



Figure 3-1. Transaction of sensory processing, autonomic, and limbic functions.

sensory processing; the impact of psychiatric conditions and dual diagnoses; a dearth of meaningful occupational engagement; a lack of control over daily routines and occupational choices; and the influence of medications and their side-effects. Moreover, individuals with intellectual disability may have fewer available resources for coping with stress and stressful life events; loss, grief, and pain that cannot be easily communicated (Scott & Havercamp, 2014).

Interplay of Autonomic Systems, Sensory Systems, and Limbic Functions

The three neurobehavioral systems previously discussed are intricately connected through various neurological structures and networks. With its sympathetic and parasympathetic branches, the ANS sets a foundational tone for the rest of the nervous system's functioning, and one's responsiveness to the challenges of daily life situations is dependent on the ANS's state. However, the ANS is directly connected to limbic structures and functions. For example, both the autonomic and limbic systems share responsibility for the regulation of endocrine and hormonal responses to stress through the hypothalamus and the amygdala. An individual who is in an alert, SNS-driven state is likely to experience the emotional responses of anxiety, hypervigilance, irritability, and aggression and may feel the need to escape or withdraw (Willner, 2015). An individual driven by PSNS influences will experience feelings of calmness and contentment (Figure 3-1).

Sensory influences contribute to both the ANS and the limbic functions with resultant reciprocity. Oversensitivity or disordered sensory processing will affect the state or tone of the ANS with concurrent limbic responses of anxiety or irritability. Subsequently, emotional and behavioral outcomes are sequelae to the primal interconnections between sensory, ANS, and limbic functions. In the presence of behavioral challenges, therapists should be thorough in their evaluation of behavioral antecedents and consider potential medical or neurobehavioral causes first and foremost. For example, pain, as a sensory stimulus, will engender SNS activation and increased cortisol production (Willner, 2015). Many individuals with intellectual disability who are unable to convey the presence or impact of their pain using verbal or gestural means may demonstrate increased emotionality, or resort to outbursts, head banging, eye gouging, etc., in an attempt to communicate or manage the pain stimulus, albeit ineffectively (Glaesser & Perkins, 2013; Medeiros, Rojahn, Moore, & van Ingen, 2014; Peebles & Price, 2011). Behavior is observable and often measurable and is always caused by something internal or external. Behavior may be directed toward oneself, as in the case of self-injurious or self-abusive behaviors (e.g., slapping, hitting, biting oneself, poking one's eyes, picking at scabs), directed toward the physical environment through destruction of property, or toward other persons, such as staff (Medeiros et al., 2014).

Consistent with behavioral and psychological theories, behavior problems are often attributed to the individual's motivation to seek attention. However, behavior problems more frequently arise in response to medical needs, psychological distress, and neurosensory considerations. While the