The relationship between early failures of development and the origin of a predisposition to later forming psychopathology has been a central concern of psychiatry.

The best description of development may come from a careful appreciation of the brain's own self-organizing operations. (Cicchetti & Tucker, 1994)

The self-organization of the developing brain occurs in the context of a relationship with another self, another brain.

We now need to ask how do social factors modulate the biological structure of the brain? (Kandel) This necessitates an interdisciplinary approach.

To this end, in *Affect Regulation and the Origin of the Self*, I offer ideas about the origins of social functioning from the developmental sciences, recent data on emotional phenomena from the behavioural sciences, and new research on limbic structures from the neurosciences in order to generate an overarching model of emotional development.

Infant psychiatry offers knowledge of the interactive creation of an attachment bond of affective communication. The failure of the dyad to create this bond is central to the intergenerational transmission of emotional disorders.

Neuropsychiatry describes how these affect-transacting experiences shape the organization of a regulatory system in the orbital frontolimbic areas of the right hemisphere. Clinical psychiatry is now demonstrating that affect regulation is an important concept that can bridge the mind-body gap.

**THE PSYCHOBIOLOGY AND NEUROBIOLOGY OF A SECURE ATTACHMENT**

The essential task of the first year of human life is the creation of a secure attachment bond
between the infant and primary care giver.

In the process of contingent responsivity the more the mother tunes her activity level to the infant during periods of social engagement, the more she allows him to recover quietly in periods of disengagement, and the more she contingently responds to his signals for reengagement, the more synchronized their interaction.

Mutually attuned synchronized interactions are fundamental to the ongoing affective development of the infant.

In light of the fact that misattunements are a common developmental phenomenon, the primary care giver must also modulate non optimal high levels of stimulation which would induce supra-heightened levels of arousal in the infant, and, most importantly, participate in interactive repair to regulate stressful infant states.

Psychobiological attunement is the fundamental mechanism that mediates attachment bond formation. (Tiffany Field)

Attachment is, in essence, the dyadic regulation of emotion. (Sroufe)

Attachment is built into the nervous system, in the course and as a result of the infants experience of his transactions with the mother. (Mary Ainsworth)

The baby's brain literally requires brain-brain interaction and occurs in the context of a positive affective relationship between mother and infant. (Trevarthen: primary intersubjectivity)

The emotional experience of the infant develops through the sounds, images, and pictures that constitute much of an infants early learning experience, and are disproportionately stored or processed in the right hemisphere during the formative stages of brain ontogeny.

The child is using the output of the mothers right cortex as a template for the imprinting, the hard wiring of circuits in his own right cortex that will come to mediate his expanding cognitive-affective capacities.

The right hemisphere is dominant in human infants, and indeed, for the first three years of life.

Joint attention: a form of nonverbal communication in which the infant coordinates his visual attention with that of the care giver, and is now not only aware of an object but simultaneously aware of the mothers attention to the object. (Trevarthen: secondary intersubjectivity)

THE ORGANIZATION OF A REGULATORY SYSTEM IN THE ORBITOFRONTAL CORTEX

Bowlby asserted that attachment behaviour is organized and regulated by means of a control system within the central nervous system, and that the maturation of this control system is
open to influence by the particular environment in which development occurs.

Recent neurobiological studies show that the orbitofrontal cortex, which is enlarged in the right hemisphere, acts in the highest level of control of behaviour, especially in relation to emotion.

Studies show that the orbitofrontal regions are centrally involved in attachment functions, processing facial information, and affect regulation, and that this system matures in the last quarter of the first year.

The orbital frontal cortex:

- Is situated at the interface of cortex and subcortex
- Acts as a convergence zone
- Sits at the hierarchical apex of the limbic system
- Acts as a major centre of CNS hierarchical control of the energy-expending sympathetic and energy-conserving parasympathetic branches of the ANS

In optimal environments, a system emerges in which rostral brain areas can modulate, under stress, a flexible coping pattern of a coupled reciprocal autonomic mode of control, in which increases in the activity in one ANS division are associated with decreases in the other.

The orbital prefrontal region is especially expanded in the right cortex, and indeed it comes to act in the capacity of an executive control function for the entire right hemisphere.

The right side of the brain contains a circuit of emotion regulation that is involved in intense emotional-homeostatic processes and in the modulation of primary emotions. (Porges)

The prefrontal-limbic cortex plays a unique role in the regulation of motivational states and in the adjustment or correction of emotional responses.

IMPLICATIONS FOR THE ETIOLOGY OF PSYCHIATRIC PSYCHOPATHOLOGY

The attempt to regulate affect to minimize unpleasant feelings and to maximize pleasant ones is the driving force in human motivation. (Westin)

The mother of the securely attached infant permits access to the child after a separation and shows a tendency to respond appropriately and promptly to his/her emotional expressions.

In contrast the mother of an insecurely attached infant is emotionally inaccessible and reacts to her infants expressions of emotions and stress inappropriately and/or rejectingly.

Early forming psychopathology constitutes disorders of attachment and manifests itself as failures of self and/or interactional regulation. These regulatory failures are manifest in a limited capacity to modulate the intensity and duration of affects.

All forms of psychopathology have concomitant symptoms of emotion dysregulation. This
dysfunction is manifest in more intense and longer lasting emotional responses.

A dysfunction of internal reparative mechanisms is most obvious under stressful and challenging conditions that call for behavioural flexibility.

Growth-inhibiting environments negatively influence the ontogeny of homeostatic self-regulatory and attachment systems.

Loss of ability to regulate the intensity of feelings is the most far-reaching effect of early trauma and neglect.

Early failures in dyadic regulation skew the developmental trajectory of corticolimbic systems.

Structural limitations in the mothers emotion processing right brain are reflected in a poor ability to comfort and regulate her child's negative states.

These experiences are stamped into the insecurely attached infants right orbitofrontal system and its cortical and subcortical connections.

Stressful alterations in the chemistry of the developing brain also produce significant changes in the numbers and functional capacities of the frontolimbic receptors for neuromodulatory and neurohormonal agents.

Non-optimal psychobiological experiences induce a severe and extensive pruning of the sympathetic ventral tegmental and/or parasympathetic lateral tegmental limbic circuits.

Early deprivation of empathic care, either in the form of excessive arousal reduction or intensification, creates a growth-inhibiting environment that produces immature, physiologically undifferentiated frontolimbic systems.

The orbital cortex shows a preferential vulnerability to a spectrum of psychiatric disorders.

A central goal of all dynamic therapies is to increase the flexibility of a persons emotional control structures.

The psychotherapist is an important regulator of the patients physiology by acting on the patients unconscious affect regulating structures.

Read another article by Allan Schore on Early Trauma and The Development of The Right Brain

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These notes were provided by Dr Allan Schore to accompany the papers which he presented at the the Faculty of Child and Adolescent Psychiatry meeting, held in Sydney, in October 1998. They are reproduced here with his kind permission. Dr Schore is Assistant Clinical Professor of Psychiatry and Biobehavioural Sciences, UCLA Medical School. He is the author of Affect Regulation and the Origin of the Self: The Neurobiology of Emotional Development, Lawrence Erlbaum, 1994.