

Editorial

The neuroscience of attachment: implications for psychological therapies

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Summary

Recent advances in attachment-informed relational neuroscience point to possible mechanisms of action of psychological therapies, with implications for effective practice.

Declaration of interest

None.

Keywords

Attachment; psychological therapies; neuroscience.

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Bowlbian attachment research¹ demonstrates the role of childhood experience in shaping adult life and the importance of security for affective freedom. As a meta-model, attachment-informed psychotherapy² (AIP) emphasises the centrality, specificity and continuity of relationships (including those with mental health professionals); the modulation of threat; and the need to anticipate and mourn inevitable separations. Applicable across a number of therapeutic modalities, it provides a frame for understanding the disruptions that bring individuals for therapy but also can challenge the therapeutic alliance. As we describe below, recent advances in relational neuroscience help make sense of these disruptions and elucidate potential mechanisms of change in AIP.

Relational neuroscience

Social species' brains do not exist in isolation. Relational neuroscience, a broad term, draws on a range of experiential, neuroendocrine and functional magnetic resonance imaging evidence to illuminate how early key relationships affect the development of brain architecture and functioning.³ We focus here on aspects relevant to psychological therapies.

Biobehavioural synchrony

In utero and postpartum, mother and baby are physiologically entrained, with patterns of heartbeat, hypothalamic–pituitary–adrenal activation and oxytocin levels mirroring and responding to one another.⁴ These form the basis of parental sensitivity, identified by attachment theory's co-founder Ainsworth as the defining feature of secure attachments. Security-providing parents intuitively know and are rewarded by their infants, skilfully regulating – neither controlling nor ignoring – their needs and affects. For insecure caregivers, negative affects in their own children and others evoke rejection and diminished oxytocin reward. Clinical⁵ and

animal⁶ models show that attachment trauma in early life influences the developing brain with long-term psychopathological consequences, including the capacity to care for the next generation – a strong message for clinicians to focus on early life experiences, taking the history of the parents alongside that of the children.

Studies of the physiology of therapist–client attachment are scant, but it is likely that biobehavioural synchrony also plays a significant role in the success of psychotherapy, especially at mutative moments in sessions. Therapists vary widely in their effectiveness:⁷ like insecure mothers,⁸ they can 'loom' intrusively with over-empathic responses or make cuttingly dismissive interpretations, however seemingly accurate. AIP skills include the ability to recognise that threat – including in the consulting room – triggers attachment behaviour and is incompatible with emotional exploration and to co-regulate affective states of hyper- or hypo-arousal.⁹

Sensitive periods

Lorenz's¹⁰ concept of sensitive periods describes temporal windows in which the young of prosocial species bond with their parents. Bowlby was puzzled that no such clearly defined periods are found in humans. However, recent studies have shown that in both human and other mammalian species there are phases in which infants are especially susceptible to parental influence,¹¹ when rapid learning takes place and the fear associated with novelty neutralised. In insecure attachment, sensitive periods tend to be disrupted. This is especially salient in disorganised attachment, associated with later psychopathology,¹² in which ineffective self-soothing strategies – self-harm, addictions, eating disorders or dissociative disorders – reflect the absence of a modulating 'secure base' presence. In effective psychotherapy, a sensitive period re-opens in which the client becomes once more susceptible to support and influence. However, with this goes a degree of regression, the management of which is part of the art of therapy.

The Bayesian brain

Bayes, one of the founders of probability theory, described how when faced with uncertainty – drawing on the default mode network – 'prior' probabilities are assigned to future events, to be converted to 'posteriors' as predictions are updated in the light of experience. Computational psychiatry, past¹³ and present,¹⁴ draws on Bayesian ideas to understand psychopathology. The mathematician and psychiatrist Friston¹⁵ extends Bayes' principle: the brain's aim, via 'active inference', is to reduce 'surprise' by converting 'free' – and

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therefore potentially disruptive and chaotic – informational energy into ‘bound’ form. ‘Bottom-up’ sensations are aligned with ‘top-down’ preconceptions and the degree of mismatch computed. Predictions need continuous updating lest we be forever trapped in the past, i.e. shaped by transference-dominated anachronistic assumptions. In healthy functioning, active inference minimises prediction error by (a) tolerating, while working to reduce, uncertainty; (b) active exploration aimed at improved sensory precision; and (c) updating of prior probabilities into more complex models of the self and its world.

Psychotherapy typically helps people at times of transition. Secure attachment makes the uncertainties of novelty tolerable, resolvable with the help of an attachment figure. In insecure attachment, agency is compromised, while rigid prior probabilities are clung to, either by isolationism or over-dependency. In a longer-term therapeutic relationship, as therapists’ and clients’ oxytocin systems become entrained, this cross-talks to the dopamine system. The ensuing ‘reward’ – the therapist’s hope and love – opens up the complexity of psychological health in contrast to the simplistic splitting and projection. Revised assumptions become possible; inhibitions of action, feeling and thoughts are lifted.

AIP

Attachment themes pervade therapeutic relationships: AIP relies on the establishment of synchrony, the opening up of sensitive periods and the revision of old assumptions and ways of being. There is a built-in tension between clients’ clinging to insecure modes of relating and therapists’ attempts to instantiate active inference. For psychodynamic therapists, this forms therapy’s main *point d’appui*: confounding transference expectations, offering the client the freedom to think and speak in an unconstrained, non-judgemental atmosphere while recognising that – initially at least – such overtures are likely to be ignored, mistrusted or actively rejected. The AIP principle of radical acceptance¹⁶ means that validation of clients’ affective and relational worlds necessarily precedes interpretation or the promotion of change.

A key contemporary attachment concept, mentalising, fosters prefrontal cortex–amygdala connectivity. Arousal is managed with the help of a trusted intimate other or secure base,¹⁷ enabling the individual to think about thinking and feelings, one’s own and those of others, and the interactions between them. When it comes to binding energy, two brains are better than one. Compromised mentalising is typical of insecure attachments, and therefore of many psychotherapy clients. In disorganised attachment and borderline personality disorder, hair-trigger arousal is incompatible with the ‘slow thinking’ needed for explicit mentalising.¹⁸

Thus fostering mentalising¹⁹ skills is a key contribution of psychotherapy to mental health practice. The capacity to mentalise enables people to stand back from their suffering and to see it both as a manifestation of vitality and how it arises from a specific, often traumatic, life history. Mentalising questions both the validity of unexamined assumptions and helps generate more nuanced receptivity and language for affective interoception.²⁰ It helps sufferers generate more realistic views of themselves, the world and others. It acknowledges the inescapability of misunderstanding, relational ruptures and misconceptions in intimate relationships – including therapy – as well as the possibilities of repair via the secure base and the ‘borrowed brain’ of the therapist.

Conclusion

Psychotherapy faces a situation not unlike Bowlby’s hero Darwin when publishing the *Origin of Species* in 1856. Pre-Mendel,

pre-Watson and Crick, Darwin knew nothing of the genetic mechanisms underpinning natural selection. After half a century of psychotherapy and attachment research, contemporary neuroscience opens a window into the fundamental mechanisms of action of psychological therapies, and their necessary translation into training and outcome protocols.

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References

- Cassidy J, Shaver P (eds). *Handbook of Attachment* (3rd edn): 242–69. Guilford Press, 2016.
- Holmes J, Slade A. *Attachment in Therapeutic Practice*. SAGE, 2017.
- Schore A. The right brain is dominant in psychotherapy. *Psychotherapy* 2014; **51**: 388–97.
- Feldman R. Sensitive periods in human social development: New insights from research on oxytocin, synchrony, and high-risk parenting. *Dev Psychopathol* 2015; **27**: 369–95.
- Strathearn L, Fonagy P, Amico J, Montague PR. Adult attachment predicts maternal brain and oxytocin response to infant cues. *Neuropsychopharmacology* 2009; **34**: 2655–66.
- Rincon-Cortes M, Sullivan R. Early life trauma and attachment: immediate and enduring effects on neurobiological and stress axis development. *Front Endocrinol* 2014; **5**: 33.
- Wilson DS, Hayes S, Biglan A, Embry D. Evolving the future: towards a science of intentional change. *Behav Brain Sci* 2014; **37**: 395–460.
- Beebe B, Lachmann F. *The Origins of Attachment: Infant Research and Adult Treatment*. Routledge, 2013.
- Slade A. Imagining fear: attachment, threat, and the dynamics of psychic experience. *Psychoanal Dialogues* 2014; **24**: 254–66.
- Lorenz K. *King Solomon’s Ring* (trans. M. Wilson). Methuen, 1961.
- Tottenham N. The importance of early experiences for neuro-affective development. In *The Neurobiology of Childhood*, Vol. 16 (eds S Anderson, D Pine): 109–29. Springer, 2014.
- Lyons-Ruth K, Jacobvitz D. Attachment disorganization: Genetic factors, parenting contexts, and developmental transformation from infancy to adulthood. In *Handbook of Attachment: Theory, Research, and Clinical Applications* (3rd edn) (eds J Cassidy, P Shaver): 667–96. Guilford Press, 2016.
- Hemsley D, Garety P. The formation of maintenance of delusions. *Br J Psychiatry* 1986; **149**: 51–6.
- Debbane M, Salamini G, Luyten P, Badoud D, Armando M, Solida Tozzi A, et al. Attachment, neurobiology and mentalizing along the psychosis continuum. *Front. Hum. Neurosci* 2016; **10**: 406.
- Friston K. The free energy principle: a unified brain theory? *Nat Rev Neurosci* 2010; **11**: 127–38.
- Linehan M. *Cognitive Behavioral Treatment of Borderline Personality Disorder*. Guilford Press, 1993.
- Coan J. Attachment and neuroscience. In *Handbook of Attachment* (3rd edn) (eds J Cassidy, P Shaver): 242–69. Guilford Press, 2016.
- Fonagy P, Luyten P, Strathearn L. Borderline personality disorder, mentalisation and the neurobiology of attachment. *Infant Ment Health J* 2011; **32**: 47–69.
- Bateman AW, Fonagy P. *Handbook of mentalizing in mental health practice*. American Psychiatric Publishing, 2012.
- Barrett LF. The theory of constructed emotion: an active inference account of interoception and categorisation. *Soc Cogn Affect Neurosci* 2017: 1–23.