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Does Adlerian Theory Stand the Test of Time: Examining Individual Psychology from a Neuroscience Perspective

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Abstract

The authors explored foundational principles of Individual Psychology through a neuroscience lens. In particular, the authors identified neuroscience support for the principles of social embeddedness, purposefulness of behavior, and holism. The authors also offered suggestions for expanding Adlerian theory through the integration of neuroscience-informed developmental theory, conceptualization of functionality, and interventions.

Keywords: individual psychology, neuroscience, counseling theory

Alfred Adler introduced Individual Psychology (i.e., Adlerian counseling) in 1912 as an alternative model to psychoanalysis (Adler, 1956). Adler was an influential forerunner to the humanistic movement in counseling, emphasizing holism, optimism, free-will, and the subjective nature of human beings (Ansbacher, 1990; Carlson, Watts, & Maniaci, 2006). Adler's phenomenological, relationship-oriented ideas greatly influenced theory and practice within mental health and are evident today in many leading counseling approaches, including person-centered, existential, cognitive, systems, and so forth (Ansbacher, 1990; Mosak & Maniaci, 1999; Peluso, Peluso, White, & Kern, 2004). Many practitioners also apply Adlerian principles as a stand-alone theory, considering it one of the more comprehensive therapeutic approaches (Sommers-Flanagan & Sommers-Flanagan, 2012). Increasingly, however, the field of mental health is shifting to more biological and neurological frameworks for understanding mental health (Cuthbert, 2014; Field, Beeson, & Jones, 2015).

Counseling professionals have called for an increased understanding and integration of neuroscience principles, referring to this movement as the next major force in counseling (D' Andrea, 2012; Ivey, Ivey, & Zalaquett, 2011; McHenry, Sikorski, & McHenry, 2014). Although counselors may not find all the research emerging from the broad and interdisciplinary field of neuroscience useful, many of the findings seem to support what counselors already believe and do, merely adding another perspective and element of credibility. DeRobertis (2015) noted that "neuroscience is paving the way for a renewed appreciation of humanistic psychology" (p. 323). Other scholars have examined person-centered, narrative, and cognitive-behavioral theories through the lens of neuroscience (Beaudoin & Zimmerman, 2011; Makinson & Young, 2012; Motschnig-Pitrik & Lux, 2007). Adlerian theory, however, has yet to be reviewed in this manner.

As with previous movements in counseling, we propose Adlerian theory is well positioned to embrace neurological findings while not losing its humanistic foundation. The purpose of this paper is twofold: (1) identify key Adlerian principles (e.g., social embeddedness, purposefulness of behavior, and holism) and corresponding neuroscience support and (2) identify neuroscience research and neuroscience-informed interventions that may serve to strengthen and expand Adlerian theory in this new era of mental health practice. It is not our intent to suggest neuroscience perspectives replace current theoretical positions or counseling approaches, nor is it our aim to suggest that human beings could or should be reduced to simplistic stimulus and response neural activity. Rather, we hope to expand perspectives and provoke thought.

Social Embeddedness

At the heart of Adlerian theory is a belief in social embeddedness, the recognition that individuals are best understood in the context of their relationships (Adler, 1927/1998). The essential role of relationships in growth and development is also a fundamental humanistic belief (Hansen, Speciale, & Lemberger, 2014). In the following paragraphs, we review specific Adlerian concepts that illustrate the belief in social embeddedness and identify supporting neuroscience literature.

Social Interest

One of the core tenets in Adlerian theory is that individuals have an innate capacity for social interest (Adler, 1956; Kefir, 1981; Mosak & Maniacci, 1999). Social interest, also translated as community feeling, is defined as a sense of belonging to the world at large and contributing to that world in socially useful ways. Mosak and Maniacci (1999) identified the following behaviors as examples of social interest: “the courage to be imperfect, contribution to the common welfare, confidence, caring, compassion, creativity, closeness, cooperation, and commitment” (p. 113). Caregivers foster social interest in children through modeling and responsive parenting (Kottman & Meany-Walen, 2015; Mosak & Maniacci, 1999).

Counselors use the concept of social interest as a gauge of mental health (Ansbacher, 1990; Manaster, Zeynep, & Knill, 2003). Theoretically, higher levels of social interest are correlated with higher levels of mental wellbeing, whereas lower levels of social interest are associated with feelings of isolation and inferiority and self-centered behaviors (Griffith & Powers, 1984). Adlerian counselors aim to increase social interest through the therapeutic relationship, interventions geared towards increasing clients’ perspective taking, and encouraging service and involvement within communities.

The Adlerian concept of social interest is consistent with many neurobiological views of optimal wellbeing (McHenry et al., 2014). Having concern for and acting in the benefit of others is reflective of neural integration (Siegel, 2010). Siegel (2010) noted “when we devote our lives to the welfare of others –not abandoning our own needs, but widening our identity to embrace the working for others as a part of who we are – we actually achieve deep states of meaning, connection, and equilibrium” (p. 256). Recent research suggests that the expression of compassion and kindness may strengthen relationships and mental and physical health (Fredrickson, et al., 2013; Poulin & Holman, 2013).

The neurohormone oxytocin is associated with social bonding, caregiving, and repair from stress-induced physiological damage (Poulin & Holman, 2013). Oxytocin is involved in the regulation of neural and behavioral responses to negative stimuli and stress reactivity. Poulin and Holman (2013) explored the role of oxytocin in buffering the negative impact of stress on health. They found that individuals who engaged in prosocial behaviors had higher levels of endogenous oxytocin and exhibited fewer negative symptoms of stress. The authors suggested that individuals engage in prosocial behaviors as a potential way to stimulate the release of oxytocin and mediate the negative impact of stress.

In another recent study, researchers found that eudemonia (i.e., meaningful happiness) was associated with healthier genetic expression (Fredrickson, et al., 2013). Individuals who reported having a higher purpose, connecting to a community, and being of service to others had lower levels of inflammatory markers. Individuals who noted more experiences of hedonic happiness showed increased levels of proinflammatory genes and decreased levels of antiviral responses. These findings seem to provide initial neurobiological support for the importance of social interest, offering validity to Adlerian counselors’ efforts to assess and strengthen ‘community feeling’ for improved mental health.

Role of Early Experiences

From an Adlerian perspective, early experiences are crucial to the overall development of individuals’ view of self, others, and the world (Adler, 1956; Mosak & Maniacci, 1999). Adler (1956) asserted that although individuals are born with particular propensities, communities are responsible for the expression of specific characteristics and talents. Adlerian counselors incorporate an emphasis on early childhood experiences through a number of concepts and interventions detailed below.

As part of a typical Adlerian assessment, counselors seek to understand individuals' family constellations, including cultural and familial values, gender role expectations, nature of the interpersonal relationships within the family of origin, and psychological birth order (Sweeney, 2009). Professionals have given particular attention to psychological birth order, the belief that individuals compare and differentiate themselves from their closest siblings in an effort to gain significance and belonging within the family. Adlerian counselors use all of the family constellation information to better understand the impact of clients' early relationships on personality development and clients' approaches to meeting the tasks of life (i.e., work, friendship, love, spirituality, and self).

An additional Adlerian concept related to early childhood experiences is personality priorities. Kefir (1981) identified personality priorities as a window into one's life style. Similar to the concept of psychological birth order, the theory behind personality priorities is that individuals develop certain attitudes and behaviors during childhood in relation to others that allow them to gain a sense of significance and belonging. Although individuals have identified a variety of personality priorities, the most common include control, superiority, comfort, and pleasing (Dillman Taylor & Ray, 2012; Kefir, 1981).

Current models of brain development, namely that early experiences have a disproportionate impact on individuals' sense of self, others, and the world, compliment the Adlerian view on early childhood experiences (Andersen et al., 2008; McHenry et al., 2014; Perry, 2009; Siegel, 2012). The brain develops in a sequential manner, beginning with the brain stem in utero and continuing with the prefrontal cortex into early adulthood. Researchers believe the foundational architecture related to the regulatory circuits of the brain, a crucial component for discussions on mental health, are primarily formed in the first five years of life (Andersen et al., 2008; Perry, 2009). Due to the highly social nature of the brain, children often internalize the neural circuitry of their closest early caregivers. Although individuals are born with certain genetic propensities, environmental experiences greatly shape which genetic propensities get expressed or repressed through a process termed epigenetics (Garrett, 2011; Siegel, 2012).

For example, Fallon (2013) examined brain scans of individuals who had engaged in violent psychopathological behaviors. He found that the participants shared similar neural profiles and patterns of "low brain function in certain parts of the frontal and temporal lobes – areas commonly associated with self-control and empathy" (p. 1). Upon further examination, he discovered that some individuals have neural profiles similar to individuals with psychopathic tendencies without exhibiting aggression and low empathy. Secure, predictable, and nurturing environments appeared to mediate the genetic tendencies towards extreme anti-social behaviors. This example seems to be a neural illustration of Adler's belief in role of early experiences in influencing genetic propensities.

The Adlerian perspectives on early social and emotional development are further supported through the extensive literature on attachment theory (Peluso et al., 2004). Neuroscience research has lent considerable credibility to attachment theory (Schore, 2012; Siegel, 2012). Most individuals develop attachments with a few early caregivers along a secure-insecure continuum. These attachment relationships are internalized as aspects of implicit memory, influencing perception, emotions, bodily sensations, and behavioral response patterns. Attachments styles are adaptive in that individuals develop internal and external responses that best help them connect with their caregivers, meeting the innate human need for connectedness and belonging, or cope with the emotional response of those needs not being met. Researchers found that secure attachments are associated with neural structures promoting emotional regulation, fear modulation, attunement, insight, self-understanding, empathy and morality (Schore & Schore, 2008; Siegel, 2012). Insecure attachments are associated with poor emotional and social intelligence, executive functioning, and stress modulation (Perry, 2009).

Therapeutic Relationship

The concept of social embeddedness extends to the Adlerian conceptualization of the therapeutic relationship. Adlerian counselors view the therapeutic relationship as a co-constructed, equal partnership (Adler, 1956). Because clients' views towards self, others, and the world are formed in the context of relationships, they can be best modified within the context of relationships. The therapeutic relationship serves just that purpose, helping clients develop more encouraged, socially-interested perspectives (Dinkmeyer, Dinkmeyer, & Sperry, 1987; Mosak & Maniaci, 1999).

From a neuroscience perspective, the therapeutic relationship serves as a new experience that has the potential to help foster experience-dependent neuroplasticity (Schore, 2012; Siegel, 2010). Siegel (2012) defined neuroplasticity as "the overall process with which brain connections are changed by experience" (p. A1-57). Counselors provide

disconfirming experiences (i.e., relational encounters that are different than those typically experienced and anticipated) and help cultivate earned secure attachments (Badenoch, 2008). Scholars hypothesize that through activation of right-brain to right-brain resonance, counselors create an emotionally safe environment that encourages exploration and facilitates changes in clients' nervous system (e.g., stress response neural circuitry). From a theoretical perspective, clients are able to gain an embodied sense of affect regulation and activation of prefrontal abilities to inhibit overactive limbic arousal. Siegel (2010) created the acronym PART: presence, attunement, resonance, and trust to describe essential elements of a neuroscience-informed therapeutic relationship. McHenry and colleagues (2014) noted that when individuals experience these conditions, specific chemicals are likely released in the brain (e.g., oxytocin, dopamine) that enhance feelings of connection, commitment, and trust.

From a social baseline perspective, trusting relationships allow for enhanced emotion regulation through processes of risk distribution and load sharing (Beckes & Coan, 2011). This improved regulation can free up metabolic and neural resources and may increase the likelihood that individuals engage in the often difficult task of therapeutic work. Porges (2011) also noted that safe environments, through the process of neuroception, seem to inhibit defense systems and allow for social engagement. These neuroscience-informed conceptualizations of therapeutic relationships offer support for the way Adlerian counselors approach the therapeutic relationship, recognizing the social-embeddedness of humans and the need to create trusting democratic partnerships in order to facilitate change.

Purposefulness of Behavior

From an Adlerian perspective, all behavior has purpose and meaning, although individuals are not always conscious of this purpose and meaning (Adler, 1927/1998). The idea that behavior is purposeful fits with the humanistic notion that "human beings are intentional, aim at goals ... seek meaning, value, and creativity" (Greening, 2006, p. 239). Explanations of human behavior from neuroscience research support these views on human behavior (Siegel, 2010).

Goal-Directed Behavior

Adlerian counselors believe individuals' actions and psychological movements are purposeful and goal-oriented (Dinkmeyer et al., 1987). Adler (1956) asserted that there is "one basic dynamic force behind all human activity, a striving from a felt minus situation towards a plus situation, a feeling of inferiority towards superiority, perfection, totality" (p. 1). Today, Adlerian counselors typically refer to significance and belonging when conceptualizing core goals (Kottman & Meany-Walen, 2015; Mosak & Maniaci, 1999). Individuals develop behaviors that are more or less useful based on their perceptions of how to achieve significance and belonging. Individuals create emotions that move them towards perceived positives and away from perceived negatives.

Adlerian counselors have developed specific concepts to discuss purposefulness of behavior in children. Dreikurs (1953), describing goals of misbehavior, noted that "children without sufficient opportunities to find their place in the family by useful contributions divert their efforts into other channels which they believe will bring them status in the group" (p. 25). The most common goal, attention, is related to a need for connection (Kottman & Meany-Walen, 2015). When the goal of attention fails to meet the need for connection, children develop more extreme goals: power – exhibiting power within the family to gain one's place and/or revenge – seeking to hurt others as one has been hurt. When all else fails, discouraged children develop the goal of inadequacy, giving up all effort to contribute and participate within their environment. As children grow older, these goals of misbehavior contribute to the development of mistaken beliefs and life style convictions about self, others, and the world.

The Adlerian belief in goal-directed action is similar to many neuroscience conceptualizations of behavior. From a neuroscience perspective, many internal and external factors influence complex human behavior (Siegel, 2012). The core goal of survival, moving towards perceived pleasure and away from perceived pain, is the most agreed upon and primal way of explaining behavior (Cozolino, 2010; Immordino-Yang & Damasio, 2007; Spielberg et al., 2012). Because survival usually requires some degree of group membership, belonging is a close second to survival in directing human behavior (Baumeister & Leary, 1995; Siegel, 2012). Porges (2011) noted that humans have adaptive neurobehavioral systems for both prosocial and defensive behaviors; the degree of safety individuals perceive from the environment greatly influences the type of behavior individuals engage. The nervous system is continually assessing risk and either inhibiting or promoting the protective instincts to fight, flight, or freeze. From this

perspective, problematic behavior results when biology and/or early experiences result in faulty assessment (e.g., hypervigilance and/or overestimation of risk) or an inability to inhibit and/or activate defense systems when appropriate.

Individuals adapt to their environments as children and often do not let go of these adaptations as adults (Badenoch, 2008; Schore, 2012; Siegel, 2012). For example, individuals may learn to survive in their environment by disconnecting from relationships and developing complete self-sufficiency. This approach may have made sense for individuals in their environments at some point in time for survival purposes; however, as adults, these individuals struggle to connect emotionally in interpersonal relationships often leading to symptoms of distress. Siegel (2012) referred to maladaptive behaviors as examples of impaired neural integration and noted that impaired integration leads to rigid or chaotic ways of being, often resulting in poor regulation, inflexibility, and maladaptive thoughts. These view of human behavior are more biological in nature, yet the perspectives compliment the Adlerian view individuals engage in behavior in order to meet innate needs.

Development of Life Style

Individuals' early environmental experiences and innate drive towards significance and belonging merge in the Adlerian concept of life style (Mosak & Maniaci, 1999). Mosak and Maniaci (1999) defined life style as "the subjective, unarticulated set of guidelines individuals develop and use to move them through life and toward their goals" (p. 47). Awareness of life style is both conscious and nonconscious and helps individuals gain a sense of predictability and control over their lives. Underlying life style is individuals' private logic; the sets of rules and beliefs that are unique to individuals based on their understanding of self, others, and the world. When this private logic matches closely with "common sense", it is considered more useful and mentally healthy. When individuals develop private logic that is in opposition to common sense, it is considered mistaken. Psychological distress within the Adlerian framework occurs when individuals develop mistaken beliefs about self, others, and the world that lead to feelings of inferiority, discouragement, and failure to successfully meet the tasks of life (Carlson et al., 2006; Mosak & Maniaci, 1999).

The neuroscience concept of implicit memory can be linked to the Adlerian concept of life style. Beginning early in life, individuals form implicit memories based on experiences (Cordon, Pipe, Sayfan, Melinder, & Goodman, 2004; Schore, 2012; Siegel, 2012). Implicit memories have no time stamp, rather they are interwoven in the mind and body in such a way that they filter the outside world and influence perceptions, bodily sensations, behavioral impulses, thoughts, and feelings. One component of implicit memory is mental models. Siegel (2012) noted that "these models, derived from the past, shape our perceptual experience of the present and help us to anticipate and act in the future" (p. 31). In an instant, internal or external triggers (e.g., feeling of helplessness, verbal praise from a respected peer, physical pain) can set off a cascade of physiological, cognitive, affective, and behavioral responses. As with the Adlerian mistaken beliefs and overall life style concept, mental models are adaptations to individuals' early environments and remain out of conscious awareness, influencing individuals' ways of relating to self, others, and the world.

Holism

A foundational principle in Adlerian theory is holism, the belief that individuals are greater than the sum of their parts and are parts of larger wholes, including family, community, society (Adler, 1956; Ansbacher, 1971). Although Adlerian theory is often known for its typologies and categories (e.g., birth order, personality priorities, goals of misbehavior), these ways of understanding individuals are intended to be part of a larger approach that encompasses individuals' totality. Therapeutic work is grounded in the equalitarian therapeutic relationship and geared towards understanding the inter- and intra-personal dynamics that contribute to discouragement and problematic behaviors (Carlson et al., 2006). Adlerian counselors give particular attention to exploring conscious and non-conscious motives for behavior and facilitating insight into action. Certain conceptualizations of neuroscience (e.g., dynamic systems neuroscience and interpersonal neurobiology (IPNB)) also support holism (DeRobertis, 2015; Siegel, 2012). In the following paragraphs, we will review the ways in which holism is expressed in the Adlerian assessment and intervention processes and offer neuroscience support for these approaches.

Assessment

The assessment process in Adlerian theory is two-fold: to assess individuals' present functioning and to assess how individuals' developed their current life style (Carlson et al., 2006). One unique aspect of the Adlerian assessment process is use of the life style assessment. In this assessment, counselors gather detailed information about the client's early childhood experiences and how his/her perceptions of those life events contribute to their current view of the world and current functioning. In addition to family constellation information already discussed, counselors can facilitate the recall of early recollections. Counselors ask clients to remember up to eight memories prior to the age of ten. From the information gathered, counselors present tentative hypotheses regarding how clients perceived and chose to respond to their developmental histories, lists of convictions that appear to be interfering with the client's current function, lists of assets and strengths, and degrees of social interest. This process gathers a holistic picture of the individual's worldview and his/her level functioning.

Neuroscience research seems to support a holistic assessment process that includes attention to early childhood relationships, environment, and significant events (Badenoch, 2008). DeRobertis (2015) noted that from a dynamic systems neuroscience perspective, "interactions within environments play a formative role in individual neural fluctuations" (p. 328). These environmental interactions include, but are not limited to, individual factors (e.g., genetics, temperament, ethnicity), family (e.g., child-parent relationship, socioeconomic status), cultural (e.g., collectivist, individualistic), and societal (e.g., institutionalized discrimination, laws). For example, a growing body of research links negative early environmental experiences with decreased cognitive, emotional, and social functioning (Andersen et al., 2008; Hanson et al, 2014; Perry, 2009; Schore & Schore, 2008).

Interventions

Adlerian counselors believe holistic change starts with counselors' understanding, empathy, and compassion, emphasizing an authentic relationship (Hansen et al., 2014; Mosak & Maniacci, 1999). With that relational foundation, counselors are then able to engage in interventions that help facilitate insight and action. Insight involves recognizing one's mistaken beliefs and view of self, others, and the world and action refers to making a conscious decision to feel, think, and act differently (Adler, 1956). Counselors and the counseling room serves as a safe base for the client to test out new ways of thinking and behaving, eventually generalizing those new ways of being to the outside world.

Adlerian counselors use a variety of interventions to facilitate holistic change (Carlson et al., 2006; Mosak & Maniacci, 1999). The life style interview and early recollections techniques are frequently used early in the therapeutic process to facilitate insight. Spitting in one's soup, identifying and challenging mistaken beliefs, acting 'as if' and role-playing are often used to help clients translate insight into action. Adlerians also use psychoeducation to teach clients about Adlerian concepts, including mistaken beliefs, feelings of inferiority, social interest, and so forth (Carlson et al., 2006). Many Adlerian counselors also draw from other approaches (i.e., cognitive, behavioral, family systems, psychodrama, narrative) to enhance social interest and encourage changes in thinking and acting (Mosak & Maniacci, 1999; Peluso, et al., 2004).

Although Adlerian counseling can be brief (Watts, 2000), many Adlerian counselors favor longer-term, individually-tailored interventions. Such counselors acknowledge the time it can take for individuals to build trust and consider the influences of early experiences on current thinking, feeling, and acting (Bitter & Nicoll, 2000). Adlerian counselors often work with individuals' entire "world", including family, schools, and community support systems, believing that "real change happens between sessions" (Bitter & Nicoll, 2004, p. 64). Adlerian counselors specifically encourage application of in-session learning outside of the counseling room during the reeducation/reorientation phase of therapy.

The process of change from neuroscience perspective, although more technical in terminology, aligns with the Adlerian view of change. A neuroscience view of change is based on principles of experience-dependent neuroplasticity (Cozolino, 2010; Siegel 2012). Neuroscientists believe that the brain can change throughout the lifespan and that individuals are filled with potential. Some research exists that suggests new relational experiences (e.g., counseling) can change the neural structure of the brain and influence perceptions, behaviors, emotions, and cognitions (Badenoch, 2008; Linden, 2006). Although the principle of neuroplasticity can foster hope, this knowledge also enhances understanding of the difficulty of change. Neural change does not occur quickly; individuals must

repeat new experiences many times for lasting change to occur (Siegel, 2012). From a neuroscience perspective, one hour weekly sessions is not likely going to result in dramatic or rapid change. Thus, involving support systems and encouraging other environmental changes that support neuroplasticity is critical. As noted above, Adlerian counselors commonly embrace systemic and holistic action that extend beyond the weekly one-on-one session.

Neuroscience research also points to the importance of counselors targeting more than one component of individuals' experiences (e.g., thought, interpersonal relationships, affect, early childhood experiences, and so forth) to support neuroplasticity. A common example of counselors failing to intervene holistically is the overemphasis on cognitive-oriented work (Field et al., 2015). Researchers have increasingly called for attention to underlying emotions and motivational drives and interventions that target physiology and implicit memory (Pankseep & Biven, 2012; Perry, 2009; Field et al., 2015). Although cognitive models of change can be helpful in working with clients' overwhelming emotions, creating change solely through such higher cortical regions is limiting because clients often lose their abilities to apply such learning when stress levels get elevated (Field et al., 2015; Raio, Orederu, Palazzolo, Shurick, & Phelps, 2013). Interventions that foster embodied awareness, including breath awareness, mindfulness, and other sensorimotor-oriented interventions may allow individuals to interrupt the cycle of automatic brain processes and make new cognitive and behavioral choices (Field et al., 2015). Interventions that use the counselor's own sense of self (e.g., bodily attunement) to attune to clients' inner experiences are also helpful in facilitating change (Badenoch, 2008). Adlerian theory, with its emphasis on the therapeutic relationship and openness to the integration seems primed to embrace holistic bottom-up (subcortical) and top-down (cortical) interventions.

Recommended Additions

Neuroscience research supports many aspects of Adlerian theory, including attention to the impact of early experiences on development, the role of environmental and systemic factors on wellbeing, and the importance of taking a holistic approach to assessment and treatment. The theory, however, may benefit from the addition of neuroscience supported theories of development and the inclusion of neuroscience-informed terminology and interventions. In the following paragraphs, we elaborate on these suggested additions.

Developmental Theory

One frequent criticism of Adlerian theory is that it does not include a comprehensive developmental model (Mosak & Maniaci, 1999). Although Adler (1956) emphasized early childhood experiences as critical to the overall development of the child's life style, he did not explicitly outline a theory of development. The integration of developmental brain science, as well as the further integration of attachment theory, may help address this gap. Brain science continues to evolve, however, certain principles are well established. The Center on the Developing Child (2007) summarized three well-supported principles of brain development: experiences build brain architecture, serve and return interaction shapes brain circuitry, and toxic stress derails healthy brain development. Early experiences impact the foundational architecture of the brain, shaping capacities for attention, social engagement, behavior, emotional regulation, intellect, and so forth. These principles, along with an understanding of the bottom-up progression of brain development (i.e., brain stem, limbic, cortex), help explain the disproportionate impact of environmental and relational factors in early childhood on development, as noted previously (Andersen et al., 2008; Perry, 2009; Siegel, 2012). Inclusion of such theories could add descriptive detail and depth to existing Adlerian concepts.

Additionally, inclusion of attachment theory within Adlerian theory could help strengthen developmental conceptualizations. Attachment theory was developed before contemporary neuroscience; however, neuroscience research findings support this social-emotional developmental theory based on evidence that healthy brain development relies on nurturing, predictable, and safe relationships with significant others (Badenoch, 2008; Siegel, 2012). A decade ago, Peluso et al. (2004) explored the similarities between attachment theory and Individual Psychology, noting that the theories both hold a coherent and stable view of the self and the world and acknowledge the crucial aspect of social interaction for the expression of such patterns. Following this conceptual article, Peluso, Peluso, Buckner, Kern, and Curlette (2009) found support for the similarities of Adlerian lifestyle and adult attachment style constructs through an empirical investigation. Carlson and Robey (2011) used the integration outlined by Peluso and colleagues as a base for demonstrating the connection between Adlerian and attachment theories. Other scholars have explored the links between attachment theory and Adlerian theory with specific client populations: adoptive families and late-placed children (LaFountain, 2011), children and adolescents diagnosed with reactive attachment

disorder (Tobin, Wardi-Zonna, & Yezzi-Shareef, 2007), and trauma shame studies (Smith, 2009). There seems to be sufficient support for formalized integration attachment theory within Adlerian theory. Doing so will help strengthen the rationale behind Adlerian concepts, including family atmosphere, social interest, mistaken beliefs, private logic, and lifestyle.

Conceptualization of Functionality

Individuals have asserted that Adlerian theory provides too simplistic of an understanding of functionality, namely that degrees of discouragement and social interest conceptualize mental health (Mosak & Maniaci, 1999). Although neuroscience supports these basic concepts as indicators of health, they are insufficient to explain the full scope of human functioning. Carlson (2000) noted that if Adler were alive today, he would be integrating new ways of understanding people, including consideration of brain functioning. Thus, in order to add further depth and credibility, we recommend adding brain-based understandings of health in Adlerian theory.

One such brain-based understanding comes from the field of interpersonal neurobiology (Siegel, 2012). From an IPNB perspective, the mind as a complex, self-organizing, non-linear system that achieves wellbeing when aspects of the system (e.g., parts of the embodied brain, interpersonal relationships) are allowed to sufficiently differentiate (i.e., specialize) and then link with other aspects of the system. This process of coordination and balance leads to integration. Siegel (2010) used the acronym FACES (flexible, adaptive, coherent, energized, and stable) to illustrate characteristics associated with neural integration. Individuals that have more integrated brains are more likely to perceive themselves as part of a large whole, leading to pro-social behaviors similar to those discussed in Adlerian through the concept of social interest. Lack of integration is expressed on a continuum of rigidity and chaos and results in symptoms categorized in traditional diagnostic systems.

Additional Interventions

The recommendation to integrate additional interventions into Adlerian practice builds on a tradition of Adlerian counselors using eclectic approaches in the service of facilitating insight and action (Mosak & Maniaci, 1999; Peluso, et al., 2004; Sweeney, 2009). Although there are many interventions to consider, we will focus on two specific interventions: neuroeducation and mindfulness skills training. Forms of these interventions are not particularly new, however, we have found little evidence that Adlerian counselors are widely embracing these types of approaches and thus believe they deserve attention within this article. Both of these interventions are consistent with Adler's adherence to phenomenological and teleological principles (Fall, Holden, & Marquis, 2010). The approaches help individuals become more aware of implicit biases that impact conscious experiencing and better understand cause and effect relationships. Increased awareness of embodied experiencing can create more choice for change.

Adlerian counselors have a long history of integrating psychoeducation into therapy (Watts, 2000). Neuroeducation is a specific type of psychoeducation, one that focuses on helping clients understand basics of brain development and brain functioning (Miller, in press). A number of clinicians have anecdotally reported their experiences integrating education about the brain into counseling sessions (Badenoch, 2008; Cozolino, 2010; Miller & Barrio Minton, in press; Siegel, 2010). Clinicians reported that understanding organic structures and functions of the brain is empowering for both counselors and clients and adds credibility and intentionality to their work (Miller & Barrio Minton, in press). Badenoch (2008) noted that teaching clients about the brain can decrease feelings of shame, increase self-compassion, increase empathy for self and others (i.e., embracing the intergenerational tragedy), decrease the deregulating intensity of memories, and give non-pathologizing terms to states of rigidity and chaos. Siegel (2010) used the phrase "name it to tame it" to describe the natural process of down regulation that can occur when individuals simply recognize and acknowledge their heightened internal states.

A specific example of neuroeducation includes talking with clients who experienced early interpersonal trauma about the social nature of the brain and the impact early relationships can have on foundational neural circuitry. A discussion about the way that individuals' embodied systems typically adapt to survive and belong can help clients make sense of present ways of thinking, feeling, and behaving that they might otherwise view as evidence of their being innately flawed or worthless (Miller & Barrio Minton, in press). Additional examples of neuroeducation include the hand model of the brain (Siegel, 2010), the healthy mind platter (Rock, Siegel, Podmans, & Payne, 2012), the functions of

right and left brain hemispheres (Badenoch, 2008), the implicit memory system (Siegel, 2010), and the impact autonomic nervous system arousal on functioning (Porges, 2011). For a more detailed description of interventions and guidelines for therapeutically engaging in neuroeducation see Miller (in press).

A second intervention that aims to increase clients' awareness of implicit responding (e.g., private logic) and holistic embodied experiencing is mindfulness skills training. Mindfulness skills training includes the fostering of introspection, consciousness, and mindfulness (Siegel, 2010). The approach relies on principles developed from ancient wisdom traditions and recently supported by neuroscience research (Tang, Holzel, & Posner, 2015). Although researchers have not yet isolated the exact mechanisms of mindfulness skills-induced change, there are associations between mindfulness-based interventions and improved emotional regulation, attention, cognition, and awareness (Baer, 2003; Brown, Marquis, & Guiffrida, 2013; Tang et al., 2015). An initial step to developing mindfulness skills includes helping clients engage in simple breath awareness practices and attuning to their bodies. Counselors can then proceed to helping clients acknowledge their thoughts and feelings as being part but not the totality of their being. Clients grow in their acceptance and curiosity, rather than judgment, of their thoughts and feelings. Clients also learn to create space between thinking and feeling and acting on those thoughts and feelings. A more advanced mindfulness skills practice is the wheel of awareness, in which counselors guide clients through a 20 minute reflective practice across eight senses, first differentiating and linking the senses within the hub of awareness and then linking them together through awareness of awareness (Siegel, 2010). For a more comprehensive discussion of mindfulness skills see Siegel (2010).

Conclusion

Integration of neuroscience into Adlerian theory is not without limitations. Despite the many advances made in the neuroscience field, there is still less known than unknown about the brain (Badenoch, 2008). In the preceding paragraphs we highlighted widely accepted understandings of patterns in brain development and functioning, however, the infinitely complex nature of the embodied nervous system limits the generalization of much of the existing research related to the impact of counseling on specific neural changes. Furthermore, most counselors have not been formally trained in neuroscience and thus are vulnerable to misconceptions and misappropriated application of neuroscience findings to counseling. Thus, counselors should use appropriate caution in applying neuroscience findings in their work and avoid approaches that reduce individuals' to the mere functioning to their neural firing patterns. Continuing education, consultation, and careful reflection on core philosophical values can aid Adlerian counselors in appropriately integrating neuroscience perspectives.

Maslow (1970) noted in a tribute honoring Adler that "Adler becomes more and more correct year by year. As the facts come in, they give stronger and stronger support to his image of man[sic]" (p. 13). Based on the evidence reviewed in this article, we conclude that this statement remains true today. Neuroscientists' research largely compliments the central humanistic tenets of Adlerian theory, including social embeddedness, purposefulness of behavior, and holism. In addition to supporting existing Adlerian principles and practices, advances in neuroscience can also inform the continued evolution of the theory, allowing for the integration of neuroscience-informed developmental theory, conceptualization of functionality, and interventions. We believe this integration adds to Adlerian counselors' understanding of the rationale and intentionality behind certain Adlerian principles and techniques and allows counselors to have another language (i.e., tool) to use in connecting with individuals and facilitating change.

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