The Science behind SleepTalk®: References and Relevant Research

Author Michelle Mayur

Ainsworth, M. D., & Bell, S. M. (1970). Attachment, exploration, and separation: Illustrated by the behavior of one-year-olds in a strange situation. *Child Development. 41 (1),* 49–67. PMID 5490680. doi:10.2307/1127388.

"Ainsworth's narrative records showed that infants avoided the caregiver in the stressful Strange Situation Procedure when they had a history of experiencing rebuff of attachment behaviour. The infant's needs were frequently not met and the infant had come to believe that communication of emotional needs had no influence on the caregiver."

Ainsworth, M.D., Blehar, M., Waters, E., & Wall, S. (1978). *Patterns of Attachment: A Psychological Study of the Strange Situation.* Hillsdale NJ: Lawrence Erlbaum Associates. ISBN 0-89859-461-8.

"Anxious-ambivalent attachment is also misnamed as 'resistant attachment'. In general, a child with an anxious-ambivalent pattern of attachment will typically explore little (in the Strange Situation) and is often wary of strangers, even when the parent is present. When the mother departs, the child is often highly distressed. The child is generally ambivalent when she returns."

Arzi, A., Shedlesky, L., Ben-Shaul, M., Nasser, K. et al. (2012). Humans can learn new information during sleep**.** *Nature Neuroscience*, *15*, 1460–1465. DOI: 10.1038/nn.3193

"If certain odors are presented after tones during sleep, people will start sniffing when they hear the tones alone -- even when no odor is present -- both during sleep and, later, when awake. In other words, people can learn new information while they sleep, and this can unconsciously modify their waking behavior."

Aronoff, J. (2012). Parental Nurturance in the Standard Cross-Cultural Sample: Theory, Coding, and Scores. *Cross-Cultural Research. 46 (4),* 315–347. doi:10.1177/1069397112450851.

"Securely attached children are best able to explore when they have the knowledge of a secure base (their caregiver) to return to in times of need. When assistance is given, this bolsters the sense of security and also, assuming the parent's assistance is helpful, educates the child in how to cope with the same problem in the future. Therefore, secure attachment can be seen as the most adaptive attachment style. According to some psychological researchers, a child becomes securely attached when the parent is available and able to meet the needs of the child in a responsive and appropriate manner. At infancy and early childhood, if parents are caring and attentive towards their children, those children will be more prone to secure attachment."

Ashman, S., Dawson, G., Panagiotides, H., Yamada, E. and Wilkins, C. (2002). Stress hormone levels of children of depressed mothers. *Development and Psychopathology, 14* (2), 333– 349.

"This study provides evidence that internalizing symptoms exist in conjunction with a more reactive hormonal stress system in children of depressed mothers. The results also provide preliminary evidence that exposure to maternal depression in the first 2 years of life may be related to children's cortisol levels later in life."

Badanes, L., Dmitrieva, J. and Watamura, S. (2012). Understanding cortisol reactivity across the day at child care. *Early Child Research Questions,* 27 (1), 156– 165.

"Full-day center-based child care has been repeatedly associated with rising cortisol across the child care day. This study addressed the potential buffering role of attachment to mothers and lead teachers in 110 preschoolers while at child care. Attachment to mothers interacted with child care quality, with buffering effects found for children with secure attachments attending higher quality child care."

Baibazarova, E., van de Beek, C., Cohen-Kettenis, P., Buitelaar, J., Shelton, K. and van Goozen, S. (2013) Influence of prenatal maternal stress, maternal plasma cortisol and cortisol in the amniotic fluid on birth outcomes and child temperament at 3 months. *Psychoneuroendocrinology, 38 (6),* 907–915.

"This prospective, longitudinal study aimed to investigate relationships between indicators of maternal prenatal stress, infant birth outcomes and early temperament. Maternal cortisol was related to amniotic cortisol, which in turn was associated with lower birth weight. Birth weight predicted infant fear and distress to limitation at 3 months old."

Barlow, J., McMillan, A., Kirkpatrick, S.B., Ghate, D., Smith, M. and Barnes, J. (2008). Health-led parenting interventions in pregnancy and early years. *Rearch Report* No. DCSF-RW070.

"The evidence suggests that the *focus* of support that is provided to both mothers and fathers during the perinatal period should be the *parent-infant relationship."*

Baumgartner, T., Heinrichs, M., Vonlanthen et al., (2008). Oxytocin shapes the neural circuitry of trust and trust adaptation in humans. *Neuron,* 58(4), 639-50. doi: 10.1016/j.neuron.2008.04.009.

"Recent behavioral evidence shows that the neuropeptide oxytocin increases trust among humans, thus offering a unique chance of gaining a deeper understanding of the neural mechanisms underlying trust and the adaptation to breach of trust… These findings may help to develop deeper insights into mental disorders such as social phobia and autism, which are characterized by persistent fear or avoidance of social interactions."

Bellis, M., Hughes, K., Jones, A., Perkins, C. and McHale, P. (2013). Childhood happiness and violence: a retrospective study of their impacts on adult well-being. *BMJ Open 3*: e003427.

"Adult well-being is strongly linked to childhood experiences. The addition of well-being measures to outcomes already associated with adverse childhoods (eg, adolescent antisocial behaviour and risks of adult disease) strengthens the case for investment in interventions to improve childhood experiences."

Benton, A. and Tranel, D. (2000). Historical notes on reorganization of function and neuroplasticity. In Levin, H. S. and Grafman, J. eds., *Cerebral reorganization of function after brain damage.* New York: Oxford University Press

Bergman, K., Sarkar, P., Glover, V. and O'Connor, T. (2008). Quality of child-parent attachment moderates the impact of antenatal stress on child fearfulness. *Journal of Child Psychology and Psychiatry, 49* (10), 1089– 1098.

"These findings provide the first human evidence that postnatal parenting may moderate the adverse effects of antenatal stress. These results raise developmental questions about the timing and effect of interventions to reduce the adverse effects of antenatal stress exposure."

Bergman, K., Sarkar, P., Glover, V. and O'Connor, T.G. (2010). Maternal prenatal cortisol and infant cognitive development: moderation by infant– mother attachment. *Biological Psychiatry ,67*, 1026– 1032.

"These findings mimic experimental animal findings and provide the first direct human evidence that increased cortisol in utero is associated with impaired cognitive development, and that its impact is dependent on the quality of the mother-infant relationship."

Berlin, L.J., Cassidy, J., & Appleyard, K. (2008). The Influence of Early Attachments on Other Relationships. In Cassidy, J., Shaver P.R., *Handbook of Attachment: Theory, Research and Clinical Applications.* New York and London: Guilford Press. pp. 333–47. ISBN 978-1-59385-874-2.

"Behavioral problems and social competence in insecure children increase or decline with deterioration or improvement in quality of parenting and the degree of risk in the family environment."

Berlin, L., Zeanah, C.H., & Lieberman, A.F. (2008). Prevention and Intervention Programs for Supporting Early Attachment Security. In Cassidy, J., Shaver, P.R. *Handbook of Attachment: Theory, Research and Clinical Applications.* New York and London: Guilford Press. pp. 745–61. ISBN 978-1-60623-028-2.

"Supporting early child-parent relationships is an increasingly prominent goal of mental health practitioners, community-based service providers and policy makers ... Attachment theory and research have generated important findings concerning early child development and spurred the creation of programs to support early child-parent relationships."

Bernier, A., Carlson, S. and Whipple, N. (2010). From external regulation to self-regulation: early parenting precursors of young children's executive functioning. *Child Development , 81 (1),* 326– 339.

"In keeping with proposals emphasizing the role of early experience in infant brain development, this study investigated the prospective links between quality of parent-infant interactions and subsequent child executive functioning (EF), including working memory, impulse control, and set shifting… These findings add to previous results on child stress-response systems in suggesting that parent-child relationships may play an important role in children's developing self-regulatory capacities."

Bremner, J.D., Randall, P., Vermetten, E., Staib, L., Bronen, R., Capelli, S. et al. (1997). Magnetic resonance image-based measurement of hippocampal volume in PTSD related to childhood physical and sexual abuse: a preliminary report. *Biological Psychiatry, 41*, 23– 32.

"The purpose of this study was to compare hippocampal volume in adult survivors of childhood abuse to matched controls. Magnetic resonance imaging was used to measure volume of the hippocampus in adult survivors of childhood abuse… All patients met criteria for PTSD secondary to childhood abuse. PTSD patients had a 12% smaller left hippocampal volume relative to the matched controls ($p < .05$), without smaller volumes of comparison regions (amygdala, caudate, and temporal lobe). These findings suggest that a decrease in left hippocampal volume is associated with abuse-related PTSD."

Cacioppo, J. T., Berntson, G. G., & Decety, J. (2011). A history of social neuroscience. In A. W. Kruglanski and W. Stroebe (Eds.), *Handbook of the History of Social Psychology*. New York: Psychology Press.

Carter, C.S. (1998). Neuroendocrine perspectives on social attachment and love. *Psychoneuroendocrinology, 23 (8),* 779– 818.

"The purpose of this paper is to review existing behavioral and neuroendocrine perspectives on social attachment and love… A review of these literatures reveals a recurrent association between high levels of activity in the hypothalamic pituitary adrenal (HPA) axis and the subsequent expression of social behaviors and attachments. Positive social behaviors, including social bonds, may reduce HPA axis activity, while in some cases negative social interactions can have the opposite effect. Central neuropeptides, and especially oxytocin and vasopressin have been implicated both in social bonding and in the central control of the HPA axis."

Cheetham, J. S. & Grieg, D.G. (1997) *Research into the Outcomes and Effectiveness of the Goulding Process – SleepTalk® for Children.* https://www.sleeptalkchildren.com/sleeptalk/research/

"The 32 completed evaluation forms demonstrated a satisfactory significant improvement in the parents' perception of their children's happiness and behaviour after 3 months. In other words, the probability that improvements observed in the children participating in SleepTalk™ for Children were due to chance alone, was less than 0.1%. Improvements included self-like, enjoyment and participation at school, happiness, relationships with others and confidence."

Chugani, H., Behen, M., Muzik, O., Juhasz, C., Nagy, F. and Chugani, D. (2001). Local brain functional activity following early deprivation: a study of post-institutionalised Romanian orphans. *Neuroimage, 14*, 1290– 1301.

"Early global deprivation of institutionalized children may result in persistent specific cognitive and behavioral deficits. Using statistical parametric mapping (SPM), the pattern of brain glucose metabolism in the orphans was compared to the patterns obtained from two control groups… Consistent with previous studies of children adopted from Romanian orphanages, neuropsychological assessment of Romanian orphans in the present study showed mild neurocognitive impairment, impulsivity, and attention and social deficits.

Chugani, D.C., Muzik, O., Behen, M., Rothermel, R., Janisse, J.J., Lee, J. and Chugani, H.T. (1999). Developmental changes in brain serotonin synthesis capacity in autistic and nonautistic children. *Annals of Neurology*, *45 (3),* 287– 295.

"These data suggest that humans undergo a period of high brain serotonin synthesis capacity during childhood, and that this developmental process is disrupted in autistic children."

Davidson, R. and McEwen, B. (2012). Social influences on neuroplasticity: stress and interventions to promote well-being. *Nature Neuroscience 15 (5),* 689–695.

"Experiential factors shape the neural circuits underlying social and emotional behavior from the prenatal period to the end of life. These factors include both incidental influences such as early adversity as well as intentional influences that can be produced in humans through specific interventions designed to promote prosocial behavior and well-being. Key extant evidence in animal models and humans is reviewed. While the precise mechanisms of plasticity are still not fully understood, moderate to severe stress appears to increase growth of several sectors of the amygdala while effects in the hippocampus and prefrontal cortex tend to be opposite. Structural and functional changes in the brain have been observed with cognitive therapy and certain forms of meditation and lead to the suggestion that well-being and other prosocial characteristics might be enhanced through training."

Davidson, R., Putnam, K. and Larson, C. (2000). Dysfunction in the neural circuitry of emotion regulation – a possible prelude to violence. *Science, 289*, 591– 594.

"Emotion is normally regulated in the human brain by a complex circuit consisting of the orbital frontal cortex, amygdala, anterior cingulate cortex, and several other interconnected regions. There are both genetic and environmental contributions to the structure and function of this circuitry. We posit that impulsive aggression and violence arise as a consequence of faulty emotion regulation. Indeed, the prefrontal cortex receives a major serotonergic projection, which is dysfunctional in individuals who show impulsive violence."

Dettling, A., Gunnar, M. and Donzella, B. (1999). Cortisol levels of young children in full-day childcare centres. *Psychoneuroendocrinology, 24*, 519– 536.

"Controlling statistically for age, shyness for boys, and poor self-control and aggression for both sexes were associated with increases in cortisol over the day at childcare. The results suggest that younger children and those with more immature social skills may frequently experience elevations in cortisol as the day progresses in group care contexts."

Doidge, N., M.D. (2007). *The Brain That Changes Itself: Stories of Personal Triumph from the Frontiers of Brain Science*. Pub: Scribe, Vic

"An astonishing new science called 'neuroplasticity' is overthrowing the centuries-old notion that the human brain is immutable. In this revolutionary look at the brain, psychiatrist and psychoanalyst Norman Doidge, M.D., provides an introduction to both the brilliant scientists championing neuroplasticity and the people whose lives they've transformed. From stroke patients learning to speak again to the remarkable case of a woman born with half a brain that rewired itself to work as a whole, *The Brain That Changes Itself* will permanently alter the way we look at our brains, human nature, and human potential."

P.99 "In the first year of life, the average brain goes from weighing 400 grams at birth to 1000 grams at twelve months. We are so dependent on the early love and the caregiving of others in

part because large areas of our brain don't begin to develop until after we are born. The neurons in the prefrontal cortex, which helps us regulate our emotions, make connections in the first two years of life, but only with the help of people, which in most cases means the mother, who literally molds her baby's brain."

Evans, B.M. (2003). Sleep, consciousness and the spontaneous and evoked electrical activity of the brain. Is there a cortical integrating mechanism? *Neurophysiologie Clinique, 33,* 1–10. doi:10.1016/s0987-7053(03)00002-9.

"The physiological change from a state of deep sleep to wakefulness is reversible and mediated by the Reticular Activating System (RAS)."

Fox, N.A. & Hane, A.A. (2008). Studying the Biology of Human Attachment. In Cassidy, J., & Shaver, P.R. *Handbook of Attachment: Theory, Research and Clinical Applications.* New York and London: Guilford Press, 811–29. ISBN 978-1-59385-874-2.

"In psychophysiological research on attachment, the two main areas studied have been autonomic responses, such as heart rate or respiration, and the activity of the hypothalamic–pituitary–adrenal axis. Infants' physiological responses have been measured during the Strange Situation procedure looking at individual differences in infant temperament and the extent to which attachment acts as a moderator. There is some evidence that the quality of caregiving shapes the development of the neurological systems which regulate stress."

Freeman, W. J. (1995). Societies of brains: A study in the neuroscience of love and hate. Hillsdale, NJ: Lawrence Erlbaum associates.

Freeman proposes that oxytocin melts down existing neuronal connections. Oxytocin is a brain neurotransmitter involved with pair and social bonding.

Gerhardt, S. (2004). *Why Love Matters: How Affection Shapes a Baby's Brain.* New York: Brunner-Routledge.

"Why Love Matters explains why loving relationships are essential to brain development in the early years, and how these early interactions can have lasting consequences for future emotional and physical health. Sue Gerhardt focuses in particular on the wide-ranging effects of early stress on a baby or toddler's developing nervous system. When things go wrong with relationships in early life, the dependent child has to adapt; what we now know is that his or her brain adapts too. The brain's emotion and immune systems are particularly affected by early stress and can become less effective. This makes the child more vulnerable to a range of later difficulties such as depression, anti-social behaviour, addictions or anorexia, as well as physical illness." Neuroscience, developmental psychology and neurobiology.

Gordon, M. (2012). *The Roots of Empathy: Changing the World Child by Child*. New York: The Experiment.

Through the Roots of Empathy organization “Mary Gordon creates a rich, rewarding classroom experience that fosters empathy within children. The program brings babies and students together in a symbiotic loving environment that has been proven to reduce aggression and increase tolerance and emotional understanding in children.”

Goulding, J.M. (2004). *The Top Hat Process*: *SleepTalk®: A Gift Of Love Through Positive Parenting.* Pub: Pennon. Vic.

Goulding, J.M. (2011). *The Goulding Process: The Foundation of SleepTalk® - helping parents develop their child’s emotional resilience, the mind’s firewall.* Pub: The Goulding Institute. Vic.

“The Goulding Process (formerly called SleepTalk® for Children) was developed in the 1970s, and empowers parents to improve and balance their child's behaviour.

The dramatic positive change and calmness it creates permeate throughout the entire family. It's for parents looking for a simple, non-intrusive way to develop a child's emotional resilience, building the mind's firewall, protecting it against negative suggestions.

It's been called: ‘The two minute gift with changes that last a lifetime.’ It's easy to learn, and takes parents only two minutes at bedtime, and it cannot be done wrong. It's absolutely safe, ethical and positive. Parents and healthcare professionals have called the Process a powerful self-help program which parents and childcare professionals have been using for more than 35 years. They endorse it because it WORKS, helping to reduce anxiety and stress, developing a positive self-confidence, empowering children to manage, improve and balance their behaviour, anxiety and relationships.”

Goulding, J. M. (2011). The effects of autosuggestion stay with our children for life! https://www.sleeptalkchildren.com.au/wp-content/uploads/2013/06/SleepTalk-article-Joane-Goulding.pdf

“Understanding the formation, acceptance and implementation of beliefs is perhaps one of the most important things to understand about the role of the subconscious mind. Some people call it the unconscious mind, but for this article the terms are synonymous. The article will discuss the importance and acceptance of suggestion and present a procedure which will assist our children to develop a happy, self-confident and harmonious belief structure.”

Haddad, L. (1999). *Sleep Talk. A breakthrough technique for helping your child cope with stress and thrive through difficult transitions*. Pub: Contemporary Books.

"The brain is a powerful organ even at rest. It accepts suggestions in the sleep state. With *Sleep Talk*, it receives and accepts honest, positive information because the 'why it won't work' objection is not present. When a mother tells her son positive things while he's awake, he can choose to negate everything she says. But in deep sleep, when she tells him how special he is and how much he means to her, the information is accepted, and changes in behavior begin to happen.”

Hanson, J., Chung, M., Pollak, S. et al. (2010.) Early stress is associated with alterations in the orbitofrontal cortex: a tensor-based morphometry investigation of brain structure and behavioral risk. *Journal of Neuroscience, 30 (22),* 7466– 7472.

"Overall, children who were victims of physical abuse had alterations in oFC and these alterations were related to functioning in different domains of behavior. This finding suggests a potential neurobiological mechanism through which early adverse experiences constitute risks for children's cognitive and emotional development."

Herrmann, N. (1997). What is the function of the various brainwaves? https://www.scientificamerican.com/article/what-is-the-function-of-t-1997-12-22/

Insel, T.R., Young, L.J. (2001). The neurobiology of attachment. *National Review of Neuroscience, 2 (2)*, 129– 136.

Kandel, E. R. (1983). From metapsychology to molecular biology: Explorations into the nature of anxiety. *American Journal of Psychiatry, 140 (10),* 1277-93.

"First proof that learning led to neuroplastic strengthening."

Kaplan, L., Evans, L. and Monk, C. (2008). Effects of mothers' prenatal psychiatric status and post-natal caregiving on infant biobehavioural regulation: can prenatal programming be modified? *Early Human Development, 83 (4)*, 249– 256.

"Collectively, the results of this study illustrate the significant influence of maternal sensitivity on infant physiology and emotional responsiveness. Sensitive parenting may provide the infant with repeated instances of appropriate support and successful coping, which may ultimately contribute to the shaping of physiologic regulation to future stressors. In addition, maternal sensitivity may promote appropriate behavioral responses from the child, which may subsequently influence others' responses to the child throughout development. Interestingly, it appears that the *in utero* programming of autonomic and HPA–axis regulation may be open to postnatal shaping of brain–behavior development, a finding that supports the compatibility of fetal programming and social–context models of infant biobehavioral development."

Kendrick, K.M. (2000). Oxytocin, motherhood and bonding. *Experimental Physiology*, *85*. 111S–124S (Spec No.).

"Release of the peptide hormone oxytocin in the brain has been shown to influence both maternal, sexual and social bonding behaviours although there are a number of species differences. This review summarizes findings on the distributions of oxytocin and oxytocin receptors in the brain, together with factors governing their expression, release of the peptide in the brain and its behavioural actions. A model of how oxytocin may act to alter maternal and socio-sexual behaviours is proposed."

Kinomura, S., Larsson, J., Gulyas, B., & Roland, P. E. (1996). Activation by attention of the human reticular formation and thalamic intralaminar nuclei. *Science, 271 (5248),* 512–515. PMID 8560267. doi:10.1126/science.271.5248.512

"It has been known for over 45 years that electrical stimulation of the midbrain reticular formation and of the thalamic intralaminar nuclei of the brain alerts animals… Here, a positron emission tomographic study showed activation of the midbrain reticular formation and of thalamic intralaminar nuclei when human participants went from a relaxed awake state to an attention-demanding reaction-time task. These results confirm the role of these areas of the brain and brainstem in arousal and vigilance."

Lipton, B.H. (2007). *The Biology of Belief*, Hay House Inc. USA

"Through the research of Dr. Lipton and other leading-edge scientists, stunning new discoveries have been made about the interaction between your mind and body and the processes by which cells receive information. It shows that genes and DNA do not control our biology, that instead DNA is controlled by signals from outside the cell, including the energetic messages emanating from our thoughts."

McKenzie Parker, I. (2014). *Self-Worth Before Self Esteem. What Every Parent Must Know about Building The Foundations Of Self Esteem.* Pub: CreateSpace.

"A non-conventional approach to addressing Self Esteem, literally working from the 'bottom up', building a sound foundation of Self Worth. Subliminal messages received from parents shape 'who we are' as children and have a long term impact in shaping 'who we are' as adults – our long term sense of self, learned emotional reactions, behavior patterns, subconscious motivations and even repressed anger."

Natural Patterns of Sleep (2007). A resource from the Division of Sleep Medicine at Harvard Medical School and WGBH Educational Foundation.

Scientists have found that the brain goes through characteristic patterns of activity throughout each period of sleep, and that it is sometimes more active when we're asleep than when we're awake. http://healthysleep.med.harvard.edu/healthy/science/what/sleep-patterns-rem-nrem

Plummer, K. (2009) *Sleep Talk® for Children* Study. Evaluation of a pilot study utilising the Sleep Talk® for Children process to promote emotional resilience in children following the Black Saturday bushfires around Melbourne. https://www.sleeptalkchildren.com/sleeptalk/research/

Conclusions:
1.The Goulding Sleep Talk® for Children program is a safe, effective and easy process that can be utilised to promote emotional resilience in children who have experienced stress, anxiety and trauma.
2. SleepTalk® for Children empowers both the parent and child, improving the bond and communication between them, therefore helping to stabilise the family unit.

Santos, E. and Noggle, C.A. (2011). Reticular Activating System. *Encyclopedia of Child Behavior and Development*, 1260-1260. DOI 10.1007/978-0-387-79061-9_2426.

"The RAS, also known as the reticular formation, refers to a network of nuclei and fibers that extend throughout the central portion of the brainstem from the medulla to the midbrain.

While the RAS is described as the primary source/ site of brain activation, this is just one portion of the functional role the RAS plays. The superior portion of the RAS, which is based in the upper pons and extends into the midbrain, regulates arousal level and consciousness…"

Sathyanarayana Rao, T.S., AshaJagannatha Rao, K. S, and Vasudevaraju, P. (2009). The Biochemistry of Belief. *Indian Journal of Psychiatry, 51(4).* PMC2802367

"Research findings have repeatedly pointed out that the emotional brain is no longer confined to the classical locales of the hippocampus, amygdala and hypothalamus. The sensory inputs we receive from the environment undergo a filtering process as they travel across one or more synapses, ultimately reaching the area of higher processing, like the frontal lobes. There, the sensory information enters our conscious awareness. What portion of this sensory information enters is determined by our beliefs. Fortunately for us, receptors on the cell membranes are flexible, which can alter in sensitivity and conformation. In other words, even when we feel stuck 'emotionally', there is always a biochemical potential for change and possible growth. When we choose to change our thoughts (bursts of neurochemicals!), we become open and receptive to other pieces of sensory information hitherto blocked by our beliefs! When we change our thinking, we change our beliefs. When we change our beliefs, we change our behavior."

Schore, A. N. (1994). *Affect Regulation and the origin of the self: The neurobiology of emotional development*. Hillsdale, NJ: Lawrence Erlbaum Associates.

"Early patterns of relating and attaching to others, if problematic, can get 'wired' into our brains. What happens during these critical periods has an inordinate effect on our ability to love and relate."

Schore, A. N. (1995). Back to basics: Attachment, affect regulation, and the developing right brain: Linking developmental neuroscience to pediatrics. *Pediatrics in Review, 26(6),* 204-17.

"Of particular relevance to pediatrics, this … time period has seen an explosion in infant research that integrates neurobiological studies of brain development and psychological studies of emotional, social, and cognitive development."

Schrott, L. M. (1997). Effects of training and environment on brain morphology and behaviour. *Acta Paediatrica*, *86 (S422),* 45-7.

"Using defined rearing or training paradigms, environmental stimulation has been found to increase brain weight (especially forebrain), cortical thickness, the number of glial cells, the glia to neuron ratio, neuronal cell body and nucleus size, and to alter synaptic profiles by increasing dendritic branching, dendritic spine density and the number of discontinuous synapses. Examples will be given from both animal and human studies that document these profound changes. Controversy exists as to whether enriched environments and/or training can compensate for neural deficits produced earlier in life."

Solomon, J., George, C. & De Jong, A. (1995). Children classified as controlling at age six: Evidence of disorganized representational strategies and aggression at home and at school. *Development and Psychopathology, 7,* 447–447.

"The anxious-ambivalent strategy is a response to unpredictably responsive caregiving, and the displays of anger (ambivalent resistant) or helplessness (ambivalent passive) towards the

caregiver on reunion can be regarded as a conditional strategy for maintaining the availability of the caregiver by preemptively taking control of the interaction."

Vythilingam, M., Heim, C., Newport, J. et al. (2002). Childhood trauma associated with smaller hippocampal volume in women with major depression. *American Journal of Psychiatry, 159 (12),* 2072-80.

"The hippocampus of adults who suffered childhood trauma is 18 per cent smaller."

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