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# NEUROBIOLOGICAL CHANGES IN REGRESSION THERAPY PROCESS

**Abstract:** This paper will examine the assumed neurobiological changes in the regression therapy treatment process. The study is based on qualitative research of multiple traumatic experiences in non-hypnotic regression therapy, as described by P. Balint, whose method focuses on the trauma healing process (with the intention of comprehending the method's potential in healing trauma) and relates it to neurobiological processes. The aim of this paper is to explain the results of the research via neurobiological processes that occur in the process of therapy and are assumed by the neurobiological theory based on scientific research. The results point to the theoretically assumed regulation of the amygdala via PFC activation in the process of becoming aware of trauma in regression, the regulation of emotions and behaviour, and show the potential of regression therapy in healing trauma and the justification of further research into this modality.

**Keywords**: trauma, regression therapy, trauma neurobiology, psychotherapy, trauma treatments, trauma healing, memory and trauma.

## 1. Introduction

Today it is a well-known fact that stressful stimuli initiate stress response, which represents the activation of complex mechanisms that

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integrate the brain and the body. In the 1990s, the neuroscientific revolution and new brain imaging techniques (PET and later fMRI) allowed for a better understanding of how the brain processes information, how different parts of the brain are activated when processing memory, sensations, and emotions, as well as how these parts form maps of consciousness – which changed the general understanding of trauma (Van der Kolk, 1996). Contemporary observations about psychological trauma take us back to Jeanne and his understanding that violent emotions impair the ability to think, feel, and act in purposeful, unique ways, and his realisation that this must be reflected in biology. First formulated in 1889, his idea that traumatic experiences are stored in memories differently than ordinary events is equally challenging today, including how such memories and their permutations can be successfully retrieved and conquered, with the aim of reducing their influence over current experience (Van der Kolk & Van der Hart, 1989). Jeanne considered the encoding and retrieval of memories to be the central organising principle of the mind. Throughout life, the categorization and integration of particular experiences allows people to develop increasingly large and flexible meaning schemes that prepare them to cope with problems later in life. He hypothesised a biologically based response to trauma that results in fragmentation of mental cohesion and causes biological, behavioural, cognitive, and emotional remnants of past experience to continue to govern current behaviour (Van der Kolk & Van der Hart, 1989). Modern definitions have a similar understanding. For example, Gabor Maté defines trauma as a *scar* or *wound* that represents a psycho-physiological disorder of disintegration and control over the organism's authentic response to adaptation and, therefore, distance from authenticity and psychophysical health in general. "It's a psychic wound that leaves a scar. It leaves an imprint in your nervous system, in your body, in your psyche, and then shows up in multiple ways that are not helpful to you later on. It remains present as an unconscious mechanism that shapes the way we live life, stopping the processes of emotional growth and development" (Maté, 2022).

The identification of neural circuits involved in the pathophysiology of PTSD, followed by genetic, neuroendocrine, immunological, and psychophysiological findings on symptom development mechanisms

and disease maintenance, represents a paradigm shift and remarkable progress in the field of trauma, as well as clinical neuroscience in general (Liberzon & Abelson, 2016). Today, neurocognitive memory theories explain the development of PTSD on the basis of pathological distortion of memory representations related to the traumatic event (Brewin & Holmes, 2003; Dalgleish, 2004). Episodic memory stores memories of past events. Based on information retrieval, there are two types of episodic memory representation: autobiographical representation (declarative or explicit episodic memory), which stores facts and events; and sensory-perceptual representation (non-declarative or implicit episodic memory), which stores skills, habits, and conditioning (Squire, 1992). Autobiographical memory is the main resource for uncovering information about an individual and the basis for narrating events and stages of one's life. It is the declarative part of episodic memory, a highly developed and structured memory system that allows valuable knowledge about past events to be efficiently archived. It is structured chronologically in a hierarchical manner and depends on widespread neocortical neuronal activity. The hippocampus plays a central role in consolidating memories and encoding information that contradicts previously learned information. The functions of the hippocampus decline under high levels of stress and may even be permanently atrophied. The sensory-perceptual representation of events ensures the retrieval of sensory information, which is fundamentally different from the retrieval of autobiographical information. Contextual facts stored in autobiographical memory are retrieved as verbally accessible knowledge, while the retrieval of sensory information is perceived as experiencing the said data (Neuner et al., 2008). Neuroimaging studies suggest that sensory-perceptual representations of past events are stored in visuospatial processing and emotion structures and are activated by limbic structures – especially the posterior cingulate cortex (including the cingulate cortex and occipital and parietal cortices), as well as voluntary movement structures activated by the motor cortex (Bremner, 2002). The amygdala plays a key role in encoding and retrieving highly emotional events. Elevated arousal supports the encoding of permanent sensory-perceptual representations of the situation (Kensinger, 2004). Increased amygdala activity leads to an exaggerated sensory-perceptual representation of

events that can be easily activated, as many environmental cues resemble items in the fear-processing structure. The activation (which is difficult to control) of only a few elements is enough to activate the whole structure. Extreme stress causes excessive sensory-perceptual representation of the traumatic event and impairs the proper functioning of the hippocampus and autobiographical memory representation. Consequently, the traumatic event is not represented as a concrete event and is often not clearly positioned among life stages. The recollection of a traumatic memory is not grounded in the narrative and spatiotemporal contextual anchors that usually tie the experience to reality. This makes it very difficult for the victim to narrate the event. Traumatic memory is primarily dominated by highly disturbing sensory elements, while narratives are mainly fragmented (Neuner et al., 2008). Stress significantly impairs the executive functions of the highly evolved prefrontal association cortex (PFC), while simultaneously enhancing primitive emotional responses of the amygdala and the tonic activation of the locus coeruleus noradrenergic system, three brain regions that are closely connected (Arnsten et al., 2015). PTSD patients show reduced activity in the medial prefrontal region, but increased activity in the amygdala. Additionally, amygdala activity is negatively correlated with medial prefrontal activity and positively correlated with symptom severity. Bouton and peers argue that fear extinction depends on the activity of medial prefrontal areas, rather than changes in amygdala-dependent associations (Bouton, 1993; Bouton & King, 1983, after Craske et al., 2008). Permanent fear extinction requires memory consolidation in prefrontal areas, which involves protein synthesis. Pathways from the prefrontal cortex to the amygdala enable the modification of the fear response, depending on the evaluation of the stimulus in the current environmental context (Neuner et al., 2008). Evidence suggests that putting feelings into words activates the prefrontal cortex (PFC) and suppresses the amygdala response, thereby helping to alleviate emotional distress. The data support a general role of the ventromedial PFC in regulating amygdala activity (Foland-Ross et al., 2010). Modern approaches to narrative exposure (CBT) rely on this fact.

Regression therapy views trauma as an inscription in memory that arises as a consequence of an event in which there is a narrowing of consciousness together with psychological pain (injury). Furthermore,

this *inscription* also conditions physiological and psychological automatic reactions that are repeated in the form of dysfunctional patterns of behaviour and feelings. In regression therapy, the dysfunctional pattern (suffering) related to the reason the client is undergoing therapy is connected with sensations in the body, i.e., the information from sensory-perceptual memory that the client brings to consciousness and pronounces. This activates implicit memory, or physiological limbic structures in particular. The information serves as an association to life events in which dysfunctional patterns are conditioned or repeated. The event that conditions the association is always searched for – a primary engram, that is, a memory inscription that contains pain and narrowing of consciousness. The event usually appears in fragments but is completed with context and expressed narratively with each passage. Defining the beginning, the end, and the time at which the event had affected the client, enables the said client to position themselves in their own past. The main focus is on connecting patterns from the events the client describes and current dysfunctional patterns. As narratives increase, emotions are regulated (which is consistent with neurobiological evidence). Activation of the mPFC triggered by repeated narrative stimulation strengthens the extinction of fear in an associative context and regulates amygdala activity and emotion intensity. Placing the traumatic event in one's autobiographical past makes it possible for the client to recognize associatively conditioned reactions if they reappear, connect the trauma with an event in the past (now located in the autobiographical memory), and experience it as a past event rather than a present threat. This opens up the possibility of trying out new ways of functioning. As a rule, the regression is not interrupted as long as the emotions are intense, that is, while the narration is incomplete because the assumption is that otherwise, we would leave the client retraumatized and emotionally excited. At the end of the regression process, techniques of experience integration and consolidation are performed, thus the experience itself becomes a conscious part of the client's past.

## 2. *Research* Problem and *Objective*

The research problem is understanding the process of regression therapy and seeing its potential in healing trauma by linking the changes occurring in the process with neurobiological processes established by neurobiology findings.

The research objective is to describe the process of multiple traumatic experiences in non-hypnotic regression therapy and compare it with the research-based theory in order to facilitate the understanding of the technique's principles, compare them with scientifically based knowledge, and determine its potential in healing trauma, as well as contribute to a better understanding of trauma.

## 3. Method

The paper analyses the results of the research conducted throughout 2021 and 2022, which follows and describes the changes in the process of re-experiencing multiple traumatic events in therapy and relates it to the neurobiological research-based theory, with the aim of understanding the technique's principles and determining the potential of regression therapy in trauma healing.

### 3.1. Variables

There were 49 defined variables, three independent and 46 dependent variables. The variables were operationalized and a measuring instrument that defined the way of measuring these phenomena was constructed. The variables are shown in the Results section, within the descriptive statistics table.

### 3.2. Sample

The research was conducted on a transcript of a regression therapy session from the author's therapy practice, obtained with the client's

approval for the use and publication of confidential data for scientific purposes, along with identity protection.

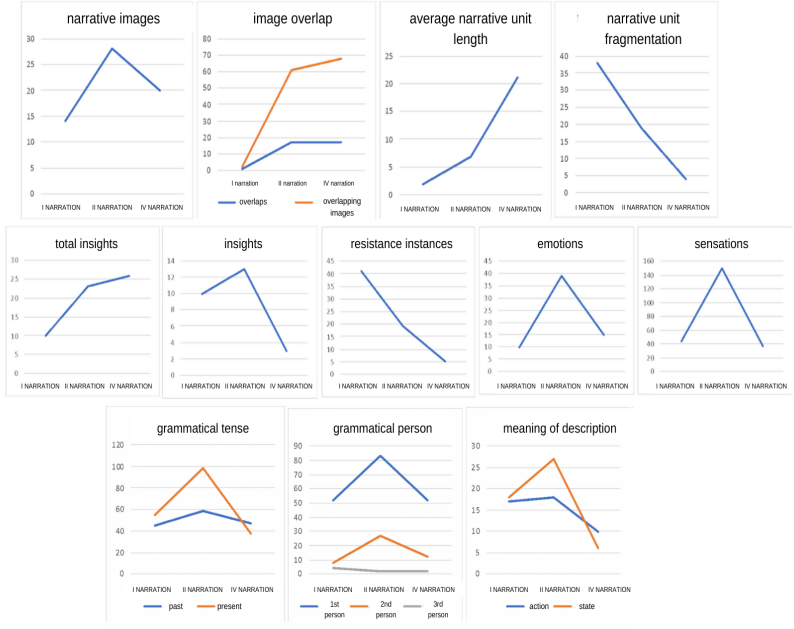
### 3.3. Procedure

The research measured behaviour expressed through speech, which had previously been recorded in the therapy transcript. Conclusions were derived from measurements of specific phenomena noted in the transcript. The decision about the constructs that were operationalized and measured was made on the basis of the phenomena observed by the phenomenological IFA narrative analysis. The constructs occurred from the narrative itself and were guided by the researcher's focus on the process of therapy and the process that takes place within the client. Measurements were taken in the first, second, and fourth narration of the traumatic event in the process of regression therapy. The client went through the third narration mentally, which rendered it unmeasurable, and it was therefore excluded from the research. In order to achieve easier navigation, the variables are arranged by focal units related to data monitoring. The main focus was on detecting and monitoring changes in PFC activation and amygdala regulation, as assumed by neurobiological theory, as well as the meaning of narratives that phenomenologically and epistemologically describe the impact of trauma on the client. The use of statistical data processing together with data comparison provided a better understanding of the processes that occur in therapy, but also within the client. The sample and the prominence of measured variables were described by descriptive statistics (frequencies and percentages), and are presented in the Results section, in the form of Excel tables and graphs.

Indicators of PFC activation refer to narrative coherence, resistance, and insights into the process. These are followed by the amount of information about the event (organised memory units of declarative memory), narrative fragmentation (the size of the narrative units), resistance to awareness, the number of narrative images and their overlapping through the repetition of events, the amount of insight into dysfunctional patterns that are consequences of trauma and that are brought to consciousness in the narrative. Raising the client's awareness

was monitored by insights into the connection between dysfunctional trauma patterns and their manifestations – representing the impact the trauma had on the client. The resistance defined by the manifested defence mechanisms and the grammatical tense that the client uses in the narrative represents an indicator of the client's effort to be present, *here and now*, in the regression process, or their aversion towards therapy and awareness. Amygdala regulation indicators that were monitored were emotions and feelings. The choice of the grammatical tense (past and present) was among the observed indicators for the purposes of determining the client's attitude towards the process, along with awareness and resistance. Moreover, the meaning of narrative descriptions related to states and actions was also monitored, with the aim of understanding their meaning in the regression therapy process. Lastly, the quality of the therapeutic relationship was observed by comparing the therapist's interventions with the client's resistance to therapy, as well as by comparing both the therapist's and the client's intensity in initiating insights which will not be presented in this paper.

## *4. Results*



| THEME | VARIABLES | I NARRATIVE | II NARRATIVE | IV NARRATIVE | TOTAL NARRATIVES | narrative measurment | measurment unit | SPSS MARK |
|---|---|---|---|---|---|---|---|---|
| NARRATIVE COHERENCE | narrative images | 14 | 28 | 20 | | No. of images | occurrence | SL |
| | overlapping images | 2 | 61 | 68 | | No. of overlapping images | occurrence | PRSL |
| | overlaps | 1 | 17 | 17 | | No. of occurrences of overlapping images | occurrence | BRPRSL |
| | missing images | | 2 | 6 | 6 | No. of missing images present in the previous narration | occurrence | NEDSL |
| | narrative unit | 1.96 | 6.89 | 21.13 | | narrative unit size | No. of lines | CE |
| | narrative fragmentation | 38 | 19 | 4 | | No. of narrative units | occurrence | FRN |
| INSIGHTS | insights obtained independently by the client | 4 | 6 | 0 | 10 | No. of insights obtained independently by the client | occurrence | UKL |
| | insights initiated by the therapist | 5 | 5 | 3 | 13 | No. of insights initiated by the therapist | occurrence | UT |
| | insights initiated by the client, reinforced by the therapist | 1 | 2 | 0 | 3 | No. of insights initiated by the client an reinforced by the therapist | occurrence | UKLT |
| | total insights | 10 | 13 | 3 | 26 | No. of total insights | occurrence | |
| RESISTANCE | supressions | 29 | 17 | 4 | 50 | No. of instances of resistance | occurrence | POT |
| | regressions | 5 | 0 | 1 | 6 | No. of instances of resistance | occurrence | RGR |
| | intellectualisations | 4 | 0 | 0 | 4 | No. of instances of resistance | occurrence | INT |
| | rationalisations | 3 | 2 | 0 | 5 | No. of instances of resistance | occurrence | RAC |
| | total resistence instances in the therapy process | 41 | 19 | 15 | 65 | resistance amount | occurrence | UKOT |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **EMOTIONS** | **fear** | 2 | 0 | 0 | 2 | **No. of instances of the named emotion** | **occurrence** | strah |
| | **sadness** | 3 | 13 | 1 | 17 | **No. of named emotions** | **occurrence** | tuga |
| | **love** | 5 | 2 | 0 | 7 | **No. of named emotions** | **occurrence** | ljubav |
| | **anger** | 0 | 11 | 8 | 19 | **No. of named emotions** | **occurrence** | ljutnja |
| | **rage** | 0 | 9 | 3 | 12 | **No. of named emotions** | **occurrence** | bes |
| | **hatred** | 0 | 1 | 1 | 2 | **No. of named emotions** | **occurrence** | mržnja |
| | **suffering** | 0 | 3 | 1 | 4 | **No. of named emotions** | **occurrence** | patnja |
| | **apathy** | 0 | 0 | 1 | 1 | **No. of named emotions** | **occurrence** | apatija |
| | **all emotions** | 10 | 39 | 15 | 66 | **No. of named emotions** | | |
| **FEELINGS** | **separation** | 17 | 9 | 2 | 28 | **No. of named feelings** | **occurrence** | separ |
| | **confusion** | 1 | 13 | 1 | 15 | **No. of named feelings** | **occurrence** | zbun |
| | **powerlessness** | 8 | 40 | 6 | 54 | **No. of named feelings** | **occurrence** | nemoć |
| | **agency** | 0 | 3 | 2 | 5 | **No. of named feelings** | **occurrence** | moć |
| | **dullness** | 1 | 20 | 8 | 29 | **No. of named feelings** | **occurrence** | tupost |
| | **hopelessness** | 0 | 5 | 2 | 7 | **No. of named feelings** | **occurrence** | bol |
| | **pain** | 11 | 43 | 12 | 66 | **No. of named feelings** | **occurrence** | zašt |
| | **protectedness** | 6 | 17 | 4 | 27 | **No. of named feelings** | **occurrence** | beznad |
| | **all feelings** | 44 | 150 | 37 | 231 | **No. of named feelings** | **occurrence** | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| GRAMMAR | past | 45 | 59 | 47 | 151 | No. of past tense occurences | occurrence | PRO |
| | present | 55 | 98 | 37 | 190 | No. of present tense occurences | occurrence | SAD |
| | 1st person | 52 | 83 | 52 | 187 | No. of 1st person occurences | occurrence | PRVOL |
| | 2nd person | 8 | 27 | 12 | 47 | No. of 2nd person occurences | occurrence | DRUGOL |
| | 3rd person | 4 | 2 | 2 | 8 | No. of 3rd person occurences | occurrence | TREĆEL |
| MEANING | action | 17 | 28 | 10 | 55 | No. of action descriptions | occurrence | RAD |
| | state | 18 | 27 | 6 | 51 | No. of state descriptions | occurrence | STA |
| INTERVENTIONS | revisiting the event | 38 | 19 | 4 | 61 | No. of action descriptions | occurrence | IVD |
| | identifying patterns | 4 | 6 | 3 | 13 | No. of action descriptions | occurrence | IPO |
| | summarising | 0 | 1 | 1 | 2 | No. of action descriptions | occurrence | IR |
| | Self-integration | | | | 7 | No. of action descriptions | occurrence | IS |
| | total interventions | 42 | 26 | 5 | | No. of action descriptions | occurrence | IUK |
| RELATION | conclusions drawn from a comparative analysis of the presented data | | | | | | | |
| CLIENT | | | | | | | | |
| PROCESS | | | | | | | | |

### *5. Discussion*

*Narrative coherence* – the presence of narrative overlap during regression therapy indicates that multiple narrative images are being connected and consolidated into distinct entities. In other words, memory fragments are incorporated into larger units forming a specific event, which indicates the subsumption of these images into a coherent autobiographical account. This process of reorganisation of memory/ies is driven by the activity of the PFC and it is intensified with each subsequent narration of a traumatic event. Most narrative images examined suggest that the second narration is particularly significant, as it is then when the participants become most highly aware of the information related to the traumatic event. The images that fade during the

process indicate that memories are hierarchically structured, which is characteristic of declarative memory where the images associated with a particular event gradually lose relevance. The hierarchical structuring suggests the formation of an autobiographical memory that further develops through successive narrations of the event in regression therapy.

*Narrative unit* is the uninterrupted flow of the client's narrative between two therapist interventions. The interruption in the client's speech suggests resistance to the process of attaining awareness, i.e., to regression, as a means to avoid experiencing negative emotions. A higher quantity of shorter narrative units is indicative of heightened client resistance, increased amygdala activity, as well as memory fragmentation and lowered awareness. Through the process of regression therapy, the number of narrative units consistently decreases, while the length of each unit – from the initial to the final narration of a traumatic event – progressively increases. This trend indicates memory defragmentation and consolidation, as well as the client's growing ability to overcome resistance and access memories consciously. It also shows the impact of heightened PFC activation in regulating the amygdala.

*Insights* – during the regression therapy process, the client obtains insights not only into the specifics of the traumatic event itself but also into the interconnectedness of their current dysfunctional behaviour patterns with the survival mechanisms that developed in response to the traumatic context. The emergence of these patterns itself confirms the theory of them being contextually conditioned and prompted by associations in the client's present environment. These insights enable the client to realise that the context of trauma and the current context are in fact different; they empower the client to make a conscious effort to interpret reality differently and change their behaviour accordingly, i.e., opt for new functional response strategies once these associations arise.

Insights reflect awareness and emerge during the very first narration in regression therapy. Clients experience the highest level of awareness in connection to specific insights during the second narration, while this awareness is at its lowest during the final narration. The cumulative number of insights increases with each new narration, which stems from the impact of awareness and PFC activity.

*Resistance* – Each new narration of the event saw a noticeable decline in the emergence of defence mechanisms, which suggests a decrease in emotional arousal (regulation of the amygdala) and increasing activity of the PFC with each narration of the event. When summarising these narrations, the client confirmed that each subsequent one was emotionally easier than the previous one.

*Emotions* identified by the client during the regression process are those conditioned in the context of past traumatic experiences. They might be triggered by different associations encountered in the client's present circumstances where these emotions no longer serve a functional purpose. The associations in question can include certain patterns of behaviour, emotions, imagery, and other sensory information as well as other situations linked to the context of trauma. The presence of these emotions in the transcript indicates the client's awareness of them, while their intensity reflects the degree of their linkage to the trauma, rather than the client's current emotional state. The discrepancy between the client's description of the "heaviness" felt when narrating the entire event and the intensity of individual emotions identified during these narrations confirms this observation. The client becomes the most aware of their emotions during the second narration and, as the therapy progresses, the intensity of these emotions decreases in the final narration. This decline in emotional intensity during the final narration is indicative of amygdala regulation. Pavlov believed that the original association learned during fear conditioning does not get erased during extinction but remains unchanged as new secondary learning develops (e.g., Bouton, 1993; Bouton & King, 1983, cited in Craske et al., 2008), with the possibility of the previously conditioned response reappearing. However, it is important to remember that his experiments were conducted on animals and there are differences in sentience and other cognitive abilities between animals and humans. We assume that the extinction of conditioned reactions in humans might be closely related to consciousness and the activation of the PFC, which we leave as an implication for future research.

*Feelings* – the activity of the limbic system is manifested in bodily sensations i.e., sensory processing data stored in implicit or perceptual

memory. Bringing these feelings into awareness occurs when the client explicitly names or describes these trauma-conditioned feelings in the narrative. These feelings are (conditionally) linked to the emotions recorded in the transcript, which shows they are conditioned by trauma. All the emotions and feelings present in the transcript are linked together in an associative chain due to being trauma-conditioned. Similar to emotions, the likelihood of becoming aware of one's feelings is the highest in the second narration, after which it decreases during the final narration.

*Grammar* – shifts in the usage of grammatical person and tense within the client's narrative. We presuppose that (1) any deviation from the first-person perspective indicates the client's reluctance to fully invest themselves and be present in the event, and (2) the use of the present tense suggests that the client is re-experiencing the event and bringing it into their awareness, while the past tense signifies recollection, i.e., the autobiographical representation of a consolidated memory. The results indicate that the presence of the present tense in the narrative has a more profound impact than the past tense, which suggests that the client engages more deeply in regression and gains a better understanding of their past in the present moment. Furthermore, the peak emotional intensity, regardless of the tense used, is reached during the second narration. The client's increased use of the present tense during the first and second narrations, followed by more frequent use of the past tense in the final narration, indicates memory consolidation within the autobiographical memory during the last narration. This shifts the narrative focus from reliving the trauma to recalling it as a memory, which presupposes active involvement of the PFC. In the overall process of narrating a traumatic experience, as well as during each individual narration, the prevalent use of the first-person perspective in self-description demonstrates the client's ability to invest themselves in the event with the purpose of becoming aware of it. The client's readiness to confront traumatic memories increases after the second narration, as evident from their reduced use of the second and third-person perspectives. The third-person viewpoint is predominantly employed in the initial narration when both amygdala reactivity and resistance to awareness are at their peak. The decline in the use of all grammatical

persons in self-descriptions in the final narration compared to the peak of occurrence – while accounting for the data showing an increase in narrative units, overlapping narrative images and information in general – signifies a decrease in descriptions of oneself within the trauma and an increase in descriptions of the traumatic event. This shift is driven by the consolidation of information in autobiographical memory and marks a significant step in transitioning from the conditioned perspective of "I am traumatised" to "the traumatic event is part of my past." It serves as an indicator of trauma resolution – the trauma no longer induces suffering but activates conscious memories that allow for contextual differentiation.

*Descriptions of actions and states* – the data indicate minimal correlation and hardly any differences in their separate usage. The peak intensity of most variables aligns with the second narration, which is also in alignment with the strongest intensity of the second narration itself for most other data points. Regarding narrative descriptions of actions and states, there is a leaning towards describing states. However, this trend shifts in the final narration, with descriptions of actions becoming more prevalent. When we examine this in the context of the previous findings from this research, we can draw parallels between descriptions of states, the use of the present tense, and the intensity of emotions the client has become aware of. Similarly, descriptions of actions may be linked to the client's recognition of their dysfunctional patterns or their newfound insights. Hence, it is observable that the awareness of insights coincides with an increase in descriptions of actions, while the use of the present tense aligns with a heightened awareness of emotions and descriptions of states. These patterns may or may not be related, which leaves room for future research.

The initial narration of the traumatic event is characterised by fragmented and incoherent memories that lack a clear chronological order and clarity in terms of their value and significance. This phase is emotionally difficult (in the examined sample, is the most challenging one) since it is when the client is the most resistant to acknowledging the traumatic memories and the least aware of the information, emotions, and conditioned associations. Furthermore, the client's capacity for

emotional regulation is at its lowest, which means that the most intense reactions are physiological. These are the indicators of the hyperactivity of the amygdala and the hypoactivity of the PFC. During the second narration, the client is the most engaged in acknowledging the traumatic event. Regression, which involves "reliving the past event in the present moment during therapy," is the most intense during this phase. The client's acknowledgement and re-experiencing of the traumatic event are at their most intense. The highest frequency of awareness instances – relating to the information about the event, emotions, and sensations – occurs during the second narration. Mental images increase in number, overlap and group together, while memory fragmentation decreases, and narrative units expand. Insights are at their peak both in terms of quantity and intensity. The client's awareness intensifies, and they begin to regulate their emotions. Furthermore, the client's resistance to therapy diminishes, which makes this phase less emotionally challenging than the initial one; simultaneously, the level of detail in the information provided increases. The therapeutic relationship between the client and therapist is at its strongest during this phase. These indicators show an increased activity of the PFC and regulated (reduced) activity of the amygdala in this phase. In the final narration, memories become defragmented and are structured into coherent units. The traumatic event in the narrative transforms into an autobiographical memory from the client's past, with a clear beginning and end within their personal history. The client's narrative shifts in focus primarily towards actions rather than emotional states, there is more frequent use of the past tense than the present tense, and the intensity of acknowledged emotions and sensations decreases. Resistance to therapy is minimal and the awareness of insights decreases, which indicates that insights are primarily gained during deeper regression, i.e., in previous narrations. In the final narration, the client is no longer in the "here and now" but instead describes events by using "then and there." Autobiographical memory is integrated, the PFC is active, there is a decrease in the activity of the limbic system, and the client's emotions are regulated.

During a traumatic experience, consciousness becomes narrowed, and individuals mainly retain perceptual and consciously unprocessed information. Modern neurobiological findings highlight the importance

of improving PFC regulation as a key objective in treating PTSD, as this would enable patients to better manage their emotions, thoughts, and actions. A more active PFC should help patients with extinguishing fear responses (via PFC regulation of the amygdala), with calming down and reducing hyperarousal (e.g., through PFC regulation of the brainstem), and with diminishing flashbacks and intrusive memories (through PFC regulation of the posterior cortex and hippocampus). Exposure therapy may work in part through the creation of a safe context in which the PFC becomes increasingly more active, i.e., activates cognitive function and awareness; this increased PFC engagement regulates the amygdala by breaking the vicious circle of primitive brain reactions and extinguishing the traumatic response (Arnsten et al., 2015). In regression therapy, conducted within a safe environment, previously unprocessed information related to a traumatic experience is brought into the client's consciousness and linked to its relevant context. This process involves forming a conscious and explicit autobiographical memory and placing it within the context of past experiences that began and ended within a particular past event. Multiple narrations of the past traumatic event gradually activate the PFC as one's awareness of the event expands; they also regulate the amygdala and emotions and reduce the influence of associations that trigger trauma-related responses; this is consistent with the neurobiological theory of trauma. This process creates a separation between the present, the past, and the context of the traumatic event; it enables the client to reassess their associative reactions, consider whether these reactions would prove functional in future situations and choose more functional and adaptive responses. It is important to keep in mind that these results pertain to the specific sample in question and that this process can vary depending on the individual due to the client-focused nature of therapy. A replication of this study on a larger sample size is necessary to confirm the conclusions concerning the techniques and processes employed in this research. Future research on the effects of trauma treatment could deal with the comparison of results obtained via technical instruments for measuring neurobiological processes with those derived from conventional self-report instruments.

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