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'. . . some of the key evidence is presented that childhood relational adversity and "maltreatment", including overt psychological trauma, as well as broader social dysfunction, are the major causes of most mental disorder, along with the implications for relationally-based treatment approaches founded upon such understandings.'
OLIVER JAMES

'. . . Increased understanding of the widespread role of emotional traumas, especially those embodied early and preverbally as deeper, unconscious, procedural memories in subcortical systems, sets out a major paradigmatic challenge to both conventional biomedical and cognitive behavioural approaches (including those ostensibly trauma-focussed), as well as to more relational talking therapies.'
FRANK CORRIGAN AND ALASTAIR HULL

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The Emerging Psychological Trauma Paradigm: an Overview of the Challenge to Current Models of Mental Disorder and Their Treatment

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Abstract: Increased understanding of the widespread role of emotional traumas, especially those embodied early and pre-verbally as deeper, unconscious, procedural memories in subcortical systems, sets out a major paradigmatic challenge to both conventional biomedical and cognitive behavioural approaches (including those ostensibly trauma-focussed), as well as to more relational talking therapies. Neuroscientific and psychological research, in association with observational and epidemiological studies, has in recent decades documented the profound impact of early trauma through relational adversity, maltreatment, abandonment, emotional neglect and/or humiliation. This research is also beginning to document the mechanisms by which trauma processing approaches may be effective. It is anticipated that future psychotherapeutic work will increasingly be guided and informed by such understandings of the underlying neurophysiological processes involved in memory reconsolidation therapies. While there is debate about how much activation is required to make a memory trace accessible to transformational change through mismatch experiences, many psychotherapeutic approaches rely on the body components of trauma memories to facilitate engagement with re-experiencing and processing of the distress held in implicit learnings derived from emotionally powerful experiences.

Therapeutic interventions for severe post-traumatic disorders need to be longer term and often require detailed attention to the

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evocation and amplification of resources beyond the safe and trustworthy relationship with the engaged and attuned therapist. However, these additional resources should be seen only as a non-intrusive framework that allows the brain's organic healing processes to flow naturally to completion, erasing the implicit learning and associated disturbing affects at their source without modification of the autobiographical memory content. There are then fundamental implications for many existing therapies which, while stressing empathic attunement, collaboration, meaning making and emotional processing, can be seen to be failing to deal with the deeper, 'ultimate' causes of many mental health problems.

When employing transformational trauma approaches it is possible that 'therapy interfering behaviours' are less commonly encountered as the patients are motivated to engage with an aetiological perspective that gives hope of complete resolution of symptoms rather than simply the management of them and a temporary relief. It is readily acknowledged that relational, socio-cultural and existential factors may play a role nonetheless in important aspects of patient 'psychopathology', and that these will also require attention during therapy. However, actual 'erasure' of the traumatically-induced learned memory or schema which has been generating the emotional distress underlying the presenting symptoms offers a profound enabling of the Self in the process of healing; perspective shifts can then be endorsed through the juxtaposition of interpersonal validation, psychosocial support and encouragement. Trauma processing is certainly not a quasi-surgical procedure detached from issues of purpose, relatedness, meaning and existential significance.

It is suggested that undue and partisan acceptance of, and adherence to, the current dominant 'evidence-based' paradigm, alongside classification systems based in an atheoretical, syndrome-based nosology, is actively unhelpful in addressing such complex disorders, and skews our focus away from the need for active treatment of 'ultimate' causes of emotional implicit learning, such as events and interactions experienced as deeply traumatic. The implication of this is that numerous patients are likely to be suffering from potentially treatable trauma-related problems but are currently deprived of effective treatment. In this overview, the authors argue that the paradigmatic shift underlying the argument for the necessary transformation of integrated mental health services to meet the needs of individuals with complex post-traumatic reactions is a massive challenge requiring considerable research and service support, rather than the passive acceptance of the status quo or dismissal of innovation on the basis of a selective attention to limited and/or flawed research findings. Those responsible for commissioning of services may be concerned about the potential for an enhanced burden on services through the requirement for longer-term psychotherapies, with the inevitable impact on waiting list targets and on the training of existing staff. However, to better meet the needs of severely traumatised individuals, obstacles to innovation, service development and treatment require priority attention if practice and services are to evolve to be fit for purpose.

Keywords: psychological trauma, neurobiology, psychotherapy, treatment, service provision.

IN RECENT years there has been an increasing recognition of the role played by, and the effects of, emotional trauma in a wide range of mental disorders – not simply those such as Post-Traumatic Stress Disorder (PTSD) that are overtly construed as resulting from traumatic events (Sara & Lappin, 2017). This represents a considerable challenge to conventional treatments of whatever modality but also provides an opportunity to improve the treatment offered to very many patients whose underlying 'pathology' is still not recognised, and thus to improve the quality of their lives. Deeper levels of traumatic memory formation – often related to early life experiences – are recognised as requiring therapy developments, e.g., the Early Life Protocol (Paulsen 2016) for Eye Movement Desensitisation and Reprocessing (Shapiro 2001), Lifespan Integration (Pace 2003), Coherence Therapy (Ecker et al 2014), the Comprehensive Resource Model (CRM, Schwarz et al 2016). Other body-based trauma therapies such as Sensorimotor Psychotherapy (Ogden & Fisher 2015), Somatic Experiencing (Levine 1997) and Brainspotting (Grand 2013) will also often find themselves dealing with symptoms whose ultimate roots are in childhood events. These therapeutic approaches all offer hope to patients struggling with affective and mood responses which have been there 'for as long as I can remember' without obvious explanation.

However, therapeutic innovation and developments which challenge the current dominant conceptualisations will struggle to obtain research funding, and perhaps initial publication, as without sufficient empirical support any reviewer will likely be negatively influenced by a different paradigm and novel conceptualisation. Thus many obstacles to the dissemination and implementation of innovative practice exist; the scientifically absurd circularity of the argument – that new therapy modalities cannot be researched because there is no evidence that they work – is not recognised as unreasonable. It is simply 'the way things are'. It is telling that committed therapists working in an evidence-based

arena still seek out innovative practice and skill advancement when the therapies they are using are simply not effective for the patients in their clinics. Trauma therapy developments from creative, theoretically-sound, clinical expertise, however under-studied, arguably represent, through their insistence on attention to the healing of the 'ultimate' cause, a whole paradigm shift in the thinking about psychological symptoms, mental disorder and their treatment.

In this overview some background to this evolving paradigmatic challenge is provided, mainly through the lens of affective neuroscience findings relevant to deep traumatic memory formation and subsequent therapeutic involvement with the clinical sequelae. There are obvious and far-reaching implications for current conventional ways of working – both biomedical and psychotherapeutic. While this cannot be fully referenced in a brief opinion piece, nevertheless it is hoped that this overview will stimulate appropriate debate beyond the inevitable resistance from proponents of those models which have failed to deliver much-needed clinical benefits, despite their ostensible evidence base. Therapeutic developments – including those neuroscientifically based – need to be encouraged and embraced, although it will also '. . . inevitably mean that the techniques pioneered will be replaced' (Corrigan & Hull, 2015). There is a great need for further comparative, long-term, outcome research, as well as research into underlying recovery and healing processes, and for the associated service developments, if clinicians are to carefully extend the range of therapeutic skills and modalities to better help those who are not responding to standard approaches.

The Neurobiology of Traumatic Experiences

The affective neuroscience perspective, applied clinically, emphasises the role of the basic affects in traumatic experience. Events get 'stuck' in the psyche when the rage, terror, grief, shame, horror and/or shock experienced in response to them are so overwhelming that they do not dissipate without leaving residual symptoms. It is recognised that emotional arousal enhances the creation of lasting memories; stress hormones acting on the amygdala being one of the mechanisms for this (McGaugh, 2013). Learning related to fear and safety that is guided by projections from discrete neuronal populations in the locus coeruleus to the amygdala and prefrontal cortex can have the discriminative functions disrupted by strongly aversive stimuli (Uematsu et al, 2017); another possible way in which trauma memories become stuck and unresolved. It is argued that another mechanism for lasting implicit memory with resulting symptom formation is a failure to complete the emotional response when neurochemical dissociation is precipitated by a physiological state of the body so extreme as to be unsafe; then a neurotransmitter capping of the excitation is engaged (Corrigan, 2014b). Other mechanisms will include attentional re-orientations, of various types, that take the focus away from the affective overload, preventing completion of the emotional response at the time of the instigating experience.

Following Panksepp & Biven (2012), it is necessary not only to consider the upper level learning derived from intensely affective experience but also to attend to the origins of the basic affect generated in the midbrain periaqueductal gray (PAG) and hypothalamus. The earlier in the brain's development that the traumatic experiences occur, the less cortical regulatory capacity there is to modulate their impact. Trauma may lead the brain to modify its development so that the enlarging cortex becomes adept at suppressing awareness of emotions and body responses as is seen in the dissociative subtype of PTSD (Frewen and Lanius 2015). Some of that suppressive, or regulatory, ability of the cortex may diminish as years, or decades, pass, so that memories previously unavailable to everyday awareness begin to intrude as flashbacks, somatic pains and discomforts, and the individual's tenuous equilibrium is challenged by inexplicable changes in mood and emotional state. There is a sudden intrusion of terror, rage, grief or shame that is incomprehensible in the current circumstances and people who have been high-functioning are suddenly stricken with an inability to perform in their usual way. Triggers become active and the person responds to particular stimuli or contexts with emotional states that make no sense to them. There is then disruption of interpersonal relationships and occupational functioning followed by the prescription of medication for symptom relief without any awareness of the aetiology of the clinical presentation.

In extreme cases, where there has been disorganised attachment in infancy (Lyons-Ruth et al 2006) prior to severe abuse, there is amnesia for behaviours in the present, and these are seen as out of character by friends and family. The recognition of self-states by clinicians, erroneously considered to lead to iatrogenic fragmentation of the personality (Brand et al, 2014), is essential for effective treatment of severe complex PTSD (e.g. Fisher, 2017).

As suppression of trauma memories and their associated emotional and body states, however involuntary, becomes more difficult to maintain,

and flashbacks, nightmares, intrusive thoughts and images become more distressing, there is almost inevitably a lowering of mood and an emergence of anxiety. To ignore the aetiological factors, neglecting the art of formulation, and elect to treat for depression, even though it would likely not meet the criteria applied in drug studies of major depressive disorder, or an anxiety disorder, as if this is a free-floating state spontaneously generated by an idling brain, is not good medicine. It also represents a denial of the human cost of adversity and the long-term implications of this.

Perhaps it is easier for much of society to have a cultural dissociation from the harsh reality that trauma is emotionally painful – and the earlier the trauma the deeper may be the woundedness which presents polymorphically later in life. This is not to deny the benefits of symptom-amelioration approaches which can work quickly and effectively, at least in the short term, but to emphasise the need for alternatives if and when gains are not maintained or are followed by further deterioration. There is a need for research that examines the process of healing, its relationship to clinical outcome measures, to the individual's functioning and quality of life, and, crucially, to the patient's priorities in treatment.

Affect Regulation, psychopathology and therapist characteristics

> '. . . (A) clash of psychotherapy paradigms can currently be seen, especially in the more severe disorders that present with a history of relational trauma and thereby a deficit in affect regulation. In such cases emotion more than cognition is the focus of the change process, and so CBT is now being challenged by updated affectively focused psychodynamic models. . .'
>
> Schore 2012, page 5

The key word in this quote from Schore (2012) is 'thereby' as it effortlessly links relational trauma with consequent impairment of affect regulation. In so doing it defines an aetiological factor that is seen as remediable by therapists using trauma therapies which embrace early attachment disruptions as targets for the healing of states of emotional distress. While the wonderful evolution of the human brain has conferred a limitless capacity for states of conscious awareness, there are many of these that provoke discomfort, dis-ease, discontent – if not more severe distress – when people *feel* that something is wrong with them. If there is no capacity for emotional responsiveness to the contents of one's mind there will be no felt need to seek help in psychotherapy.

'Top-down' therapies that focus on thoughts and the responses to them nevertheless are aiming for a shift in the feeling of well-being, or the lack of it, even when they offer a curiously restricted range of moods and feelings to be considered dysfunctional, and avoid consideration of what feels good or not so good. The therapists engaged in these modalities for the treatment of, for example, anxiety and depression and the maladaptive behaviours associated with that one emotional state and that one mood state, may be themselves functioning in an almost entirely cognitive mode and have little perceived need for awareness of their own emotional responses and the accompanying body states. In contrast, psychotherapists expert in sensorimotor psychotherapy (Ogden et al, 2006, Ogden & Fisher, 2015) or somatic experiencing (Levine, 1997) or the Comprehensive Resource Model (CRM; Schwarz et al, 2017) require a deep level of attunement to their own level of body activation as well as to that of their patient. It could be argued that it is the blending of different foci of activation in the prefrontal cortex of the therapist that enables the distinction at a neurobiological level; those who are purely cognitive will have primarily dorsal and lateral prefrontal activations, while those who are somatically and emotionally attuned will be primarily functioning from the ventral and medial areas of their prefrontal cortex, in addition to those working memory areas required for theoretical analysis of constructs.

Schore (1994), who highlighted the role of the orbitomedial prefrontal cortex in the capacity for relational attunement in the infant-mother dyad, has stressed the differentiated role of the right hemisphere and how the implicit functions of the right brain develop in the skilled therapist (Schore 2012); and he amasses considerable evidence in support of this view. However, there is a need to consider not only right/left but medial/lateral and dorsal/ventral dimensions for the prefrontal cortex – and the cortical/subcortical for the brain as a whole. If the more ventral and medial areas of prefrontal cortex are engaged in multisensory integration, modulation of somatic responses, emotion regulation, and self-awareness, can a purely cognitive approach by the therapist have a deep impact on the affective valence of the self in the patient? It seems very unlikely. This would apply equally to those trauma therapists who strictly follow a protocol while having little engagement with the harsh emotional reality of the memories facing the person to whom the protocol is being applied – and indeed to therapists occupied only with cognitions

and behaviours as a result of their clinical training or because they cannot encounter and tolerate emotional distress in any other way.

One opposing argument is that if attachment disturbances can be resolved through imagery, metacognitive skills and collaboration in treatment (Brown & Elliott, 2016) – without a need to address directly the emotional pain of early attachment woundedness – that would indeed represent an efficient cognitively-based way to resolution in treatment.

A key question therefore arising from trauma therapies, and posing a challenge to them, is whether there can be full healing without the need to clear the body memories of the originating episodes, whether those are childhood abuse events, single event traumas (e.g. a road traffic collision) or attachment wounds. The impact of attempting to clear all the emotional pain at the brainstem level is that therapy can take a long time as more and more comes to the surface; although those with structural dissociation who work through self-states are often surprisingly rapid processors of years of complex abuse. The risk of working at the purely cortical level, whether through cognitions and metacognitions or through relational constructs, is that there will be a greater suppression of the trauma memories that are underlying. This promotes over-modulated dissociation of the type described in Frewen and Lanius (2015) and is likely to be of temporary benefit only, because it does not clear the core pain.

Affect regulation and outcome in therapy

If the basic affects encountered in traumatic experience, and in the therapy of it, are generated primarily at a subcortical level, is it sufficient to conceptualise them only in terms of the experience of depressed mood or anxious state? Computerised therapy interventions that have been shown to be empirically effective would appear to support this possibility. However, knowledge of the neural substrates of the capacity for affect regulation, and for a coherent and worthwhile sense of self, would counter that it is unlikely to occur in any long-term and/or meaningful way.

Hill (2013), who has developed the clinical implications of Schore's affect regulation theory, considers relational trauma to be the:

> 'cumulative effect of chronic misattunement, immoderate shaming, and repeated episodes of prolonged dysregulation that occur in insecure attachment relationships during the critical period in development of the primary affect-regulating system.'

If one considers any traumatic experience, whether relational or less obviously relational (such as the result of accident, traumatic injury, earthquake, flood, war, etc.) to involve the basic affects of rage, grief and terror (Panksepp, 1998), in addition to shame (Corrigan, 2014a), then it becomes clear how traumatic experience of either a collective (disaster) or interpersonal type can overwhelm the affect regulation capacity of the individual. Developmental trauma is that which occurs through relational disruption in infancy and early childhood when the basic affective response exceeds the developing capacity of the brain to modulate it. The unresolved distress may be under the surface of conscious awareness but still gives rise to physical complaints, mood changes, unexpectedly triggered emotional and somatic responses, and a negative valence on the sense of self.

The re-humanisation of psychotherapy that is made possible with the integration of affective neuroscience imposes a duty on the therapist to be as aware as possible of emotional and somatic responses within therapy sessions. The therapist must be fully present and not triggered into their own dissociative response as a result of traumatic experiences that have not been resolved – the reason that therapists often need their own personal therapy.

The neurosequential hierarchy of brain development (Perry 2006) suggests that early relational experience is dominated by the somatic and the affective responses to evolving intersubjectivity, promoting the development of salient internal working models (Bowlby, 1969) that are affectively charged. The infant reacts primarily at a visceral level to vicissitudes in the caregiving provided, and is soothed through being held, nourished, cleaned and attuned to. It is necessary when exploring relational trauma which activates templates created through what was learned in infancy, for the therapist to recognise the somatic, visceral level of the distress and not be entirely caught up in high-level conceptual content.

The natural expression of the urge to attach in the newborn baby is immediately evident through the movement upwards on the mother's body, resting in the skin-to-skin contact of the upper abdomen and chest, before seeking the nourishment of the breast. As the infant grows the urge to attach is still shown by proximity-seeking. When that urge is thwarted the obstruction of it is painful, as evidenced by distressed

vocalisations (Panksepp, 1998). To extend the observation as a clinical illustration, this thwarted urge to attach can be internalised as the individual's awareness of basic needs 'never' being met and that experience, later in life, colours the adult's view of the world, of other people, and of the self.

Although it might not be considered traumatic by some more cognitive practitioners, the pain of feeling that basic attachment needs are never met can be so overwhelming that dissociation from the agonising aloneness occurs as a neurochemical protection from over-stimulation of excitatory neurotransmitter systems. That pain is therefore unresolved and represents an unconscious trauma that has clinical effects across the lifespan. The awareness of unmet needs for attachment, originating in subcortical structures, may be compounded by the relational activation of basic mammalian affects – grief, rage, fear and shame.

The infant or older child may learn that the experience of being close is always accompanied by sadness when safe proximity is too brief and unsatisfying. Rage is aroused when the protest at the unmet need in an interaction externalises into anger at the other who is seen to be failing; this may manifest later in narcissistic personality traits. Fear occurs when the caregiver is abusive and closeness involves painful intrusions. Shame is activated with the sense of worthlessness that accompanies humiliating or punitive interactions. These deep experiences can leave a mark that is so fundamental to the individual that it may be seen later in life as a personality characteristic or trait.

Using the basic affect terms – seeking attachment, fear, rage, grief, shame – in therapy keeps the discourse at the level of affective consciousness while, neurobiologically, the therapist should be additionally and simultaneously engaging more dorsal and lateral areas of prefrontal cortex in evaluation of what templates for relational experience and interaction are being made evident.

Dissociation that is severe enough to result in the separation of self-states that is structural (van der Hart et al, 2006), often involving amnesic barriers, generally requires the dissociative response to have occurred first in infancy (Lyons-Ruth et al, 2006). The severity of the disorder is then determined by the extent of physical, emotional or sexual abuse in the first seven years of life, as this occurs on a template of dissociative defence, initially neurochemical, to overwhelming affect in the primary caregiving relationship. The affects involved are those mediated by the midbrain and hypothalamus – rage, fear, grief and shame. Corrigan & Elkin-Cleary (in preparation) argue that shame is in a special category of evolved basic affect, usually requiring corticolimbic appraisal prior to a distinctive pattern of activation in the midbrain and hypothalamus determined by projections from prefrontal cortex. Self-states holding these affects – rage, fear, seeking attachment, grief, shame – enact the associated defence responses of fight, flight or freeze, attach, withdraw and hide.

The distress reduction of protective fight states may be achieved through tension-alleviating behaviours such as self-harm, substance abuse, eating disorders and less obviously 'dysfunctional' but nevertheless damaging actions in relationships. This last group of behaviours may include: interpersonal submissive, compliant, humiliating, angry, fearful, shaming, and/or grief-stricken interaction patterns that functionally endorse the relevant self-state to the extent that change may be seen as unsafe and therefore unwelcome. Strategies specific to the internal self-states, such as those found in Internal Family Systems (IFS; Schwartz, 1995), EMDR for early trauma (Paulsen, 2016), CRM (Schwarz et al, 2017) and other models, are then brought in to break the deadlock. Each self-state likely has its own prefrontal cortical profile with an affective content linked to the outputs to the amygdala, the hippocampus, the hypothalamus, and the midbrain PAG (periaqueductal gray). Neuroimaging studies of the dissociative subtype of complex PTSD demonstrate that it differs from the primarily re-experiencing subtype through activation in the medial prefrontal cortex; increased in the dissociative subtype, decreased in the re-experiencing subtype (Lanius et al, 2015). The medial prefrontal cortex has projections to, for the modulation of, the affect-generating areas of midbrain and hypothalamus (Price, 2006) – so these differences reflect the extent to which awareness of the somatic impact of the affects (integral to each self-state) is either suppressed or under-regulated. These deep structures and processes then have established templates for sequences of responses to relational adversities.

It is possible to understand these procedures, defined extensively for example in Cognitive Analytic Therapy (CAT), in terms of stored affective responses and their associated defence actions. This understanding facilitates therapeutic interventions, especially when the affectively-charged cognitions are paired with present-day mismatches as in, for example, Coherence Therapy (Ecker et al, 2014).

Affect regulation and therapist congruence

In effective talking therapy the collaborative and empathic therapeutic relationship underpins the conceptual analysis of the presenting problem and therefore offers the possibility of a multi-level attunement – if, in the therapist's brain, the orbitomedial prefrontal areas for empathic attunement are simultaneously engaged with the more cognitive, working memory functions. Clinical conceptualisations that focus on narrative, existential, and diagrammatic reformulation likely involve more dorsal and lateral areas of prefrontal cortex in the therapist and could lead to the experience of intersubjectivity failure if done without attunement within the therapeutic relationship. That is, while these understandings may be valuable at a conceptual level for the patient through the involvement of self-related areas (Northoff et al, 2006) of the default mode network that are more autobiographical, there is also the potential for a loss of the empathic attunement that leads to greater learning within the therapy. The same can happen in trauma therapy that is conducted in a manualised, protocol-focused manner by a therapist who can allow little empathy for the person's distress.

Mechanisms of healing

Therapy aimed at making sense of current difficulties and historic issues, or interpreting to the patient, is consistent with a long tradition in psychoanalysis and subsequent psychodynamic practices. The problem for many people is that understanding of their difficulties, while helpful, is insufficient for clearing the symptoms which they repeatedly experience. Gaining the insight that a somatic complaint could be an expression of repressed anger may clear neither the midbrain-generated affect with its sensitised responses to specific triggers nor the physical manifestation of it. Of note, in CAT an early emphasis on description rather than interpretation was held to promote the patient's capacity for self-reflection (Ryle, 1997). Enhanced self-awareness through relational intersubjectivity in therapy, rather than interpretation, promotes reorganisation of the patient's 'implicit procedural knowledge' (Stern et al, 1998), the area of the self, it is argued here, that is derived from emotionally-charged experiences.

Formal trauma processing work, especially with those who have structural dissociation from early attachment disruption and later abuse, has a life and direction of its own as the brain's capacity for complex and deep healing is engaged. It is therefore important that any focus on misunderstandings and ruptures within the therapeutic relationship does not distract from this process. In any therapeutic relationship, but especially when the work is longer-term, it is essential that patients have sufficient trust in their therapist, and the therapy itself, to continue in treatment even when the content leads to painful emotional states. This may also provide an experience of secure and boundaried attachment that is novel, beneficial, and potentially revelatory.

In formal trauma work such as with EMDR (Shapiro, 2001), for example, the aim is often to keep therapist involvement to a minimum while the patient processes the trauma memories. The therapist is non-judgemental, containing, boundaried, and respectful while simultaneously aiming to be an empathic support during the patient's processing of their trauma memories. However anything in the interaction that recapitulates an early experience of not being seen, not being listened to, or not being valued will interfere with continuation of therapy – although that itself may become a target for processing if acknowledged and worked with by a patient willing to continue with treatment rather than drop out.

To what extent repair of deep relational wounds can occur through the empathic attunement of the therapist during only a brief course of treatment is unclear. In CRM it is observed that deeply attending to, 'stepping into', the intense affect arising from the midbrain PAG and hypothalamus on return to the original trauma allows the deconsolidated memory to clear, with permanent erasure of the associated symptoms; meaning-making follows the physiological change rather than the reverse. While there are mismatch experiences through resources held on eye positions in CRM, the change in physiological activation, for example through altered respiratory sequences, when the distressing memory is active in the body's awareness appears to be sufficient to achieve complete clearing of the distress. We argue that the physiological mismatch, occurring almost immediately when the deconsolidation window of healing opportunity opens, leads to a re-orienting at a brainstem level followed by a new belief about the self which serves as the continuing schema variant. The memory reconsolidation literature (e.g. Ecker et al, 2014) suggests that erasure of the painful early experience would only occur when it was activated at an experiential level during the therapy session in which there is the juxtaposition of the affectively-charged, or affectively-neutral, mismatch experience. The deconsolidation period of neuroplasticity, of approximately five hours duration, requires a mismatch

to promote reconsolidation and erasure; the distress of trauma memories is not indelible.

Being with the pain of being alone, feeling it fully in mind and body, while simultaneously being aware of the presence of a caring, attuned other may provide the juxtaposition which erases the impact of the early adversity – if the young self-state that is carrying the woundedness is able to be fully aware of the present-day connection. The adult patient may be aware of the difference in present and past experiences without it translating to the young self-states holding the pain, thereby limiting the benefits. An individual with early life trauma and attachment disruption may be unable to quickly perceive the therapist as caring and attuned, or may instead experience any care as threatening or false. When the template has been laid down in infancy it can be difficult to access the core pain as there are likely to be accretions of dissociative and defence responses which need to be worked through first; this can take a long time.

For the relationship with the therapist to be seen otherwise will take time, experience and, perhaps, specific therapeutic work, although in modalities such as CRM the attachment conflicts are mainly resolved through the interactions of traumatised self-states with their attachment resources. In CRM the young self-state is helped to form a deeply attuned connection to an attachment resource whether that be one or more of an animal, spiritual being or natural element, before accessing the emotional pain. This resourcing allows not only the strength and support that makes access to the pain possible but also, simultaneously, is providing a mismatch juxtaposition that promotes healing.

In services which have rigid timescales for treatment and, therefore, a focus on ending therapy well within a fixed number of sessions it would be unrealistic if not contraindicated to aim to access the deepest relational wounds. Where circumstances dictate a strictly limited quantity of therapy the conceptual level understanding fulfils the requirement of providing an insight which can become more embedded as it is lived with. It can provide a validating understanding of how the person came to a particular way of being in relation to self and other, of how he or she has acquired particular meanings that are deeply felt as true.

When the patient is able to get to the originating memory, and its affective and somatic load – how can healing then occur? What is the essential mechanism of change? The dominance for some decades of the behaviourist paradigm made axiomatic that any change had to be through exposure that prompted relearning, even when the therapy is disliked by a large number of therapists and the drop-out amongst patients is high (Corrigan & Hull 2015). Exposure treatment aims to drive new learning from the prefrontal cortex to the amygdala so that triggered responses are suppressed and cease to be troublesome, especially in contexts similar to that in which the new learning occurred. However, relapse readily occurs because the underlying emotional learning is not altered; some of the mechanisms for this are now being elucidated (Marek et al, 2018). When exposure treatments do lead to permanent change this benefit is incidental to the theory (of, for example, Mowrer, 1960, Foa et al, 1986), and occurs because erasure has occurred instead of the relearning in corticolimbic circuits that can be effective in the short-term, especially when the environment is no longer stressful or dangerous. The reconsolidation literature (e.g. Ecker et al, 2014) suggests that the exposure therapy must somehow have induced a mismatch prediction error which allowed the destabilised memory to be reconsolidated. Failing this serendipitous occurrence, under conditions of further trauma, or continuing perception of threat, the temporarily inactivated (through learning of top-down control) circuits between the prefrontal cortex, the amygdala and the brainstem are re-activated and symptoms recur.

Therapies such as EMDR and CRM which aim to get direct to the core of the index memory can be said to be aiming for erasure of the traumatic learning rather than new top-down learning, so that symptoms will not recur at times of stress. The brain's organic healing process will often find a mismatch during processing but the affectively-valenced preferred positive cognition (in the case of EMDR) or the New Truth (in the case of CRM) will have that necessary quality to ensure completeness of the memory transformation.

Psychotherapy can now aim for erasure of the distress of a memory underlying a clinical presentation – leaving the episodic or autobiographical memory fully intact – so anything less than erasure is short-term and incomplete. Erasure of the affective content of the traumatic experience means that symptoms are cleared permanently and will not recur in response to triggers, even at times of further stress. The deconsolidated memory has been challenged by a mismatch which erased the raw, unprocessed affective content. This does not involve behavioural exposure *which does not work long-term*; an unpleasant experience for therapist and patient – reactivating the distress but not leading to reconsolidation – which does not have lasting benefit, unless there is inadvertent erasure.

Erasure cannot be achieved without reactivation of the distress of the original adverse experience (alongside the mismatch experience as noted), so treatment inevitably involves re-acquaintance with the brainstem affects when the implicit memory is destabilized. These have left their mark by being overwhelming so it is necessary for therapy to be sufficiently resourced that dissociation or abreaction, in the sense of uncontrolled emotional expression that does not clear the core affective responses, do not occur and that healing erasure instead has the opportunity to complete. When schemas underlying, and making necessary, symptoms are explored, as they are in Coherence Therapy (Ecker, 2017) there is likely involvement of affectively-charged cognitions, presumed here to engage ventral and medial areas of prefrontal cortex, especially those which have outputs to midbrain and hypothalamus. Significantly, any schema that continues to have adverse effects has almost certainly been acquired through an experience of strong affect at its inception.

Memory reconsolidation in therapy requires not only the memory reactivation, or deconsolidation (the destabilised state), but a mismatch experience during the period of approximately five hours in which there is the neuroplastic susceptibility to erasure. Transforming the emotion generated by, and updating of the knowledge acquired at the time of, the original experience. . .

> '. . . retroactively changes the encoded personal meaning of the experience, which in turn changes the emotion generated by the incident as it now exists in episodic memory. Declarative, factual memory of the concrete happenings of course remains unchanged; it is the (semantic) personal significance and expected contingencies of those happenings that have been transformed.'
> (Ecker, 2017)

Coherence Therapy stresses the importance of the change in meaning while CRM argues for a change in affective physiology and a brainstem re-orienting to the content of the memory prior to the change in meaning. Others argue for a new emotional experience during the period of arousal prompted by the reactivation of the significant memory (Lane et al, 2014). Although such debate requires empirical testing via brain imaging, and even molecular neurobiology, the key point is that erasure via memory reconsolidation is the aim in therapy as it leads to a complete and permanent loss of symptoms and an effortless non-response to previous triggers (Ecker, 2017). These changes mean that there is no longer: any emotional or autonomic nervous system response to previously troubling triggers; no behavioural manifestation, such as a momentary freeze, of the triggered response; and, no recurrence or relapse of these changes with time.

It seems likely – from the observations in Coherence Therapy – that mismatches, at least for traumatic experiences, engage the prefrontal cortex-midbrain PAG-hypothalamus axis in the kinds of parallel circuits seen with the mesolimbic dopamine system in response to environmental changes (Reynolds & Berridge, 2008). Identification of the active ingredients of healing change and their brain substrates should, through the application of neuroscience to treatment, help therapists to direct their efforts in a more focused and targeted way. Some clinicians may attend more to the midbrain/hypothalamus end of the axis, and some others to the ventral and medial prefrontal cortex areas that project directly to the affect-generating subcortical structures. The former will attend to stepping into the affect while the latter will focus more on the affectively-loaded cognitions and schemas. The therapist in both instances will need to be attentive and emotionally attuned while simultaneously engaged with working memory theoretical constructs, but the multi-level involvement will be a testament to the creativity and complexity of the intrinsic healing processes of the human brain/mind self which it is often the privileged position of the therapist to observe and promote. Ecker (2017) writes:

> 'The relevance of reconsolidation research findings to psychotherapy is potentially very great because clinical symptoms are maintained by emotional learnings held in implicit memory, outside of conscious, explicit awareness, in a wide range of cases, including most instances of insecure attachment, post-traumatic symptomatology, compulsive behavior, addiction, depression, anxiety, low self-esteem, and perfectionism, among many other symptoms . . . A versatile, reconsolidation-based clinical methodology that targets and reliably nullifies the specific emotional learnings maintaining such symptoms would revolutionize the field of psychotherapy.' (Ecker 2017)

Classification without cause; diagnosis without formulation; symptom-management without hope

The cognitive-behavioural model of therapy (CBT) focuses on management of symptoms in the present with many therapists preferring to use cognitive restructuring rather than its own exposure techniques (Corrigan & Hull, 2015a, 2015b). A cognitive behavioural therapist working within twenty sessions may deal with an immediately precipitating event but

will be disinclined to look at the 'ultimate' cause such as early-life experiences of events and interactions which have been felt as deeply traumatic. These experiences during the brain's development may be difficult to access and need treatment appropriate to the developmental level at which they occurred. That is, adversity encountered before full functioning of the cerebral cortex may respond less readily to cognitive restructuring and lead to the patient being seen as treatment-resistant or personality-disordered (Corrigan & Hull, 2015 a & 2015b).

There is also the biomedical model that considers psychopharmacology, and other physical treatments, to be the answer to any clinical presentation. Treatable aetiological factors are ignored, unlike in other areas of medicine, in favour of a symptom-based nosology. Rather than acknowledge aetiological factors for a post-traumatic disorder, the occurrence of traumatic events at all, or indeed the very presence of PTSD, proponents of the biomedical approach will favour any other 'diagnosis', such as anxiety (a symptom), depression (a non-specific mood state) or, where behaviours are viewed as hard to understand or 'maladaptive' they will assign the diagnostic label of personality disorder (a construct with little empirical utility in many clinical settings).

If this purely biomedical paradigm were valuable/valid the discrete categories defined would have specific pharmacological approaches which would be effective. This may be argued for some psychotic disorders but is not true of conditions such as PTSD (e.g. Gapen et al, 2016), and other trauma-related disorders such as Borderline Personality Disorder (BPD), for which drug treatments have very limited value in symptom-management; they are frequently used non-scientifically with the implicit justification that defined psychiatric conditions, which are, after all, described in carefully constructed nosologies, must respond to the currently available psychotropic drugs.

Rewriting the criteria for particular diagnostic groups does not appear to lead to any greater definition of, or rationale for, psychopharmacological agents that are effective or to a better understanding of clinicopathological correlates. Diagnostic biomarkers to guide drug treatments are not in sight and may not be appropriate in trauma-based disorders. Even an event-based case conceptualisation finds the formal categorisation of little help in getting to the index traumatic experiences and the pleomorphic impact they have left in the nervous system. Terror of abandonment in infancy may manifest later with depression, anxiety, obsessive-compulsive symptoms, somatoform disorders, physical illnesses, eating disorders, and other presentations – often co-morbidly.

All of these listed are effective in providing the way into the body memories and the associated affects.

It is impossible to know, because it has not been formally studied, how many of those whose symptoms do not clear with top-down management of their myriad symptoms would instead benefit from a deeper exploration of the origins of their distress. This is a major challenge for the future, as the economic implications of required service developments would be significant, perhaps a latent reason for such resistance to this. Socio-political forces drove the initial nosological acceptance of PTSD, perhaps those pressures will yet play a role in the acceptance (or refusal) of innovative and effective therapy approaches. When the way in is through the body memories rather than through higher-level interpretations or cognitions, it is the patient's lived experience, rather than the therapist's preferred modality or theoretical perspective, that directs the process of healing.

Prescriptive matching and patient preferences

Not all patients are able to be fully aware of their body's affective responses, and some may be unwilling to engage with approaches that require this. When the detachment from body experience is based in dissociation from abusive events in childhood any increase in embodiment is in itself a threat to feelings of safety and comfort. Many will be able to gradually reverse this disconnection in therapy but some will choose not to do so, perhaps, to give one example, because the opportunity presents itself at a time in their life when any destabilisation could be damaging. Progress during individual treatment of complex post-traumatic disorders is rarely linear (Frewen & Lanius, 2015) and patients can choose when to address certain pieces of the work. It is important that there is a range of options so that the individual can make a fully-informed decision based on their circumstances, their symptoms, and their aims in life and living.

Given a lack of training, experience and expertise, the clinician's assessment of trauma history severity is likely to be less than complete, especially when dissociative amnesia is a prominent part of the presentation; it would therefore be impossible to provide services according to a retrospective review of any prior consideration of the history of adversity. If services are provided for those with the most severe disorders of structural dissociation, the treatment programmes that are

then available can more readily adapt to clinical presentations that are based in experiences of adversity that have been less chronically and intensely overwhelming. Those who are most traumatised should be receiving the treatment they need rather than being dismissed as being 'personality disorders'. The brain defines its own level of traumatic experience by defending against the neurochemically, or otherwise neurobiologically, unsustainable; that is why there should be no dismissal by therapists of events that appear superficially to be less damaging. Breaching of the threshold for what can be experienced and assimilated is what determines the later ill-effects, not the manifest content or story narrated.

Conclusion and implications

There is great optimism experienced by patients and clinicians when new ways of working allow life-enhancing progress in conditions that have previously been resistant to treatment. Patients who have all but given up hope can be re-energised in their commitment to their lives when that which had previously been insurmountable becomes first manageable – and then ceases to be a problem at all. The importance of hope in those who have been chronically despairing cannot be over-valued but those colleagues and service leads who do not see the re-ignition of optimism may perceive instead prolonged and painstaking therapy that does not appear to be producing results fast. That perspective may contribute to an apparent reluctance to countenance long-term, body-based, trauma processing therapies.

This paradigm shift would have significant service implications if applied across a wide range of diagnoses, with neurobiological and relational factors therefore included within an aetiologically based formulation. Also, while there may be maladaptive relational patterns that are not based in early-life experience – and there may be higher-level cognitive learning /schemas and existential dilemmas that are not event-based – it is nevertheless striking how often the visceral response to expression of these leads back to adverse experience or 'ultimate' cause. Much depends on motivation to change, as some personality characteristics may be amenable to alteration through attention to their earliest expression, if the person is willing to address these. However, there may instead be a sense of justification in holding on to the traits, especially if it is perceived as others who suffer as a result rather than the individual possessing them.

Other 'blocks to healing' (Schwarz et al, 2016) can be identified and worked through before the core pain/ learning is addressed. This may also add to the time required for completion of the therapy; although removal of the blocks allows healing to be successful when progress could otherwise founder.

Treating the trauma of early disrupted attachment experiences can be lengthy and punctuated by periods of increased distress so not everyone will embark on it when given the choice, even when they start from a place of emotional embodiment. For some the realisation of the interpersonal impact of therapy may limit their commitment to it as the changes in relationships may be too much to cope with at once. Others may need to continue to dull their pain with substances, prescribed and otherwise, and will feel that the course of treatment is too difficult and/ or too protracted to commit to. Those who do decide to pursue the treatment will generally have an experience of deep change in early sessions that will give hope sufficient to bolster commitment to further work. The therapist's knowledge that there is the unquestionable potential for significant long-term healing is also overtly expressed, along with acknowledgement of the difficulties. This openness furthers the collaborative engagement in psychotherapy which is likely a major factor with whatever modality is used. Hope of healing change in a long-term therapy makes for a low drop-out rate and that also has financial implications for health services unconcerned with the distant future of individuals.

Neuroscientific plausibility is an indirect source of evidence as it provides a rationale for innovative treatments for complex post-traumatic reactions, and the concept of what constitutes an evidence base must be expanded to include this (Corrigan & Hull, 2015a; 2015b). The authors accept there will always be an economically derived priority for rapid symptom reduction and limitation of therapy sessions (Corrigan & Hull, 2015a) but any approach for complex post-traumatic disorders must be neuroscientifically credible, and credible to the individuals being treated; they will all too readily know when the therapist, the conceptualisation, and the therapy approach are not aligned with their lived experience, or where the lack of attunement and resources make what is offered something to be feared and avoided rather than embraced – albeit tentatively at first.

Long-term outcome research – as well as research into underlying recovery processes (which the authors confess to finding very intriguing) – is essential, as are the necessary associated service developments.

Moreover, there needs to be support for the clinicians developing these approaches and those who carefully pursue the extension of the range of their therapeutic skills, learning new modalities to better help those who are not responding to standard approaches. Other areas of medicine specify when conditions are too expensive to treat, and it is then open to sufferers to lobby for change. One caveat is that the challenges faced by those with complex post-trauma conditions may preclude their own activism and require assistance through advocacy.

Covert decisions based in economic strictures are a disservice to those whose lives have been blighted by inescapable traumatic experience because the opportunity for change through open debate is denied. Therapeutic developments can bring hope into a clinical area often dominated by negatively-charged cognitions of aloneness, worthlessness, helplessness and hopelessness, making evaluation and further improvement a rich source of clinical creativity and optimism. Rapid treatment as early in life as possible could prevent decades of suffering for traumatised individuals and restore, or provide afresh, a quality of life hitherto unimaginable. □

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