

Neuroscience: The Brain behind the Social Worker and Client Relationship

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Abstract

We are social beings. It is embedded in our DNA (Deoxyribonucleic Acid) and literally in our brain. The lack of education about neurobiology has developed many misconceptions among social workers that neuroscience is too academic and thus irrelevant to clinical practice. Although the study of the brain is important as the brain is a social organ behind the social worker and client relationship. This paper is intended to be a primer stemming from the assumption that many readers are unfamiliar with neuroscience which is the science of the brain. The purpose of this paper is to offer new insights into the crucial role of neuroscience and its applicability to the body language displayed by both the social worker and client during their relationship.

The human lifespan is only about 650, 000 hours (Bryson, 2003). Humans have evolved from our primate ancestors 100, 000 years ago and it took “another 50,000 years for our brains and culture to evolve sufficient complexity to make us capable of language, planning, and creativity” (Cozolino & Santos, 2014, p. 157). The brain has allowed humans to dominate all other species (Carey, 1990). It is a spongy mass which has been compared to a telephone switchboard and a supercomputer (Carey, 1990). Our brains and bodies are synchronized to function together. The brain is the most advanced and sophisticated organ known in the universe (Carey, 1990).

We are social beings. It is embedded in our DNA (Deoxyribonucleic Acid) and literally in our brain. In fact, all thirteen central parts of the brain; prefrontal cortex, anterior cingulate cortex, insula, thalamus, brain stem, corpus callosum, cerebellum, limbic system, basal ganglia, hippocampus, amygdala, hypothalamus and the pituitary gland all have a partner (Hanson, 2009). There are no single brains as we are all intricately connected to each other; imperative for our well being and survival. Our brains process sensory, motor, and emotional information in 10 to 50 milliseconds, but it takes 500 to 600 milliseconds (a half second) for brain activity to even register in conscious awareness (Cozolino & Santos, 2014). The idea that a substantial portion of the human mind is unconscious is not new, as Freud himself provided the most significant insight to look beyond the narrow corridor of consciousness (Wilson, 2004). The lack of education about neurobiology has developed many misconceptions among social workers that neuroscience is too academic and thus irrelevant to clinical practice (Applegate & Shapiro, 2005). The study of the brain is critical as the brain is a social organ behind the social worker and client relationship.

This paper is intended to be a primer stemming from the assumption that many readers are unfamiliar with neuroscience which is the science of the brain (Applegate & Shapiro, 2005). The purpose of this paper is to offer new insights into the crucial role of neuroscience and its applicability to the body language displayed by both the social worker and client during their relationship. The characteristics of the brain have a tremendous impact on how we function. Therefore, understanding the connection between the brain and body and by extension, the implications for social work practice will provide a psychoeducational perspective of how we think and act. To set the stage, the author will introduce interesting facts about the brain, a working example of Dr. Dan Siegel (2013) *Hand Model of the Brain* and Dr. John Ridley Stroop (1935) *Stroop Colour Word Test*. Readers will have the opportunity to try these examples for themselves as for the philosopher, John Dewey (1904) emphasized, you learn by doing. Next will be the importance of body language, and Dr. Edward Tronick ‘*Still Face Experiment*.’ Lastly, implications for social work practice.

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Facts about the Brain

Much of the brain is divided into two hemispheres; left hemisphere and right hemisphere and is composed of 75 to 80% of water (Shroff, 2016; Siegel & Hartzell, 2013). The brain keeps us alive and is designed to sense, process, store and perceive information from the external and internal world (Cozolino & Sprockay, 2006). The human brain has about 100, 000, 000, 000 or 100 billion neurons (Agatonovic-Kustrin & Beresford, 2000). From the age of 35 years about 7000 neurons are lost daily (Shroff, 2016). The brain receives information from all our five senses; hearing, seeing, tasting, feeling and smelling. As Eagleman (2015) describes the brain is sealed within a dark vault and has no direct access to the outside world with “everything you experience -every sight, sound, smell- rather than being a direct experience is an electrochemical rendition in a dark theater” (p.39). In other words, you don’t see with your eyes, you don’t feel with your fingers, and you don’t hear with your ears. It is your brain that does all of this. Therefore, you don’t see things the way they are; you see things the way you are (Eagleman, 2015). In fact, there are so many stimuli coming to our senses that we receive 11, 000, 000 pieces of information per second (Wilson, 2002). However, we can only handle 40 pieces of information per second consciously (Wilson, 2002).

The brain is very complex to handle all aspects of our life even before we are born. During early pregnancy, the neurons in the fetus can multiply at a rate 250,000 neurons/minute (Shroff, 2016). The brain consists of 60% white matter and 40% grey matter while the white is the supporting matter and the grey is the thinking matter of the brain, so if the brain were a computer, the grey matter would be the computer itself and the white matter its cables (Shroff, 2016). An adult brain weighs about 3 pounds or 1300 to 1400 grams which are about 2% of the body weight if you weigh 150 pounds or 70 kgs (Shroff, 2016). Although the brain only accounts for 2% of our body weight, it consumes 20% of the oxygen that we breathe and roughly 20% of our daily calories (Shroff, 2016). From all the blood pumped out of the heart, 15-20% goes directly to the brain (Shroff, 2016). Surprisingly, the brain is more active and thinks more at night than during the day (Shroff, 2016). All these facts that you have learned about the brain have now changed your brain as every time you learn a new fact or skill your brain changes called neuroplasticity (Carey, 1990).

Dr. Dan Siegel (2013) Hand Model of the Brain

To create a basic visual of the brain Dr. Dan Siegel (2013), who is a clinical professor of Psychiatry at the UCLA School of Medicine, has developed a hand model of the brain which he uses to teach parents about the brain (Siegel & Hartzell, 2013). It is a useful model of the brain so that we can see a representation of the brain in front of us (Siegel & Hartzell, 2013). Try it for yourself. Dr. Siegel (2013) provides a step by step procedural process to create the hand model of the brain.

First hold up your hand then “take your thumb and bend it into your palm and fold your fingers over the top” this is “an accurate general model of the brain” (Siegel & Hartzell, 2013, p. 194). Now hold up your fist so that your fingernails face you and you will see the “middle two fingernails are behind the eyes...the ears come out the side, the top of the head is at the top of your bent fingers (symbolizing the cerebral cortex which is for thinking and reasoning), the back of the head corresponds to the back of your fist, and your wrist represents the neck. The center of your wrist represents the spinal cord coming up from your back, and the center of your palm symbolizes the brain stem which emerges from the spinal cord” (Siegel & Hartzell, 2013, p. 194). The brain stem and limbic area work together for emotion regulation (Siegel & Hartzell, 2013). The brain stem is the lowest area and most ancient part of the brain. It is sometimes called ‘primitive or reptile’ brain, which takes in data from the outside world through sensations of the body and perceptual system, except for smell (Siegel & Hartzell, 2013). This area regulates wakefulness and sleep and major survival reflexes; “fight, flight, freeze or faint” (Siegel & Hartzell, 2013, p. 194). Now raise your fingers to reveal your curled-up thumb in the palm of your hand, and you will observe the limbic structures in the model which “mediate emotion and generate emotional states” (Siegel & Hartzell, 2013, p. 194). These limbic functions influence processes throughout the brain and are essential because if someone aggravates us and ‘pushes our buttons’ the wrong way we ‘flip our lid,’ represented by flipping our fingers in an upright position in the brain model (Siegel & Hartzell, 2013). When this happens, we tend to express adverse reactions towards others (Siegel & Hartzell, 2013).

Stroop Colour Word Test

The Stroop Colour Word Test was initially developed in 1935 by psychologist John Ridley Stroop to measure selective attention and cognitive flexibility (Stroop, 1935). He tested the effects of interference when presented with conflicting stimuli using various experiments. In one of his experiments participants were instructed to recite the name of 100 colors presented, however, the printed word was in an opposing ink color (Stroop, 1935). For example, the word red was written in blue ink so that the correct answer would be the observed color of blue. He measured the time to recite the colors verbally, the errors made, and the errors not corrected (Stroop, 1935). It resulted in participants taking 47 seconds longer when the ink color of the word was printed in the name of a different color, then to recite same name colors printed in black (Stroop, 1935).

An example of brain interference is when new visual information conflicts with old stored information of knowledge (Stroop, 1935). Interference is understandably the impediment or hindrance of an action (Stroop, 1935). The result of an interference itself is the product of how people think which uses brain functions such as memory (Heathcote, Popiel & Mewhort, 1991). For example, drivers have learned to implicitly and automatically stop at a red stop sign, however, if that sign was converted to green an interference effect may occur, requiring drivers more time to react to stop at the new green colored stop sign. Another example of interference is a doorbell with the sound of a telephone ring or a telephone ring with the sound of knocking at the door. It would also create interference of the old knowledge competing with the new knowledge. So, the more knowledge we have about our brains and our thinking processes, the more people will have effective strategies to live our lives. The Stroop experiment demonstrates that selective attention is the ability to pay attention to relevant information and ignore distracting information. A brain interference may also occur when verbal language is not congruent with the expressed body language.

Importance of Body Language

Non-verbal communication through body language is called kinesics. It is defined as “conscious and unconscious psycho muscularly-based body movements and intervening or resulting still positions, either learned or somatogenic, of visual, visual-acoustic and tactile and kinesthetic perception. Whether isolated or combined with the linguistic and paralinguistic structures and with other somatic and behavioral systems possess intended or unintended communicative value” (Poyatos, 2002, p. 185).

An individuals’ body posture, gaze movements, a heavy chest that expands and contracts with troubled breathing, a hand inside a pocket, the stride of a person and many more subtle movements or still positions communicate meaning (Poyatos, 2002). Observing the body language in our clients will provide a clearer picture as to what the client is personally experiencing.

Imagine this. You are a social worker in child welfare agency, and you are interviewing your client about what progress they have made of keeping a daily journal of how they are overcoming their outbursts of anger. You observe your clients body language. The client had a loss for spoken words but communicated ample body language. You notice your client placing their hands clasped on the table and looking at the wall in an uncomfortable stare. Then the client put their elbow on the table and their hands to their head and covered their eyes. Next, their cheeks began to flush to convey embarrassment or discomfort to answer the question. Then your client says verbally ‘Everything is going fine. I have had no outbursts this week’. Observing and understanding the body language of the client is an essential dimension of the social work practice. Being attuned to our bodies and the bodies of our clients will enhance our understanding of the working relationship.

It is a scientific fact that people’s gestures and even how our physical movements speak to each other (Pease & Pease, 2008). Every day, we use gestural behaviors as a form of communication whether we realize it or not. For example, pointing with your finger which way you would like to go, shaking your head yes or no, shoulder shrugging, smiling, etc., you get the idea, these convey a message to the receiver. Politicians sometimes pretend to believe in something that they don’t believe in or imply that they are someone than who they are (Pease & Pease, 2008). They spend much of their time “pretending, lying, hiding their emotions and feelings” but by paying very close attention to their body language, we recognize the interference between their body language signals and verbal communication (Pease & Pease, 2008, p. 4).

Body language conveys the “automatic information” gathered unconsciously and implicitly (Angelo & Cross, 1993). For example, in the classroom teachers ask students questions and observes the student’s body language to form an assessment of how the student is learning (Angelo & Cross, 1993).

It is no secret that a single gesture can convey more than a thousand words (Savignon, 1976). If you have a verbal communication with someone, and the person responds to your question with a verbal 'yes' but simultaneously shakes their head side to side to signal 'no,' there is a brain interference in the brain. Somewhat like the interference found in the Stroop Test, the body language we are seeing, and the verbal communication we are hearing are contradictory.

Dr. Edward Tronick 'Still Face Experiment'

Dr. Edward Tronick, the director of Child Development Unit at Harvard University, conducted a 'Still Face Experiment' (Tronick, 2009). Its purpose was to observe how responsive babies are to the emotions, reactivity, social interaction and facial expressions they receive from others in their environment (Tronick, 2009). This experiment was first developed on the premise that babies could not engage in social interaction with others or be receptive to others (Tronick, Als, Adamson, Wise, & Brazelton, 1978). However, this research demonstrated that babies are, in fact, very responsive to their environments (Tronick, 2009). In this experiment as explained by Dr. Tronick (2009) the mother begins to play with the baby who is about one year old. The mother gives a greeting to the baby, and the baby reciprocates with a greeting. The baby plays with her mother for a few minutes, and then the mother turns her head away and returns with a still face for two minutes. Here the baby observes the mother's non-responsiveness body language and begins to react negatively crying and turning away (Tronick, 2009).

Dr. Tronick's experiment provides credence that even our face-to-face interactions are co-created by an ongoing moment-to-moment dynamic process that generates unique interactive exchanges in the relationship (Tronick, 2009). Humans expand their states of consciousness through the co-creation of social exchanges (Tronick, 2009). Therefore, being able to know another's state of mind means to exchange meanings with another person about their individual's subjective experience of the self, the relationship and the world around them (Tronick, 2009). It would hold true in the relationship between social worker and client by using our Mirror Neuron System (MNS). The MNS is any act from others you can predict from experience which includes emotional and behavioral expressions.

Social Work Implications

Mary Richmond can be credited with early efforts to understand client relationships and its critical importance: "Friendly visiting means intimate...knowledge of and sympathy with a ... family's joys, sorrows, opinions, and feelings...[although] without it he is almost certain...to blunder seriously" (p. 180). Research has shown effective relationships include empathy (Shaw as cited in Biestek, 1957), rapport and emotional bridging (LeRoy as cited in Biestek, 1957), some aspects of transference (Taft as cited in Biestek, 1957; Garrett Mangold & Zaki, 1982), engagement (Smalley, 1967) and therapeutic alliance (Coady, 1999). In addition to these crucial aspects of an interpersonal relationship, to truly understand being human, we must understand not only how we as people exist with others, but how our brains exist in relation to other brains (Cozolino, 2006).

Human development and maturation are the longest of all the mammals; infant and parent are an inseparable dyad (Cozolino, 2006). There is no question we are social. In social work practice, the social worker observing and interpreting the client's body language will enhance their understanding of the client. We rely on many neural systems that process social and emotional information and gather massive amounts of data from clients across the social synapse, consciously and unconsciously such as facial expressions, body posture, blushing, pupil dilation and many still-to-be-discovered channels (Cozolino & Santos, 2014). With this new-found information, we try to understand and articulate experiences of the unconscious internal states that clients may not be able to articulate themselves (Cozolino & Santos, 2014).

At the same time, the social worker's awareness of their body language and that they are not creating a brain interference is extremely important as it sets the tone for the working relationship. Given the fact our brains have evolved in this social context, we have developed the ability to link with other brains, attuning with each other, regulating each other's emotional systems, and helping to grow each other's neural networks (Cozolino & Santos, 2014). It helps social workers to understand the social nature of the brain and that their body shifts serve as the gateway towards insights of another person. Humans are social to the core; the brain is both embodied and relational, as revealed in Dr. Tronick's Still Face Experiment that the center of our humanness is social connectedness (Tronick, 2003). Dr. Siegel (2013) *Hand Model of the Brain* can symbolically remind us in practice that the brain plays a vital role in the client relationship.

Dr. Stroop (1935) *Stroop Colour Word Test* adds another layer of awareness that at times there may be a brain interference that we need to step back and take another look such as when our clients may verbally say one thing, but their body language tends to convey a different message. The behaviors that we use in body language are learned skills we have achieved over the course of our lives and are a valuable way we communicate our needs and wishes to others. Therefore, understanding the brain behind the social worker and client will enhance and strengthen the working relationship.

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