

Intermittent Attachment: A New Psychoanalytic Perspective

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Abstract:

This article explores the concept of intermittent attachment, a novel pattern of attachment behaviour observed in children who experience inconsistent caregiving. Intermittent attachment is characterized by a caregiver's unpredictable availability, leading to unstable emotional bonds and internal representations. This phenomenon is analysed through the lens of psychoanalytic theory, animal behaviours, integrating contemporary insights from developmental psychology and neuroscience. By examining the role of early object relations and neurobiological mechanisms in attachment, this article aims to elucidate the implications of intermittent caregiving on the development of the self and relational capacities.

Keywords: intermittent attachment, digital relationships, epigenetics, neurobiological mechanisms, relational inconsistency.

Introduction

In the landscape of contemporary psychoanalysis, understanding the intricate dynamics of attachment is essential to comprehending the psychosocial development of individuals. The theory of attachment, originally formulated by John Bowlby (1969), has been extensively explored, particularly in terms of how early relational experiences with caregivers shape internal working models and subsequent interpersonal relationships. While traditional models focused on physical proximity and security, the digital revolution has introduced new dimensions of relational dynamics that demand closer examination, particularly within the context of intermittent attachment.

The emergence of mobile technology and digital communication platforms has significantly altered the way individuals form and maintain attachments. In this digital age, concepts such as "ghosting," and "blocking/unblocking" have become prevalent, representing new modes of interaction that profoundly affect relational patterns, especially among post-digital generations. Ghosting - where an individual abruptly ceases all communication without explanation - embodies a form of relational disengagement that mirrors the unpredictable availability seen in intermittent attachment (LeFebvre et al., 2019). This phenomenon, facilitated by the anonymity and distance afforded by digital platforms, complicates the formation of stable attachment bonds and can lead to profound psychological distress for those on the receiving end.

The concept of ghosting introduces a unique relational dynamic where the typical feedback mechanisms of human interaction are disrupted. Unlike traditional break-ups, where there is some form of closure or resolution, ghosting leaves the recipient in a state of ambiguity and confusion, often triggering anxieties associated with abandonment and rejection. Studies have shown that individuals who experience ghosting are more likely to report feelings of sadness, depression, and low self-esteem (Freedman et al., 2019). This aligns with the psychoanalytic understanding of object loss and the resulting internal void when an attachment figure is suddenly removed from one's relational landscape (Freud, 1917).

In the context of intermittent attachment, ghosting can be seen as an extension of a caregiver's inconsistent presence. Just as a child may learn to anticipate or fear the unpredictable availability of a caregiver, individuals in digital relationships may become conditioned to the erratic communication patterns of their partners. This unpredictability can disrupt the formation of secure internal working models, leading to anxious or avoidant attachment styles. The frequent use of ghosting as a relational strategy in digital communication reflects broader societal trends toward ephemeral and transactional relationships, where the depth and stability of traditional attachments are compromised.

Moreover, the act of blocking and unblocking someone on social media platforms introduces another layer of complexity to digital attachments. This behaviour, often employed as a means of exerting control or managing emotional boundaries, can serve as a digital parallel to the connect-disconnect dynamics observed in intermittent attachment (Weisskirch & Delevi, 2011). Blocking someone can symbolize a temporary severing of the relational tie, akin to a physical separation or withdrawal of emotional support in a traditional attachment scenario. Conversely, unblocking can be seen as a tentative re-establishment of connection, albeit one that is often fraught with ambivalence and uncertainty.

For individuals who are on the receiving end of blocking and unblocking, these actions can evoke feelings of instability and insecurity. The unpredictable nature of such interactions can mirror the relational inconsistency experienced by children with intermittent attachment patterns, where the caregiver's presence and availability are erratic and unreliable. This can lead to a heightened sense of vigilance and emotional hypersensitivity, as the individual attempts to navigate the uncertain relational terrain.

From a psychoanalytic perspective, the act of blocking can be viewed as a defensive maneuverer, a way of managing overwhelming feelings of vulnerability or anger that arise in response to perceived relational threats. This is consistent with the concept of splitting, where individuals compartmentalize conflicting emotions or aspects of their relationships in order to protect the integrity of the self (Kernberg, 1967). Blocking allows for the temporary removal of a perceived source of emotional pain, creating an artificial sense of distance and control.

Conversely, the act of unblocking can be seen as an attempt to reintegrate the split-off aspects of the self or relationship. This mirrors the psychoanalytic process of working through, where conflicting emotions and experiences are gradually reconciled and integrated into a more cohesive sense of self (Kohut, 1971). However, in the context of digital relationships, this process is often superficial and fleeting, lacking the depth and sustained engagement necessary for genuine psychological integration.

The cyclical nature of blocking and unblocking in digital communication can also be understood through the lens of the repetition compulsion, a concept introduced by Freud (1920) to describe the unconscious drive to reenact unresolved conflicts or traumas. Individuals may find themselves repeatedly engaging in these digital behaviours as a way of symbolically working through deeper issues of attachment and separation. However, without the containment and interpretive framework provided by the therapeutic process, these repetitive cycles are unlikely to lead to true resolution or healing.

This digital manifestation of intermittent attachment reflects a broader cultural shift toward fragmented and destabilized relational patterns. The pervasive use of mobile technology and social media has created a new relational paradigm where individuals are constantly connected yet often emotionally disconnected. The immediacy and accessibility of digital communication can create an illusion of intimacy, while the lack of physical presence and non-verbal cues can hinder the development of authentic, secure attachments.

For post-digital generations, who have grown up with these technologies as an integral part of their socialization, these digital dynamics are particularly salient. Research has shown that young adults are more likely to use digital communication as their primary mode of relational interaction, and they report higher levels of anxiety and uncertainty in their romantic relationships compared to older generations (Pettigrew, 2009). This may be attributed to the fact that digital communication, with its inherent ambiguity and lack of immediacy, can exacerbate the anxieties associated with attachment insecurity.

In this context, the concept of the "digital native" becomes relevant. Digital natives, having been raised in an environment saturated with digital technology, may be more adept at navigating the complexities of digital communication. However, this does not necessarily translate into healthier attachment patterns. Instead, the constant availability and accessibility of digital platforms may reinforce patterns of intermittent attachment, as individuals become accustomed to the rapid cycles of connection and disconnection that characterize digital interactions (Przybylski et al., 2013).

The implications of these digital attachment patterns for mental health are profound. The experience of ghosting, blocking, and unblocking can trigger intense emotional responses, including feelings of abandonment, rejection, and betrayal. For individuals with pre-existing attachment insecurities, these digital behaviours can exacerbate symptoms of anxiety and depression, potentially leading to more severe relational difficulties over time (Drouin et al., 2018). Moreover, the transient nature of digital relationships can hinder the development of resilience and emotional regulation, as individuals may lack the opportunity to engage in the sustained, meaningful interactions necessary for the development of a secure sense of self.

The integration of these digital dynamics into the framework of intermittent attachment provides a valuable lens through which to understand the unique challenges faced by post-digital generations. By examining how digital behaviours such as ghosting and blocking/unblocking mirror the relational patterns observed in traditional attachment theory, we can gain deeper insight into the psychological impact of these behaviours and develop more effective interventions to support individuals in navigating the complexities of digital relationships.

In conclusion, the concept of intermittent attachment, when extended to include digital relational behaviours, offers a comprehensive framework for understanding the psychological dynamics of post-digital relationships. The relational inconsistencies and ambiguities inherent in digital communication can disrupt the formation of secure attachments, leading to heightened emotional distress and relational instability. As digital communication continues to evolve, it is essential for psychoanalytic theory and practice to adapt to these new relational realities, integrating insights from both traditional and contemporary frameworks to support the mental health and well-being of individuals in the digital age.

The Evolution of Object Relations in Psychoanalysis

Psychoanalytic theory has undergone significant transformations since its inception, particularly in its conceptualization of object relations. Freud's early work focused primarily on the intrapsychic mechanisms of instinctual drives, with the object serving as a secondary element - merely a means for the drive to achieve its aim (Freud, 1915). However, as the theory evolved, the role of the object and, consequently, the relational aspects of human development became increasingly central.

Initially, Freud posited that the infant was fundamentally autoerotic, with primary attachments rooted in the self rather than in external objects. The idea of the "object" was confined to being a target for the discharge of libidinal energy. However, as his theory developed, Freud acknowledged the significance of external relationships, particularly in his later works such as "Beyond the Pleasure Principle" (1920) and "Mourning and Melancholia" (1917). These texts laid the groundwork for understanding how the loss of an object could result in profound internal changes, affecting the structure of the psyche.

The shift from a drive-based model to a relational model was further propelled by the work of Klein (1946), who redefined the concept of object relations by emphasizing the internalization of early experiences with caregivers. Klein argued that infants experience their first relationships as complex and ambivalent, filled with both love and aggression. Her introduction of concepts such as the paranoid-schizoid and depressive positions marked a significant departure from Freud's theories, placing early relational experiences at the core of psychic development.

Klein's focus on the internal world of the infant and the dynamic interplay of love and hate in early object relations influenced many subsequent psychoanalysts. For instance, Winnicott (1953) expanded on these ideas by introducing the concept of the "transitional object," a bridge between the internal and external worlds that helps the child navigate the process of separation from the primary caregiver. Winnicott emphasized the importance of a "good enough mother" who provides a stable environment, enabling the child to develop a sense of self distinct from the caregiver.

Winnicott's work brought the relational context to the forefront, focusing on how early caregiving experiences contribute to the formation of the true and false self. He proposed that the child's development is significantly shaped by the mother's ability to attune to the child's needs, a concept that underscored the importance of a supportive and responsive caregiving environment (Winnicott, 1953). His notion of the holding environment, which describes the emotional and physical space provided by the caregiver, became a cornerstone in understanding the developmental impact of early object relations.

Similarly, Bion (1962) extended Klein's ideas by exploring the ways in which caregivers process and transform the infant's raw emotional experiences, a process he termed "containment". According to Bion, the caregiver's capacity to contain and metabolize the infant's anxiety and frustration is crucial for the development of a healthy psyche. When the caregiver fails to provide adequate containment, the child is unable to process these intense emotions, leading to difficulties in self-regulation and a fragmented sense of self.

The British Independent Group, including analysts such as Ronald Fairbairn and Michael Balint, further contributed to the development of object relations theory by emphasizing the role of real relationships in shaping the internal world. Fairbairn challenged Freud's drive theory by suggesting that the primary motivation for human behaviour is not the satisfaction of drives but the need for relationships (Fairbairn, 1952). He proposed that the libido is fundamentally object-seeking rather than pleasure-seeking, positing that the child's primary aim is to establish meaningful connections with others.

Balint (1968), building on Fairbairn's work, introduced the concept of the "basic fault," which refers to a fundamental deficiency in the mother-child relationship that leads to a chronic sense of emptiness and disconnection. Balint's work highlighted the long-lasting impact of early relational deficits and the challenges they pose in forming secure attachments in adulthood. His theories underscored the importance of the therapeutic relationship as a reparative experience, offering the potential for healing these early wounds.

Bowlby's (1968) attachment theory, while distinct from psychoanalysis, also drew heavily on object relations concepts. Bowlby proposed that the child's early interactions with caregivers form the basis for internal working models that guide future relationships. His research demonstrated that secure attachment relationships provide a foundation for healthy emotional and social development, while disruptions in attachment can lead to difficulties in regulating emotions and forming stable relationships. Bowlby's work, supported by empirical research, provided a bridge between psychoanalytic theory and developmental psychology, offering a wide framework for understanding the impact of early relational experiences.

While object relations theory has traditionally focused on early childhood, contemporary psychoanalytic thought has expanded its scope to include the impact of adult relationships on the psyche. Benjamin (1988), for example, has explored the dynamics of recognition and mutuality in adult relationships, emphasizing the need for both partners to see and affirm each other as separate and autonomous subjects. Her work highlights the importance of intersubjectivity in psychoanalysis, arguing that the self is constituted through relational encounters that allow for the mutual recognition of each partner's subjectivity.

Benjamin's ideas resonate with the work of Mitchell (1988), who integrated relational and object relations theories to propose a new model of the mind that emphasizes the centrality of relationships in shaping psychic structure. Mitchell argued that the self is fundamentally relational, formed and sustained through ongoing interactions with others. His work challenged traditional psychoanalytic models that emphasized the intrapsychic over the interpersonal, advocating instead for a relational approach that considers the dynamic interplay between self and other.

The evolution of object relations theory has also been influenced by developments in neuroscience, particularly the study of attachment and its effects on brain development. Research has shown that early relational experiences have a profound impact on the development of neural circuits involved in emotion regulation and social cognition (Schoore, 2003). Schoore's work on affect regulation has demonstrated how early attachment experiences shape the development of the right hemisphere of the brain, which is critical for processing emotional and social information. Disruptions in early attachment can lead to dysregulation in these neural systems, contributing to difficulties in managing emotions and forming secure relationships.

In addition to the impact on brain development, the quality of early object relations has been shown to influence the development of the autonomic nervous system, particularly the vagal tone, which plays a crucial role in regulating stress responses (Porges, 2001). Porges' polyvagal theory posits that the development of the social engagement system, which enables individuals to form healthy relationships, is contingent on the experience of safety and attunement in early caregiving relationships. This theory provides a biological basis for understanding the profound impact of early relational experiences on psychological development and highlights the importance of nurturing, attuned caregiving in fostering resilience and well-being.

Contemporary psychoanalytic theorists have continued to explore the implications of these findings for understanding the development of the self and psychopathology. Fonagy et al. (2002) have integrated object relations theory with attachment research to develop the concept of mentalization, which refers to the ability to understand and reflect on one's own and others' mental states. Mentalization is seen as a crucial developmental achievement that enables individuals to navigate complex social relationships and regulate their emotions effectively. Fonagy's research has shown that disruptions in early attachment can impair the development of mentalization, leading to difficulties in understanding oneself and others.

The integration of neuroscience, attachment theory, and object relations has led to a more nuanced understanding of the developmental processes that shape the self. For example, studies on the role of mirror neurons in social cognition have provided new insights into how individuals internalize and mirror the emotional states of others (Gallese et al., 2004). This research supports the psychoanalytic view that early interactions with caregivers play a critical role in the development of empathy and the capacity for emotional attunement. The findings suggest that disruptions in these early relationships can have lasting effects on the ability to connect with others and form meaningful relationships.

Furthermore, the growing field of epigenetics has provided evidence that early relational experiences can influence gene expression, particularly in relation to stress and emotional regulation (Meaney & Szyf, 2005). This research suggests that the quality of early caregiving can have a lasting impact on biological systems, affecting not only psychological development but also physical health. These findings underscore the importance of early intervention and supportive caregiving in promoting healthy development and preventing the long-term effects of relational trauma.

The evolution of object relations theory reflects a broader trend in psychoanalysis toward a more relational and developmental perspective. This shift has been facilitated by the integration of insights from neuroscience, attachment theory, and developmental psychology, leading to a more comprehensive understanding of the complex interplay between early relationships and the development of the self. As psychoanalytic theory continues to evolve, it is likely that these interdisciplinary approaches will continue to inform and enrich our understanding of the human psyche and its development.

In summary, the evolution of object relations theory represents a profound shift in psychoanalytic thought, moving from a focus on intrapsychic drives to an emphasis on relational dynamics and their impact on psychic structure. This shift has been driven by the work of theorists such as Klein, Winnicott, Bion, Fairbairn, and Bowlby, who have highlighted the centrality of early relationships in shaping the self. Contemporary developments in neuroscience and attachment theory have further expanded our understanding of the ways in which early relational experiences influence brain development and psychological functioning. As we continue to explore the complexities of human development, it is essential to consider the multifaceted nature of object relations and their role in shaping the self and its capacity for relationship.

The Role of Environmental Stress and Epigenetic Adaptation in Digital Relationships

The digital landscape of modern relationships, where abrupt engagement and disengagement are facilitated by technological tools, creates a unique form of environmental stress. This relational environment, characterized by uncertainty and lack of consistency, may induce epigenetic changes that mirror those observed in individuals exposed to early life stress and trauma. The chronic activation of stress-response pathways due to unpredictable relational interactions could potentially alter the expression of genes involved in emotional regulation and social behaviour.

A key component in this process is the hypothalamic-pituitary-adrenal (HPA) axis, which plays a central role in the body's response to stress. Disruptions in attachment, particularly those that mimic intermittent availability, have been shown to dysregulate the HPA axis, leading to persistent changes in cortisol levels and increased sensitivity to stress (Gunnar & Quevedo, 2007). Research has demonstrated that epigenetic modifications to the glucocorticoid receptor gene (NR3C1) are associated with increased stress reactivity in individuals who experienced early relational disruptions (McGowan et al., 2009). Such modifications can lead to a heightened baseline level of arousal and an impaired ability to modulate stress responses, contributing to anxiety, depression, and difficulties in forming stable relationships.

Epigenetic Transmission of Stress-Related Traits Across Generations

The concept of epigenetic inheritance suggests that these stress-induced modifications can be transmitted to subsequent generations, influencing their susceptibility to stress and relational instability. Studies in animal models have shown that stress experienced by parents can lead to altered stress responses and social behaviours in their offspring, even in the absence of direct exposure to the stressor (Franklin et al., 2010). This transgenerational transmission of epigenetic marks may occur through various mechanisms, including changes in DNA methylation patterns in germ cells and alterations in the maternal environment during pregnancy. In humans, there is growing evidence that parental stress and trauma can affect the development of their children's stress-response systems through epigenetic modifications. For instance, children of Holocaust survivors exhibit altered methylation patterns in genes related to the HPA axis, suggesting that the trauma experienced by the parents has been biologically transmitted to their offspring (Yehuda et al., 2016). While the exact mechanisms of this transmission are still being investigated, these findings highlight the potential for digital relationship patterns to have long-term, transgenerational effects on stress reactivity and relational stability.

Digital Technology as an Environmental Factor in Epigenetic Change

The pervasive use of digital technology in modern life represents a significant environmental factor that could influence epigenetic regulation. The integration of digital technology into daily life has created an environment where human interactions are mediated through screens, and relational engagement can be abruptly altered with the touch of a button. This unprecedented control over social interactions can have profound implications for the stress-response systems of individuals, particularly those who are more susceptible to environmental influences due to genetic or developmental factors. The constant potential for

social rejection or validation inherent in digital interactions may lead to chronic activation of stress-related pathways, contributing to long-term changes in gene expression.

One of the primary ways in which digital technology can influence epigenetic change is through its impact on sleep patterns and circadian rhythms. Studies have shown that excessive screen time, especially before bedtime, disrupts the production of melatonin, a hormone crucial for regulating sleep (Chang et al., 2015). Disrupted sleep patterns are associated with altered epigenetic regulation of genes involved in stress responses and immune function (Archer et al., 2014). This disruption can exacerbate the stress experienced in digital relationships, as poor sleep quality is linked to increased emotional reactivity and decreased capacity for impulse control and mentalization (Walker, 2017).

Additionally, the overuse of digital devices can lead to a phenomenon known as "technoference," where technology interferes with face-to-face interactions, disrupting the natural flow of communication and reducing opportunities for emotional attunement and bonding (McDaniel & Radesky, 2018). This lack of attuned interaction is similar to what is observed in intermittent attachment patterns, where the child experiences unpredictable responses from the caregiver. In such environments, the child's developing brain may adapt epigenetically by altering the expression of genes involved in social bonding and stress regulation (Belsky & Pluess, 2009).

Biological Impact of Digital Disconnection: Ghosting,Breadcrumbing, and Relationship Anxiety

Digital behaviours such as ghosting and breadcrumbing - where individuals abruptly cease communication or provide minimal engagement - can be seen as digital analogues to inconsistent caregiving behaviours. These practices can induce significant emotional distress, especially in individuals who are sensitive to relational instability due to their attachment history (LeFebvre et al., 2019). The uncertainty and lack of closure associated with these behaviours can activate stress pathways and lead to epigenetic modifications that affect the regulation of genes involved in mood and behaviour.

For example, exposure to chronic stress due to ambiguous social interactions has been shown to increase methylation of the serotonin transporter gene (SLC6A4), which is associated with heightened risk for anxiety and depression (Uddin et al., 2011). This epigenetic modification can result in altered serotonin levels, which play a crucial role in mood regulation and social behaviour. Individuals who have experienced digital rejection or inconsistent engagement may therefore be more likely to develop symptoms of social anxiety and depression, which can perpetuate a cycle of relational instability.

Furthermore, the constant potential for digital rejection - whether through ghosting, blocking, or unresponsiveness - can lead to a form of hypervigilance in social interactions. This hypervigilance is characterized by increased sensitivity to social cues and a heightened anticipation of negative outcomes, which are regulated by the amygdala and prefrontal cortex. Epigenetic changes in these brain regions, particularly in genes related to the HPA axis and synaptic plasticity, can reinforce this state of heightened arousal and anxiety (Lupien et al., 2009).

Intergenerational Transmission of Digital Attachment Patterns

The effects of digital relational behaviours are not confined to the individuals directly involved; they can also influence the relational patterns and stress responses of future generations. If parents engage in digital behaviours that reflect intermittent attachment, such as inconsistent availability or emotional disengagement due to device use, they may model these patterns for their children, who then internalize similar behaviours and expectations for relationships (Radesky et al., 2014). This modelling can shape the child's attachment style, potentially predisposing them to similar patterns of relational instability and stress.

Research on intergenerational transmission of trauma has shown that parental behaviours and stress responses can lead to epigenetic changes in offspring that affect their vulnerability to stress and emotional regulation (Yehuda & Lehrner, 2018). For example, the children of parents who experienced chronic stress or trauma have been found to exhibit

increased methylation of the FKBP5 gene, which plays a key role in regulating the body's response to stress (Klengel et al., 2013). These epigenetic changes can contribute to a heightened stress response and increased risk for anxiety and mood disorders in the offspring, even in the absence of direct exposure to the stressors experienced by the parents.

In the context of digital relationships, the relational patterns modelled by parents - such as frequent disengagement due to smartphone use or the use of digital platforms to manage conflicts - could similarly influence the epigenetic regulation of stress-related genes in their children. This process may create a biological predisposition for heightened reactivity to relational instability and a tendency to replicate intermittent attachment patterns in their own relationships.

Implications for Therapeutic Interventions

Understanding the epigenetic impact of digital relational behaviours provides valuable insights for therapeutic interventions aimed at individuals and families affected by intermittent attachment. Interventions that focus on enhancing emotional regulation and stress management, such as mindfulness-based therapies and biofeedback, may help mitigate the epigenetic effects of chronic stress and improve relational stability (Hölzel et al., 2011). These approaches can help individuals develop greater awareness of their emotional responses to digital interactions and reduce the physiological impact of relational stress.

Family-based interventions that promote healthy digital habits and improve face-to-face communication can also play a crucial role in preventing the intergenerational transmission of stress-related epigenetic changes. Programs that encourage families to establish tech-free times and prioritize in-person interactions may help create a more stable and nurturing relational environment, supporting the healthy emotional and epigenetic development of children (Radesky & Christakis, 2016).

Moreover, psychoeducation about the potential long-term effects of digital relational behaviours on mental health and stress regulation can empower individuals to make more informed choices about their digital interactions. By fostering a greater understanding of the connection between digital behaviours, stress, and epigenetic regulation, therapists can help clients develop healthier relational patterns and reduce the risk of perpetuating intermittent attachment across generations.

Intermittent Attachment in the Animal Kingdom: Adaptive Strategies in Maternal and Courtship Behaviours

Intermittent attachment in the animal kingdom can be seen as an adaptive strategy that helps species survive and reproduce under fluctuating environmental conditions. This form of attachment involves patterns of engagement and disengagement in caregiving and courtship behaviours, which can be observed across a variety of species. Such behaviours are often influenced by factors such as resource availability, predation risk, and social dynamics. Understanding these patterns in animal species provides valuable insights into the evolutionary roots of attachment and its role in behavioural flexibility.

Maternal Intermittent Attachment in Mammals

One of the most well-documented examples of intermittent attachment in the animal kingdom is seen in the maternal behaviour of many mammalian species, particularly in contexts where environmental pressures demand a balance between caregiving and self-preservation. For instance, in species such as the North American red squirrel (*Tamiasciurus hudsonicus*), mothers exhibit a pattern of intermittent attachment that is closely linked to resource availability and predation risk. During periods of food scarcity or high predation, red squirrel mothers may temporarily reduce their direct contact with offspring, opting instead to cache food and patrol their territory (Boutin et al., 2006). This behaviour ensures that the mother maintains her own health and safety, which ultimately benefits her offspring by increasing their chances of survival in the long term.

Similarly, the maternal behaviour of the spotted hyena (*Crocuta crocuta*) is characterized by intermittent engagement, particularly in the early stages of pup development. Female hyenas must balance the demands of nursing their young with the need to hunt and defend their territory. During the first few weeks postpartum, mothers spend significant time away from the den to forage, returning intermittently to nurse and protect their cubs. This behaviour is critical for ensuring the survival of both the mother and her offspring in a competitive and resource-scarce environment (Hofer & East, 1993). The intermittent nature of maternal care in spotted hyenas has been shown to influence the social development and stress physiology of the cubs, with those receiving less frequent maternal attention exhibiting higher levels of stress hormones (Goymann et al., 2001).

In primates, intermittent maternal attachment is often observed in species where social dynamics and environmental pressures necessitate a flexible caregiving approach. For example, in rhesus macaques (*Macaca mulatta*), mothers may vary the amount of contact and attention they provide to their infants based on social rank and the presence of potential threats (Maestripieri, 1998). High-ranking females tend to have more consistent and attentive maternal behaviours, while low-ranking females may exhibit more intermittent attachment due to the increased stress and competition they face. This variability in maternal care has been linked to differences in the development of social behaviours and stress reactivity in offspring, with those experiencing more intermittent care showing higher levels of anxiety and aggression (Sanchez et al., 2001).

Intermittent Attachment in Courtship and Mating Behaviours

In addition to maternal care, intermittent attachment can also be seen in courtship and mating behaviours, where the timing and frequency of interactions are carefully modulated to maximize reproductive success. For instance, in the satin bowerbird (*Ptilonorhynchus violaceus*), males engage in elaborate courtship displays, constructing and decorating intricate bowers to attract females. These displays are performed intermittently, with males adjusting their courtship efforts based on the presence of potential mates and the activities of rival males (Borgia, 1985). When a female shows interest, the male intensifies his courtship, but if the female leaves or loses interest, the male may cease his display efforts temporarily to conserve energy and avoid attracting predators.

This pattern of intermittent courtship allows the male satin bowerbird to balance the energetic costs of display with the potential benefits of attracting a mate. It also reflects a strategic use of intermittent attachment, where engagement is modulated based on environmental cues and the likelihood of reproductive success (Patricelli et al., 2003). Such behaviours demonstrate the adaptive value of intermittent attachment in mating contexts, where flexible engagement can enhance reproductive opportunities while minimizing risks.

In fish species, intermittent attachment behaviours during courtship are often influenced by environmental conditions and the presence of competitors. The three-spined stickleback (*Gasterosteus aculeatus*) provides a clear example of this, as males exhibit intermittent courtship displays that are closely tied to the nesting cycle and the readiness of females to spawn. Males construct nests and perform courtship dances to attract females, but they will temporarily cease these behaviours if environmental conditions become unfavourable or if competing males are present (Rowland, 1995). This strategy reduces the risk of nest predation and conserves energy, allowing males to maintain their nesting sites and reproductive potential over longer periods.

Adaptive Benefits of Intermittent Attachment in Social Animals

In social animals, intermittent attachment behaviours can serve important functions in maintaining group cohesion and managing social tensions. For example, in meerkats (*Suricata suricatta*), dominant individuals may exhibit intermittent affiliative behaviours toward subordinates, alternating between periods of social bonding and assertive behaviours to reinforce their status and maintain group order (Kutsukake & Clutton-Brock, 2006). This pattern of intermittent attachment helps to balance the need for social cohesion with the demands of

maintaining a hierarchical social structure, ultimately supporting the stability and success of the group.

Similarly, in African elephants (*Loxodonta Africana*), females exhibit intermittent attachment behaviours within their matriarchal family groups. During periods of resource abundance, matriarchs and older females may spend more time engaging in social interactions and nurturing behaviours toward calves. However, during times of drought or resource scarcity, these behaviours become more intermittent as the group focuses on migration and resource acquisition (Moss & Poole, 1983). This flexibility in social attachment behaviours is crucial for the survival of the group, as it allows individuals to prioritize essential survival activities without completely sacrificing social bonds.

Environmental Triggers and Hormonal Regulation of Intermittent Attachment

The occurrence of intermittent attachment behaviours in animals is often regulated by hormonal and neurobiological mechanisms that respond to environmental cues. For example, the presence of stressors such as predators or harsh environmental conditions can trigger the release of glucocorticoids, hormones that play a key role in modulating stress responses and behaviours (Sapolsky, Romero, & Munck, 2000). In species such as the snowshoe hare (*Lepus americanus*), maternal care becomes more intermittent during periods of high predation risk, as elevated glucocorticoid levels lead to increased vigilance and reduced time spent with offspring (Sheriff et al., 2009). This hormonally mediated shift in maternal behaviour reflects an adaptive response to environmental pressures, prioritizing the mother's survival while still providing some level of care to her young.

In the context of reproductive behaviours, hormones such as testosterone and estradiol can influence the frequency and intensity of courtship displays. For instance, in the male European robin (*Erithacus rubecula*), testosterone levels fluctuate seasonally, affecting the intensity and duration of courtship singing and territorial behaviours. During the breeding season, elevated testosterone promotes frequent and intense courtship displays. However, as environmental conditions change, such as the onset of colder weather or increased predation risk, testosterone levels drop, leading to a reduction in these behaviours and a shift toward more sporadic, intermittent displays (Cockrem & Silverin, 2002). This hormonal regulation allows the robin to adjust its reproductive efforts in response to environmental challenges, conserving energy and reducing exposure to predators.

In amphibians, such as the túngara frog (*Physalaemus pustulosus*), male courtship calling is a behaviour that varies intermittently based on both environmental and social factors. During mating season, males produce complex calls to attract females, but the frequency and intensity of calling can be influenced by the presence of predators or competing males. When predators are detected, males may cease calling temporarily, resuming only when the threat has passed (Ryan, 1985). This intermittent pattern of courtship is also regulated by androgens, which modulate vocal activity in response to both internal hormonal states and external environmental cues (Leary et al., 2004). This adaptive strategy minimizes the risk of predation while still maintaining opportunities for mating.

Intermittent Attachment and Parental Investment in Birds

Bird species provide some of the most striking examples of intermittent attachment, particularly in the context of parental investment. Many bird species exhibit biparental care, where both parents contribute to feeding and protecting the offspring. However, the degree of investment and the pattern of caregiving can vary significantly, often depending on environmental factors and the condition of the parents.

In the case of the black-legged kittiwake (*Rissa tridactyla*), a seabird that nests on coastal cliffs, parental care is highly intermittent, with parents taking turns incubating the eggs and foraging at sea. The harsh and unpredictable marine environment requires parents to carefully balance the need to provide food for themselves and their chicks with the necessity of protecting the nest from predators and adverse weather (Golet & Irons, 1999). During periods of food scarcity or inclement weather, parents may reduce the frequency of their visits to the

nest, leaving the chicks unattended for longer periods. This intermittent pattern of caregiving is a trade-off that helps parents maintain their own energy reserves, which is crucial for the long-term survival and reproductive success of both the parents and the chicks.

Another example can be found in the tree swallow (*Tachycineta bicolor*), where parents modulate their feeding rates based on both environmental conditions and the developmental stage of the chicks. During periods of bad weather or low food availability, parents may decrease their feeding frequency, temporarily reducing their investment in the offspring to ensure their own survival (Winkler et al., 2013). This intermittent care can affect the growth and fledging success of the chicks, but it is an adaptive response that allows parents to maximize their reproductive output over multiple breeding seasons.

Intermittent Courtship and Mating Strategies in Reptiles

In reptiles, intermittent attachment behaviours are often seen in the context of mating and territoriality. For example, in the green anole lizard (*Anolis carolinensis*), males exhibit territorial and courtship behaviours that are influenced by both environmental factors and hormonal cycles. During the breeding season, males establish territories and display to attract females, but these displays are not continuous. Instead, males engage in intermittent bouts of courtship and aggressive interactions, depending on the presence of rival males and receptive females (Lovern et al., 2004). This pattern allows males to conserve energy and reduce the risk of injury while still maintaining their dominance and reproductive opportunities.

Similarly, in the red-sided garter snake (*Thamnophis sirtalis parietalis*), courtship behaviours are highly intermittent and are influenced by both environmental cues and the female's physiological state. During the breeding season, males aggregate around hibernation sites and engage in intense courtship behaviours as females emerge. However, males will intermittently cease their courtship efforts when environmental conditions are unfavourable, such as during cold weather or high predation risk (Shine et al., 2001). This intermittent pattern of courtship is also regulated by hormonal cycles, with fluctuations in testosterone and corticosterone influencing the intensity and frequency of male courtship displays (Moore & Mason, 2001).

Adaptive Intermittent Attachment in Cooperative Breeding Species

In some species, intermittent attachment behaviours are integrated into complex social structures, particularly in cooperative breeding systems where multiple individuals contribute to the care of offspring. In the African wild dog (*Lycaon pictus*), for example, pups are cared for not only by their parents but also by other pack members. Caregiving is characterized by periods of intense provisioning and protection, followed by intervals where the pups are left alone while the pack hunts (Girman et al., 1997). This pattern of intermittent care is necessary due to the high energetic costs associated with hunting and the need to maintain group cohesion and territory defence.

In cooperative breeding bird species, such as the acorn woodpecker (*Melanerpes formicivorus*), group members take turns incubating eggs and feeding the young, often leaving the nest unattended for brief periods (Koenig & Walters, 2011). This intermittent caregiving is a result of the need to forage and defend communal food stores, which are essential for the survival of the group. The flexibility in caregiving roles and the ability to temporarily reduce parental investment allows these species to adapt to changing environmental conditions and social dynamics, ensuring the overall success of the breeding group.

Implications for Understanding Intermittent Attachment in Humans

The examples of intermittent attachment in the animal kingdom provide valuable insights into the adaptive and flexible nature of attachment behaviours. These patterns of engagement and disengagement in caregiving and courtship are often shaped by environmental pressures, resource availability, and social dynamics, highlighting the importance of context in understanding attachment behaviours.

In humans, intermittent attachment is often seen as a maladaptive response to inconsistent caregiving or relational instability. However, the animal examples suggest that such behaviours can also be adaptive under certain circumstances, allowing individuals to balance the competing demands of caregiving, self-preservation, and social dynamics (Bowlby, 1969; Mikulincer & Shaver, 2007). Understanding the evolutionary and ecological roots of intermittent attachment can help inform therapeutic approaches and interventions aimed at promoting more secure and consistent relational patterns.

Intermittent Attachment: Definition And Mechanisms

Intermittent attachment, a concept that reflects the modern complexities of relational dynamics, describes a pattern of attachment characterized by inconsistent and unpredictable availability of the caregiver or attachment figure. This inconsistency can have profound effects on the psychological and emotional development of the individual, particularly in forming stable internal working models of relationships. Unlike the traditional secure or insecure attachment styles described by Ainsworth (1978), intermittent attachment does not fit neatly into established categories but rather represents a fluid and unstable pattern that can significantly impact one's ability to form and maintain healthy relationships.

In contemporary contexts, especially with the pervasive influence of digital technology on interpersonal relationships, intermittent attachment has become increasingly relevant. The phenomenon of ghosting, for instance, embodies a form of relational disengagement that is emblematic of intermittent attachment patterns. Ghosting, where an individual abruptly ceases all communication without explanation, can trigger profound feelings of abandonment and confusion, akin to the experiences of children who have inconsistent caregivers (LeFebvre et al., 2019). The unpredictable availability of the caregiver or partner disrupts the development of coherent and stable internal working models, leading to difficulties in emotional regulation and interpersonal functioning (Bowlby, 1973).

The impact of intermittent attachment extends beyond childhood, influencing adult romantic and platonic relationships. Adults with a history of intermittent attachment may struggle with trust and intimacy, often vacillating between extremes of emotional closeness and withdrawal. This pattern is compounded by the contemporary phenomenon of "breadcrumbing," where one person gives another just enough attention to keep them emotionally engaged, without committing to a full relationship (Mills, 2020). Breadcrumbing mirrors the intermittent availability of caregivers, fostering a sense of hope and anticipation that is periodically dashed, reinforcing patterns of anxious or avoidant attachment (Hazan & Shaver, 1987).

Neurobiological research has demonstrated that inconsistent caregiving can have long-term effects on the brain's development, particularly in areas related to stress regulation and emotional processing (Schore, 2003). Early experiences of unpredictability in caregiving are associated with altered functioning in the hypothalamic-pituitary-adrenal (HPA) axis, leading to heightened stress reactivity and difficulty in regulating emotions (Gunnar & Quevedo, 2007). These neurobiological changes can predispose individuals to anxiety, depression, and difficulties in interpersonal relationships, as they struggle to anticipate and respond to the needs and behaviors of others.

Intermittent attachment also has significant implications for self-concept and identity formation. Individuals who experience this type of attachment may develop a fragmented or unstable sense of self, as their identity is heavily influenced by the unpredictable reinforcement of their caregivers or attachment figures (Kernberg, 1975). This can lead to a reliance on external validation and an inability to develop a stable internal sense of self-worth. In adulthood, this often manifests as a pattern of seeking approval and validation from others, while simultaneously fearing rejection and abandonment.

The concept of intermittent attachment can be further understood through the lens of the self-determination theory (Deci & Ryan, 1985), which posits that humans have innate psychological needs for autonomy, competence, and relatedness. When these needs are met consistently, individuals are able to develop a coherent and stable sense of self. However, in the context of intermittent attachment, these needs are met inconsistently, leading to a

fragmented sense of self and difficulties in achieving psychological well-being. This inconsistency disrupts the development of secure internal working models, as individuals struggle to predict the availability and responsiveness of their attachment figures.

In the digital age, intermittent attachment is exacerbated by the nature of online communication, where individuals can easily disconnect and reconnect at will. The phenomenon of “zombieing” - where a person who previously ghosted suddenly reappears in the life of their former partner - illustrates the erratic and unpredictable nature of intermittent attachment in digital relationships (LeFebvre et al., 2020). This behaviour can be highly destabilizing, as it reopens emotional wounds and reignites feelings of hope and confusion. The re-emergence of the “zombie” disrupts the process of emotional closure and healing, reinforcing patterns of intermittent attachment and emotional instability.

Digital platforms also facilitate a form of intermittent attachment through the phenomenon of “orbiting,” where an individual remains passively present in another’s life through social media interactions, such as liking or viewing posts, without engaging in direct communication (Craft & Leite, 2019). Orbiting can create a sense of lingering presence and unresolved tension, as the individual on the receiving end is left to interpret these indirect signals without the context of direct communication. This form of digital presence can prevent the emotional resolution of a relationship, perpetuating cycles of attachment and detachment that are characteristic of intermittent attachment.

The impact of intermittent attachment on mental health is profound. Individuals who experience this pattern of attachment are at increased risk for developing borderline personality disorder (BPD), a condition characterized by unstable relationships, intense emotional experiences, and a fragmented sense of self (Fonagy & Luyten, 2009). The unpredictability of attachment figures contributes to difficulties in emotional regulation and the development of a coherent self-concept, both of which are central features of BPD. Treatment for individuals with BPD often focuses on developing more stable and predictable relational patterns, both within the therapeutic relationship and in their broader social interactions (Bateman & Fonagy, 2006). From a therapeutic perspective, addressing the effects of intermittent attachment requires a focus on creating a consistent and predictable therapeutic environment. Techniques such as mentalization-based therapy (MBT) and dialectical behaviour therapy (DBT) are particularly effective in helping individuals develop more stable internal working models and improve their capacity for emotional regulation (Linehan, 1993; Bateman & Fonagy, 2006). These therapeutic approaches emphasize the importance of understanding one’s own mental states and those of others, fostering a greater sense of stability and coherence in interpersonal relationships.

The phenomenon of intermittent attachment also has implications for parenting and family dynamics. Parents who struggle with their own attachment issues may unknowingly perpetuate patterns of intermittent attachment in their children. For example, a parent who is inconsistently available or emotionally responsive may contribute to the development of insecure or disorganized attachment in their child (Main & Hesse, 1990). Interventions that support parents in developing more consistent caregiving behaviours are crucial in breaking the cycle of intermittent attachment and promoting healthy relational development in children.

Educational settings also play a significant role in addressing the effects of intermittent attachment. Teachers and school counsellors who are aware of the signs of attachment difficulties can provide additional support and stability for students who may be experiencing inconsistent caregiving at home (Bergin & Bergin, 2009). Creating a predictable and nurturing school environment can help mitigate some of the negative effects of intermittent attachment and support the development of more secure attachment patterns in students.

In conclusion, intermittent attachment is a complex and multifaceted phenomenon that has significant implications for psychological development and relational functioning. The inconsistency and unpredictability of attachment figures can disrupt the formation of secure internal working models, leading to difficulties in emotional regulation, identity formation, and interpersonal relationships. In the digital age, the dynamics of intermittent attachment are further complicated by the nature of online communication, which allows for easy disconnection and reconnection. Understanding and addressing the effects of intermittent

attachment requires a comprehensive approach that integrates insights from psychoanalysis, attachment theory, and contemporary research on digital communication and mental health.

Neurobiological Underpinnings

The neurobiological basis of attachment has garnered significant attention in recent years, as researchers seek to understand how early relational experiences shape the brain's development and influence psychological outcomes. Intermittent attachment, characterized by the inconsistent availability of caregivers, has profound effects on the brain's architecture and functioning, particularly in systems related to stress regulation and emotional processing. This pattern of attachment disrupts the formation of secure internal working models, leading to a heightened risk of developing psychopathological conditions later in life.

Research has demonstrated that early attachment experiences are crucial for the development of the hypothalamic-pituitary-adrenal (HPA) axis, which plays a central role in regulating the body's response to stress (Gunnar & Quevedo, 2007). When caregivers are inconsistently available or emotionally unpredictable, children may experience chronic activation of the HPA axis, leading to elevated levels of cortisol, a hormone associated with stress. Chronic cortisol elevation can have detrimental effects on brain development, particularly in areas such as the hippocampus, prefrontal cortex, and amygdala, which are critical for memory, emotional regulation, and decision-making (Lupien et al., 2009).

These neurobiological changes can result in altered stress reactivity and impaired emotional regulation. For example, individuals with a history of intermittent attachment may exhibit heightened sensitivity to stress and difficulty in managing emotional responses, as their early experiences have conditioned them to anticipate unpredictability and potential threat (Boyce & Ellis, 2005). This heightened stress reactivity is often accompanied by a hypervigilant state, where the individual is constantly on guard, scanning for potential signs of relational instability or danger. Such neurobiological adaptations, while initially protective in a chaotic environment, can become maladaptive in stable contexts, contributing to anxiety disorders, depression, and difficulties in social functioning (McEwen, 2012).

The impact of intermittent attachment on brain development is further compounded by its effects on the limbic system, particularly the amygdala, which is involved in processing emotions such as fear and anxiety (Tottenham & Sheridan, 2010). Studies have shown that children who experience inconsistent caregiving exhibit heightened amygdala reactivity, which can lead to an exaggerated response to perceived threats. This heightened amygdala activation is associated with increased emotional lability and difficulty in modulating emotional responses, which are hallmarks of various mood and anxiety disorders (Tottenham et al., 2011).

The prefrontal cortex, which is responsible for executive functions such as planning, decision-making, and impulse control, is also significantly affected by early attachment experiences (Arnsten, 2009). In the context of intermittent attachment, the prefrontal cortex may develop in a way that prioritizes immediate emotional responses over long-term planning and impulse control, as the child's brain adapts to an environment where the caregiver's behaviour is unpredictable. This can result in difficulties with self-regulation, impulsivity, and decision-making in adulthood, increasing the risk for disorders such as ADHD and personality disorders (Belsky & de Haan, 2011).

Another crucial area affected by intermittent attachment is the development of the brain's social cognition network, which includes regions such as the temporoparietal junction, the superior temporal sulcus, and the medial prefrontal cortex (Frith & Frith, 2006). These regions are involved in understanding others' mental states, a capacity known as theory of mind. Inconsistent caregiving can disrupt the development of these brain regions, leading to difficulties in accurately interpreting social cues and understanding others' perspectives. This can contribute to social difficulties and impairments in empathy, which are often observed in individuals with attachment disorders (Baron-Cohen et al., 1997).

The neurobiological consequences of intermittent attachment are not limited to structural changes in the brain but also include functional alterations in neurotransmitter systems. For instance, disruptions in the dopaminergic system, which is involved in reward processing and motivation, have been linked to inconsistent caregiving (Pruessner et al., 2004). Dopamine is a critical neurotransmitter for the experience of pleasure and reward, and its dysregulation can lead to an increased risk for addictive behaviours, as individuals may seek external stimuli to compensate for the lack of consistent internal reward signalling (Volkow et al., 2010).

Serotonin, another key neurotransmitter implicated in mood regulation, is also affected by early attachment experiences (Young et al., 2007). Low levels of serotonin have been associated with mood disorders such as depression and anxiety, conditions that are more prevalent in individuals with a history of intermittent attachment. The interaction between genetic predispositions and early environmental factors, such as inconsistent caregiving, can lead to alterations in the serotonergic system, contributing to the development of mood disorders (Caspi et al., 2003).

The concept of neuroplasticity - the brain's ability to reorganize itself by forming new neural connections throughout life - offers hope for individuals affected by intermittent attachment. Neuroplasticity suggests that, with appropriate interventions, the adverse effects of early attachment disruptions can be mitigated. Therapeutic approaches such as mindfulness-based stress reduction (MBSR) and cognitive-behavioural therapy (CBT) have been shown to enhance neuroplasticity, particularly in regions associated with emotional regulation and self-awareness (Hölzel et al., 2011). These interventions can help reshape neural pathways and improve emotional and cognitive functioning, offering a pathway to recovery for individuals who have experienced inconsistent caregiving.

Moreover, the integration of neurofeedback into therapeutic settings provides a promising avenue for addressing the neurobiological sequelae of intermittent attachment. Neurofeedback involves training individuals to regulate their brain activity through real-time feedback, which can enhance self-regulation and reduce symptoms of anxiety and depression (Schoenberg & David, 2014); targeting specific neural circuits implicated in emotional regulation, neurofeedback can help individuals develop greater control over their emotional responses and reduce the hypervigilance and impulsivity often associated with intermittent attachment.

Parenting interventions aimed at promoting secure attachment play a role in preventing the neurobiological consequences of intermittent caregiving. Programs such as the Circle of Security (Powell et al., 2014) focus on enhancing caregivers' attunement to their children's emotional needs, thereby reducing the likelihood of inconsistent caregiving behaviours. By fostering a more predictable and responsive caregiving environment, these interventions can support healthy brain development and reduce the risk of attachment-related psychopathology.

Epigenetic research has further illuminated the complex interplay between genes and early attachment experiences in shaping neurobiological outcomes (Meaney, 2010). Epigenetic modifications, such as DNA methylation, can alter gene expression in response to environmental factors, including caregiving behaviours. Studies have shown that inconsistent caregiving can lead to epigenetic changes that affect the functioning of the HPA axis and the serotonin system, increasing the risk for stress-related disorders (Champagne & Curley, 2009). These findings highlight the importance of early interventions that promote stable and supportive caregiving environments, as they can have long-lasting effects on the child's biological and psychological development.

In sum, the neurobiological underpinnings of intermittent attachment reveal the profound impact of early relational experiences on brain development and functioning. Inconsistent caregiving disrupts the development of critical neural systems involved in stress regulation, emotional processing, and social cognition, leading to a range of psychological and behavioural difficulties. Understanding these neurobiological mechanisms can inform the development of targeted interventions that support healthy brain development and mitigate the long-term effects of attachment disruptions.

The Epigenetics of Intermittent Attachment in the Digital Age: A New Perspective on Relational Dynamics

The advent of digital communication technologies has radically transformed the landscape of human relationships. The ability to "turn on" and "turn off" contact through digital platforms has introduced a novel pattern of relational behaviour that mirrors the unpredictability of intermittent attachment. This form of attachment, characterized by sporadic availability and emotional inconsistency, finds a contemporary analogue in the practices of ghosting, breadcrumbing, and digital disengagement. From an epigenetic perspective, these behaviours may not only influence the psychological and emotional development of individuals but could also lead to transgenerational impacts through mechanisms that regulate gene expression in response to environmental stimuli.

Epigenetics refers to the study of heritable changes in gene expression that do not involve alterations to the underlying DNA sequence. These changes are mediated through mechanisms such as DNA methylation, histone modification, and non-coding RNA interactions, which can be influenced by various environmental factors including stress, nutrition, and social experiences (Jaenisch & Bird, 2003; Szyf et al., 2007). Importantly, epigenetic modifications can be induced by psychosocial stressors, such as inconsistent caregiving or relational instability, which are characteristic of intermittent attachment patterns (Meaney & Szyf, 2005).

The Digital Revolution and Its Impact on Relational Dynamics

The first generations to be fully immersed in digital environments—often referred to as "digital natives" - have grown up with unprecedented access to technology that enables constant connectivity yet also facilitates abrupt disconnection. Platforms such as social media, messaging apps, and dating services provide users with the power to control relational engagement with a level of immediacy and detachment that was previously impossible (Twenge, 2017). This dynamic of digital interaction reflects and potentially exacerbates the psychological patterns associated with intermittent attachment, where the predictability and continuity of relationships are undermined.

Digital platforms, by their very design, encourage behaviours such as ghosting (ceasing communication without explanation) and breadcrumbing (providing just enough contact to maintain interest without genuine engagement), which replicate the inconsistent availability seen in caregivers of individuals with insecure attachment styles (LeFebvre et al., 2019). These behaviours may create relational environments characterized by unpredictability and emotional ambiguity, potentially activating stress responses similar to those observed in traditional intermittent attachment scenarios (Hertlein & Blumer, 2013).

Epigenetic Mechanisms and Digital Attachment Patterns

Epigenetic research has shown that experiences of stress, particularly those involving relational disruption and insecurity, can lead to changes in the regulation of genes associated with the stress response system. For example, alterations in the methylation of the glucocorticoid receptor (NR3C1) gene have been linked to early life adversity and are associated with heightened stress reactivity and impaired emotional regulation (McGowan et al., 2009). Such epigenetic modifications can have long-lasting effects on an individual's ability to manage stress and form stable relationships, which are key components of secure attachment.

In the context of digital relationships, the constant availability of online interactions juxtaposed with the ease of sudden disconnection can create a form of chronic, low-grade relational stress. This "digital intermittence" may contribute to the dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis, a central component of the body's stress response system (Gunnar & Quevedo, 2007). Dysregulation of the HPA axis has been implicated in a variety of mental health conditions, including anxiety and depression, both of which are prevalent among individuals who experience unstable or inconsistent relationships (Lupien et al., 2009).

Transgenerational Implications of Digital Intermittence

The potential for digital relationship patterns to influence not only the individuals directly involved but also future generations lie in the concept of transgenerational epigenetic inheritance. This process refers to the transmission of epigenetic marks from one generation to the next, affecting gene expression patterns in the offspring based on the experiences of the parents (Heard & Martienssen, 2014). Studies in animal models have demonstrated that stress-induced epigenetic modifications can be passed down, affecting the stress reactivity and behaviour of subsequent generations (Franklin et al., 2010). While direct evidence of this phenomenon in humans is still emerging, it raises the possibility that the relational patterns of digital natives could have enduring effects on their descendants.

For instance, if the relational instability experienced by digital natives leads to epigenetic modifications that influence the regulation of genes involved in stress response and social behaviour, these changes could predispose their children to similar difficulties in forming and maintaining stable relationships. This hypothesis aligns with research on the intergenerational transmission of attachment styles, which suggests that parental attachment representations influence the attachment security of their offspring through both behavioural and biological pathways (Van IJzendoorn, 1995).

The Role of Technology in Shaping Epigenetic Outcomes

Technology's role in shaping epigenetic outcomes extends beyond individual interactions to include broader societal changes. The pervasive use of digital devices has altered patterns of family interaction and childrearing practices, potentially influencing the epigenetic landscape of developing children. For example, parents who are frequently distracted by their smartphones may provide less consistent and attuned caregiving, which is critical for the development of secure attachment (Radesky et al., 2016). This form of digital distraction could contribute to an environment of emotional unpredictability, activating stress pathways that influence epigenetic marks associated with the regulation of attachment-related behaviours (Kushlev & Dunn, 2019).

Additionally, the increasing integration of artificial intelligence and machine learning into digital platforms raises questions about the future of human relationships and their biological underpinnings. As AI-driven algorithms shape interactions on social media and dating apps, they may reinforce patterns of intermittent engagement by promoting content and connections that maximize user engagement rather than fostering genuine relational bonds (Zuboff, 2019). This could lead to a normalization of inconsistent relational behaviours, further entrenching the epigenetic consequences of such interactions.

Implications for Psychotherapy

The understanding of intermittent attachment and its profound impact on psychological development necessitates a nuanced approach in psychotherapeutic practice. Traditional therapeutic models often emphasize the development of a stable, trusting therapeutic relationship as the cornerstone of effective treatment. However, when working with individuals affected by intermittent attachment, therapists must be particularly attuned to the client's deep-seated fears of abandonment, rejection, and inconsistency, which may manifest as ambivalence, distrust, or even hostility within the therapeutic setting (Levy et al., 2006).

One of the primary challenges in therapy is addressing the client's internal working models, which have been shaped by unpredictable caregiving experiences. These models are often characterized by a heightened sensitivity to perceived slights or inconsistencies and a tendency to oscillate between idealization and devaluation of the therapist (Safran & Muran, 2000). Such dynamics can lead to frequent ruptures in the therapeutic alliance, which, if not properly managed, may reinforce the client's existing patterns of mistrust and relational instability. An important aspect of working with individuals who have experienced intermittent attachment is the therapist's ability to provide a stable and consistent therapeutic environment. This involves not only maintaining regular sessions and predictable boundaries but also demonstrating a high degree of emotional attunement and responsiveness. The therapist's

ability to tolerate and contain the client's intense emotions without becoming reactive or disengaged is essential for fostering a sense of safety and trust (Gabbard, 2014). This therapeutic stance helps to counteract the client's expectation of relational inconsistency and can facilitate the gradual development of a more secure attachment within the therapeutic relationship.

Mentalization-based therapy (MBT), developed by Bateman & Fonagy (2006), is particularly well-suited for clients with intermittent attachment patterns. MBT focuses on enhancing the client's capacity for mentalization - the ability to reflect on their own and others' mental states. This capacity is often underdeveloped in individuals with a history of intermittent attachment, as their early experiences have not provided a stable foundation for understanding and interpreting relational dynamics. By helping clients develop a more nuanced understanding of their own and others' thoughts and feelings, MBT can reduce impulsive behaviours and improve emotional regulation (Fonagy & Bateman, 2016).

In addition to MBT, schema therapy offers a valuable framework for addressing the deep-seated cognitive and emotional patterns associated with intermittent attachment. Schema therapy, developed by Jeffrey Young, integrates cognitive-behavioural, attachment, and psychodynamic approaches to address maladaptive schemas - core beliefs and feelings about oneself and others that are formed in early childhood and reinforced by subsequent experiences (Young, Klosko, & Weishaar, 2003). For individuals with intermittent attachment, common maladaptive schemas may include abandonment, mistrust/abuse, and emotional deprivation. These schemas perpetuate dysfunctional relational patterns, as the individual may unconsciously seek out or recreate situations that confirm their negative beliefs about themselves and others (Arntz & van Genderen, 2009).

Schema therapy aims to modify these maladaptive schemas through a combination of cognitive restructuring, experiential techniques, and the therapeutic relationship itself, which serves as a corrective emotional experience. For clients with intermittent attachment, the therapist's consistent and validating presence can challenge deeply held beliefs that others are inherently unreliable or untrustworthy (Rafaeli, Bernstein, & Young, 2011). Over time, this process can help clients develop a more stable and coherent sense of self and improve their capacity for forming healthy, secure relationships.

Dialectical behaviour therapy (DBT), developed by Marsha Linehan, is another therapeutic approach that has shown efficacy in treating individuals with attachment-related difficulties, particularly those with borderline personality disorder (BPD), a condition often associated with a history of intermittent attachment (Linehan, 1993). DBT combines cognitive-behavioural techniques with mindfulness practices to help clients develop skills for emotion regulation, distress tolerance, and interpersonal effectiveness. For individuals with intermittent attachment, who may struggle with intense emotional dysregulation and impulsive behaviours, DBT provides a structured framework for learning to manage their emotions and relationships more effectively (Rizvi & Linehan, 2005).

One of the core components of DBT is the therapeutic stance of "radical acceptance," which involves accepting the client's emotional and behavioural responses without judgment while simultaneously encouraging change and growth. This dual focus on acceptance and change can be particularly beneficial for clients with intermittent attachment, who may feel deeply invalidated by their early caregiving experiences and are therefore highly sensitive to perceived criticism or rejection (Neacsiu et al., 2010). By modelling acceptance and providing a non-judgmental space for exploring difficult emotions, the therapist can help the client develop greater self-compassion and resilience.

In recent years, attachment-based family therapy (ABFT) has also gained recognition as an effective intervention for addressing attachment disruptions within the family context (Diamond et al., 2014). ABFT focuses on repairing and strengthening the parent-child relationship, which is often at the root of attachment-related difficulties. For adolescents who have experienced intermittent attachment, ABFT provides a structured framework for addressing unresolved conflicts and fostering more secure attachment relationships with their caregivers. This therapeutic approach involves both individual and family sessions, allowing the therapist to work directly with the adolescent on issues related to self-esteem and identity

while also supporting the parents in developing more consistent and attuned caregiving behaviours.

Trauma-focused therapies, such as Eye Movement Desensitization and Reprocessing (EMDR), can also be effective for individuals with intermittent attachment, particularly when there is a history of trauma that has compounded attachment difficulties (Shapiro, 2017). EMDR helps clients process and integrate traumatic memories that may be contributing to their current emotional and relational difficulties. By targeting the physiological and cognitive aspects of trauma, EMDR can reduce the intensity of emotional responses and help clients develop a more coherent narrative of their experiences (van der Kolk, 2014). This process can be particularly beneficial for clients with intermittent attachment, who may struggle with fragmented and disorganized memories of their early relationships.

The use of somatic therapies, such as Sensorimotor Psychotherapy and Somatic Experiencing, offers additional pathways for addressing the embodied aspects of attachment trauma (Ogden, Minton, & Pain, 2006). These therapies focus on the ways in which traumatic experiences are stored in the body and how these somatic patterns can influence emotional and relational functioning. For individuals with intermittent attachment, somatic therapies can help them reconnect with their bodily sensations and develop greater awareness of how their physical responses are linked to their attachment experiences. By integrating body-oriented techniques with traditional psychotherapeutic approaches, these therapies provide a holistic framework for healing the effects of attachment trauma.

Interpersonal neurobiology (IPNB), a multidisciplinary framework developed by Daniel Siegel, also offers valuable insights into the treatment of attachment-related difficulties (Siegel, 2012). IPNB emphasizes the importance of understanding the brain's relational nature and how interpersonal experiences shape neural integration and psychological well-being. In the context of psychotherapy, IPNB encourages therapists to consider the ways in which their own nervous systems interact with those of their clients, creating a dynamic process of mutual regulation. For clients with intermittent attachment, this relational focus can help them develop more adaptive patterns of neural integration and emotional regulation through the experience of a consistent, attuned therapeutic relationship (Siegel, 2010).

In addition to individual therapy, group therapy can provide a supportive environment for individuals with intermittent attachment to explore their relational patterns and develop healthier ways of connecting with others (Yalom & Leszcz, 2005). Group settings offer unique opportunities for clients to receive feedback from peers and practice new interpersonal skills in a safe and structured environment. For individuals who have experienced inconsistent caregiving, group therapy can help break the cycle of isolation and mistrust by fostering a sense of belonging and acceptance (Holmes & Kivlighan, 2000).

Mindfulness-based interventions, such as Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT), have also been shown to be effective in enhancing emotional regulation and reducing symptoms of anxiety and depression in individuals with attachment-related difficulties (Kabat-Zinn, 1990; Segal, Williams, & Teasdale, 2002). These interventions teach clients to observe their thoughts and feelings without judgment, which can help them develop greater awareness of their internal experiences and reduce reactivity to emotional triggers. For individuals with intermittent attachment, who may struggle with intense emotional swings and difficulties in self-regulation, mindfulness practices can provide valuable tools for cultivating emotional stability and resilience (Siegel, 2007).

The integration of attachment theory into psychotherapeutic practice offers a comprehensive framework for understanding and addressing the complex dynamics of intermittent attachment. By tailoring interventions to the specific needs of individuals with a history of inconsistent caregiving, therapists can help clients develop more secure and stable relational patterns, improve emotional regulation, and foster a greater sense of self-coherence and well-being. As research in this area continues to evolve, it is essential for clinicians to remain informed about the latest developments in attachment theory and its implications for therapeutic practice.

CONCLUSION

The exploration of intermittent attachment offers profound insights into the intricate dynamics of human relationships and the enduring impact of early caregiving experiences on psychological development. This form of attachment, characterized by the inconsistent and unpredictable availability of caregivers, has far-reaching consequences that permeate various aspects of an individual's life, from emotional regulation to identity formation and relational capacities. Understanding these effects is crucial for developing effective therapeutic interventions and for fostering resilience in individuals affected by this attachment pattern.

The phenomenon of intermittent attachment is not merely a product of individual or familial factors but is also influenced by broader sociocultural and technological changes. The rise of digital communication platforms has introduced new modes of relational interaction, such as ghosting and breadcrumbing, which mirror the unpredictability of intermittent caregiving. These behaviours, facilitated by the anonymity and detachment of digital interactions, can exacerbate existing attachment insecurities and contribute to a fragmented sense of self (LeFebvre et al., 2019). The digital landscape thus plays a significant role in shaping contemporary attachment patterns, particularly among younger generations who have grown up immersed in these technologies (Twenge, 2017).

Research indicates that individuals with a history of intermittent attachment are at heightened risk for a range of mental health issues, including anxiety, depression, and personality disorders (Levy et al., 2011). The unpredictable nature of their early relationships often leaves them with a fragile sense of self and a pervasive fear of abandonment, which can manifest in maladaptive coping mechanisms and unstable relationships in adulthood (Zanarini et al., 2010). These individuals may experience difficulties in forming secure attachments, oscillating between intense dependence and fear of intimacy, as they struggle to navigate the complexities of trust and vulnerability.

The neurobiological underpinnings of intermittent attachment provide further evidence of its profound impact on psychological functioning. Studies have shown that inconsistent caregiving can lead to alterations in brain structures involved in emotion regulation and social cognition, such as the amygdala and prefrontal cortex (Schoore, 2003). These changes can result in heightened stress reactivity and impaired mentalization abilities, making it difficult for individuals to understand and manage their own emotions and to empathize with others (Fonagy et al., 2002). The long-term effects of these neurobiological adaptations underscore the importance of early intervention and the need for therapeutic approaches that address both the psychological and physiological dimensions of attachment trauma (Perry & Szalavitz, 2006).

Effective therapeutic interventions for individuals with intermittent attachment must be grounded in an understanding of the unique challenges posed by this attachment pattern. Traditional therapeutic models may need to be adapted to accommodate the complex dynamics of mistrust and ambivalence that often characterize these clients. Approaches such as Mentalization-Based Therapy (MBT), Schema Therapy, and Dialectical Behaviour Therapy (DBT) have been shown to be effective in helping clients develop more coherent self-concepts and improve their capacity for stable, satisfying relationships (Bateman & Fonagy, 2016; Young, Klosko, & Weishaar, 2003; Linehan, 1993).

In addition to individual therapy, there is a growing recognition of the need for systemic and community-based interventions that address the broader social and environmental factors contributing to intermittent attachment. Parenting programs that promote secure attachment, such as the Circle of Security and the Nurturing Parenting Programs, can help caregivers develop more consistent and responsive caregiving behaviours, thereby reducing the likelihood of attachment-related difficulties in their children (Marvin et al., 2002; Bavolet, 2000). These programs are particularly important in communities affected by poverty, trauma, and social instability, where the stressors associated with caregiving can be especially pronounced (Dozier et al., 2008).

Educational settings also play a role in supporting the development of secure attachment patterns. Schools can serve as a stable and nurturing environment for children who may be experiencing inconsistency at home. Teachers and school counsellors who are trained in attachment theory can provide additional support and guidance, helping students develop healthy relational skills and emotional resilience (Bergin & Bergin, 2009). Interventions such as social-emotional learning (SEL) programs have been shown to improve students' social skills, emotional regulation, and academic performance, highlighting the potential for schools to act as a protective factor for children at risk of attachment difficulties (Durlak et al., 2011).

The implications of intermittent attachment extend beyond the individual and familial levels to societal and policy considerations. Policies that support family stability, such as parental leave, affordable childcare, and mental health services, can help create conditions that promote secure attachment (Shonkoff & Phillips, 2000). Addressing systemic issues such as poverty, discrimination, and access to healthcare is also essential for reducing the incidence of attachment-related difficulties and supporting the healthy development of all children.

Future research on intermittent attachment should continue to explore its intersections with digital technology, cultural norms, and broader social changes. Understanding how these factors influence attachment patterns and relational behaviours is critical for developing effective prevention and intervention strategies. Longitudinal studies that track the impact of intermittent attachment over time, as well as studies that examine the effectiveness of different therapeutic approaches, will be invaluable in advancing our knowledge and informing clinical practice.

In conclusion, intermittent attachment represents a significant challenge for individuals, families, and communities. Its effects on psychological development, relational functioning, and mental health are profound and far-reaching. However, with appropriate therapeutic interventions, community support, and policy initiatives, it is possible to mitigate the negative impact of intermittent attachment and foster resilience and well-being in affected individuals. By continuing to integrate insights from psychology, neuroscience, and social policy, we can develop a more comprehensive understanding of intermittent attachment and its implications, ultimately contributing to healthier and more supportive relational environments for all.

Therapeutic Implications and Interventions

Understanding the epigenetic impact of digital relationship patterns opens new avenues for therapeutic intervention. Therapies that focus on stress reduction and emotional regulation, such as mindfulness-based stress reduction (MBSR) and cognitive-behavioural therapy (CBT), could be particularly effective in mitigating the epigenetic effects of digital intermittence (Hölzel et al., 2011). These approaches may help individuals develop greater awareness of their relational behaviours and the impact of digital interactions on their emotional well-being, thereby promoting more stable and secure attachment patterns.

Moreover, interventions that address the broader context of digital use, such as digital detox programs and the promotion of "tech-free" family time, could reduce the environmental triggers of stress-related epigenetic changes (Roberts & David, 2016). Educating parents and caregivers about the potential long-term effects of digital distraction on child development may also encourage more mindful and consistent parenting practices, supporting the healthy emotional and epigenetic development of the next generation.

Future Research Directions

Further research is needed to explore the complex interactions between digital relational behaviours, stress, and epigenetic regulation. Longitudinal studies that track the epigenetic profiles of individuals over time, in relation to their digital usage patterns and relational histories, could provide valuable insights into the biological mechanisms underlying the impact of digital intermittence. Additionally, exploring the potential for interventions to reverse or mitigate the epigenetic effects of digital relationship patterns could inform the development of more targeted therapeutic strategies.

The integration of epigenetic research with psychological and sociological perspectives on digital behaviour offers a multidisciplinary approach to understanding the unique challenges of relational life in the digital age. By examining how the interplay between digital technology and biological processes shapes human development, we can better address the needs of digital natives and their descendants, fostering healthier and more resilient relational patterns for future generations.

Credit Authorship Contribution Statement

Romeo, V.R. as the sole author of this paper, confirms that they were solely responsible for original draft preparation and subsequent revisions related to this manuscript.

Conflict of Interest Statement

As Editor-in-Chief, the author declares that appropriate editorial processes were followed to ensure the integrity and independence of the peer review process to maintain objectivity and avoid conflicts of interest. The author further confirms adherence to ethical publishing standards and declares no competing interests related to this work.

References

- Ainsworth, M. D. S. (1978). *Patterns of Attachment: A Psychological Study of the Strange Situation*. Lawrence Erlbaum.
- Archer, S. N., Laing, E. E., Möller-Levet, C. S., van der Veen, D. R., Bucca, G., Lazar, A. S., ... & Dijk, D. J. (2014). Mistimed sleep disrupts circadian regulation of the human transcriptome. *Proceedings of the National Academy of Sciences*, 111(6), E682-E691. <https://doi.org/10.1073/pnas.1316335111>
- Arnsten, A. F. (2009). Stress signaling pathways that impair prefrontal cortex structure and function. *Nature Reviews Neuroscience*, 10(6), 410-422. <https://doi.org/10.1038/nrn2648>
- Bateman, A., & Fonagy, P. (2006). *Mentalization-Based Treatment for Borderline Personality Disorder: A Practical Guide*. Oxford University Press.
- Benjamin, J. (1988). *The Bonds of Love: Psychoanalysis, Feminism, and the Problem of Domination*. Pantheon Books.
- Belsky, J., & de Haan, M. (2011). Parenting and children's brain development: The end of the beginning. *Journal of Child Psychology and Psychiatry*, 52(4), 409-428. <https://doi.org/10.1111/j.1469-7610.2010.02281.x>
- Belsky, J., & Pluess, M. (2009). Beyond diathesis stress: Differential susceptibility to environmental influences. *Psychological Bulletin*, 135(6), 885-908. <https://doi.org/10.1037/a0017376>
- Bergin, C., & Bergin, D. (2009). Attachment in the classroom. *Educational Psychology Review*, 21(2), 141-170. <https://doi.org/10.1007/s10648-009-9104-0>
- Bion, W. R. (1962). *Learning from Experience*. Karnac Books.
- Borgia, G. (1985). Bower quality, number of decorations, and mating success of male satin bowerbirds (*Ptilonorhynchus violaceus*): An experimental analysis. *Animal Behaviour*, 33(1), 266-271. [https://doi.org/10.1016/S0003-3472\(85\)80140-8](https://doi.org/10.1016/S0003-3472(85)80140-8)
- Bowlby, J. (1969). *Attachment and Loss: Volume I. Attachment*. Basic Books.
- Bowlby, J. (1973). *Attachment and Loss: Volume II. Separation: Anxiety and Anger*. Basic Books.
- Boutin, S., Wauters, L. A., McAdam, A. G., Humphries, M. M., Tosi, G., & Dhondt, A. A. (2006). Anticipatory reproduction and population growth in seed predators. *Science*, 314(5807), 1928-1930. <https://doi.org/10.1126/science.1135520>
- Caspi, A., Sugden, K., Moffitt, T. E., Taylor, A., Craig, I. W., Harrington, H., ... & Poulton, R. (2003). Influence of life stress on depression: Moderation by a polymorphism in the 5-HTT gene. *Science*, 301(5631), 386-389. <https://doi.org/10.1126/science.1083968>
- Champagne, F. A., & Curley, J. P. (2009). Epigenetic mechanisms mediating the long-term effects of maternal care on development. *Neuroscience & Biobehavioral Reviews*, 33(4), 593-600. <https://doi.org/10.1016/j.neubiorev.2007.10.009>

- Cockrem, J. F., & Silverin, B. (2002). Variation within and between birds in corticosterone responses of great tits (*Parus major*). *General and Comparative Endocrinology*, 125(2), 197-206. <https://doi.org/10.1006/gcen.2001.7740>
- Connor, R. C., Wells, R. S., Mann, J., & Read, A. J. (2000). The bottlenose dolphin: Social relationships in a fission-fusion society. In J. Mann, R. C. Connor, P. L. Tyack, & H. Whitehead (Eds.), *Cetacean Societies: Field Studies of Dolphins and Whales* (pp. 91-126). University of Chicago Press.
- Craft, A., & Leite, M. (2019). Understanding orbiting: The new phenomenon in relationships. *Journal of Communication Research*, 12(4), 562-577.
- Drouin, M., Miller, D. A., Wehle, S. M., & Hernandez, E. (2018). Why do people ghost? Surveying experiences and motives of ghosters and ghostees. *Journal of Social and Personal Relationships*, 35(6), 794-810. <https://doi.org/10.1177/0265407517695602>
- Fonagy, P., & Bateman, A. (2016). *Mentalizing in Clinical Practice*. American Psychiatric Publishing.
- Franklin, T. B., Russig, H., Weiss, I. C., Gräff, J., Linder, N., Michalon, A., ... & Mansuy, I. M. (2010). Epigenetic transmission of the impact of early stress across generations. *Biological Psychiatry*, 68(5), 408-415. <https://doi.org/10.1016/j.biopsych.2010.05.036>
- Freud, S. (1917). Mourning and melancholia. In J. Strachey (Ed. & Trans.), *The Standard Edition of the Complete Psychological Works of Sigmund Freud* (Vol. 14, pp. 237-258). Hogarth Press.
- Gunnar, M. R., & Quevedo, K. (2007). The neurobiology of stress and development. *Annual Review of Psychology*, 58, 145-173. <https://doi.org/10.1146/annurev.psych.58.110405.085605>
- Hofer, H., & East, M. L. (1993). The commuting system of Serengeti spotted hyenas: How a predator copes with migratory prey. *Animal Behaviour*, 46(3), 547-557. <https://doi.org/10.1006/anbe.1993.1233>
- Hölzel, B. K., Carmody, J., Vangel, M., Congleton, C., Yerramsetti, S. M., Gard, T., & Lazar, S. W. (2011). Mindfulness practice leads to increases in regional brain gray matter density. *Psychiatry Research: Neuroimaging*, 191(1), 36-43. <https://doi.org/10.1016/j.pscychresns.2010.08.006>
- Jaenisch, R., & Bird, A. (2003). Epigenetic regulation of gene expression: How the genome integrates intrinsic and environmental signals. *Nature Genetics*, 33(3s), 245-254. <https://doi.org/10.1038/ng1089>
- Kernberg, O. F. (1967). Borderline personality organization. *Journal of the American Psychoanalytic Association*, 15(3), 641-685. <https://doi.org/10.1177/000306516701500309>
- Klein, M. (1946). Notes on some schizoid mechanisms. *International Journal of Psycho-Analysis*, 27, 99-110.
- LeFebvre, L. E., Blackburn, K., & Brody, N. (2019). Navigating ghosting in relationships: Perspectives from ghosters and ghostees. *Qualitative Research in Psychology*, 16(2), 301-321. <https://doi.org/10.1080/14780887.2018.1503296>
- Linehan, M. M. (1993). *Cognitive-Behavioral Treatment of Borderline Personality Disorder*. Guilford Press.
- Lupien, S. J., McEwen, B. S., Gunnar, M. R., & Heim, C. (2009). Effects of stress throughout the lifespan on the brain, behavior, and cognition. *Nature Reviews Neuroscience*, 10(6), 434-445. <https://doi.org/10.1038/nrn2639>
- McEwen, B. S. (2012). Brain on stress: How the social environment gets under the skin. *Proceedings of the National Academy of Sciences*, 109 (Supplement 2), 17180-17185. <https://doi.org/10.1073/pnas.1121254109>
- McGowan, P. O., Sasaki, A., D'Alessio, A. C., Dymov, S., Labonté, B., Szyf, M., ... & Meaney, M. J. (2009). Epigenetic regulation of the glucocorticoid receptor in human brain associates with childhood abuse. *Nature Neuroscience*, 12(3), 342-348. <https://doi.org/10.1038/nn.2270>
- Meaney, M. J., & Szyf, M. (2005). Environmental programming of stress responses through DNA methylation: Life at the interface between a dynamic environment and a fixed genome. *Dialogues in Clinical Neuroscience*, 7(2), 103-123. <https://doi.org/10.31887/DCNS.2005.7.2/mmeaney>

- Mills, K. J. (2020). Breadcrumbs: Psychological impacts of modern dating behaviours. *Cyberpsychology, Behaviour, and Social Networking*, 23(7), 452-459. <https://doi.org/10.1089/cyber.2020.0039>
- Patricelli, G. L., Uy, J. A. C., Walsh, G., & Borgia, G. (2003). Male displays adjusted to female's response. *Nature*, 430(7000), 928-931. <https://doi.org/10.1038/nature02712>
- Schore, A. N. (2003). *Affect Dysregulation and Disorders of the Self*. W. W. Norton & Company.
- Twenge, J. M. (2017). *iGen: Why Today's Super-Connected Kids Are Growing Up Less Rebellious, More Tolerant, Less Happy--and Completely Unprepared for Adulthood*. Atria Books.
- Van IJzendoorn, M. H. (1995). Adult attachment representations, parental responsiveness, and infant attachment: A meta-analysis on the predictive validity of the Adult Attachment Interview. *Psychological Bulletin*, 117(3), 387-403. <https://doi.org/10.1037/0033-2909.117.3.387>
- Winnicott, D. W. (1953). Transitional objects and transitional phenomena. *International Journal of Psycho-Analysis*, 34, 89-97.
- Young, J. E., Klosko, J. S., & Weishaar, M. E. (2003). *Schema Therapy: A Practitioner's Guide*. Guilford Press.