



BIOLOGY OF THERAPEUTIC RELATIONSHIP

Kim Barthel, OTR/L 2004

"Therapeutic use of self", is a phrase that is emphasized as a significant component of our occupational therapeutic process. We inherently recognize this natural and intrinsic aspect of our relationships with clients as essential and profound in our ability to create change. But, in this current healthcare delivery system of evidence, efficacy and economy, there seems to be very little time allotted for this fundamental and precious element of our professional identity.

The love of connecting with clients and recognizing the importance of creating safe and open relationships invited me to investigate possible evidence for the importance of this aspect of what we do. To my surprise, a great deal of current brain research emphasizes the importance of human relationships on brain development, learning and mental health. There is support for this important aspect of our process. I would love to share some of my research with you...

The process of human connection begins at birth. That old concept of bonding or developing a relationship is well documented. But what really happens during this process. Well, Megan Gunnar, a researcher in Seattle, measured the oxygen flow to the brain using a PET scanner during bonding phases of mothers with their newborns. She provided startling evidence that relationship is registered by the brain. During bonding moms exhibit excessive PET scan illumination in the right orbital-frontal cortex when gazing and connecting with their babies. But what was even more startling was the simultaneous activation of the right orbital-frontal cortex of the baby. An entrainment of brain activation occurs during this important fundamental relationship.

Gabor Mate in his book "Scattered Minds" describes this attachment as "an inborn system in the brain that evolves in ways that influence and organize motivational, emotional and memory processes with respect to significant care giving figures. This inborn system seems to have survival value to the infant, facilitating the necessary connection with the caregiver for its very survival. This attachment system motivates infants to seek proximity to parents and to establish communication with them. At the level of the mind, attachment establishes an interpersonal relationship that helps the immature brain use the mature functions of the parent's brain to organize its own processes. To me this finding was profound. Not only does relationship teach us about relationships, but it prepares our brain for functions of attention, learning and memory.

For the first seven months the baby primarily communicates with the mother in an unconscious fashion. This is evidenced by measuring newborn brainwave states. The newborn presents with a predominant delta wave which is like deep sleep or trance state. Very minimal conscious activity is available. The infant is incapable of deciphering the meaning of words, receiving messages that are purely emotional. They are conveyed by the mother's gaze, her tone of voice and her body language, all of which reflect her unconscious internal emotional environment. Anything that threatens the mother's emotional security may disrupt the developing wiring and chemical supplies of the infant's brain's emotional-regulating and attention-allocating systems.

Dr. Gunnar then investigated the effects of maternal moods on the electrical activity of the infant's brain to examine the impact of disconnection on brain activity. Depression in adults is associated with decreased electrical activity in the left hemisphere.



Dr. Gunnar compared the EEG's of infants whose mom's experienced post-partum depression with the brain waves of mom's without. As we remember, mom's in a typical connecting phase with their infants exhibit increased activation of the right orbital-frontal cortex while their infants demonstrated brainwave entrainment with this pattern. The infants of depressed mothers failed to show this differential hemispheric activation. This means that the brain activity that is anticipated during positive infant mother exchange did not occur.

Further brain research has indicated that this area of the brain, the orbital-frontal cortex plays a role as a mediator between emotions and rational thought. The ROFC is helpful in the function of emotional regulation, arousal and attention. Long term studies have indicated that many children with attention deficit disorder experience challenges with the functioning of the ROFC. Thus relationship seems to set the stage for many other skills.

Imbedded within this attachment process lies the subtle dance of attunement. This attunement occurs between mom's and infants as they connect, with mom's initiating engagement, following the lead of the child and allowing intermittent interruptions in connection. This dance is the earliest form of learning functions of self-regulation. It is a process necessary for the normal development of the brain pathways and neurochemical apparatus of attention and emotion.

Dr. Gunnar discovered that infants whose caregivers were too stressed, for whatever reason to give them the necessary attunement contact grow up with difficulty regulating their emotions. Human connections can create neuronal connections.

Well why am I telling you this? The very same attunement process can be created in the connected relationship. Children who have experienced trauma or have had insufficient attunement experiences and demonstrate behavioral challenges, personality disorders, attention deficit disorders are responding to therapeutic relationships that emulate the activation of the ROFC through relationships that provide attachment, bonding and the dance of attunement. When this preferred state of relating is available then the brain is better regulated for learning and change. Relationship sets the stage.

Other studies have been done with brainwaves in relationships. One particular study measured the brainwaves of counselors in a compassion state. They consistently demonstrated a slowed brainwave state (theta-delta). Clients in session with these counselors, followed suit by entraining with this state of EEG and a subsequent lowering of blood pressure and reduced galvanic skin response. Relationship can clearly support a relaxed state of being.

The field of psycho-neuro-immunology has also contributed to our understanding of the value of relationship in healing. We used to believe that the mind and the body were separate entities. A scientist named Candace Pert discovered neuropeptides, chemicals typically found in the brain located in the capsules of our organs, in the walls of the gut and even in our white blood cells. There are bits of the brain floating around the body. What this translates into is that emotions live in the body. When we are out of balance in our emotional self, experiencing trauma, experiencing illness, stress or change, our body responds in kind. Therapeutic relationships when established create a sense of safety and a state of relax that can facilitate mind/body reaction of healing. One long term psychoneuroimmunological study found that women with breast cancer demonstrated increased longevity and shorter durations of treatment when they attended support groups. Men who experienced cardiac arrest, lived longer when they were in supportive relationships. There seems to be something healing about this state of connection.

As humans, our body is able to recognize this process of connection. Chemically the body reacts with a release of serotonin within the nervous system that reflects a state of calm and joy. This neurotransmitter substance has been noted to peak during intense human connections. Human connection also triggers the autonomic nervous system hormonally into a state of relaxation providing us with an internal experience of comfort and security.

We perceive connection as a feeling in the heart as warmth, acceptance, validation, reassurance, and support. We recognize



this quality of interaction through eye gaze, facial expressions, body language, and overall states of being with whom we are connected. We can feel the intensity and the quality of the connection through the eyes when we “lock on”.

It has been through experience that this form of connection is the magic in therapy. Setting the stage for an open state, emotionally, learning potential is enhanced. Let's continue to incorporate this critical element in our work with the clients we love to serve.

CONNECTIONS BIBLIOGRAPHY

Ainsworth, M.D.S., Blehar, M.C., Waters, E., & Wall, S. (1978) *Patterns of Attachment: A psychological study of the Strange Situation*. Hillsdale, New Jersey: Erlbaum.

Ainsworth, M.D.S., & Eichberg, C. (1991) Effects on infant-mother attachment of mother's unresolved loss of an attachment figure, or other traumatic experience. In C.M. Parkes, J.Stevenson-Hinde, & P. Marris (Eds), *Attachment across the life cycle* (pp. 160-186). London:Routledge.

Atkinson, L., & Zucker, K.J. (Eds.). (1997). *Attachment and psychopathology*. New York: Guilford Press.

Barnes, C.A., Erickson, C.A., Davis, S., & McNaughton, B.L. (1995) Hippocampal synaptic enhancement as a basis for learning and memory: A selected review of current evidence from behaving animals. In J.L. McGaugh, N.M. Weinberger, & G. Lynch (Eds), *Brain and Memory: Modulation and Mediation of Neuroplasticity* (pp. 259-276). New York: Oxford University Press.

Benedersky, M., & Lewis, M. (1994). Environmental risks, biological risks, and developmental outcome. *Developmental Psychology*, 30, 484-494.

Broman, Sarah and Fletcher, Jack. (1999) *The Changing Nervous System: Neurobehavioral Consequences of Early Brain Disorders*. Oxford University Press. New York.

Bundy, A., Lane, S., and Murray, E. (2002) *Sensory Integration Theory and Practice*, 2nd Edition. F.A. Davis, Philadelphia.

Carlson, E.A. (1998). A prospective longitudinal study of disorganized/disoriented attachment. *Child Development*, 69, 1107-1128.

Cho, Daniel (2004). Phonics Could Prevent Dyslexia. *Scientific American Mind*. Scientific American Special Edition.

DeGangi, Georgia (2000) *Pediatric Disorders of Regulation in Affect and Behavior. A Therapist's Guide to Assessment and Treatment*. Academic Press, New York.

Des Maisons, K. (1998) *Potatoes Not Prozac*. Fireside Books, New York.

Englert, Hermann. (2004) *Sussing out Stress*. Scientific American Mind. Scientific American Special Edition.

Field, T. (1995) Infants of depressed mothers. *Infant Behavior and Development*, 18, 1-13.

Fischetti, Mark (2004) *Half a Brain More*. Scientific American Mind. Scientific American Special Edition.

Gage, Fred. H. (2003) *Brain, Repair Yourself*. Scientific American, September Issue.



- Greenspan, Stanley I. (1997) *The Growth of the Mind and the Endangered Origins of Intelligence*. Addison-Wesley Publishing Company, Inc. New York.
- Greenspan, Stanley I. and Wieder, Serena. (1998) *The Child with Special Needs*. Addison-Wesley Publishing Company, Inc. New York.
- Grossberg, Stephen (2005). Linking attention to learning, expectation, competition and consciousness. *Neurobiology of Attention*. 107: 652-662.
- Hamer, Dean and Copeland, Peter (1998) *Living With Our Genes*. Doubleday. New York.
- Kandel, E.R. (1998) A new intellectual framework for psychiatry. *American Journal of Psychiatry*, 155, 457-469.
- Kandel, E.R. & Abel, T. (1995). Neuropeptides, adenylyl cyclase, and memory storage. *Science*, 268, 825-826.
- Ledoux, Joseph (1990). Information flow from sensation to emotion: Plasticity of the neural computation of stimulus value. In M. Gabriel & J. Moore (Eds.) *Learning and Computational Neuroscience: Foundations of Adaptive Networks* (pp. 3-51). Cambridge, MA: MIT Press.
- Ledoux, Joseph. (1996) *The Emotional Brain*. Touchstone Books. New York.
- Lewis, M.D. (1995). Cognition-emotion feedback and the self-organization of developmental paths. *Human Development*, 38, 71-102.
- Lewis, M.D. (1997). Personality self-organization: Cascading constraints on cognition-emotion interaction. In A. Fogel, M.C, D. P. Lyra, & J. Valsiner (Eds.), *Dynamics and indeterminism in developmental and social processes* (pp. 193-216). Mahwah, NJ: Erlbaum.
- Lipton, Bruce H., *The Biology of Belief*. Lecture, 2003.
- Mate, Gabor. (1999) *Scattered Minds. A New Look at the Origins and Healing of Attention Deficit Disorder*. Alfred A. Knopf Canada. Toronto.
- Mattmiller, Brian. (1999) *Child Abuse Can Alter Brain Development*. University of Wisconsin.
- Morris, R.G.M. (Ed.) (1989). *Parallel distributed processing: Implications for psychology and neurobiology*. Oxford: Clarendon Press.
- Moss, B., & Gotts, E.A. (1998). Relationship-based early childhood intervention: A progress report from the trenches. *Zero to Three*, 18, 24-32.
- Nash, J. Madeleine. (2002) *The Secrets of Autism*. Time Magazine, May 6 Issue.
- Neimark, Jill (1997) *Impertinant Ideals*. Psychology Today, November/December.
- Papolos, Demetri and Papolos, Janice. (1999) *The Bipolar Child*. Broadway Books. New York.



Perry, B., Pollard, R., Blakley, T., Baker, W., and Vigilante, D. (1996) Childhood trauma, the neurobiology of adaptation and use-dependent development of the brain: How states become traits. Trauma Information Pages. Department of Psychiatry and Behavioral Sciences. Houston, Texas.

Perry, B.D. (1997). Incubated in terror: Neurodevelopmental factors in the "cycle of violence." In J. Osofsky (Ed.), *Children in a Violent Society* (pp. 124-149). New York: Guilford Press.

Post, R.M., & Weiss, S.R.B. (1997). Emergent properties of neural systems: How focal molecular neurobiological alterations can affect behavior. *Development and Psychopathology*, 9, 907-930.

Post, R.M., Weiss, S.R.B., Li, H., Smith, M.A., Zhang, L.X., Xing, G., Osuch, E.A., & McCann, U.D. (1998). Neural plasticity and emotional memory. *Development and Psychopathology*. 10, 829-856.

Roth, Gerhard. (2004) The Quest to find Consciousness. *Scientific American Mind*. Scientific American Special Edition.

Roley, Susanne, Blanche, Erna and Schaaf, Roseann (2001). *Understanding the Nature of Sensory Integration with Diverse Populations*. Therapy Skill Builders. USA.

Rossi, Ernest. (1993) *The Psychobiology of Mind-Body Healing*. W.W. Norton and Company, Inc. New York.

Rubinow, D.R., & Post, R.M. (1992). Impaired recognition of affect in facial expression in depressed patients. *Biological Psychiatry*. 31,947-953.

Rutter, M. (1987). Psychosocial resilience and protective mechanisms. *American Journal of Orthopsychiatry*, 57, 316-331.

Rutter, M. (1989). Temperament: Conceptual issues and implications. In G.A. Kohstamm, J.E. Bates, & M.K. Rothbart (Eds.) *Temperament in Childhood* (pp. 362-479) New York: Wiley.

Rutter, M., (1991) Age changes in depressive disorders: Some developmental considerations. In Garber & K.A. Dodge (Eds.), *The Development of Emotional Regulation and Dysregulation* (pp. 273-302). Cambridge, UK: Cambridge University Press.

Rutter, MK. (1997). Clinical implications of attachment concepts: Retrospect and prospect. In L. Atkinson & K.J. Zucker (Eds.), *Attachment and psychopathology* (pp. 17-46). New York: Guilford Press.

Sapolsky, Robert (2003). *Taming Stress*. *Scientific American*. September 2003.

Schmidt, Richard and Lee, Timothy. (1999) *Motor Control and Learning*. Human Kinetics. **Champaign, Illinois.**

Schore, Allan N. (1994) *Affect Regulation and the Origin of the Self*. The Neurobiology of Emotional Development. Lawrence Erlbaum Associates. New Jersey.

Schwartz, Jeffrey M. and Begley, Sharon (2002) *The Mind and the Brain: Neuroplasticity and the Power of Mental Force*. Reagan Books. New York.

Shore, Rima. (1997) *Rethinking the Brain*. New Insights into Early Development. Families and Work Institute. New York, New



York.

Shumway-Cook, Anne and Woollacott. (1995) Motor Control. Theory and Practical Applications. Lippincott Williams and Wilkins. New York.

Siegel, Daniel. (1999). The Developing Mind: Toward a Neurobiology of Interpersonal Experience. Guilford Press, New York.

Sigman, M., & Siegel, D.J.(1992). The interface between the psychobiological and cognitive models of attachment. Behavioral and Brain Sciences, 15, 523.

Stern, D.N. (1985). The Interpersonal World of the Infant. New York: Basic Books.

Sternberg, Esther. (2001). The Balance Within. W.H. Freeman and Company, New York.

Strauch, Barbara (2003) The Primal Teen. Doubleday, New York.

Teicher, Martin. (2002) Scars That Won't Heal: The Neurobiology of Child Abuse. Scientific American.