**AUSTRALIAN CHILDHOOD FOUNDATION CONFERENCE TRUST, LOVE, AND BETRAYAL**

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# EARLY RIGHT BRAIN DEVELOPMENT AND THE RELATIONAL ORIGINS OF MUTUAL LOVE AND INTERSUBJECTIVE PLAY

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- In 1994, very beginning of *Affect Regulation and the Origin of the Self* asserted "The understanding of early development is one of the fundamental objectives of science. **The beginnings of living systems set the stage for every aspect of an organism's internal and external functioning throughout the life span**."
- Over course of my subsequent studies offered interdisciplinary evidence which supports developmental principle that during critical periods of maturation **developing brain is malleable**, and that early relationship with mother shapes baby's brain **for better or for worse**.

- Note both outcomes are implied in conference title "**Trust, Love, and Betrayal**."
- In yesterday's keynote "The growth-promoting role of mutual regressions in deep psychotherapy" I focused on latter, **psychopathogenesis**, and on working with early relational trauma in reenactments of attachment trauma between mother and infant.
- Here, I focus on former, **trust and love**, on mother's contributions to an **optimal development** of her infant's right brain attachment bond of emotional communication and regulation.

- Expansion of a keynote I presented here in 2014 “The development of the right brain across the lifespan: What’s love got to do with it?” Also chapter with Marks-Tarlow “How love opens creativity, play, and the arts through early right brain development” (in *Play and Creativity in Psychotherapy*), and an interview for *American Journal of Play*, “Playing on the right side of the brain. An Interview With Allan Schore.”
- Now offer a developmental model of central role of **right brain** in origins of two adaptive functions of evolving personality, **mutual love and intersubjective play.**

- In this application of regulation theory I utilize perspective of interpersonal neurobiology in order to shed light upon perhaps most essential characteristic of human experience, ability of humans to **share love with an emotionally valued other**, an adaptive function of early **mutual love** that fundamentally impacts “every aspect of an organism's internal and external functioning throughout the life span.”
- I will argue that paradigmatic expression of how mother shapes baby’s brain **for the better** is expressed in an early bond of mutual love.

- Oxford Dictionary defines love as “a state or feeling,” “**deep affection, strong emotional attachment**.”
- Love is (1) a noun: **a feeling of tenderness, passion, and warmth**; and (2) a verb: to **feel love for another person** – actions including expressions of physical affection, tenderness, and acts of kindness. The first usage implies love as an intense **intrapersonal** emotion, the second as a strong **interpersonal** emotional communication.
- Two definitions integrate **“one person”** intrapsychic and “**two person”** interpersonal perspective in **loving**, **intimate** attachment emotion communicating bond.

- **Right Brain and Mother-Infant Mutual Love**
- From very beginnings of modern biology and psychology, science has also explored its origins and emotional expressions. Indeed in his seminal work *The Expression of Emotions in Man and Animals* (1872) Charles Darwin stated, "The emotion of **love,** for instance that of a **mother for her inf**ant, **is one of the strongest of which the mind is capable."**
- Freud (1940): the mother-infant relationship "is unique, without parallel, established unalterably for a whole lifetime as the first and **strongest love-object and the prototype of all later love relations**."

- Psychoanalysis, science of unconscious process, suggest origins of the brain/mind/body emotional expressions of love are unconscious.
- Pediatrician-psychoanalyst Donald Winnicott studied deepest origins of capacity to love. "The early management of an infant is a matter **beyond conscious thought and deliberate intention**. It is something that becomes possible only through love" and that the mother "by expressing love in terms of physical management and in giving physical satisfaction enables the infant psyche to begin in the infant body."

- In primordial context of mutual love, "The main thing is a communication between the baby and mother in terms of the anatomy and physiology of live bodies."
- Winnicott (1963) described two forms of love in the developing infant. "**Quiet love**" seen in moments when mother holds and handles (soothes, comforts, caresses) the infant. "Quiet love" characterized as "a mutual dwelling of baby and mother where one and one make not two but one" (Ulanov, 2001).
- On other hand "**excited love**" occurs in moments of thrilling excitement and intense interest in interaction with the mother, and contains an energetic potential.

- In modern neurobiological yerms, regulation theory suggests that the calming and soothing, dyadic context of Winnicott's "**quiet love**" represents a down-regulating transition of dysregulating negative affect from a high arousal sympathetic dominant energy-expending state to a low arousal parasympathetic dominant energy-conserving psychobiological state expressed in comfort and relief from stress and distress (**left cradling**).

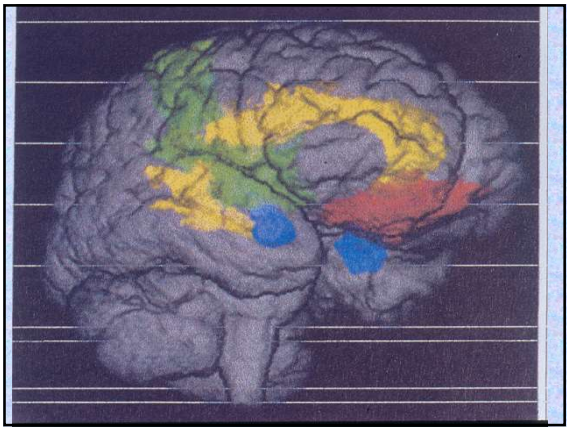
- On other hand Winnicott's "**excited love**" contains an energetic potential that represents an up-regulating transition from a calm, quiet alert state into a regulated high arousal, mutually accelerating, sympathetic-dominant energy-expending emotional state, expressed by expanding joy and excitement.
- Ultimately "quiet love" and "excited love" need to be integrated into the personality structure. Optimal sympathetic-parasympathetic autonomic balance.

- In mid-century another of Freud's disciples, **Erich Fromm** (1956) wrote classic *The Art of Loving*, in which he described love as "**the experience of union with another being**," and "**becoming one with another**."
- Fromm described what he deemed to be the central problem in individual development: "What meaning – in both women as well as men - does our longing for a mother have? What constitutes the bond to the mother?" Stated that **motherly love** is an unconditional affirmation of child's life and needs, and that it is expressed in **two different aspects**:

- "One is the care and responsibility absolutely necessary for the **preservation of the child's life** and his growth. The **other** aspect goes further than mere preservation…Motherly love, in this second step, makes the child feel: it is good to have been born; it instills in the child the **love for life** and not merely the wish to remain alive…Mother's love for life is as infectious as her anxiety."
- Note overlap between Fromm's maternal support of child's love for life and Winnicott's "excited" love that contains an energetic potential.

- At end of last century I began to publish my own studies of impact of attachment on early developing right brain. In my first book (1994) offered evidence that **right orbitofrontal cortex acts as control center of attachment described by Bowlby (1969)**.
- Schore (1994): evolutionary motivational system of **attachment** is much more than achieving a "secure base" or a sense of trust and safety. **Mother down-regulates negative and up-regulates positive emotion, including strong positive emotion**.
- Expanding this model in my second book (2003) I offered heuristic proposal:

- "The infant's right brain is tuned to dynamically self-organize upon perceiving certain patterns of facially expressed exteroceptive information, namely the visual and auditory stimuli emanating from the smiling and laughing joyful face of a **loving mother**."
- Concluded, "the visual image of the **loving mother's** positive emotional face as well as the imprint of the mother's regulatory capacities are inscribed into the circuits of this lateralized prefrontal system."
- Over course of first year mutual emotional exchanges imprinted into the **amygdala, insula, cingulate and orbitofrontal** areas of infant's developing **right brain**.



- Neuroimaging research of mother-infant love spanning 3 to 16 months documents role of RH and OFC, anterior cingulate, insula, and amygdala.
- Nitschke et al., Orbitofrontal cortex tracks positive mood in mother's viewing pictures of their newborn infants, *NeuroImage*, 2004. OFC.
- Ranote et al., The neural basis of maternal responsiveness to infants: an fMRI study. *NeuroReport*, 2004. RH.
- Bartels & Zeki, The neural correlates of maternal and romantic love. *NeuroImage*, 2004. OFC, insula, anterior cingulate.

- Noriuchi et al., The functional neuroanatomy of maternal love: mother's response to infant's attachment behaviors, *Biological Psychiatry*, 2008. Right OFC, insula, anterior cingulate.
- Barrett et al., Maternal affect and quality of parenting experiences are related to amygdala response to infant faces, *Social Neuroscience*, 2012. OFC, anterior cingulate, amygdala.
- Minagawa-Kawai et al., Prefrontal activation associated with social attachment: Facial-emotion recognition in mothers and infants, *Cerebral Cortex*, 2009. Right OFC in both mother and infant.

- "**Our results are in agreement with those of Schore (1999, 2000) who addressed the importance of the right hemisphere in the attachment system**."
- Minagawa et al: right OFC function "develops within the social world between caretakers and infants as one form of attachment. This type of emotional regulation is also a fundamental social skill to extend infants' social involvement beyond kinship and friendship, including **love**, in the general social world."
- In overview of emerging field of epigenetics , Miller (*Science,* 2010) describes**"the importance of a loving mother."**

- **Role of Mutual Love in the Co-creation of Primary Intersubjectivity and Mutual Play**
- Body of work suggests face-to-face **mutual love and mutual play both onset at 2 to 3 months**.
- Stern: "At the age of two to three months, infants begin to give the impression of being quite different persons. When engaged in social interaction, they appear to be more wholly integrated."
- At this stage infant participates in shared "observable interactive events" involved in "**bridging the infant's subjective world and the mother's subjective world**."

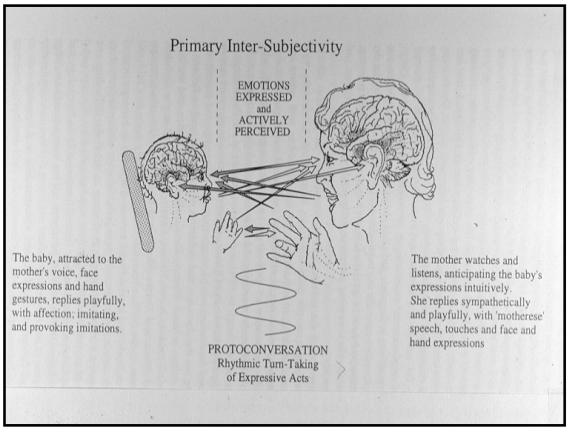
- **Ammaniti and Galesse** (2013):
- "From the **second month after birth**, parents and infant begin to show a temporal structure in their interactions…In this period, the sharing of social gaze between parent and baby is the expression of coordinated interactions, which can occur between 30% and 50% of the time. At the same time, mutual gaze can be integrated with parents' and infants' affectionate touch…**At around 3 months, parents tend to touch their baby in an affectionate way and infants tend to respond with an intentional affectionate touch."**

- **Dissanayake** (2001) at **2-3 months**, infant's changing response to loving mother's face, gesture, and voice:
- "[A]lthough mothers 'talk' to their babies, the multimodal messages in early interactions are nonverbal. What mothers convey to infants are not their verbalized observations and opinions about the baby's looks, actions, and digestion—the ostensible content of talk to babies—but rather positive affiliative messages about their intentions and feelings: **You interest me, I like you, I am like you, I like to be with you, You please me, I want to please you, You delight me, I want to communicate with you, I want you to be like me**."

- Social experiences that generate intense positive affect at 2-3 months represent initiation of not only mutual love but **mutual play**.
- **Fogel and Branco** (1997): "**Three-month old-infants** signal their willingness to engage in **play** by both gazing at mother and smiling, and they use gaze away and the cessation of smiling or the onset of crying to indicate their desire to end a bout of play. Before 3 months, infants do not have the ability to do this."
- Babies are ready to engage in behavioral turn-taking as early as 8 weeks of age, when they expect social contingency, predictable back-and-forth interactivity.

- Same time period represents onset of right brain-to-right brain protoconversations within dyad (**Trevarthen**, 1979). In these initial transactions of **"primary intersubjectivity"** baby, attracted to mother's voice, facial expressions and gestures replies **spontaneously and playfully with affection**, while mother replies spontaneously and playfully to baby's nonverbal communications.
- Traffic of visual, auditory-prosodic and tactile signals induce instant emotional effects: dyadically amplified excitement and pleasure ("excited love") build within dyad.

- Trevarthen (1993): visual eye-to-eye messages are coordinated with auditory vocalizations (tone of voice, "motherese") and tactile and body gestures as a channel of **communication**. Resultant dyadic resonance ultimately permits **intercoordination of positive affective brain states**.
- This interactive mechanism requires older brains to engage with mental states of awareness, emotion, and interest in younger brains, and involves a **synchronized** coordination between the motivations of the infant and the subjective feelings of adults.




- Trevarthen (1990): "the intrinsic regulators of human brain growth in a child are specifically adapted to be coupled, by emotional communication, to the regulators of adult brains." This **synchronization** occurs in **right brain-to-right brain** communications.
- Stern (1990) describes dynamics of **synchronized** heightened state of arousal, when mother pumps positive emotional energy in form of joy and excitement into infant. Level of intensity of joyful, **excited** infant as attains **extremely high levels of activation, almost maximally tolerable to the developing nervous system**.

- "Joy is the product of a mutual regulation of social exchange by both partners. Smiling back and forth is the prototypic example; it usually begins at a relatively low level of intensity. Each partner then progressively escalates - **kicking the other into higher orbit**, so to speak. The exchange occurs in **overlapping waves**, where the mother's smile elicits the infant's, reanimating her next smile at an even higher level, and so on. These overlapping waves build in intensity, until, most often, **simultaneous mutual hilarity breaks forth**."
- [Relational amplification of strong positive emotion]

- Feldman et al. (2011) study **interaction synchrony** between mothers and their 3-month infants during face-to-face **free play**. Describe "**intense moments within attachment relationships**: "during episodes of high positive arousal – for instance, **moments of vocal or affective synchrony** which are accompanied by **high positive energy** – the tightness of this biological synchrony increased."
- State of **"high positive energy"** in mutual play between mother and 3 month infant corresponds to an expression of *"***excited love"** that contains "**an energetic potential."**

- Tucker (1992): "The ability to participate in processes of **play and affectional interaction** may be a key determinant of both information flow and the brain arousal that help to shape developing networks."
- Play, like love associated with pleasure, intense activation of ventral tegmental **dopamine** neurons as well as high levels of **oxytocin** ("love hormone").
- As in mutual excited love mutual intersubjective play is driven by interactive regulation of a shared strong positive affective state that results from right brain to-right brain face-to-face **resonance, synchronization, and amplification of intense emotional arousal**.

- Marks-Tarlow (2010, 2011) describes the emotion-regulating aspects of early play, designed by nature to implicitly carry babies to the **brink of regulatory boundaries**. Early games of peek-a-boo and later versions of hide-and-seek tap into the edges of abandonment fears. Throwing baby high up in the air becomes gleeful due to fears of falling and necessary trust of being caught instead of perishing. In all of these early games, the line between safety and danger, joy and distress is a thin one.
- **Both mutual play and mutual love expand the child's capacity to tolerate high levels of arousal**.

- By playing on the edges of what is intolerable again and again young children learn to stretch those regulatory boundaries, such that later in life they can engage in **passionate and creative pursuits** that may be difficult and risky, yet nonetheless rewarding.
- Marks-Tarlow points out that right brain-to-right brain mother-infant protoconversation in mutual play continues over the **first year**. In this play, repetition in the mother's vocal utterances, facial expressions, and body movements coordinates the minds and brains of two bodies, regulating the infant emotionally and **uniting mother and child temporally**.

- This primordial form of play thus generates the neurobiological substrate on which all forms of play—mother-infant mutual and solitary, spontaneous and controlled, active and passive—evolve.
- In next developmental transition from **infancy to toddlerhood** play behavior expands significantly. Research shows that at ten to thirteen-and-a-half months, a significant increase in positive emotion accompanies the neo-toddler's rapid neuromuscular development, gross motor ability, and upright locomotion.

- Tulkin and Kagan (1972): at 10 months fully 90% of maternal physical and verbal behavior consists of affection, play, and caregiving, with only 5% involved in prohibiting the child from ongoing activity. By 1 year-of-age stimulation-seeking exploratory play time increases to as much as 6 hours of the child's day.
- Chisholm (1990) underscores the adaptive aspect of early play: by altering the relationship of the young organism to its developmental environment, **play in effect makes the environment an "enriched" one**.
- Play behavior reflects heightened activation of an exploratory-assertive motivational system.

- According to my colleague **Russell Meares** right brain-to-right brain protoconversation continues in the **second year**, a time when a toddler becomes acutely aware of others, develops a full, playful imagination, and grows eager for novel experiences.
- With expansion of higher right-brain functions and the onset of language, protoconversation now takes the form of intersubjective imaginative games, then **intrasubjective, internalized dialogues**, and what Meares calls "**conversational play**." This creative game, which toddler plays while alone, depends on make-believe, expressive use of words and analogy.

- Meares describes it as **analogical or protosymbolic play, which is imbued with the extra dimension of pleasure**. The game consists of a miniature story, told as if to the child himself or herself but also to someone else, who is not there except as a feeling of **presence** of the internalized, protoconversational mother.
- This earliest form of symbolic play allows the toddler to play with ideas and generate **fantasies**, including fantasied interactions with other selves. Studies now confirm that **symbolic play and imagination** are heavily influenced by **right-brain activation**.

- Tight coupling of right brain play and love with attachment dynamic: over first 2 years of human life **"strong" emotion of love is capable of energetically "jump starting" all positive emotions and behaviors, including interest, excitement, joy, curiosity, exploration, and play**.
- Mutual exchange of love fuels a young child's desire to explore the environment, drink in novelty, and eventually to fire up imagination in service of creativity. As children grow and develop, this initial dose of love gets internalized into **passionate engagements throughout life including a love for life itself**.

- **Mutual Love and Play in Psychotherapy and Beyond**
- In **contrast** to this scenario of mutual love and intersubjective play, intense and enduring **relational stress** that arises in psychopathogenetic social-emotional contexts and preclude these two forms of synchronized mutual love is associated with histories of significantly **reduced** amounts of spontaneous play.
- In this manner, the neural substrates of early protoconversational, intersubjective play, and later symbolic play fail to evolve, leading to enduring deficits in these adaptive, growth-promoting functions.

- Due to non-optimal early attachment contexts that inhibit expression of mutual love, love goes underground, surrounded by **defenses**, generating repressed love and dissociated love.
- Joseph (1992): "The infant and child must experience love and nurturance, or the limbic nuclei will not develop normally….**It is the limbic system and the right half of the brain that suffers from a lack of contact comfort.** This lack may give rise to considerable feelings of neediness and unhappiness, the reasons for which are not clear to the left brain and the conscious mind."

- "It is very difficult for children (or even adults) to consciously recognize the absence of something they have never been exposed to. However, as there is a physical and biological need for love and affection, this absence is fully felt even when it is not understood."
- **Winnicott**: "What you are looking for is your capacity to love, and without your knowing all the details, we can say some failure in your early life made **you doubt your capacity to love**."
- Winnicott: psychotherapy happens in the **overlap of two play areas**—that of the patient and that of the therapist.

- As I discussed in yesterday's plenary synchronized interactively regulated mutual regressions can potentially transmute a pathological regression into an **adaptive regression**, thereby providing a corrective emotional experience and a therapeutic progression.
- Mutually regulated regression reduces patient's symptomatology, but also produces more efficient and intimate right brain-to-right brain communication.
- Adaptive mutual regressions enhance development of the patient's right brain capacity for not only affect regulation, but also for symbolization, metaphor, fantasy, imagination, and shared intersubjective play.

- With adults, therapy focuses on interactively regulating conscious and unconscious **negative and positive affect**, as well as facilitating growth of patient's relational symbolic imaginative functions. Play allows patient and therapist not only to discover but to nurture different and more complex aspects of right-brain self.
- That said, in all forms of psychotherapy— infant, child, and adult—the emotion expressing and regulating **attachment relationship between the patient and therapist is essential to therapeutic change**.

- With respect to **child psychotherapy**, clinical models of play between therapist and patient have long been known to be effective with early trauma histories.
- **Association for Play Therapy**: treatment involves "the systematic use of a theoretical model to establish an interpersonal process wherein trained play therapists use the therapeutic powers of play to help clients prevent or resolve psychosocial difficulties and achieve optimal growth and development."
- Play therapy now integrating data from neuroscience and recent advances in theory, including my own work on mutual regression, attachment, and the right brain.

- These approaches focus on attachment trauma and stress importance of therapeutic relationship and the regulation of affective states.
- In this work role of therapist is not to simply interpret child's play (LH), but to cocreate play contexts that can form a stronger attachment bond of emotional communication and interactive regulation (RH).
- **Child's defenses** can be understood as strategies that minimize or avoid intolerable affects, both negative and positive. Thus attention needs to be focused on defenses, and not only on conscious but also unconscious affects.

- **Spontaneous dyadic play in mutual regressions can reenact attachment trauma, which is then communicated and regulated by the therapist**.
- Affect regulation: play in therapy also serves as a context for rupture and repair, which enables a child to creatively cope with an array of negative affects and to generate novel solutions to interpersonal problems.
- The cocreated therapeutic relationship thus allows children to tolerate and regulate not only negative emotions but also positive emotions, and it facilitates a more secure implicit, **positive sense of self and emotional well-being**.

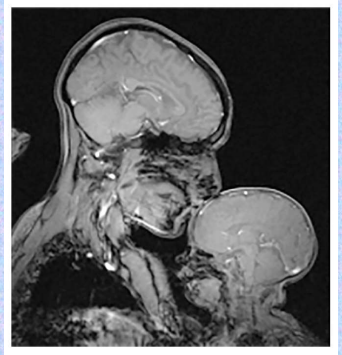
- On other hand **love** has had a more controversial history than play in in psychotherapy. In classical psychoanalysis, love was considered a natural aspect of the transference dynamic, yet was **discouraged**, if not forbidden within psychoanalysis **by Freud**, who tended to eroticize all forms of adult love.
- In contrast **Sándor Ferenczi** highlighted centrality of mutual emotional experience generally, and love specifically. For Ferenczi the essential characteristics of parenthood were the essential characteristics of the psychotherapist. In *The Leaven of Love*, his student Izette DeForest (1954) expounded upon his position:

- "The offering of loving care cannot be given, either by parent or by psychotherapist, on demand or in answer to threat. It must be given freely and spontaneously as a genuinely felt emotional expression. And it must provide an environment of trust and confidence and hope, so that the neurotic sufferer can gradually unburden himself of his conscious and unconscious anxieties; of his shame and guilt; of his hostility and plans of vengeance; of his rejected longing to love; of all his deeply hidden secrets…"

- "It must provide the environment (no matter how absurd it may objectively appear) which is essential to growth, to the unfolding of individuality."
- "In other words, the therapist must give to the patient a replica of the birthright of love which has denied him, as an infant or a growing child, but which, if granted, would have assured him full stature as an individual in his own right."
- Since "love is the leaven" of early attachment development, both interactively regulated mutual **quiet** and **excited love** are **leaven for deep healing and post-traumatic growth during psychotherapy**.

- At this point, twenty five years after my first book *Affect Regulation and the Origin of the Self*, advances in technology now present images of attachment communication system embedded in first relationship, the one between mother and infant.
- In very recent article in ***Annals of Family Medicine*** Ungar offered a two-person psychological image of the **neuroscientist Rebeca Saxe and her 4-month-old infant in an MRI scanner**. Commenting on this emotionally evocative image of quiet love Ungar concluded,

- “The image depicts the mother-infant bond at the level of its most basic neuroanatomy. Through a grainy spectrum of black and grey, the infant brain – seemingly exposed and vulnerable – is held by a larger and more robust adult brain. The two are in close communication through ***a* kiss to the infant’s forehead**, giving merit to the statement of Allan Schore, certainly to apply to our little patients in the office, that the developing brain forms in the setting of a relationship – **a bonding relationship, with ‘another self – another brain.’”**



- Attachment fundamentally more than security and safety, but ability of forming **intimate strong emotional bounds within a highly valued relationship with another subjective self**.
- **Porges and Carter** (2010): “Although the brain retains plasticity and adaptability throughout life, early experience may set the parameters for that plasticity. **Attachment** may be said to set up social and emotional homeostasis, **designing future patterns for intimacy**…Emotional homeostasis resides in the subcortical brain structures and their links to cortical structures, all of which are shaped in early life.”

- From relational onset in early infancy **mutual love** increases right lateralized emotion processing on both sides of any loving dyad, whether **parent-child, adult romantic, or intimate friendships.**
- This **intimacy** includes adaptive ability to be unselfconsciously **playful**, to with an other, to be able to share highly pleasurable states daydreaming and **imagination**, to be mutually **creative**, to share the **joy** of a love for life with a trusted other, to vulnerably communicate intensely personal **hope and dreams**, and to be young at heart and **loving** within an **intimate**, highly valued **close relationship**.