BOOK REVIEWS

Edited by
RICHARD M. BILLOW, M.D.

Non-English Review Editor
HAIM WEINBERG, PH.D.


It is an interesting time for the intellectual debate over the future of mental health conceptualization, research, and treatment. Most recently, the director of the National Institute of Mental Health (NIMH), Thomas Insel (2013), dramatically announced that NIMH will no longer support DSM-based investigations, calling the psychiatric manual’s symptom-based categories invalid. “Patients with mental disorders deserve better,” he declared. Instead, NIMH will support research based on its new Research Domain Criteria (RDoc; NIMH, 2011), which view mental disorders as “biological disorders involving brain circuits that implicate specific domains of cognition, emotion, or behavior.” Jonathan Shedler (2013a, 2013b), a strong proponent of psychodynamic psychotherapy, responded with a harsh critique, calling this new approach biological reductionism, stating that there is no evidence to support the notion that all problems that bring patients to therapy can be understood in terms of brain circuitry. Within this context, Stephen Porges’s (2011) The Polyvagal Theory heroically attempts to create meaningful links between basic science research, social behavior, and clinical practice. Per his report, the polyvagal theory is “particularly important for psychotherapists,
who focus on the social interaction within the therapeutic setting and forgo pharmacological interventions” (p. 259). Though the book makes no explicit reference to group therapy, I found it to be relevant to this readership for two main reasons: First, it highlights basic physiological processes that are at the core of most psychiatric conditions. And second, it enhances our understanding of what leads to social engagement or disengagement. In what follows, I briefly describe some of the book’s main concepts and their clinical relevance.

THE EVOLUTION, AND DISSOLUTION, OF THE AUTONOMIC NERVOUS SYSTEM

Anyone who has ever taken a survey course like “Introduction to Psychology” probably remembers the basic division of the autonomic nervous system (ANS) into a sympathetic nervous system (SNS) and a parasympathetic nervous system (PNS), with the former active in fight/flight behaviors and the latter in restorative states, and with both functionally distinct from the central nervous system (CNS). In this book, Porges delineates a more sophisticated and accurate understanding of our ANS as it operates in response to both external challenges and the needs of our internal organs, what Claude Bernard referred to as milieu intérieur (the environment within). To do so, he explains—and at times speculates (p. 29)—how the two branches of the ANS interact, how they developed evolutionarily, and how they interact with higher brain functions. Interestingly, he notes that the label “sympathetic nervous system” shows its historical association with feelings, in comparison to the PNS which “guards against feelings” (p. 160). He views this binary distinction as flawed in light of new evidence supporting the important role of the PNS in emotion regulation. The protagonist of his theory is the 10th cranial nerve, the vagus nerve, which accounts for most of the PNS. And as we repeatedly learn, there is more than one vagus nerve (hence the name of the theory: poly-vagal).

Originating in several areas in the brainstem, the vagus is a family of neural pathways which enable bidirectional communication between the brain and internal organs (p. 81). Approximately 80% of its fibers are afferent and serve to communicate
to the brain the state of the body’s internal organs (e.g., heart, lungs, stomach). The communication of the body’s internal state is termed *interoception* and underlies what we later experience as feelings: in a previous review of Damasio (2003), I briefly outlined the biological underpinnings of feelings (Slonim, 2012). The vagal system integrates interoceptive information with higher cognitions and determines how resources will be distributed (as seen in an illustrative figure on p. 91). This process is highly important since in dysregulated bodily states little energy is available to attend to the external environment.

The ability to self-soothe and effectively attend to the environment evolved through the process of evolution (p. 156). Primitive fish, for example, lacking a vagus nerve, have very limited ability to self-soothe once they are excited via their endocrine system; reptiles already have a vagus and an SNS which can allow “darting” (rapid mobilization) and “freezing” (sudden immobilization) behaviors; but only mammals have a myelinated vagus which can subtly regulate cardiac output to foster engagement and disengagement. Despite the evolutionary advances, humans and other mammals retained the more primitive vagal system. As a rule of thumb, Porges asserts that we use our more advanced vagal system, but if it is unavailable, we use our more primitive vagal system. This process is termed the Jacksonian principle of dissolution: “[T]he higher nervous arrangements inhibit (or control) the lower, and thus, when the higher are suddenly rendered functionless, the lower rise in activity” (p. 161). Regression, in this theoretical framework, has a new meaning. When we are regressed, we are not two year olds; we are alligators… [NICE!]

**VAGAL TONE—A BIOLOGICAL MARKER OF STRESS VULNERABILITY AND EMOTION REGULATION**

According to this theory, what keeps us from regressing into a defensive reptilian mode is our “smart” mammalian myelinated vagus, which originates in the nucleus ambiguus (NA).1 Porges...
uses the effective metaphor of a “vagal brake” to describe its function. One of the central features of the “smart” vagus is its regulation of the heart. Our heart’s pacemaker, we learn, has a high intrinsic rate which, in safe states, is inhibited by the vagal brake (p. 229). When the vagal brake functions effectively, it can briefly remove its influence on the heart (“taking the foot off the brake”) in response to external challenges and increase its influence (“pushing the brake”) to allow the body to return to its previous calm state. When this system is dysfunctional, the threshold for negative cues in the environment can be lower, hyper-reactivity may ensue, and the ability to self-soothe may be compromised (p. 130). Thus, Porges proposes that vagal tone can be seen as a physiological marker of emotion regulation flexibility and stress vulnerability.

To his credit, Porges also describes a method for quantifying vagal tone. Respiratory sinus arrhythmia (RSA), the “natural rhythm in the heart rate pattern at approximately the frequency of spontaneous breathing” (p. 229), appears to be a good index of “smart,” mammalian vagal tone. The book goes into some detail on how this index is calculated, and a recent study has indicated that even non-experts in psychophysiology can calculate it using available software tools (Hibbert, Weinberg, & Klonsky, 2012). Using RSA as an index of vagal functioning, Porges demonstrates that low vagal tone is associated with borderline personality disorder, which is associated with poor emotion regulation skills, as well as with abuse history, which is associated with heightened sensitivity to danger (p. 232). Other studies have shown that poor vagal tone is associated with trait anxiety (Miu, Heilman, & Miclea, 2009) and major depression (Brunoni et al., 2013). Though psychophysiological studies of group therapy are complicated by many moving parts, it would be interesting to see what impact group therapy, with its emphasis on social behavior, has on vagal tone. Other fascinating questions could also be asked and studied: What happens to vagal tone over the course of a session? How do fluctuations in one member’s (or the therapist’s) vagal tone impact other members? How does vagal tone fluctuate in response to significant group events, such as interpersonal conflicts, members leaving the group?
The Social Engagement System

The _Social Engagement System_ refers to a collection of muscles necessary for social interactions (pp. 125-126). Among others, these include the eyelids, the middle ear muscles, the larynx, and neck muscles. Control of these muscles enables accurate listening, especially for human voices, emotional expression, use of prosody, head turning and tilting, and so forth. Combined, they heavily impact the quality of social experiences. The theory posits several intricate connections between the Social Engagement System and the ANS. First, social engagement comes online only in conditions evaluated as safe via neuroception, the non-conscious risk-assessment process thought to take place in the primitive parts of the brain. Second, from a phylogenetic perspective, the group of muscles which constitute the social engagement system evolved in the transition from reptiles to mammals, like the myelinated vagus. Third, the same brainstem structure, the nucleus ambiguus, is involved in the regulation of both the myelinated vagus and the social engagement system. And fourth, a bidirectional relationship exists between the ANS and the social engagement system: Not only does the ANS restrict, or enable, social behaviors, but calming social interactions like a gentle stroke can also suppress defensive behaviors, likely by increased levels of oxytocin in the bloodstream (p. 295).

**Clinical Implications**

Though knowledge of the relationship between the ANS and the social engagement system clearly has clinical implications, there is no consensus among experts on how this translates to treatment models. Porges himself envisions treatments where therapists use biofeedback to detect—and modify—the rapidly changing physiological states of their patients (p. 298). Van der Kolk emphasizes mindful practices (e.g., chi qong, tai chi, yoga) that can be used to help individuals shift into more calm physiological states (p. xvi). Others, like Fosha (e.g., Lipton & Fosha, 2011) incorporated the polyvagal theory into their treatment modality by emphasizing the positive interpersonal interactions between...
therapist and patient that can inhibit ANS defensive reactions and increase social behaviors.

Without taking away from the above interventions, I would like to suggest a few ways in which the theory can impact a group therapist’s conceptualizations and choice of interventions. First, the group situation provides ample opportunities to examine danger-evoking cues (neuroception), and group members can help each other become more aware of—and less surprized by—such cues. Perhaps less obvious (and more challenging), the group situation can also help individuals learn ways in which their behaviors evoke a neuroception of danger in others. Eye-rolling, sarcasm, or even averting one’s gaze can be “neuroceived” as dangerous. By learning how to seem less intimidating, individuals can create fewer (even short-term) “enemies.” Second, an understanding of the different defensive modes, including the distinction between fight/flight and freeze, can help set reasonable expectations for how long it might take a group member to recover once his or her ANS enters a defensive mode. Moreover, the book’s detailed description of freeze/shut-down behaviors highlights the physiological danger that such states entail (i.e., rapid deceleration of heart beat) and the potentially different approach necessary to help individuals recover from such states (p. 251). Third, the theory emphasizes the relationship between the ANS and the brain’s higher cortical functions (p. 115). Therapeutically, this suggests that insight and higher-order thinking are key to the regulation of emotions and should not be—as they sometimes are—disregarded as “intellectualization.” And fourth, paying attention to the muscles of the social engagement system can serve as a non-invasive measure of group members’ physiological state.

CONCLUSION

The polyvagal theory, as I have outlined, is full of insights relevant to clinicians and researchers alike. As van der Kolk aptly asserts, “Porges helped us understand how dynamic our biological systems are and gave us an explanation why a kind face and a soothing tone of voice can dramatically alter the entire organization of the human organism” (p. xvi). The book, however, has its limitations. It is repetitive, with many of the chapters con-
taining similar descriptions of the theory. And while repeated rehearsal can aid in retaining some of the complicated aspects of the theory, it feels unnatural and hurts the reading experience. Additionally, some of the chapters are relatively “old” in research terms (i.e., mid 1990s), and little effort was made to update these chapters with recent knowledge. On a positive note, the book contains chapters, such as Chapter 18, that can effectively serve as a sophisticated introduction to the ANS and its relevance for therapeutic work.

To conclude, despite the book’s organizational limitations, its broad scope and solid scientific base provide ample evidence, for anyone who needed it, that the interpersonal nature of psychotherapy should not be discounted. Porges makes a strong case against the exclusive focus on drug treatment for psychiatric treatment. And while for psychotherapists this is hardly shocking news, having scientific evidence to support these claims is important, if only to have more knowledge when talking to patients or policy makers.

REFERENCES


_Tzachi Slonim, Ph.D._

_Clinical Psychology Program_

_The City University of New York_

_E-mail: tzachi.slonim@gmail.com_