



REVIEW

The ability to direct cognitive resources. Developmental hypotheses and clinical implications: an integrated neuroscience and psychodynamic theoretical review.

La capacità di orientare le risorse cognitive. Ipotesi di sviluppo e implicazioni terapeutiche: una revisione teorica integrata di neuroscienze e psicomica.

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Abstract: Recent discoveries in neuroscience have significantly broadened the theoretical frameworks for the treatment of mental disorders. It allows us to find more points of convergence between different methodological approaches and to integrate treatment techniques. This literature review analyses the neuropsychological and psychodynamic outcomes of attachment styles with the aim of highlighting similarities between the works cited below and hypnotic techniques, seeking to provide them with a solid theoretical basis, beyond in the field of military psychology.

Riassunto: Le recenti scoperte delle neuroscienze hanno permesso di ampliare notevolmente le cornici teoriche di riferimento per il trattamento dei disturbi mentali. Ciò permette di trovare sempre più punti di incontro tra approcci metodologici differenti e di integrare le tecniche di trattamento. Questa revisione della letteratura analizza gli esiti neuropsicologici e psicodinamici degli stili di attaccamento con lo scopo di evidenziare delle analogie tra i lavori in seguito citati e la tecnica ipnotica, cercando di fornirle una solida base teorica di riferimento, oltre ad un'applicazione nel campo della psicologia militare.

Keywords: neuropsychology, intersubjectivity, hypnosis, right brain, mentalisation, attachment.

Keymessages:

- Premature emotional development, mediated by the right hemisphere, constitutes the neurobiological basis of attachment and emotional regulation.
- Hypnosis acts on these circuits, enabling blocked developmental regulatory processes to be reactivated.
- Directing cognitive resources between internal and external environments is a cross-cutting mechanism common to various therapeutic approaches.

Introduction

Advances in neuropsychological research allowed us to reconsider and broaden the theoretical models used in the study of the mind, facilitating better integration between different approaches and schools of thought. A vast body of literature shows that patients attribute therapeutic change more to the relationship built with the therapist than to the techniques employed (1). From

this perspective, the patient-therapist relationship is considered capable of modifying dysfunctional attachment patterns, by reactivating those developmental processes that had become stalled due to original experiences with incompetent caregivers (2; 3).

This paper proposes a vision of psychopathology based on the studies of Schore (4-12), Fonagy et al. (13) and Holmes (14), integrating their contributions with the

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Tab. 1. PICO Method derived from the primary research question.

Population	Intervention	Comparison	Outcomes
Adults in clinical or experimental settings, with reference to attachment and hypnosis processes	Implementation of hypnotic techniques, relational hypnosis or processes of interpersonal synchronization activation of the right hemisphere.	//	Neurobiological and psychological evidence related to the effectiveness of hypnosis on attachment and emotional regulation.

hypnotic perspective. It explores the conceptual analogies between emotional regulatory systems, hemispherical lateralisation and the ability of the mind to direct its cognitive resources. Therefore, the aim of this study is to define the state of the art regarding the understanding of the role of cognitive resources allocation in development and therapy, and the link between right-brain functions and emotional and trance regulatory processes, whilst establishing a common conceptual framework for various therapeutic methods.

Materials and Methods

A comprehensive theoretical review was carried out with the aim of exploring the convergence between emotional neuroscience, relational psychodynamics and clinical hypnosis. The methodological approach is empirical, yet conceptual and comparative, since it is based on the analysis of recognised theoretical, clinical and neurobiological resources, with the aim of identifying common principles and shared therapeutic implications. The PICO method was used in order to outline the objective of the literature review. (Tab. 1) Boolean operators were used to define the records of the literature review and the following MeSH terms:

“hypnosis, attachment, right hemisphere, limbic system, brain lateralization, interpersonal synchrony”. It included all experimental and non-experimental articles published between the year 2000 and the year 2025, in Italian or English, with full text available. It excluded all studies on non-clinical hypnosis, autohypnosis without a therapeutic contact and the researches focused solely on other non-hypnotic psychotherapies. This study adopts an interdisciplinary and metatheoretical perspective, whereby validity is not determined by statistical verification but instead by the internal coherence and the explicative ability of the resulting model. The method follows the grounded theory paradigm (15), adapted to the theoretical-clinical context in which conceptual data analysis proceeds iteratively, allowing categories and connections between neuroscience and psychotherapy to emerge. The research strategy identified 293 articles, 11 of which fully met the research objectives. (Tab.2)

Results

The research strategy initially identified 293 potentially relevant articles. Following the screening phase and assessment of compliance with the objectives of the review, eleven studies were included in the final qualitative analysis (Tab.3). The selection highlighted a convergence

Tab. 2. Summary of the research strategy adopted.

Database	Mesh terms	Number of Articles	Selected Articles
PubMed / MEDLINE	("Hypnosis" AND "Attachment") AND ("Right Hemisphere" OR "Limbic")	104	2
Scopus	(Hypnosis AND attachment AND "brain lateralization")	64	2
PsycINFO	(Hypnosis AND psychotherapy AND attachment)	52	1
Google Scholar	"Attachment-focused hypnosis" OR "inter-brain synchrony hypnosis"	55	1
Targeted research in the military field (PubMed / Scopus / PsycINFO)	(Hypnosis OR hypnotherapy) AND (military OR veteran OR combat OR deployment) AND (PTSD OR pain OR sleep OR team OR synchrony)	18	5

Tab. 3. Articles selected for a critical review of the literature

Authors	Full title	Study design	Sample	Method	Results
Varga K., <i>Brain Sciences</i>	Possible Mechanisms of Hypnosis from an Interactional Perspective	Narrative review	Neuropsychological literature	Analysis of the neural mechanisms of hypnosis.	It describes neurobiological mechanisms (limbic, right-hemispheric) and synchronisation processes.
Dumas G. et al., (2021,2010)	Inter-Brain Synchronization during Social Interaction	Experimental study (EEG hyperscanning)	Pairs of healthy subjects (n=20)	EEG recording during social interaction.	Inter-brain synchronisation associated with relational attunement has been highlighted.
Spiegel E. (2016, 2020)	Attachment-Focused Hypnosis in Psychotherapy for Complex Trauma: Attunement, Representation and Mentalization; Relational Factors in Hypnosis and Psychotherapy (Special Section, 2020)	Clinical article /theoretical review	Clinical cases and literature	Attachment-focused hypnosis.	It highlights the value of hypnosis in restructuring insecure attachment patterns.
Wolf TG et al. (2022)	Functional Changes in Brain Activity Using Hypnosis: A Systematic Review	Neuroimaging review	fMRI and PET studies (n=45)	Analysis of functional changes in the brain under hypnosis	Modulation of the limbic networks and implicit attention has been confirmed.
Di Filippo et al. (2024)	Intimate relationships and hypnosis: insecure adult attachment affects emotions and absorption during hypnosis	Empirical study	Adults (n=60)	Assessment of the relationship between attachment and variables during hypnosis.	Links between insecure attachment and greater emotional absorption/instability.
Schore A (2012).	The Science of the Art of Psychotherapy (book, 2012) / Right-brain affect regulation theory	Theoretical neuroscience article	N/A	Summary of theories on the right hemisphere and emotional regulation.	He suggests that therapeutic processes operate primarily via the right hemisphere.
Williams, R. M., et al. (2022)	Effects of Hypnosis, Mindfulness Meditation, and Education for Chronic Pain in Veterans: a randomized clinical trial. Contemporary Clinical Trials.	Randomized clinical trial	Veterans with chronic pain	Comparison: hypnosis vs mindfulness vs education; outcomes: pain, sleep, distress.	Hypnosis associated with pain relief and improved sleep versus the control group.
Turner, A. P., et al. (2023)	Effects of Hypnosis, Mindfulness Meditation, and Education for Chronic Pain on Substance Use in Veterans: supplementary analysis.	Secondary Analysis (RCT)	Veterans' subgroup (follow-up)	Analysis of functional outcomes and substance use.	Varying effects on secondary outcomes; hypnosis and mindfulness show benefits.
Jones, H. G. (2024)	Adjunctive use of hypnosis for clinical pain: a systematic review. Pain Reports.	Systematic review	Clinical studies on hypnosis and pain	Meta-analysis of RCTs on hypnosis as an adjunctive treatment for pain	Support for the complementary use of hypnosis; recommendations for veterans.
Reinero, D. A., et al. (2021)	Inter-brain synchrony in teams predicts collective behavior. Social Cognitive and Affective Neuroscience.	Experimental study (EEG hyperscanning)	Cooperational-teams (simulations)	EEG hyperscanning during cooperative tasks; analysis of inter-brain synchronisation.	Inter-brain synchronisation predicts collective behaviour and performance.
Lu, H., et al. (2022)	Transcranial electrical stimulation and teamwork: potentials for military training. Frontiers in Neuroscience.	Review / experimental studies	Studies on neuromodulation and group learning	A review of studies on tES/tDCS applied to team tasks.	Preliminary evidence on the potential of neuromodulation to facilitate collective learning.



across three main thematic areas: (1) the neurobiological and relational correlates of hypnosis, with particular reference to the modulation of limbic and attentional networks (31); (2) attachment, mentalization and emotional regulation processes, in relation to the development of neurophysiological structures involved in emotional regulation (4-6, 13; 35); (3) interpersonal and inter-brain synchronization phenomena, associated with cooperation and co-regulation in dyadic and group contexts (32; 54). Further evidence from the experimental and clinical literature on military personnel and veterans, showed significant effects of hypnosis on pain and distress reduction, as well as on behavioural and functional variables (51-53). At the same time, studies of neuroimaging and systematic review have confirmed the modulation of the fronto-limbic networks during hypnotic states (29;31), whilst researches on hyperscanning have shown that inter-brain synchronisation predicts the quality of cooperation and collective performance (32; 54). Finally, studies on non-invasive neuromodulation suggest possible future applications for the enhancement of group coordination in complex settings, including military ones (55).

Discussion

A comprehensive analysis of the sources reveals a coherent framework, linking early neurobiological development, emotional regulation, mentalisation capacity and hypnotic dynamics. The central concept that unifies these domains is the ability to direct cognitive resources, a maturation function that enables the mind to direct attention, regulate emotions and modulate interpersonal responses. Schore (4-12), in his pioneering works, underlined that the timeframe between the intrauterine phase up until the end of the first year and a half of life represents a critical phase in emotional and brain development, during which the "primary emotional regulation system" forms. This period is divided into sub-phases in relation to the maturation of the vagal system (ventral and dorsal), and the outcomes of brain development are the result of the maturation of the sympathetic and parasympathetic branches of the ANS, in compliance with Porges' studies (16). During the development of the ventral and dorsal vagal system the parent-child dyad's communicative exchanges are predominantly characterised by non-verbal signals with strong emotional valence; communication flows from the right hemisphere of the caregiver to the right hemisphere of the child, where it is

learnt and becomes embedded within the neural pathways of the developing right hemisphere (as implicit/procedural, emotional and unconscious memory) (16). The earlier development of the right hemisphere compared with the left has been documented by numerous research studies (17; 18; 19). What seems to be of crucial importance for the consolidation of right-lateralised neurological circuits, which connect the limbic system to the prefrontal cortex (and, at a later stage, the right hemisphere to the left), is the emotional synchronization between parent and child in the processes of social attention, stimulation and the modulation of excitement. This synchrony occurs across multiple levels of physiological integration, through hormonal regulation mediated by oxytocin, heart rate, pupillary changes, body posture and facial expressions (4-6; 9; 11; 12; 20-25). According to Brancucci, Lucci, Mazzatenta et al. (26), neuroscience attributes a key role to the right hemisphere in the encoding of information arising from face-to-face exchanges, such as the perception of voices, gestures, smells and pheromones. In line with this perspective, Van Lancker Sidtis (27) highlights how, in neurotypical individuals, the right hemisphere processes voices, intonations, faces and visual representations in a more refined and nuanced way. In light of the above, it is worth noting that the right hemisphere, which has a functional advantage in prosodic processing, attentional control, unconscious processes and facial encoding (28), becomes more active during trance; and, in this state, it is possible to influence it in order to regulate visceral parameters (29). It is interesting to note that Ray and Tucker (30) have suggested that hypnosis could be the proof that the human brain is designated to be influenced from the outside in order to regulate internal states, just as when a child's nervous system is immature and relies on regulation provided by their caregivers.

Considering that, during the more sensitive postnatal period, the right posterior areas involved in sensory elaboration and responsiveness to social signals develop early, among these: the right insula, the right basolateral amygdala and its connections with the medial and anterior areas of the right cingulate cortex and with the right prefrontal cortex (11).

According to what Schore described, every insecure attachment style determines a functional separation of emotional experiences between the right hemisphere and the analytical structures (reflective functions) of the

left hemisphere, since the primary affection that generates in the right hemisphere, not being regulated, is disorganising and can't be integrated into more complex processes (4-6; 9; 11-12). Recently, Varga (3), suggested that the right limbic system, which is involved in hypnotic phenomena (29) and in the cognitive-affective response patterns (4-6; 9; 11-12), could be the neural structure through which hypnosis could produce corrective effects. Moreover, other researchers have documented that the right temporoparietal cortexes of people engaged in interpersonal exchanges synchronise with one another and, in particular, emphasise that the synchronised right temporoparietal junctions of interlocutors are particularly active during social interactions, in attentional processing, in perceptual awareness, in the processing of prosodic elements of language and in empathic understanding (32).

To further support this argument, we note that the right-lateralised cerebral system enables us to make sense of other people's minds (33), and it is interesting to note that hypnotic therapy, in particular, acts precisely by increasing activity in this cerebral region (29). In 2019, Schore (11), in describing the functions of the right hemisphere, defines it as the neural substrate of the unconscious [see also McGilchrist (34)] and, given that the indirect hypnotic approach acts precisely upon this region, it is interesting to note that it is the right hemisphere that is most active during trance states.

Shame and Dissociation in Primary Affective Regulation

According to the modern theory of attachment (4-6; 9; 11-12; 35), positive early relational interactions between caregiver and child result in a balanced development of the sympathetic and parasympathetic branches of the autonomic nervous system. A well-balanced ANS in both its branches is able to respond adequately to emotional dysregulations caused by relationship breakdowns, thanks to the restoration of the relationship, enabling the child to have a secure style of attachment, and provides an excellent foundation on which to build subsequent reflective function. In contrast, ambivalent insecure attachment could be the result of the child using active coping strategies in response to the constant hyperarousal of the caregiver. The massive amounts of cortisol produced because of this style of attachment, are neurotoxic; in particular, they slow down the myelination of the nerve fibres of the structures that connect the amygdala

to the rest of the limbic system, making its activity harder to modulate by the limbic system itself. The anxious-ambivalent parent goes to extremes in the ways in which they disrupt the bond. According to this developmental pattern, in order to avoid returning to a dysregulated state, the child curbs his or her misbehaviours and constantly seeks out the caregiver by adjusting to the parent's needs. The outcome is that the child will be resistant to separation and will find themselves in a constant state of physiological hyper-arousal (4-6; 9; 11). What has been described could be the underlying cause of anxiety and associated disorders, as well as forms of anxious and entangled object relations characterised by significant fears of abandonment by the partner.

Avoidant attachment represents the opposite situation. The parents of a child who displays this style of attachment pay little attention to their child's calls for attention, are rather neglectful towards him and adopt an avoidant attitude themselves. The child who experiences this relational trauma does not receive proper regulation of emotional stimulation and, in order to overcome their emotional distress, implements passive coping strategies, thereby under-regulating himself. In this case, it is the production of endogenous opioids that determines biological malfunctions in the HPA axis (4-6; 9; 11). Positive emotional attachment also tends to be rejected, since the ability to manage the associated state of physiological hyper-arousal has not developed. Shame is felt at an intense level because, also in this case, during phases of misattunement and subsequent re-regulation, the avoidant parent has not limited the child's exposure to shame. The above-described conditions could lead to a whole series of subsequent mentalisations associated with depressive disorders, such as emotions based on avoidance, fear, disengagement, social isolation, feelings of inadequacy, sensitivity to shame and guilt associated to the depressed mood (35).

Finally, the disorganised attachment style is the result of extremely inconsistent parenting patterns. The parent of a child with disorganised attachment alternates between moments of hyper-regulation and moments of hypo-regulation of the child's emotions, in a highly inconsistent way if compared to the situations that the child experiences. The latter will adopt coping behaviours from both ends of the spectrum (passive and active), but he will do so to an exaggerated degree, swinging from one extreme of emotional regulation to the



other, unable to effectively modulate their reactions. Parents who fit this pattern have often been mistreated themselves, or else have suffered from a disorganised and disoriented style of care. Recent research by Beebe (36) has highlighted the way in which mothers dissociate themselves from their child's states of pain or suffering. Indeed, they often averted their gaze and withdrew completely, shutting themselves off from their child, who was left without emotional regulation – presumably to protect themselves from reliving the emotions associated with that state of distress. The result is that children who grow up with scared parents, and often scare themselves, not only experience dysregulation in the activation of both ANS branches, but the very states of the Self in which they find themselves are dissociated (35). In insecure-avoidant attachment, even if there is an imbalance in the ANS, the sympathetic and parasympathetic sub-systems continue to interact, co-regulating reciprocally, whereas in disorganised attachment, the regulatory ability of the ANS is lost. Dissociation can be found in any attachment style, but it is important to mention that in the anxious-avoidant one is quantitatively and qualitatively lower than in disorganised attachment which, due to these psychological factors, is the most problematic attachment pattern out of the four (4-6; 9; 11). Shame caused by continuous misattunement, and the related sympathetic or parasympathetic hyper-arousal, could be the cause of pathological dissociation. Already in 1889, Janet (37), in describing dissociation, suggested the presence of a trauma that impeded the integration of memories (and related emotions) into one's personal history. Dissociation, therefore, develops as an adaptive defence mechanism (38; 39) against events that can't be integrated into the continuum of consciousness.

We suggest that the ability of voluntarily choosing to direct mental functions towards the inner self or the outside world (above all, towards the Self or the other that the Self) is a crucial skill acquired during development; it is believed that, before coming under voluntary control, this ability is automatically guided by emotional regulation systems. Let's suppose that hypnotic trance may be correlated with what has been described. Entering a trance state could represent a very early ability of the mind resulting from the attunement and detuning between child and caregiver (ruptures and repairs in dyadic relationships). Therapeutical hypnosis, in addition to the

well-known clinical benefits it offers, could have the effect of enhancing voluntary control of cerebral systems that govern cognitive functions by recalling what happened during childhood, as explained above.

A second system of emotional regulation, on the other hand, deals with more complex and mature functional characteristics of the mind, and the object of regulation is the Self (13).

It is worth noting that, typically, the child's explosive and indifferentiated emotional reactions are promptly mirrored by the parent, who subsequently ensures that these expressions are gradually modulated. These new, modulated emotional states displayed by the parent are sometimes recognised, mirrored and interiorised by the baby who, without being able to distinguish between the Self and the caregiver, attributes this newly mitigated emotional expression to themselves. In this process, the parent acts as a regulator of the state of the Self, and the process that ensues would constitute the transition from caregiving to self-regulation (13). The theoretical constructs of the mechanism of interpersonal interpretation and the social bio-feedback model, proposed in the mentalisation theory (13), would appear to support the hypothesis that the human mind is evolutionarily predisposed to orient itself towards the inner self or the outside world to, respectively, dissociate from or be influenced by others.

The ability to direct mental functions inwards or outwards could be the result of very early acquisition of a sense of Self as a physical agent. Initially, it is assumed that the newborn lacks the ability to distinguish between what is internal from what is external; however, during early interactions and thanks to the functioning of the contingency module (13; 40), the infant acquires a sense of Self as a physical agent and learns the difference between internal and external sensations. Minds, evolutionarily predisposed to receive external hetero-regulatory influence (30), may progress from an initial state of undifferentiated perception of stimuli (like a melting pot of stimuli whose source cannot be identified) to a gradual discrimination of what is inside the body and what is outside it.

Therefore, we suggest it will be possible for the child to choose, both unconsciously and voluntarily, if directing their cognitive resources inwards or outwards in a dynamic way. In the moments in which they direct their cognitive resources towards the caregiver, attuning to them, they learn from their parent to organise, regulate and



use, also at neural level, their own cognitive resources and emotions, and to reason about the functioning of their own mind, the minds of others and the world.

Another interesting insight into dyadic co-regulation provides further support to the idea described above. It has been observed that in moments of emotional attunement between the caregiver and the child, follow a cyclical pattern (13). In particular, when it comes to negative emotions, the parent mirrors the emotional state of the infant for short period of time, followed by time-out moments during which they continue to manipulate, cuddle, comfort and talk to the child, in an attempt to reduce the expression of their distress.

This cyclical pattern has very important implications for the modulation of emotions given that the child initially experiences a strong contingency between their own state and the parent's response, but later on, moment by moment, the situation changes since, during time-out moments, they are confronted with the breakdown of that contingency. To recover it, the child must adjust their responses and they do so by narrowing the scope of its activities. In doing so, however, they are in fact changing their behaviour towards a more regulated status that now will be a lot more similar to the feedback received from their parent. The child, from their point of view, will perceive that, through the adjustments they have made to their expressions, they have also changed the emotional state of the parent (13), and, in this way, the parent teaches to the child how to regulate their own negative emotions. In this process, continuing with our hypothesis, the child experiences different mental states in relation with the direction of their cognitive resources that, in this case, are moved from the inside to the outside, towards the caregiver who will act as an attuned, hetero-regulatory object. Sometimes, a parent may misinterpret the child's emotional state and attributes a different emotion to it, mirroring the wrong emotion or, by failing to mirror any emotion at all, simply expresses their own feelings in response to the child's (41). In these cases of failed attunement, a state defined as "alien Self" develops within the emerging Self, perceived as different from and foreign to the self (13)); therefore, according to our hypothesis, the nervous system's orientation, which was previously attuned to something other than the self, is rapidly and involuntarily redirected inwards. These very rapid and attentive switches, "forced" by a loss of attunement with the other person, are potentially

pathogenetic events since the child moves from an attuned hetero-regulated state to an inner world that is still disorganised and at the mercy of a dysregulated and dysregulating emotional energy. When these experiences are limited, they can still be integrated into a sense of identity through the autobiographical narrative ability of mentalisation; however, if these misattunements are too frequent, they become intolerable for the child with the result that the alien self that develops as a consequence cannot be integrated into a unified sense of identity, but will remain an inaccessible part, a foreign (dissociated) core, that becomes embedded within the self (13).

The functional role of surprise

During the development process, children start to elaborate more and more complex arguments about the events they observe. The fact that human beings, since early childhood, tend to look for causal links and anticipate certain situations, is something worth reflecting on (14). By anticipating a certain situation, the surprise effect can be avoided as well as the production of "free energy", destabilising for the nervous system. Readers are referred to the original text for a brilliant psychoanalytical description of the above. Our focus is to recall that the constant attempt to make sense of events and to anticipate their effect, not only restores a sense of agency, but also enables human beings to avoid feeling unprepared and disorganised. To achieve this, Holmes (14) suggests that there is a system of minimisation of surprise whose function is to compare bottom-up models – namely what the brain processes from sensory data – with top-down models – that is, predictive hypotheses based on prior learning. Probably, the ability of interfering with the world's events develops at moments when a child receives confirmation from a parent on their hypotheses; in other words, when their epistemic trust strengthens (43-45).

We believe that, during childhood, every new bottom-up information generates surprise and free energy, which results in the acquisition of a top-down model for interpreting the world. As the child gets older and acquires more and more knowledge on the world, the surprise and free energy states will become increasingly rare and, as predictions about life events become gradually more accurate, it can be assumed that a sense of self-efficacy will develop and become established. However, the child will be destabilised by surprise states, as they imply that the top-down prediction made was wrong. Holmes (14) sug-



gests that neurobiological gratification, which derives from the accuracy of the predictive models, may be correlated to the dopaminergic gratification system. We suggest that functional or dysfunctional changes can arise from surprise in relation to inner dispositional states - that is the willingness of an individual to question, in a critical, curious and constructive way, the beliefs they have formed on the basis of predictive models (seeing the world through the eyes of a child), rather than experiencing the failure of a prediction as an attack on one's sense of agency. From a clinical point of view, the hypothesis described above carries important implications; in fact, novelty and "predictable surprises" can shape the therapeutic process (46), leading to the formation of new and more functional models of the world. On the other hand, psychopathology can also be seen as the acquisition of maladaptive models of the world in which the avoidance of surprise leads to defence mechanisms that disrupt the balance between top-down and bottom-up processing systems, and where one may end up considering only one or the other [see, for example, the description of the exclusion of bottom-up systems in favour of top-down ones in schizophrenia, proposed by Holmes (14)]. It is conceivable that, during treatment, the flow of new material coming from the right hemisphere, very similarly to the bottom-up processes described by Holmes (14)], creates a state of functional surprise in which the patient can 'overturn' pre-existing mental patterns. Let's consider that in psychotherapy, the shift in dominance from the left hemisphere to the right one is necessary to modify neural pathways associated with dysregulated/dysregulating feelings (or emotions), resulting from a dysfunctional caregiving style, therefore lowering its arousal level and maintaining it within the window of tolerance (12), where it can be mentalised. It may be argued that the shift in the distribution of resources that occurs during therapy generates a functional surprise and new knowledge, since when affect-related arousal is modulated, it can access more complex and specific processing systems, which are lateralised to the left, as this would no longer trigger protective blocks at the corpus callosum level (against excessive energy) that prevent mentalisation (12) and we suggest that new top-down interpretative models may be generated. This movement, managed by the therapist, is in line with what we had anticipated would happen at an early stage in dyadic interactions, namely the shifting of cognitive resources from the outside (an external regula-

tor) to the inside (and vice versa). Therapies, such as the EST (47-49) and the wounded Self psychotherapy model proposed by Spiegel (50), are also be easily situated within the proposed hypotheses; in fact, they primarily use the movement of mental resources to produce a change. Readers are referred to the original texts for further details; in this context, we wish to emphasise just how powerful hypnosis is as a means of accessing the primary affective regulation system (located in the right hemisphere) and modifying it. The state of trance induces a shift in cognitive resources from the processing of external stimuli towards internal ones. There is not necessarily a shift from conscious to unconscious content, although it is interesting to note that, as argued earlier, during the hypnotic induction phase there is a functional shift of brain resources from the left to the right hemisphere.

Conclusions

The theoretical and clinical evidence assessed agrees that the ability to direct cognitive resources is a fundamental mental function, developed during early emotional interactions and which can be reactivated in a therapeutic context.

This ability allows individuals to direct their attention, regulate their emotions and maintain a self of coherence of the Self, also in the presence of contradictory or traumatic stimuli. The proposed integrated model puts together Schore's, Fongay's and Holmes' contributions into a dynamic vision of the mind as an open, self-regulating system.

Secure attachment, emotional regulation and mentalisation constitute three sides of one evolutionary process, whose neurobiological basis lies in the limbic-prefrontal connections of the right hemisphere. When these systems become disorganised, the subject loses the ability to direct their cognitive resources in an adaptive way; the duty of the therapist becomes to provide a new regulatory experience and to facilitate the reactivation of integrative functions. Hypnotic trance, from this perspective, represents a privileged condition of plasticity and rebalancing. It allows access to implicit mental states, where emotional memories can be reprocessed and integrated. The therapist's voice, rhythm and empathetic presence act as resonant factors that stimulate neurophysiological coherence and self-organization.

Therefore, therapeutic change can be considered a process of cognitive-affective readjustment, during which

the patient's minds, supported by the relationship, rediscovers its own ability for functional surprise, regulation and openness to experience. Additionally, the integration of results coming from military literature, enriches and consolidate in a significant way the theoretical hypotheses proposed in this paper. Research conducted on veterans and military personnel (51-53) offer empirical validation for emotional regulatory dynamics and arousal modulation mediated by hypnosis, suggesting that such technique may operate through mechanisms of limbic rebalancing and right-hemispheric dominance. These results are consistent to the interpretative model outlined in the text, according to which trance represents a neurofunctional condition able to facilitate the reorganisation of emotional-sensory circuits and the inter-hemispheric attunement.

At the same time, evidence from studies on inter-brain attunement and group neurodynamics (54) reveal that neural co-regulation between the members of a team – an indicator of shared emotional and attentive synchrony – correlates with better collective performance and team cohesion.

These results provide an experimental support to the idea we propose in the text, that interpersonal attunement is not only a psychological phenomenon but a neurophysiological process that can be observed, and hypnotic training or attentive modulation can potentially favour implicit coordination in high intensity group context, such as military ones.

Finally, literature on neuromodulation techniques (55), opens up a translational perspective that is coherent with the proposed theoretical framework: if interpersonal synchronisation represents an objective cooperation indicator, the possibility of modulating these patterns through non-invasive stimulation (tES/tDCS) could constitute a future area of integrated research between neuroscience, military psychology and clinical hypnosis. Overall, the military evidence confirms the plausible application of the theoretical constructs presented – in particular the function of the right hemisphere in emotional regulation, the interpersonal dimension of hypnotic trance, and the relation between attachment, attunement and collective performance – and suggests a convergence between neuropsychological models and operational practices in military training.

This convergence opens up the possibility of developing integrated interventions, where neuro-emotional aware-

ness and interpersonal attunement become fundamental components of the preparation and the psychological support of the military personnel.

This approach paves the way for an integrated conception of caregiving, where the limit between neuroscience and psychodynamics are overcome in favour of a unified understanding of mental functioning and the healing journey.

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Disclosures

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