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EMOTIONAL DYSREGULATION IS THE CORE PROBLEM IN PSYCHOPATHOLOGICAL MANIFESTATIONS

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ABSTRACT

The established opinion is that emotions are the gift given to us by nature in order to help us connect with other people. They are constantly generated, usually by stimuli in our intrapersonal as well as in external world. Problems raised in our relationships initiate emotions to help us to fix those problems. Almost all forms of human psychopathology are associated with dysregulated emotions. The failure to apply appropriate cognitive, attentive, and behavioural regulatory strategies is the core for emotion dysregulation.

The brain regulates emotions through a biological mechanism. Emotions rise in intensity, peak, and then go flat once the emotion adaptive action tendency has been expressed. The aim of the therapist is to help clients express, face, and regulate their emotions, and to channel these emotions into healthy actions.

The idea of this article is to present contributions from both affective neuroscience and psychotherapy in order to explain the ways how our emotions become dysregulated in life and how they can become regulated through psychotherapy.

Keywords: emotion, dysregulation, psychopathology, psychotherapy, neuroscience

INTRODUCTION

The crucial roles in human survival, without doubt, are the brain responses which shaped the human mind. However, in modern life, they pose a serious danger to our individual and collective destiny, which could be shaped by destructive emotions. The main hypothesis, according some neuroscientists, is that three poisons are responsible for human unhappiness: hate (animosity), craving (strong desire), and delusions (unrealities). This opinion emerges as the reason for the relevance of emotions in human functioning. Myself, I am convinced that emotions are the most important psychological functions in human existence. From a Darwinian perspective, even destructive emotions have been important for survival by modelling the repertoire of the heart as a compromise for behaviour.

I will try to explain what emotions are and the difference between feelings and emotions: two words which are frequently used as synonyms. My explanation is generally based on Antonio Damasio's contemporary neuroscientific work.

The medical definition for emotions describes them as a mental state that arise spontaneously rather than through conscious effort, and which are often accompanied by physiological changes. From Damasio's point of view, emotions are stereotypical patterns view for everybody. They are external representations of our fear, sadness, angry, joy etc.

They are, as could said, "the theatre of our body". By contrast, feelings are internal, intimate, our own, non-visible representations, happening in the mind, or metaphorically explained, they are "the theatre of the mind". Feelings are our knowledge about emotions, equal to consciousness. As the highest psychological functions, feelings arise only in highly evolved organisms which developed a complex CNS. Shortly, emotions (fear, anger, joy etc.) are a collection of actions directed by the outside and are visible to outside. Feelings are not visible, they are internal, subjective, private events, and even their function is also related to our body (hunger, thirst), but they have a higher psychological function – our knowledge about physiological processes inside, which is equal to consciousness. Feelings are at the top of hierarchical tree of our functions, and they are related to high cognitive processes (IQ). Figure 1 represents the hierarchical tree of homeostasis. It could be said that feelings are the sum of all drives, collective motivations, and emotions.

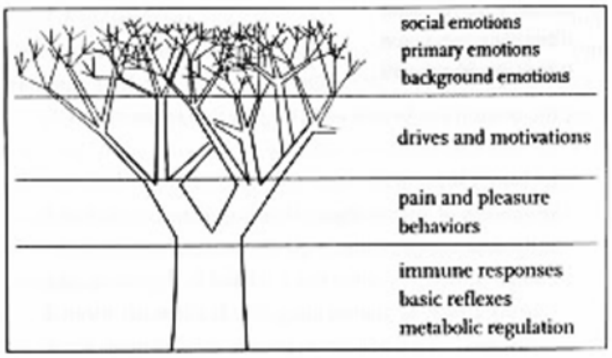

Fig. 1. *Damasio's hierarchy of homeostasis*

If emotions are movement, actions, or sequences, they can provoke some mental experience. It can be said that life itself is an action, behaviour the homeostasis, and together with the CNS, they all represent the mind. The brain manages our life through the mind by possibility to represent inside what is happening outside. Feelings and consciousness contain life, the federal knower.

In the further text, however, the term emotions and feelings will be used as synonyms.

As mentioned before, emotions are the gift which nature has provided us to help us connect with others. Emotions are constantly generated, usually by stimuli in our intrapersonal world. Emotions express our needs and desires. They bond us with others, guide us in navigating our social interactions, and help us care for each other. When problems happen in our relationships, emotions arise to help us fix those problems. However, when emotions become dysregulated, pathology begins. Almost all forms of psychopathology are associated with dysregulated emotions or with some deregulatory mechanisms.

NEURONAL BASIS OF EMOTIONAL DYSREGULATION

There is no one centre in the brain responsible for emotions. Emotions involve an orchestration of activity in circuits throughout the brain, particularly the frontal lobe, amygdala, and the hippocampus. If any particular part of the brain is damaged, different psychological problems arise. One the most important human qualities may be the ability to regulate emotion, and the frontal lobes appear to play a key role. The frontal lobe is involved in much emotional dysregulation, as well as in destructive emotions. Figure 2 schematically shows how neuronal pathways are involved in emotional processing.

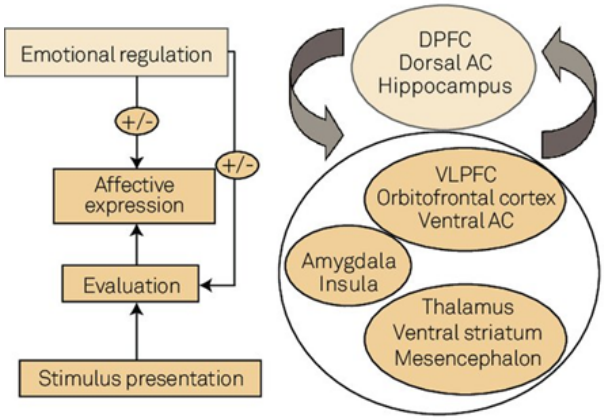

Fig. 2. *Neural pathways involved in emotional processing. [The figure was uploaded by Kette Valente]*

Recent advancements in brain sciences have enabled researchers to determine

patterns and locations of neural activation associated with various psychological functions. These techniques have revived a longstanding debate regarding the relation between the mind and the brain: while many authors claim that neuroscientific data can be employed to advance theories of higher cognition, others defend the so-called 'autonomy' of psychology. However, new imaging techniques allow us to understand and localize the neural circuits involved in psychological processes.

As known, depression is the most frequent consequence of emotional dysregulation and the major problem for patients in current psychotherapeutic settings. Depression is strongly characterized by difficulties in regulating unpleasant emotions. An intriguing psychodynamic hypothesis considers depression as a failure in the mother-infant interactions during childhood, affecting the construction of the representation of the self, others, and relationships.

Messina et al. (2016) [1] provide a link between abnormal activation of the default mode system (DMN) in the brain observed in depression and the exaggerated negative self-focus and rumination that lead to emotion dysregulation in these patients. According to proposed model, the weaker executive area activation observed in depressed patients is attributable to a lack of cognitive control over negative emotions.

Default network (DMN) is a specific, anatomically defined brain system, which is preferentially active when individuals are not focused on the external environment. Anatomically, DMN is primarily composed of the dorsal medial prefrontal cortex, posterior cingulate cortex/praecuneus and angular gyrus. The default network is active when individuals are engaged in internally focused tasks including autobiographical memory retrieval, envisioning the future, and conceiving the perspectives of others [2].

The main feature of the default system is that it is activated during rest [3, 4, 5]. It has been well documented that in the absence of a task that demands voluntary attention, the mind usually tends to wander6. Activation of the default system is generally anti-correlated with activation of the executive areas, a situation reflecting the opposition between internal (default system) and external addressed attention (executive functions) [7]. Due to the default system's involvement in self-related processing and semantic representation of repeated past experiences, an abnormal default system activity should be expected in depressed patients. Several studies have tried to clarify the specificity of resting-state brain functioning in depression, using positron emission tomography (PET) or MRI techniques. Figure 3 represents brain activation in depressed examinees.

While psychodynamic models of emotion regulation emphasize the importance of the internal representation of the self and others in explaining emotional disorders, neuroscience is concentrated more on emotion regulation as a form of cognitive control, neglecting the importance of the semantic representations on which controlling processes may act.

The default system is abnormally activated in patients with depression, which is consistent with the observation of negative self-focus and rumination in such patients. In line with clinical models coming from psychodynamic theory, these difficulties in emotion regulation can be seen as associated with the existence of rigid, negative internal representations of the self and others.

In the same context, individuals with marked autistic traits also display several features of social and emotion dysregulation. Additionally, people with anxiety disorders suffer from severe emotional dysregulation and subsequent cognitive biases.

Considering such processes in neurobiological models of emotional dysregulation helps us to build bridges between the theories behind clinical psychology and neuroscience.

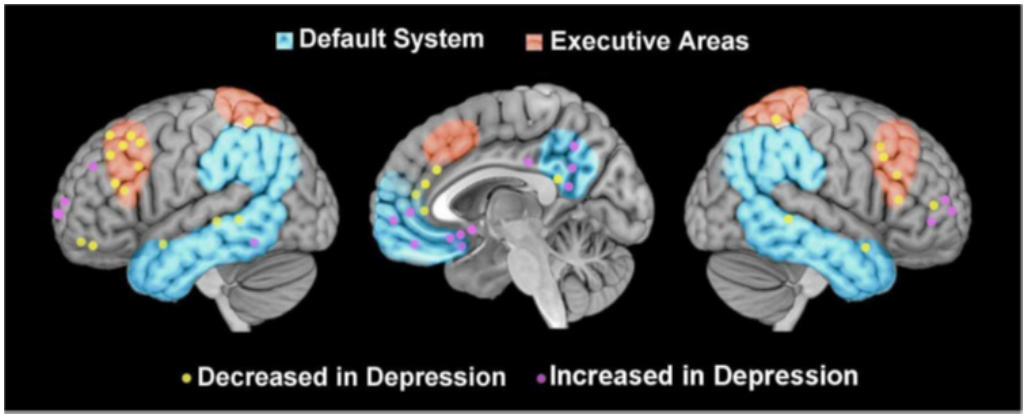

Fig. 3. *Graphical representation of foci of brain activity in depressed patients located in executive areas (in yellow decreased activations, in violet increased activations) [Retrieved from http://neurosynth.org/; Yarkoni et al., 2011] [8]*

PSYCHOTHERAPEUTIC MODALITIES RELATED TO EMOTION'S REGULATION

The ability to regulate emotions is essential for healthy psychological functioning and is a key focus of psychotherapy. Working actively with emotions has been empirically shown to be of central importance in any psychotherapy. Different therapeutic models based on different theoretical orientations have incorporated principles and techniques to work on dysregulated emotions. I will mention some contemporary techniques.

(1) *Emotion regulation therapy* (ERT) is a modern and efficacious treatment for distress disorders (i.e., depression and anxiety). It was shown that individuals with distress disorders exhibit disruptions in two corresponding brain networks including the salience network (SN) reflecting emotion/motivation and the default mode network (DMN) reflecting self-referentiality [9]. Emotion Regulation Therapy (ERT) integrates principles from affective science with cognitive-behavioural treatments to identify and modify the functional nature of negative self-referential processing (i.e., worry, rumination) by targeting motivational and regulatory mechanisms, as well as behavioural consequences.

In its current form, ERT is a manualized intervention consisting of 16 weekly sessions that specifically target motivational mechanisms, regulatory mechanisms including self-referential (i.e., worry, rumination, and self-criticism) and behavioural (i.e., avoidance, reassurance seeking, and compulsive behaviours) responses, and contextual learning consequences that are hypothesized to comprise the distress disorders. ERT is divided into two sequential phases, with the first phase of treatment focusing on the cultivation of mindful emotion regulation skills with the goal of promoting intentional and flexible responding to intense emotional experiences, including emotions of anxiety, anger, and sadness. In the second phase of ERT, the focus shifts to promoting behavioural "proactivity." Subsequently, clients are encouraged to proactively take actions reflective of personal meaning and value [10, 11].

From a neuroscientific point of view, it was confirmed that ERT is associated with changes in the connectivity of nodes of the DMN and SN networks to regions across the brain, and these changes were associated with clinical improvement. Figure 4 shows changes in brain connectivity obtained with ERT.

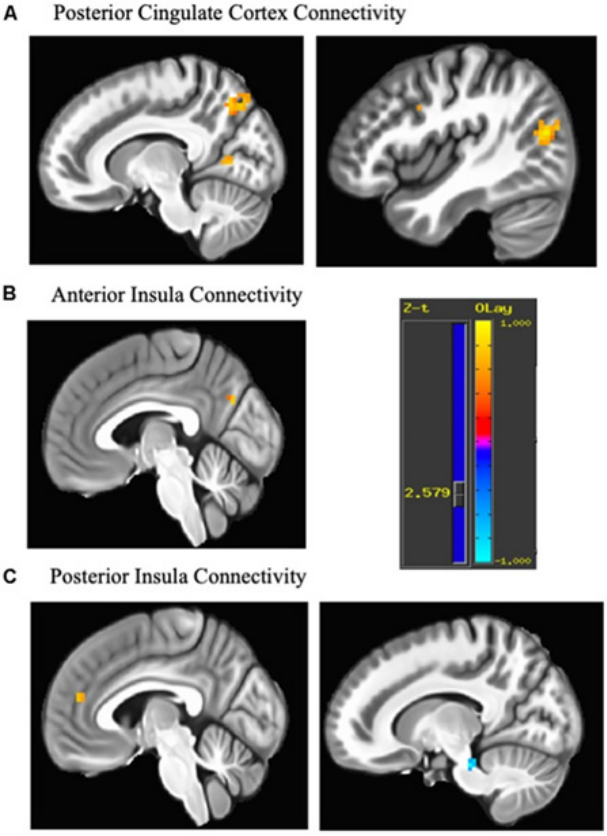

Fig. 4. Change in connectivity associated with pre-post emotion regulation therapy (ERT) [From Scult et all., Front Behav Neurosci 2019][12]

(2) *Schema Therapy* (ST) assumes that traumatization in childhood and frustration of basic childhood needs lead to the development of early maladaptive schemas (i.e., basic mental representations of the self, the relationship to others and the world) and dysfunctional schema modes (i.e., negative emotional-cognitive-behavioural states), cause psychological problems later, in adult life [13].

Schemas are defined as organized patterns of information processing compromising thoughts, emotions, memories, and attention preferences. Schemas have a strong impact on how individuals view themselves, their relationships to others and the world. Young et al., (2003) [14] described 18 maladaptive schemas: shame/defectiveness, social isolation, mistrust, or unrelenting standards. If a maladaptive schema is activated, associated painful emotions arise.

In order to deal with these intensive emotions, coping strategies (surrender, avoidance, overcompensation) are developed such that attenuate aversive emotions impair adaptive interpersonal and self-regulatory behaviour.

The roots of this approach are in cognitive behavioural therapy and aim to help the patient deal with emotional dysregulation. Schema Therapy was shown to be the most effective treatment, especially for borderline personality disorders. Borderline patients often had a comorbid personality disorder (PD) and showed complex, rigid, and chronic psychological problems in emotion regulation and in interpersonal relationships, which, in most cases, could be traced back to their childhood. Shortly, in ST problems in emotion regulation are interpreted as a consequence of adverse early experiences (e.g., lack of safe attachment, childhood abuse or emotional neglect). These negative experiences have led to unprocessed psychological traumas

and fear of emotions, and result in attempts to avoid emotions and dysfunctional meta-cognitive schemas about the meaning of emotions.

ST is based on the idea that aversive experiences and frustration of basic childhood needs (e.g., safety, love, attention, acceptance, or autonomy) lead to the development of maladaptive schemas in interaction with biological and cultural factors.

ST assumes that when these underlying problems are addressed, emotion regulation improves. Major ST techniques for trauma processing use imagery instead of verbalization and probably have greater impact on emotions [15].

(3) *Mindfulness-based interventions* (MBIs) The word "mindfulness" corresponds to the capacity to retain an object in the mind, or being aware of and attentive to the present moment [16]. In clinical and research contexts, mindfulness as a specific type of meditation practice has been described as a "nonelaborative, non-judgmental awareness" of present-moment experience, a non-reactive awareness that emerges as a result of intentionally paying attention to present experience, and a capacity that can be trained through formal meditation practice [17]. There are group interventions, specially designed for targeting specific psychopathological substrates (like emotion dysregulation), in particular those related to psychiatric conditions [18]. Most of these models include cognitive, self-awareness, emotional, and attitudinal components, none of which provide an in-depth understanding of the relationship between mindfulness and emotion regulation changes.

As said before, emotion regulation can be defined as all conscious and non-conscious strategies we use to increase, maintain or decrease one or more components of an emotional response [19], including implicit (nonconscious, and automatic processes), as well as explicit (voluntary and conscious mental processes) [20]. Some of the main neurocognitive mechanisms implicated in mindfulness meditation include attention control, emotion regulation, and self-awareness[21].

From a neural perspective, these processes are realized by different and complex distributed brain systems. Subcortical regions like the amygdala, periaqueductal grey, ventral striatum, anterior insula, and dorsal-anterior cingulate cortex are involved in emotional reactivity. Cortical regions such as the dorso-lateral prefrontal cortex, the ventro-lateral prefrontal cortex, the pre-supplementary and supplementary motor area and parietal cortex are involved in explicit emotion regulation. These regions conform to the so-called central executive network (CEN), usually involved in top-down emotion regulation, but also in attention and voluntary cognitive control. Finally, the ventral-anterior cingulate cortex and the ventro-medial prefrontal cortex are involved in implicit emotion regulation, outside of awareness processing of emotion, but also in encoding the subjective value of the stimuli or conditions experienced by the subject [21, 23, 24].

It has been stated that different emotion regulation strategies might activate these brain systems differentially, which are implicated in emotion regulation processes. Over the last few years, longitudinal studies using fMRI have used a myriad of experimental tasks investigating emotion regulation changes secondary to MBIs.

Neurobiological studies indicate that this type of mental training may have an effect on the plasticity of brain structure and functioning [25, 26].

Clinical applications of MBIs will require a very good understanding of what is better for whom, and distinguishing what types of psychological treatments, regular psychotherapy or MBIs are better for different types of depression or anxiety disorder.

(4) *Parenting Programs* are currently the treatment of choice for behavioural disorders in children, and one of their main components is reducing the negativity bias in the child–parent dyad. The Rational Positive Parenting Program (rPPP) is a program with a special focus on parent emotion regulation functional reappraisal strategies, which has recently received consistent support for reducing child externalizing and internalizing disorders.

Newly developed interventions aimed at modifying negative attentional biases (i.e., attention preferentially allocated to negative, disliked, or threat like stimuli) by training implicit associations have been recently suggested as important strategies in fostering positive parenting [27]. Training of implicit attentional associations from negative stimuli to positive or neutral stimuli has received much interest with the introduction of the Attention Bias Modification (ABM) training. ABM is based on the emotion-regulation attentional deployment strategy, considered a new intervention within the cognitive behavioural therapy framework. This has been documented to have promising clinical effects in both youth and adult population regarding anxiety and emotional related issues [28, 29, 30, 31, 32]. The parent ABM task aims to redirect the attention of parents from angry faces of children to happy faces of children, for prevention purposes.

(5) *Movement and music therapies*. As mentioned before, emotion regulation is a person's active attempt to manage their emotional state by enhancing or decreasing specific feelings. Peripheral theories of emotion argue that the origins of emotions stem from bodily responses. This notion has been reformulated in neurophysiological terms by Damasio[33], who claimed that emotions are generated by conveying the current state of the body to the brain through interoceptive and proprioceptive afferent input. The resulting brain activation patterns represent unconscious emotions and correlate with conscious feelings. This proposition implies that through deliberate control of motor behaviour and its consequent proprioception and interoception, one could regulate his emotions and affect his feelings. This concept is used in dance/movement (psycho)therapy where, by guiding the client to move in a certain way, the therapist helps the client to evoke, process, and regulate specific emotions. Because of the mirror neurons, feeling what the client feels is enabled also through observation and imagination of their movements and posture.

Additionally, a novel emotion regulation intervention, the so called Tuned In therapy [34], uses participant selected music to evoke emotions in session and teaches participants emotional awareness and regulation skills. Therefore, Tuned In therapy shows promise as a brief emotion regulation intervention, especially beneficial for adolescents. These findings build upon an earlier study with young adults. Tuned In is atheoretical in regard to psychotherapeutic approaches and could be integrated with other program components, as required. The Tuned In program was designed to train young people in emotion awareness, labelling, and regulation, using music listening as an engaging and meaningful way of evoking emotions during sessions.

COGNITIVE OR EXPERIENTIAL REGULATION OF EMOTIONS?

As said before, the point of this article is to show that emotional dysregulation is the core problem in psychopathological manifestations. Emotion dysregulation occurs due to the failure to apply appropriate cognitive, attentive, and behavioural regulatory strategies. Generally, the brain regulates emotions through a biological mechanism. Usually, in the situation where the emotion adaptive action tendency work normally, emotions rise in intensity, attain their peak, and then recede proportionally to the intensity of the stimulus, similar to a Gaussian curve. Following this model, emotions are not inherently dysregulated. Dysregulation results when excessive conditioned anxiety exists, or when certain defensive strategies are developed [35–40]. In this situation, the clinician could regulate the dysregulating anxiety paired with the emotion or remove defences which cause the dysregulated affects. One must first clarify these mechanisms and integrate them. However, both processes act as a dual system to foster top-down (cognitive), and bottom up (experiential) regulation. The clinician can choose, moment by moment, whether affect regulation would best be fostered by either top-down (cognitive) or bottom up (experiential) strategies.

Cognitive therapies depend mainly on the use of new cognitive strategies. This process is known as Memory Reconsolidation [41,42]. The targeted emotional learning is reactivated in a labile (plastic) state that allows the previous learning

to be erased by offering the experience of an opposite emotional experience [43, 44]. If the memory reconsolidation process is reached during therapy, a patient's defences will be attenuated, and the patient can bear the feelings. Since the defence is no longer necessary, it no longer provokes the dysregulated affects. Likewise, since the patient is able to bear the formerly warded off feelings, they no longer trigger the previous level of anxiety which was dysregulating. As a result, the dysregulated affect and the associated mechanisms that produce the dysregulation cease to exist. All treatment modalities based on active working and reworking of target emotional learnings (such as mindfulness, psychodynamic therapy, or Schema Therapy) foster Memory Reconsolidation.

Difficulties in emotion regulation seem to be related with both internalizing (e.g., major depression and anxiety disorders) [45, 46, 47] and externalizing behaviour problems (e.g., attention-deficit/hyperactivity disorder) in adolescents and young adults. In this context, the deficits in emotion regulation are an important risk factor for aggressive behaviours which are current problem in contemporary life. Thus, the ability to regulate emotions is an important part of adaptive functioning in society.

Empathy-related responding, including caring and sympathetic concern, is thought to motivate prosocial behaviour, inhibit aggression and pave the way towards moral reasoning [48].

Human empathy involves several components: affective arousal, emotion understanding and emotion regulation, each with different developmental trajectories. These components are implemented by a complex network of interacting neural regions, including the superior temporal sulcus, insula, medial and orbitofrontal cortices, amygdala and anterior cingulate cortex, as well as autonomic and neuroendocrine processes implicated in social behaviours and emotional states.

In this context, the development of emotion regulation, through the maturation of crucial brain areas (i.e., the anterior cingulate cortex and prefrontal cortex), is functionally linked to the development of executive and metacognition functions, which are closely related to the cognitive aspects of empathy [49].

However, it is important to distinguish explicit from implicit emotion regulation. As known, explicit emotion regulation is based on conscious and effortful application of strategies while implicit emotion regulation is based on automatically and unconsciously designed mechanisms [50].

Figure 5 shows the neural model of both strategies of emotion regulation.

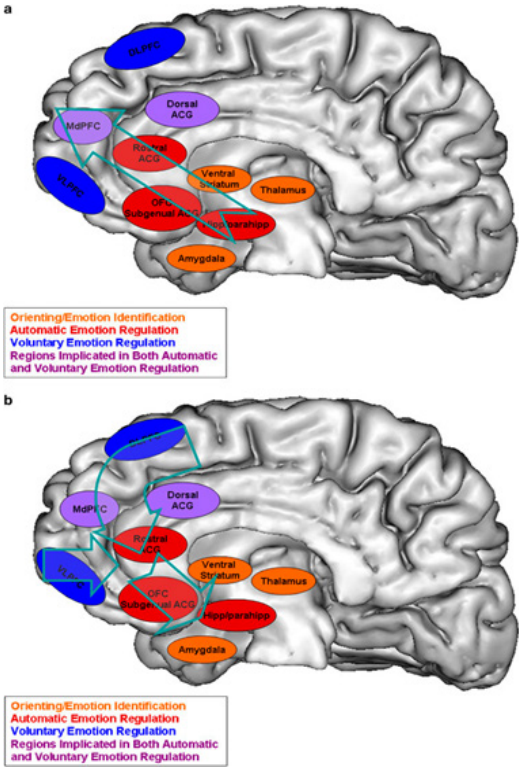

Fig. 5. *Neural model of emotion regulation illustrating neural systems implicated in voluntary (a) and automatic subprocesses(b) of emotion regulation. [This figure was uploaded by Cecile D Ladouceur] [51]*

CONCLUSION

This article aimed to gather important information from neuroscience and psychotherapy to illustrate how emotions become dysregulated in everyday life, and how they can become regulated through psychotherapy. In fact, the purpose of modern psychotherapies is to help clients express, face, and regulate their emotions and channel them into healthy actions.

The presented novel approaches and strategies used to regulate emotions are strongly grounded in affective neuroscience and experimental research. The selected treatment modalities presented in this context are based on active working and reworking to target emotional learning by experimental techniques such as schema therapy, mindfulness, parenting programs and use of motions and music, targeted to foster memory reconsolidation.

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Резиме

НЕРЕГУЛИРАНИТЕ ЕМОЦИИ СЕ СУШТИНА ЗА ПСИХОПАТОЛОШКИ МАНИФЕСТАЦИИ

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Вообичаено е мислењето дека емоциите претставуваат дар што природата ни го дала за да ни помогне во поврзувањето со другите луѓе. Тие постојано се генерираат, најчесто од стимули што произлегуваат од самата личност или од надворешниот свет. Проблемите настанати во нашите односи предизвикуваат емоции токму за да ни помогнат да се надминат тие проблеми. Речиси сите форми на човечката психопатологија се придружени со нерегулирани емоции. Ваквата нерегулираност настанува поради неможност да се применат соодветни когнитивни, внимателни или бихевиорални регулаторни стратегии.

Мозокот ги регулира емоциите со биолошки механизми. Емоциите се раѓаат, достигнуваат врв и се намалуваат кога се активираат токму регулаторните механизми. Целта на терапевтот е да им помогне на клиентите да се соочат, да ги искажат и да ги регулираат емоциите преку создавање здрави акции.

Идејата на трудот е да се прикажат сознанијата од афективната невронаука и од психотерапијата за да се објасни како емоциите стануваат нерегулирани и како ќе станат регулирани со помош на психотерапијата.

Клучни зборови: емоции, нерегулираност, психопатологија, психотерапија, невронаука