered adequate qualitative evidence to support the use of the SM-Map in counseling and counselor education. To produce quantitative evidence for the validation of the theoretical framework, I chose states of mind as the construct of interest and developed the *State of Mind Questionnaire* (SMQ) using the guidelines proposed by DeVellis (2017).

I followed contemporary guidelines for scale development in creating the SMQ. According to DeVellis (2017), the suggested seven steps for instrument development include: (1) determining what is to be measured; (2) generating an initial item pool; (3) determining the format for measurement; (4) having the items reviewed by experts; (5) considering inclusion of validation items; (6) evaluating items; and (7) optimizing scale length. Since the SMQ delivers categorical results which cannot be evaluated through exploratory factor analysis, the latter two steps were not applicable to this study.

First, I developed an initial pool of items by creating 42 statements to represent thoughts, feelings, and behaviors describing each of the 42 states of mind within the SM-Map. For example, within the proposed theoretical framework of the SM-Map, the affective system of PANIC has six manifestations: a) outward expression (PANIC via social engagement; *I'm able to talk about this situation easily*); b) inward reflection (PANIC via play; *I think about this situation sometimes and this reflection is useful to me*); c) reaction formation (PANIC mobilized with FEAR; *I tend to alter my response to the situation according to what I believe will be most*



*accepted by others around me*); d) perseveration (PANIC mobilized with RAGE; *I think about this situation all the time; I find it difficult to stop*); e) inhibition (PANIC immobilized with FEAR; *It's difficult for me to express any feelings toward others about this situation*); and f) absent-mindedness (PANIC immobilized without FEAR; *I often lose sight of the situation or may forget the situation is happening*). Once I created the initial item pool, I chose to use a Likert scale response format requiring participants to indicate their level of agreement with each statement as it applied to a significant situation connected to their symptoms (i.e., *strongly agree, agree, neutral, disagree, or strongly disagree*). Two experts trained within counseling, emotion regulation, and psychodynamic theory reviewed the items. I integrated their feedback into a revised version of the SMQ by altering the wording for one definition of the states of mind and changing 14 of the 42 items to align with suggested revisions. I then designed this study to administer the items to a sample to quantitatively validate the SMQ by comparing its results to clinical symptoms as measured by the Symptom Assessment – 45 (SA-45; Maruish, 2004). This instrumented is easily applied to clinical practice and can be administered by counselors without extensive experience in assessment. I selected this instrument because it provided a total score for overall symptoms in the global severity index (GSI) which could easily be compared to the number of regulated and dysregulated states of mind in the SMQ. Furthermore, my hope in developing the SMQ was that states of mind would become nuanced specifiers that highlighted both overactive and underactive elements for diagnostic categories, and the subscales within the SA-45 provided scores for such categories so I could examine how states of mind within the SMQ correlated with specific symptom clusters.

## Method

There were two research questions for this study: 1) To what extent is the number of regulated and dysregulated states of mind scores on the SMQ related to the global severity index (GSI) scores for the SA-45? Regulated states of mind included those with autonomic expressions of social engagement and play. Dysregulated states of mind included those with autonomic expressions of mobilized with FEAR, mobilized with RAGE, immobilized with FEAR, and immobilized without FEAR. 2) Which of the individual states of mind in the SMQ predict clinical symptoms as measured by the subscales in the SA-45?

### Participants

Three hundred adults participated in this study and demographics were stratified per United States Census data. Participant age ranged from 18 to 82 with seven categories: 18-20 ( $n = 10$ ), 21-29 ( $n = 49$ ), 30-39 ( $n = 55$ ), 40-49 ( $n = 50$ ), 50-59 ( $n = 56$ ), 60-69 ( $n = 50$ ), 70-79 ( $n = 27$ ), and 80+ ( $n = 3$ ). The mean age was 46.75 ( $SD = 16.71$ ). The sample included 158 females, 140 males, one transgender male, and one participant who identified as ‘other.’ Participants identified as American Indian ( $n = 2$ ), Asian-American/Oriental/Pacific Islander ( $n = 13$ ), Asian East Indian ( $n = 3$ ), Biracial ( $n = 4$ ), Black/African American ( $n = 39$ ), Mexican American/Chicano/Chicana ( $n = 31$ ), Puerto Rican ( $n = 7$ ), Other Hispanic ( $n = 15$ ), White/Caucasian ( $n = 183$ ), and Other ( $n = 3$ ).

### Instruments

The following measures were included in this study and integrated into a survey that was administered to participants. The instruments were selected based on their relevance to emotion regulation, symptom measurement, and fit for online administration.

**Demographic questionnaire.** Participants responded to a demographic questionnaire which included questions about age, gender identity, and racial identity. Participants were asked to confirm proficiency in reading English and completing computer-based questionnaires. The latter questions were designed to minimize threats to internal validity related to survey format.

**State of Mind Questionnaire.** The *State of Mind Questionnaire* (SMQ; Author, 2018) is a 42-item self-report measure of states of mind. Each state of mind is conceptually linked with one of the six autonomic expressions of seven neurological affective systems. The SMQ is designed to evaluate observable expressions to explore the regulated and dysregulated states of each system. Each item within the questionnaire contains a statement that represents thoughts, feelings, and behaviors associated with each of the states of mind. Clients identify a situation to use in reference to each statement, and then are asked to indicate if they strongly agree, agree, are neutral, disagree, or strongly disagree that the statement describes an aspect of how they are coping with the situation. Results of the SMQ are then mapped out onto the State of Mind Map, which illustrates how the affective systems are being expressed via six autonomic states. Counselors and clients can use the map to conceptualize problems and plan interventions.

**Symptom Assessment – 45 Questionnaire.** The *Symptom Assessment – 45 Questionnaire* (SA-45; Maruish, 2004) is a 45-item self-report questionnaire that evaluates nine subscales of psychological symptoms: anxiety, depression, obsessive-compulsive, hostility, interpersonal sensitivity, paranoid ideation, phobic anxiety, psychoticism, and somatization. Totals from two global scales, the Global Severity Index (GSI) and the Positive Symptom Total (PST), indicate the overall presence of symptoms with higher scores indicating more symptoms. Test-retest reliability for subscales ranged from .49 to .84 ( $Md = .79$ ;  $GSI = .84$ ) for adults.

Internal consistency of the nine subscales ranged from .74 to .87 ( $Md = .81$ ) for adult non-patient samples and .73 to .91 ( $Md = .86$ ) for adult inpatient samples.

## **Procedure**

Participants were invited via email to complete the survey by a Qualtrics, Inc. project manager. Qualtrics, Inc. is a survey software company which incentivizes participants to engage in survey research. Incentives include, but are not limited to, SkyMiles, points toward retail outlet discounts, cash, and gift cards. Participants were provided a link that brought them to the survey where they reviewed the information page and expressed consent, viewed counseling resources available to them in the event they experienced distress, and completed the demographic form, SMQ, and SA-45. Each survey was validated to ensure there were no missing data, and a speed timing test was used to increase the quality of data. The data were then securely downloaded from the Qualtrics Platform and input into SPSS for statistical analysis.

## **Data Analyses**

To respond to the first research question, I ran two correlational analyses: one to compare the number of regulated states of mind to GSI scores, and another to compare the number of dysregulated states of mind to GSI scores. To respond to the second research question, I first correlated all states of mind from the SMQ to each of five subscales within the SA-45: Anxiety, Depression, Obsessive-Compulsive, Hostility, and Interpersonal Sensitivity. The SMQ was not designed to measure paranoia, phobia, psychoticism, or somatization, so these subscales were not included in analyses. I then identified the strength of the correlations between SMQ items and subscales. All SMQ items with Pearson  $r$  correlation coefficients above .30 were loaded into multiple regression analyses for the corresponding SA-45 subscale.

## Results

### Correlational Analyses

In examining correlations between the number of regulated and dysregulated states of mind in the SMQ to GSI scores in the SA-45, results of the correlational analyses indicated that there was a significant negative association between the number of regulated states of mind in the SMQ and GSI scores in the SA-45, ( $r(298) = -.22, p < .001$ ), indicating a small effect size (see Table 1). There was also a significant positive association between the number of dysregulated states of mind in the SMQ and GSI scores in the SA-45, ( $r(298) = .49, p < .001$ ), indicating a large effect size. Results indicated that participants who identified more regulated states of mind experienced fewer symptoms, and those who identified more dysregulated states of mind experienced more symptoms.

### Multiple Regression Analyses

The exploratory nature of this study required me to examine relationships between items in the SMQ and the subscales in the SA-45 prior to putting them into a predictive model. I ran correlational analyses between all the items in the SMQ and the five subscales of interest. Field (2013) suggested a benchmark for loading factors with statistically significant ( $p < .05$ ) correlations over .30 into factor analysis (Field, 2013). I followed this guideline, and items with statically significant ( $p < .05$ ) correlations above .30 were included in the multiple regression analyses to explore the predictive nature of the items for anxiety, depression, obsessive-compulsive, hostility, and interpersonal sensitivity (see Table 2).

**Anxiety.** The first regression analysis estimating the influence of predictor variables on anxiety (ANX) scores in the SA-45 yielded a statistically significant model,  $F(5, 294) = 28.17, p < .001, R^2 = .32$ , indicative of a large effect size. Model predictors accounted for approximately

32% of the change among anxiety scores. Within the model, perseveration ( $\beta = .20, p < .05, 95\%$  CI [.932, 3.133],  $sr^2 = .03$ ); panic ( $\beta = .19, p < .05, 95\%$  CI [.921, 3.295],  $sr^2 = .03$ ); devaluation ( $\beta = .17, p < .05, 95\%$  CI [.816, 3.269],  $sr^2 = .02$ ); self-shaming ( $\beta = .15, p < .05, 95\%$  CI [.449, 2.469],  $sr^2 = .02$ ); and doubt ( $\beta = .15, p < .05, 95\%$  CI [.474, 2.854],  $sr^2 = .02$ ) yielded a robust predictive relationship of anxiety indicative of small effect sizes (see Table 3). This finding accounted for approximately 32% of anxiety and can be attributed to the fact that participants who indicated the presence of perseveration, panic, devaluation, self-shaming, and doubt within the SMQ states experienced higher levels of anxiety.

**Depression.** The second regression analysis estimating the influence of predictor variables on depression (DEP) scores in the SA-45 yielded a statistically significant model,  $F(8, 291) = 38.77, p < .001, R^2 = .52$ , indicative of a large effect size. Model predictors accounted for approximately 52% of the change among depression scores. Within the model, perseveration ( $\beta = .18, p < .05, 95\%$  CI [.942, 3.004],  $sr^2 = .02$ ); pleasure-seeking ( $\beta = -.31, p < .05, 95\%$  CI [-4.234, -2.446],  $sr^2 = .09$ ); self-shaming ( $\beta = .22, p < .05, 95\%$  CI [1.456, 3.327],  $sr^2 = .04$ ); helplessness ( $\beta = .14, p < .05, 95\%$  CI [.830, 3.584],  $sr^2 = .02$ ); tactlessness ( $\beta = .14, p < .05, 95\%$  CI [.646, 2.951],  $sr^2 = .02$ ); avoidance ( $\beta = .13, p < .05, 95\%$  CI [.484, 2.683],  $sr^2 = .01$ ); idealization ( $\beta = .11, p < .05, 95\%$  CI [.198, 2.645],  $sr^2 = .01$ ); and devaluation ( $\beta = .10, p < .05, 95\%$  CI [.104, 2.414],  $sr^2 = .01$ ) yielded a strong predictive relationship of depression indicative of small effect sizes (see Table 4). This finding accounted for approximately 52% of depression and can be attributed to the fact that participants who indicated the presence of perseveration, self-shaming, helplessness, tactlessness, avoidance, idealization, and devaluation experienced higher levels of depression, whereas participants who indicated the presence of pleasure-seeking experienced lower levels of depression.

**Obsessive-Compulsive.** The third regression analysis estimating the influence of predictor variables on obsessive-compulsive (OC) scores in the SA-45 yielded a statistically significant model,  $F(5, 294) = 26.65, p < .001, R^2 = .31$ , indicative of a large effect size. Model predictors accounted for approximately 31% of the change among obsessive-compulsive scores. Within the model, avoidance ( $\beta = .22, p < .05, 95\% \text{ CI } [1.261, 3.696], sr^2 = .04$ ); doubt ( $\beta = .18, p < .05, 95\% \text{ CI } [.902, 3.431], sr^2 = .03$ ); helplessness ( $\beta = .19, p < .05, 95\% \text{ CI } [1.283, 4.191], sr^2 = .03$ ); perseveration ( $\beta = .16, p < .05, 95\% \text{ CI } [.570, 2.836], sr^2 = .02$ ); and self-shaming ( $\beta = .14, p < .05, 95\% \text{ CI } [.410, 2.535], sr^2 = .02$ ) yielded a predictive relationship of obsessive-compulsive scores indicative of small effect sizes (see Table 5). This finding accounted for approximately 31% of obsessive-compulsive and can be attributed to the fact that participants who indicated the presence of avoidance, doubt, helplessness, perseveration, and self-shaming experienced higher levels of obsessive-compulsive symptoms.

**Hostility.** The fourth regression analysis estimating the influence of predictor variables on hostility (HOS) scores in the SA-45 yielded a statistically significant model,  $F(3, 296) = 31.37, p < .001, R^2 = .24$ , indicative of a moderate effect size. Model predictors accounted for approximately 24% of the change among hostility scores. Within the model, devaluation ( $\beta = .25, p < .05, 95\% \text{ CI } [1.461, 3.737], sr^2 = .05$ ); helplessness ( $\beta = .25, p < .05, 95\% \text{ CI } [1.868, 4.504], sr^2 = .06$ ); and doubt ( $\beta = .19, p < .05, 95\% \text{ CI } [.874, 3.059], sr^2 = .03$ ) yielded a predictive relationship of hostility scores indicative of small effect sizes (see Table 6). This finding accounted for approximately 24% of hostility and can be attributed to the fact that participants who indicated the presence of devaluation, helplessness, and doubt experienced higher levels of hostility.

**Interpersonal Sensitivity.** The final regression analysis estimating the influence of predictor variables on interpersonal sensitivity (INT) scores in the SA-45 yielded a statistically significant model,  $F(8, 291) = 26.92, p < .001, R^2 = .43$ , indicative of a large effect size. Model predictors accounted for approximately 43% of the change among interpersonal sensitivity scores. Within the model, perseveration ( $\beta = .12, p < .05, 95\% \text{ CI } [.205, 2.434], sr^2 = .01$ ); pleasure-seeking ( $\beta = -.29, p < .05, 95\% \text{ CI } [-4.016, -2.094], sr^2 = .08$ ); idealization ( $\beta = .20, p < .05, 95\% \text{ CI } [1.254, 3.903], sr^2 = .03$ ); doubt ( $\beta = .15, p < .05, 95\% \text{ CI } [.651, 3.103], sr^2 = .02$ ); devaluation ( $\beta = .12, p < .05, 95\% \text{ CI } [.306, 2.793], sr^2 = .01$ ); avoidance ( $\beta = .12, p < .05, 95\% \text{ CI } [.238, 2.589], sr^2 = .01$ ); helplessness ( $\beta = .13, p < .05, 95\% \text{ CI } [.453, 3.381], sr^2 = .01$ ); and self-shaming ( $\beta = .10, p < .05, 95\% \text{ CI } [.031, 2.060], sr^2 = .01$ ) yielded a predictive relationship of interpersonal sensitivity scores indicative of small effect sizes (see Table 7). This finding accounted for approximately 43% of interpersonal sensitivity and can be attributed to the fact that participants who indicated the presence of perseveration, idealization, doubt, devaluation, avoidance, helplessness, and self-shaming experienced higher levels of interpersonal sensitivity, whereas participants who indicated the presence of pleasure-seeking experienced lower levels of interpersonal sensitivity.

## Discussion

This study has several implications. First, research in diagnosis has primarily focused on building and evolving the current diagnostic paradigm of clustering symptoms disconnected from underlying neurological mechanisms. Although conceptualizing categorical diagnoses based on symptom clusters has promoted advancement in assessment and treatment, this practice does not align with research in IPNB which holds that health and disorder are connected to regulatory processes across mind, body, and relationships (Panksepp, 2016; Porges, 2017; Siegel,



2015). The SMQ was built upon an alternative diagnostic paradigm that connects observable states of mind with regulatory functions in the nervous system, thereby reducing the gap between research and practice. This preliminary study created evidence that the states of mind within the SMQ correlated to symptoms as measured by the SA-45. Participants who reported using more regulated states of mind also reported fewer clinical symptoms, while participants who used more dysregulated states of mind also reported more symptoms. These results directly connect to research on regulation theory and psychological defenses (Montgomery, 2013; Schore, 2012), but provides evidence to support future research in exploring how the affective systems (Panksepp, 2016) influence the expression of autonomic states (Porges, 2011). These results imply that it may be effective for counselors to target states of mind in counseling in case conceptualization and treatment planning, specifically with the intent of supporting clients in using more regulated states of mind and fewer dysregulated states of mind when navigating challenging situations.

Second, the models produced in the multiple regression analyses within this study suggest that clinical symptoms conceptualized as anxiety, depression, obsessive-compulsive, hostility, and interpersonal sensitivity may be dissected to reveal specific underlying states of mind contributing to their presence. All the subscales proved to be combinations of both overactive and underactive states. For example, instead of understanding anxiety as an overactive compensatory cluster of symptoms, results from this study suggest that it can be conceptualized more specifically as a combination of both overactive and underactive mechanisms: self-shaming (immobilized CARE with FEAR); doubt (immobilization without FEAR); avoidance (PLAY immobilized without FEAR), perseveration (PANIC mobilized with RAGE), devaluation (mobilized RAGE), and panic (mobilized FEAR). This may greatly influence treatment

approaches to symptoms since it alters the paradigm. With anxiety for example, instead of simply trying to reduce affective expressions, treatment may prove more effective if it targets both the overactive and underactive elements involved.

Third, as trauma grows increasingly prevalent, counselors need frameworks that address the physiological underpinnings of traumatic stress symptoms (Yesko, 2012, 2015). The SMQ was built upon research on the integrative process of emotion, which inherently includes trauma-informed research. The focus for evaluation on the SMQ narrows counseling to target the nervous system's response to a situation, and highlights mechanisms found in the stress response (Levine, 2010; Scaer, 2014). By applying the SMQ to counseling, counselors and clients automatically operate from a trauma-informed perspective. Rather than focusing on the symptoms that emerge once defensive action has been employed chronically, counselors who utilize the SMQ can focus on the instant neural cascade that emerges as clients respond to situations that throw the nervous system into flux. This cascade influences the difference between an event that is effectively processed by the mind and body and an event that is encoded implicitly as unresolved and traumatic. Adopting a diagnostic paradigm that recognizes the processes involved in trauma could greatly shift counseling practices toward a more trauma-informed perspective.

### **Multicultural Implications**

Finally, the SMQ was built with social justice in mind. Some have argued that the DSM framework has reinforced dominant cultural values by embedding assumptions within the criteria that can be considered classist, heterosexist, sexist, and racist (Eriksen & Kress, 2008; Kutchins & Kirk, 1997; Sutherland et al., 2016). An important aspect of social justice as it applies to diagnosis is for counselors to keep in mind how diagnostic categories are influenced by the

dominant culture. The model used in the SMQ may address this problem. First, the focus for evaluation within the SMQ is on contextual situations and the client's perspective of it. This attitude reflects feminist-informed systemic frameworks, which honor the client's experience of the world and recognize that power dynamics play into how others perceive their response. Second, the SMQ is built on a diagnostic framework that focuses on physiology, rather than the cultural manifestations of symptoms. This practice may be more aligned with research on the physiological similarities in emotion that suggest the brain may have inborn pathways that are similar across cultures (Siegel, 2015). Instead of focusing on symptoms, counselors who use the SMQ narrow counseling interventions to target the physiological mechanisms that produce them. Approaching client problems in such a way may reduce bias and oppression inherent in current diagnostic practices.

### **Limitations and Delimitations**

This study had several noteworthy limitations and delimitations. First, a significant limitation to the study was related to the small sample size. While the sample was stratified per US Census data, it only represented 300 responses, many of which came from white individuals. This limits the generalizability of the results to individuals who are outside the demographics of the study. Furthermore, the sample did not intentionally include individuals diagnosed with mental health disorders, which also limits the generalizability of the results to this population. Finally, this study did not control for social desirability factors, which may have impacted its ability to obtain honest participant responses.

One delimitation for this study included using self-report measures via online software. Although issues of social desirability, accuracy, and honesty are always relevant factors that threaten internal validity for self-report measures, I chose to utilize this format due to the SMQ's

utility in increasing awareness and insight for those who complete it. Additionally, administering the measures online limited the potential to monitor for extraneous variables (e.g., noise, distractions in the testing environment, influence from other people) that may have impacted the study's internal validity. However, administering the survey online allowed me to stratify the sample according to US Census data. This was an important delimitation that allowed me to diversify the sample, so I chose to deliver the survey online regardless of this potential issue.

### **Future Research**

Future research could build upon this study in several ways. First, this study was validated on a relatively small sample representative of the United States population. The next phase of validation research will involve distributing the SMQ to a larger, more diverse sample to increase the power and generalizability of the study. In particular, it will be important to examine the SMQ using samples that include more people of color. In this study, although the sample was stratified per US Census data, it still included primarily white participants. This limited the generalizability of the results to non-white populations. Additionally, distributing the SMQ and SA-45 to participants with known clinical diagnoses could be useful to see if there are similar correlations in a clinical sample.

It also may be useful to further explore other measures of symptoms as compared to the SMQ. Since the SMQ inherently proposes an alternative form of diagnosis, it will be important to validate it using multiple measures to see how it compares to current conceptualizations of symptoms. Second, the presence of pleasure-seeking was a predictor variable for both depression and interpersonal sensitivity. Examining this element in future research given the potential for pleasure-seeking to be a factor that increases resilience against mental disorder also may be useful. Finally, a necessary next step in validating the SMQ will involve pairing the states of

mind with biological measures of underlying neurological mechanisms. There is evidence to support that different affective experiences distribute processing throughout the body in varied locations (Nummenmaa, Glerean, Hari, & Hietanen, 2014). Having specific physiological measures of the state of mind may reveal that there are specific aspects of the mind correlated with specific parts of the body. Producing such research would be well-aligned with research that integrates the mind and body.

### **Conclusion**

Counselors need a new framework for diagnosis that recognizes the connection between mind and body. This preliminary validation study produced quantitative data that begins to support the use of the SMQ in counseling for diagnostic purposes, particularly in understanding how states of mind predict clinical symptoms. Utilizing such a framework in better aligns counseling practices with research from Interpersonal Neurobiology and better enables counselors to work with the mind/body connection.

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## TABLES

Table 1: *Intercorrelations between Number of States of Mind and GSI Scores*

States of Mind	<i>M</i>	<i>SD</i>	GSI
Number of Regulated States of Mind	7.46	3.53	-.22
Number of Dysregulated States of Mind	9.71	5.52	.49

*Note.* All coefficients are significant at the  $p < .01$  level.

Table 2: *Intercorrelations between States of Mind and SA-45 Subscales*

States of Mind	ANX	DEP	OC	HOS	INT
Self-Deprivation	--	.35	--	--	--
Self-Shaming	.33	.43	.31	--	.31
Pleasure-Seeking	--	-.39	--	--	-.33
Inhibition	--	.31	--	--	--
Doubt	.35	.36	.37	.32	.38
Avoidance	.35	.40	.40	--	.36
Perseveration	.42	.45	.36	--	.39
Devaluation	.37	.35	--	.37	.34
Tactlessness	--	.39	--	--	--
Indirect Support-Seeking	--	.31	--	--	--
Idealization	--	.31	.32	--	.37
Panic	.41	.43	.33	--	.32
Helplessness	--	.33	.30	.35	.31

*Note.* All coefficients are significant at  $p < .01$ . ANX = anxiety; DEP = depression; OC = obsessive-compulsive; HOS = hostility; INT = interpersonal sensitivity.

Table 3: *Regression Analysis Summary for State of Mind Variables Predicting Anxiety*

States of Mind	B	SE B	$\beta$	<i>t</i>	<i>p</i>
Perseveration	2.03	0.56	.20	3.64	< .001
Panic	2.11	0.60	.19	3.50	.001
Devaluation	2.04	0.62	.17	3.28	.001
Self-Shaming	1.46	0.51	.15	2.84	.005
Doubt	1.66	0.60	.15	2.75	.006

*Note.*  $R^2 = .32$  ( $N = 300$ ,  $p < .001$ )

Table 4: *Regression Analysis Summary for State of Mind Variables Predicting Depression*

States of Mind	B	SE B	$\beta$	<i>t</i>	<i>p</i>
Perseveration	1.97	0.52	.18	3.77	< .001
Pleasure-Seeking	-3.34	0.45	-.31	-7.36	< .001
Self-Shaming	2.39	0.48	.22	5.03	< .001
Helplessness	2.21	0.70	.14	3.15	.002
Tactlessness	1.80	0.59	.14	3.07	.002
Avoidance	1.58	0.56	.13	2.84	.005
Idealization	1.42	0.62	.11	2.29	.023
Devaluation	1.26	0.59	.10	2.15	.033

*Note.*  $R^2 = .52$  ( $N = 300$ ,  $p < .001$ )

Table 5: *Regression Analysis Summary for State of Mind Variables Predicting Obsessive-Compulsive*

States of Mind	B	SE B	$\beta$	<i>t</i>	<i>p</i>
Avoidance	2.48	0.62	.22	4.00	< .001
Doubt	2.17	0.64	.18	3.37	.001
Helplessness	2.74	0.74	.19	3.71	< .001
Perseveration	1.70	0.58	.16	2.96	.003
Self-Shaming	1.47	0.54	.14	2.73	.007

Note.  $R^2 = .31$  ( $N = 300$ ,  $p < .001$ )

Table 6: *Regression Analysis Summary for State of Mind Variables Predicting Hostility*

States of Mind	B	SE B	$\beta$	<i>t</i>	<i>p</i>
Devaluation	2.60	0.58	.25	4.50	< .001
Helplessness	3.19	0.67	.25	4.76	< .001
Doubt	1.97	0.56	.19	3.54	< .001

Note.  $R^2 = .24$  ( $N = 300$ ,  $p < .001$ )

Table 7: *Regression Analysis Summary for State of Mind Variables Predicting Interpersonal Sensitivity*

States of Mind	B	SE B	$\beta$	<i>t</i>	<i>p</i>
Perseveration	1.32	0.57	.12	2.33	.020
Pleasure-Seeking	-3.06	0.49	-.29	-6.26	< .001
Idealization	2.58	0.67	.20	3.83	< .001
Doubt	1.88	0.62	.15	3.01	.003
Devaluation	1.55	0.63	.12	2.45	.015
Avoidance	1.41	0.60	.12	2.37	.019
Helplessness	1.92	0.74	.13	2.58	.010
Self-Shaming	1.05	0.52	.10	2.03	.043

Note.  $R^2 = .43$  ( $N = 300$ ,  $p < .001$ )

## Response to Committee Feedback

Constructive feedback was shared by committee members at my defense meeting. A discussion with my chair helped frame my response to each comment. The following narrative describes how each comment was addressed in a subsequent revision of my manuscript that will be submitted for review and potential publication in my target journal.

**Comment 1** *In your methods section, account for error and multiple analyses by discussing the Bonferroni correction. Because you computed 5 MRAs, you would take your .05 alpha level, divide it by 5, and your new benchmark for significance would be .01. Please then interpret findings accordingly.*

In response to this comment, I added the procedure used for calculating the Bonferroni correction in section 3, Methodology, and within the manuscript. Specifically, I computed the significance level for the multiple regression analyses by dividing the alpha level of .05 by 5, the number of analyses. This delivered a new significance level of .01. I applied this new level to interpret the results within my manuscript. Results remained the same for three of the subscales within the SA-45: Anxiety, Obsessive-Compulsive, and Hostility. However, using the new significance level, I found that two states of mind, idealization and devaluation, no longer produced a significant predictive relationship for Depression. This reduced the percentage of depression accounted for from 52% to 50%. Additionally, self-shaming no longer produced a significant predictive relationship for Interpersonal Sensitivity, thereby reducing the percentage of interpersonal sensitivity accounted for from 43% to 42%. I updated the results section of the manuscript accordingly.

**Comment 2** *Explain your rationale for including “neutral” responses in the category for there not being the presence of an affective state. This should appear in your methodology section (Section 3) where you describe the instrumentation used.*

In response to this comment, I added an explanation within section 3, Methodology, within the paragraph describing the State of Mind Questionnaire (SMQ). Within the explanation, I described the exclusive nature of the states of mind within the proposed diagnostic framework. The presence of one state of mind may automatically preclude the existence of another state of mind, thereby requiring the framework to deliver an option that indicates neutrality in relationship to presence of a state of mind. Furthermore, I described clinical applications of the SMQ. Specifically, it is more prudent to assume that neutrality in relationship to a state of mind indicates an absence of it. This practice makes the SMQ more conservative in its ability to adequately describe a client’s experience. See page 87 to review these changes.

**Comment 3** *In your discussion section, add additional content further describing specific implications for counselors. Offer tangible suggestions for how these new findings can inform clinical practice and what that might look like for a counselor (rubber meets the road).*

In response to this comment, I clarified the relationship between current diagnostic practices and treatment planning. I articulated the need for counselors to be equipped with diagnostic tools that directly address the bilateral activation of the nervous system present in current diagnostic categories. I utilized the example of anxiety to depict how a singular diagnosis can be indicative of both over-arousal and under-arousal. Having nuanced descriptors of these mechanisms empowers counselors to design treatment interventions that calm overactive systems within the bodymind, and design other interventions that activate underactive systems.

Furthermore, I elaborated upon how the SMQ is related to trauma-informed and multiculturally-informed care.

**Comment 4** *Make sure the correct “n” values are listed in all tables and when referencing the statistical output of your MRAs in the manuscript.*

In response to this comment, I updated the *n* values within the results section of my manuscript and within the tables at the end of my manuscript. The new *n* values were as follows: Anxiety (*n* = 294); Depression (*n* = 293); Obsessive-Compulsive (*n* = 294); Hostility (*n* = 296); and Interpersonal Sensitivity (*n* = 292).

**Comment 5** *Look to condense length of the manuscript. You likely could include all MRA analyses in one large table. Just use a heading embedded within the table to differentiate the analysis being referenced.*

In response to this comment, I consolidated all the MRA results into one large table, using headings to delineate the different subscales within the SMQ. I also substantially revised the Limitations and Delimitations and Future Research sections to streamline the language. These revisions made the sections more concise and considerably reduced the length of the manuscript so that it aligned with page limitations for various academic journals.

## APPENDIX A

### Institutional Review Board Approval Letter



TEXAS A&M UNIVERSITY  
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Human Subjects Protection Program

Institutional Review Board

Date: April 27, 2018

TO: Ashley Anne Seewald, Graduate Student  
College of Education and Human Development

CC: Dr. Joshua Watson, Faculty  
Professor, College of Education and Human Development

FROM: Office of Research Compliance

SUBJECT: Exempt Determination

Human Subject Research Activities that do not meet one or more exempt categories are subject to IRB review.

On April 27, 2018, the Texas A&M University-Corpus Christi Office of Research Compliance reviewed the following submission:

Type of Review:	Exempt Determination
Title:	Validation of the State of Mind Questionnaire: An Assessment of Polyvagal Emotion Regulation
Investigator:	Ashley Anne Seewald
IRB ID:	30-18
Funding Source:	None
Documents Reviewed:	IRB_30-18_Seewald_Exempt_Application_Validation_of_the_SMQ_4_27_2018 30-18_Seewald_Appendices IRB Application 4_27_2018

Based on the information provided, the Office of Research Compliance has determined the research meets exempt category: 45 CFR 46.101(b)(2) (Research involving use of educational tests, survey procedures, interview procedures or observation of public behavior).

Therefore, this project has been **determined to be exempt from IRB review**. You may proceed with this project.

**Reminder of Investigator Responsibilities:** As principal investigator, you must ensure:

1. Informed Consent: Ensure informed consent processes, if applicable, are followed and information presented enables individuals to voluntarily decide whether or not to participate in the research project.
2. Amendments: This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. Any planned changes that would impact the criteria in which the exempt determination was made, requires submission by the investigator to the IRB to ensure that the research continues to meet criteria for exemption. Changes to the protocol must be requested by submitting an Amendment Application to the Research Compliance Office for review. The Amendment must be approved before being implemented.





OFFICE OF RESEARCH COMPLIANCE  
Division of Research, Commercialization and Outreach  
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Human Subjects Protection Program

Institutional Review Board

3. **Completion Report: Upon completion of the research project (including data analysis and final written papers), a Completion Report must be submitted to the Research Compliance Office.**
4. **Adverse Events: Adverse events must be reported to the Research Compliance Office immediately.**

Please do not hesitate to contact me with any questions at [irb@tamucc.edu](mailto:irb@tamucc.edu) or 361-825-2497.

Respectfully,

Rebecca Ballard, JD, MA, CIP  
JD, MA, CIP

Digitally signed by Rebecca  
Ballard, JD, MA, CIP  
Date: 2018.04.27 17:04:10  
-05'00'

Rebecca Ballard, JD, MA, CIP  
Director, Research Compliance and Export Control Officer  
Division of Research, Commercialization and Outreach

## APPENDIX B

### Information Sheet

#### Validation of the State of Mind Questionnaire: An Assessment of Polyvagal Emotion Regulation

##### **Introduction**

The purpose of this page is to provide you information that may affect your decision to participate in this research study. By completing this online survey, you are consenting to participate in the study. By participating in this study, you are certifying that you are 18 years of age or older. Please do not complete this online survey if you do not consent to participate in the study.

You are being asked to participate in a research project studying how individuals cope with stress. The purpose of this study is to explore ways to effectively assess how individual approaches to coping present themselves as thoughts, behaviors, and feelings. You were selected to be a possible participant because of your expressed willingness in completing surveys such as this one.

##### **What will I be asked to do?**

If you agree to participate in this study, you will be asked to complete three sections of a survey. The first is a brief demographic questionnaire asking you to disclose your age, gender, and race; the second is a questionnaire to gather information about how you are coping with stressors in your life; and the third is a questionnaire to explore the clinical symptoms you may be experiencing because of stressors in your life. The entire questionnaire contains 92 items and will take approximately 30-40 minutes to complete.

##### **What are the risks involved in this study?**

The risks associated in this study are minimal, and are not greater than risks ordinarily encountered in daily life. However, the questionnaires are designed to increase your self-awareness. As a result, it is possible you may become more aware of current emotional experiences in your life. Contact information for emotional support is provided at the beginning and the end of the survey for you to utilize in the event you need support.

##### **What are the possible benefits of this study?**

The possible benefit of participation is personal growth. Completing the survey may promote self-awareness and may help you achieve insight into how you are approaching stressful situations. This may validate that your approaches are quite effective or it may help you to reflect upon what you would like to change.

##### **Do I have to participate?**

No. Your participation is voluntary. You may decide not to participate or to withdraw your participation at any time without your current relations with Qualtrics, Inc. being affected.

**Who will know about my participation in this research study?**

This study is anonymous and the researcher will not be informed of your personal information. No identifiers linking you to this study will be included in any sort of report that might be published. Research records will be stored securely and only the researcher will have access to the records.

**Whom do I contact with questions about the research?**

If you have questions regarding this study, you may contact the researcher, Ashley Anne Seewald at [aaseewald@gmail.com](mailto:aaseewald@gmail.com).

**Whom do I contact about my rights as a research participant?**

This research study has been reviewed by the Institutional Review Board and/or the Office of Research Compliance at Texas A&M University-Corpus Christi. To report a problem, or for questions regarding your rights as a research participant, contact the Research Compliance Office: at (361) 825-2497 or via email sent to “IRB@tamucc.edu”.

<mailto:caroline.lutz@tamucc.edu>

**By clicking to the next page, you consent to participating in this study.**

APPENDIX C

Brief Demographic Survey

Please complete the following demographic questions.

I agree that I am proficient in English and feel comfortable reading the following surveys.

Agree

Disagree



I agree that I am proficient in online survey software, and I feel comfortable participating in the following online survey.

Agree

Disagree



How old are you?

What is your racial identity?

American Indian

Asian-American/Oriental/Pacific Islander

Asian East Indian

Biracial

Black/African-American

Mexican-American/Chicano/Chicana

Puerto Rican

Other Hispanic

White/Caucasian

If other, please specify:

What is your gender identity?

Female

Male

Transgender Female

Transgender Male

Gender Variant/Non-Conforming

If other, please specify:



## APPENDIX D

### **State of Mind Questionnaire (SMQ)**

For additional information about the State of Mind Questionnaire, please contact the author.

## APPENDIX E

### **Symptom Assessment – 45 (SA-45)**

Maruish, M. E. (2004). Symptom assessment-45 questionnaire (SA-45). In M. E. Maruish (Ed.),  
The use of psychological testing for treatment planning and outcomes assessment:  
*Instruments for adults*, 3(3), 43-78. Mahwah, NJ: Lawrence Erlbaum Associates  
Publishers.

## APPENDIX F

### **State of Mind Map (SM-Map)**

For additional information about the State of Mind Map, please contact the author.



## APPENDIX G

### **State of Mind Questionnaire (SMQ): Expert Revisions Form**

For additional information about the Expert Revisions Form, please contact the author.

## APPENDIX H

### **Finalized SMQ Items and Definitions with Expert Revisions**

For additional information about the Finalized SMQ Items and Definitions with Expert Revisions, please contact the author.

## APPENDIX I

### **Categorization of Regulated and Dysregulated States of Mind**

For additional information about the Categorization of Regulated and Dysregulated States of Mind, please contact the author.

