Self-attachment: an integrative and holistic psychotherapeutic technique

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Algorithmic Human Development

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Initial Motivation

- Mongol Trauma hypothesis (A.E. 2010):

- Islamic-Iranian holocaust

- Transgeneration of Mongol trauma

- Major source of root cause of psychological disorders

- Ideological root of Al-Qaeda and ISIL (Daesh)

- **Great Challenge**:

  Need an effective self-help therapeutic method

- **Big Question**:
  Can we synthesize the Eastern rehabilitation methods with modern psychological sciences?

Disorders of affect regulation

- "The overwhelming majority of psychiatric disorders are disorders of affect regulation in social interactions." (Schore 2003, 2013; Cozolino 2006, 2010).

- An **incapacity to regulate strong emotions** underpins depressive and anxiety disorders, bipolar disorders, borderline personality disorder, schizophrenia and all types of personality disorders.

Attachment theory
(Bowlby, Ainsworh, Maine, 1960-80's)

•   Dominant paradigm in developmental psychology pioneered by John Bowlby.

• A toddler has one of four types of attachment with her/his primary caregiver depending on their relationship, crucial for the child's emotional development and the "internal working model" throughout life:

•   Secure attachment (loving parent)
•   Avoidantly insecure (rejecting parent)
•   Anxiously insecure (inconsistent parent)
•   Disorganisedly insecure (frightening parent)

•   "Attachment insecurity is a major contributor to mental disorders" (Mikulincer and Shaver 2012)

Secure attachment circuits in the first year
## (Allan Schore, 2003)

• The loving mother - through mutual gaze, mirroring, singing, dance and play - attunes, resonates and fine tunes with and thus regulates the baby's affective states, maximizing positive and minimizing negative affects.

• Synchronized **right brain – right brain interactions** in the **mother-baby dyad** greatly increase dopamine and endogenous opiates, inducing rapid growth of the baby's brain.

• The **orbital prefrontal cortex** develops as the executive director of the limbic system, to regulate and delay response to arousal of emotions.
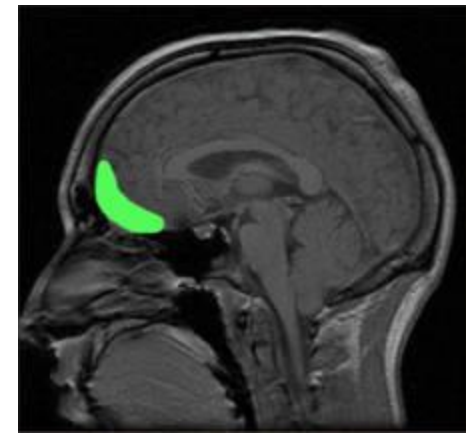
• The child slowly acquires a mental image of the loving mother, an internal model/neural circuits used increasingly in the absence of the mother too.

Orbital prefrontal cortex

Attachment Objects in Ethology

- Rhesus monkey infants spent far more time with Harry Harlow's **cloth covered surrogate mothers** than **bare wire surrogate mothers.**

- When the infants had no choice they developed very differently.

- Infants with cloth covered surrogate mothers later would made **bodily contact with their mothers and calm down** when scared.

- Infants with bare wire surrogate mothers, however, did not retreat to their mothers when scared.

- Instead, they threw themselves on the floor, clutched themselves, rocked back and forth, and screamed in terror.

- Infants used the cloth covered surrogates as **an attachment object for emotion regulation**, a form of self-attachment.

Attachment Objects in Human Children

- With their large pre-frontal cortex, humans invest high emotional significance to and **bond with inanimate or abstract objects**, which mediate self-directed behaviour to contain anxiety and provide inner peace

- Donald Winnicott: Children passionately bond with "**transitional objects**" such as a pillow or a blanket as a "comfort object".

- Comforting properties of a **good enough mother** are projected to the transitional object.

- By interacting with the transitional object, a mother substitute, the child then acquires **the capacity for self-soothing.**

Religion as Attachment Object

- **"The idea of God is the idea of an absolutely adequate attachment-figure**." (Gordon Kaufman, 1981).

- In Christianity, Granvist, Mikuliner & Shaver (2010):

1. Phenotypic resemblance between relationship to God and relationship to parents centred around **love**

2. Common attributes of "**availability**" and "**benevolence**"

3. Similarities in attachment behaviour: "**proximity seeking**" and "**perceived omnipresence**"

4. Similarities as "**safe haven**" and "**secure base**"

- Islamic spirituality, Ghobary Bonab, Miner &Proctor (2013)

Human bonding examined with fMRI
(Bartles and Zeki, 2000 and 2004: Schjødt et al. 2008)

• Mothers, respectively adult lovers look at photos of their loved ones and some other children, respectively some other friends.

• Activated brain areas of mothers overlap with romantic lovers in dopamine producing caudate nucleus, the reward pathways when looking at the photos of loved ones.

Caudate nucleus

• Deactivated brain areas for maternal and romantic love overlap in regions associated with negative emotions, social judgment.

• Caudate nucleus is activated in devout protestants when praying, but only if they regularly pray at least three times a week.
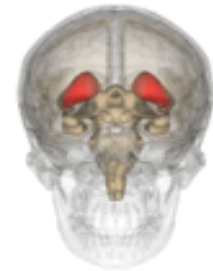
Neural attractors in the brain

- Attachment types and internal working models create **strong neural attractors** with large basins sculpted in the brain by **repetition of similar experiences**, optimal or suboptimal.

- They dominate in our interpretations, decisions, behaviour.

- Other examples in which strong attractors are shaped:

- **Attachment to a deity**

- **Children's attachment to transitional objects** and the associated narratives.

- **Infant monkey's attachment with cloth covered surrogates** and the associated soothing effects.

Modelling attachment in neural networks

- Hopfield neural networks are used to store and retrieve memory.

- A neuron either is on with value 1 (firing) or is off (not firing) with value -1, a vast simplification of the real situation.

- Between any two neurons there is a connection weight

- The state of a neuron (+1 or -1) will be renewed one at a time depending on the states of other neurons and the weights.

- Hopfield network is initially trained to store a number of patterns or memories using a Hebbian learning rule.

- The network has an energy value for each configuration which decreases any time the network is asynchronously updated.

- It is then able to recognise any of the learned patterns by exposure to only partial or even some corrupted information about that pattern.

Left window:

Hopfield neural network usage Example

Create Neural Network (100 Neurons)

Add pattern to Neural network
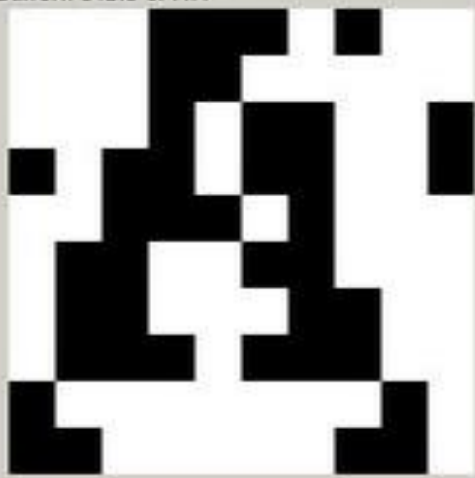
Run network dynamics

Properties of Neural Network
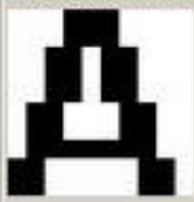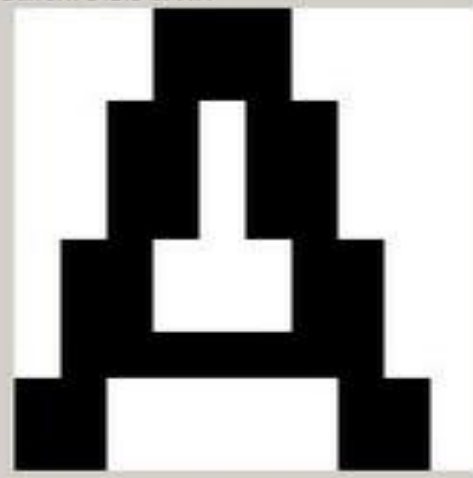
Size of Neural Network: 100

Number of patterns: 3

Current value of Energy: 0

Current State of NN

Patterns in NN

Right window:

Hopfield neural network usage Example

Create Neural Network (100 Neurons)

Add pattern to Neural network

Run network dynamics

Properties of Neural Network

Size of Neural Network: 100

Number of patterns: 3

Current value of Energy: -5542

Current State of NN

Patterns in NN

Artificial brain: from depression to happiness
(A.E. & Mancinelli 2013, A.E. 2013)

- Train a 50 x50 network with 30 copies of a sad smiley and single copies of up to 30000 random images

- Depressed brain: any random image is interpreted most likely as a sad face

- Now in addition train the network with 40 copies of a happy face

- If now exposed to a random pattern

  most likely the happy face is retrieved.

- The depressed brain has undergone psychotherapy
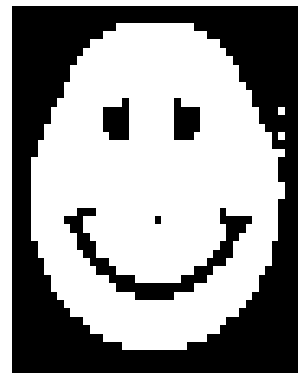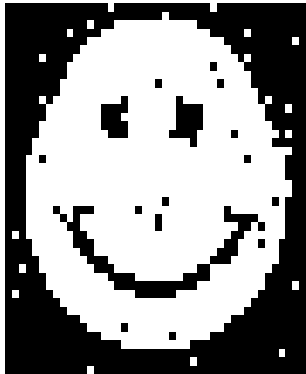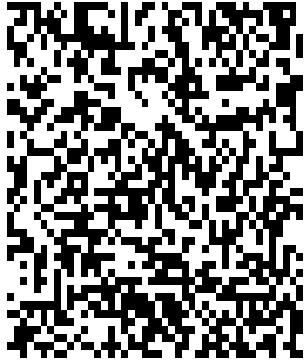
Holistic intervention to heal psychological disorders

- To tackle the root of disorders, in adults with suboptimal internal working model:

- Create a new strong neural attractor in the brain to make a fresh start in emotion regulation by emulating loving parents.

- The new optimal neural attractor will challenge and eventually contain the sub-optimal attractor .

- Under high stress we find temporary regression to the sub-optimal attractor, but shorter and less painful.

- Experiments in artificial neural networks confirms this change in the dominating attractor.
(A.E. & Mancinelli 2013, A.E. 2013)

Self-Attachment therapy: Make a Fresh Start

- Create new optimal strong attractors by emulating mother nature.

- The brain is comprised of "two individuals":

  (i) Adult self: a thinking/reasoning faculty with neural activities mostly in the pre-frontal cortex or "left" brain
  (ii) Inner child: a feeling/emotional faculty with neural activities mostly in the limbic system or "right" brain

- Three stages in self-attachment algorithm to become your parent:

1. Connecting: Adult connects to the inner child with compassion.

2. Bonding: Adult self creates an internal affectional bond with the inner child, subjectively experienced as "falling in love".

3. Re-parenting: Adult practices with the inner child to regulate arousal, minimise negative affects and maximise positive affects.

Examples of exercises

- Affect regulation for a trauma (Sad_Child) :
The individual imagines the traumatic scene in which the adult self imaginatively intervenes to comfort verbally and physically the inner child.

- Habituation to singing a happy song (Happy_Child):
The individual learns the happy song by heart and sings it to the inner child imagining that it helps to raise the child to emotional maturity.

- Promising results in over a dozen uncontrolled case studies of chronic depression and anxiety.

- High rate of compliance, quick time of symptom alleviation compared to other techniques such as CBT or schema therapy.

Rudiments of Self-Attachment in Ethology
(John Capitanio 1986)

- Non-human primates exhibit abnormal **self-directed behaviour** when subjected to isolation in their early lives.

- One type of self-directed behaviour mimics certain calming or stimulating interactions with a mother monkey

- In the absence of a mother to suck on, cling to or be stimulated by, the isolated infant monkey engages in **self-orality, self-clasping or rocking**.

- Since this self-directed behaviour, a form of self-attachment, is not learned, it must be part of the **attachment** system initially discovered by John Bowlby.

Other results and future work

- Four other mathematical models for self-attachment

- Controlled pilot study

- Controlled double blind randomised clinical trials

- fMRI studies

- Tailoring self-attachment protocols for different types of disorders and mental illness

- Improving neural models of self-attachment

- Mobile app for self-attachment

- A virtual reality environment for self-attachment

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