LEX LOCALIS-JOURNAL OF LOCAL SELF-GOVERNMENT
ISSN:1581-5374 E-
ISSN:1855-363X VOL. 23, NO.
8(2025)

# Psychotherapy Using EMDR Technique on a Case of Post-Traumatic Stress – Victim of Natural Disasters – Flood.

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**Submission: 01.02.2025. Acceptance: 03.05.2025. Publication:29.06.2025**

**Abstract:**
This study aims to provide a clinical applied model for treating Post-Traumatic Stress Disorder (PTSD) resulting from a natural disaster, through a case study of a 41-year-old man who lost his father during a sudden flood. The study relied on the case study method using a quasi-experimental (pre–post) design and the PCL-5 scale to diagnose and measure symptom severity.
The EMDR (Eye Movement Desensitization and Reprocessing) protocol was applied across ten integrated therapy sessions, including desensitization, installation, body scan, and homework assignments. Results showed a significant reduction in symptom severity from 64 to 22 points on the PCL-5 scale, with a marked decrease in indicators of re-experiencing, avoidance, negative cognitive changes, and hyperarousal. The Validity of Cognition (VOC) index increased from 2 to 7, while the level of distress (SUD) decreased from 9 to 1.
The study concludes that EMDR is effective in the Algerian context for treating PTSD resulting from natural disasters and recommends expanding its use and training specialists in it.
**Keywords:** Post-Traumatic Stress Disorder, EMDR, Case Study, Flood, PCL-5, Algeria.

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**Introduction:**

Post-Traumatic Stress Disorder (PTSD) is one of the most prominent psychological disorders that draws the attention of researchers and therapists due to its severe impact on individuals, families, and society. This disorder typically appears following exposure to traumatic events such as natural disasters, wars, traffic accidents, or the loss of loved ones under tragic circumstances. Its symptoms manifest in multiple forms, notably: re-experiencing the traumatic event through nightmares or intrusive memories, avoidance behaviors, hyperarousal, in addition to negative thoughts and beliefs about the self and the world (American Psychiatric Association, 2013).

Studying this disorder is increasingly important in the Algerian context due to the recurrence of traumatic events in recent years, whether natural, such as the Bab El Oued floods, or health-related, like the COVID-19 pandemic. Local field research has shown that a significant proportion of victims experience PTSD symptoms to varying degrees (Laaj & El Mahdi, 2024; Cherif, 2022; Walhi, 2025). Hence, there is a need to verify the effectiveness of modern therapeutic interventions, primarily EMDR (Eye Movement Desensitization and Reprocessing), which has proven effective in global studies (Shapiro, 2018; Bisson et al., 2019) as well as local research (Qalmin, Baraka, Harizi, 2021).

**Study Objective:**

The aim of this study is to reduce PTSD symptoms in a victim of a natural disaster – flood – using EMDR therapy.

**Theoretical Framework**

**Post-Traumatic Stress Disorder:**

**Linguistically:** The term trauma is derived from the Greek word "trauma," meaning a "wound" or "injury," which can be physical but also affects the psyche.

**Terminologically:** In psychology, psychological trauma refers to the phenomenon of a breach or rupture of the self caused by violent and powerful stimuli. Trauma is a wound or scratch resulting from a violent act inflicted on a person, leaving a deep impact, such as a woman experiencing sexual abuse during childhood (Mansouri, 2021, p. 30).

PTSD is defined in the DSM-5 as a set of psychological symptoms persisting for more than one month after exposure to a life-threatening traumatic event, including four main dimensions: re-experiencing, avoidance, negative changes in thoughts and emotions, and hyperarousal (American Psychiatric Association, 2013). The ICD-11 presents a more focused view on three core symptoms: re-experiencing, avoidance, and hyperarousal (World Health Organization, 2018).

**Risk Factors for PTSD:**

- **Environmental:** severity of the trauma, temporal proximity, loss of loved ones.
- **Psychological:** tendency to self-blame, poor coping skills.
- **Social:** weak family and social support.

**2. Prevalence in the Algerian Context:**

Local research indicates that PTSD is not rare in Algerian society. Laaj & El Mahdi (2024) found that women victims of physical violence show severe PTSD symptoms. Cherif (2022) observed relatively high symptom rates among COVID-19 survivors, and Walhi (2025) confirmed that health traumas can also trigger PTSD among adolescents with diabetes.

Regarding the validity of measurement tools, a recent study by Sabah & Hammadi (2025) verified the psychometric properties of the PCL-5 scale in Algeria on a sample of cancer patients, confirming it as a valid and reliable instrument for current research.

**3. Theoretical Approaches Explaining Psychological Trauma:**

- **Cognitive Model (Ehlers & Clark, 2000):** Explains disorder persistence as resulting from misinterpretation of the event or its consequences, with avoidance of trauma thoughts preventing natural memory processing.
- **Dual Representation Theory of Memory (Brewin et al., 1996):** Distinguishes between consciously retrievable descriptive memories and sensory-contextual memories that appear intrusively.
- **Neurobiological Models (LeDoux et al., 2009):** Show amygdala hyperactivity, weakened regulation by the prefrontal cortex, and HPA axis dysregulation.

**Cognitive (Information Processing) Approach:**

Every psychological manifestation is a cognitive phenomenon. This information-processing theory assumes that a person can perceive danger and respond to defend or flee. Trauma occurs unexpectedly, disrupting cognitive structure, resulting in avoidance, re-experiencing, and impaired alertness to danger (Journal of Psychological and Educational Studies, Vol. 37, No. 1, November 2021).

**Biological Approach:**

Van der Klole (1984) noted that trauma disrupts brain and some bodily functions. Studies (Lazarus & Folkman, 1987) demonstrated that stress affects immune resistance, with weaker coping individuals showing lower vaccine responses and fewer natural defense cells. The psychoneuroimmunology field emerged from these brain–immune interactions, linking stress to mental and physical health (Ashraf Mohamed Chreit, 2002).

**Psychoanalytic Theory:**

Freud attributed PTSD to resurfacing childhood problems and the use of defense mechanisms to control anxiety, while external environmental stimuli reinforce or perpetuate the disorder. He neglected external context, focusing instead on pre-trauma personality (Sabrine, 2015, p. 15).

**4. Effective Treatments for PTSD:**

**Post-Trauma Therapy:**

Various cognitive-behavioral techniques are used for PTSD treatment, notably:

**EMDR Therapy (Shapiro, 2018):**

Global studies have shown the effectiveness of cognitive-behavioral therapy and exposure therapy for PTSD (Bisson et al., 2019). The EMDR protocol established by Shapiro (2018) has received extensive scientific support. In Algeria, Qalmin, Baraka, & Harizi (2021) applied it to a PTSD case, showing significant improvement after ten sessions, supporting broader local application.

**Stress Inoculation:**

A behavioral strategy to build PTSD treatment programs involving hierarchical organization of traumatic memories. Exposure is gradually increased to reduce anxiety through three phases:

- **Phase 1:** Relaxation training to prepare the individual for imagining the traumatic scene.
- **Phase 2:** Positive imagery training.
- **Phase 3:** Gradual exposure (systematic desensitization) using incremental confrontation with the stressor while maintaining physiological relaxation (Yaqub Ghassan, 1999, pp. 137–138).

**Flooding:**

The client is exposed to intense anxiety, either imaginatively or in reality, to extinguish the trauma response.

**Cognitive Restructuring:**

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Corrects causal misattributions, addressing beliefs that the patient is responsible for all suffering, used independently in individual therapy (Mohamed Al-Hajjar, 1999, p. 113).

**Systemic Family Therapy:**

Creates a context where the individual's story becomes collective, integrating family members to support the traumatized person and manage trauma consequences (Shadli Abdel Rahim, 2017, p. 180).

**Practical Aspect:**

**Method:**

A quasi-experimental method was selected, suitable for the study's aim and the case study, involving in-depth analysis of a specific social phenomenon (Abu Asaad & Al-Nouri, 2016, p. 22). It provides a comprehensive report with analytical, diagnostic, and interpretive information, plus recommendations (Metwally, 2016, p. 21).

**Study Tools:**

- **Observation:** A primary data collection tool, recording changes in behavior and personality in real-time (Mahmoud Mandouh Mohamed Salem, 2012, p. 80).
- **Semi-Structured Interview:** Follows a prepared guide with standardized instructions for consistency, allowing flexibility (Attia Latifa Kulthoum, 2013, p. 111).

**Therapeutic Protocol:**

EMDR protocol (Shapiro, 2018) was implemented with eight standard steps, integrating psychological exercises and relaxation over ten sessions (~90 minutes each), with careful monitoring of psychological progress and emotional state.

**Eight EMDR Steps (Shapiro, 2018):**

1. Psychological history and case assessment
2. Preparation and education
3. Targeting distressing memories
4. Assessment using SUD and VOC
5. Desensitization
6. Positive cognition installation
7. Body scan
8. Re-evaluation and follow-up

**Application:**

Ten sessions were conducted with relaxation exercises, homework, and periodic assessment using SUD, VOC, and PCL-5.

**PCL-5 Scale:**

A 20-item self-report tool measuring PTSD symptom severity per DSM-5, using a Likert scale from 0 (not at all) to 4 (extremely). Adapted to Arabic and validated in Algeria (Qandoz & Ben Rahma, 2021), showing good reliability (Cronbach's alpha 0.87–0.91).

**SUD – Subjective Units of Disturbance:**

Measures emotional distress (0 = no distress, 10 = extreme distress) (Shapiro, 2001):

- 0 = No distress (complete calm)
- 1–3 = Mild to moderate distress, tolerable
- 4–6 = Moderate to high distress (affects concentration)
- 7–9 = Very severe distress (possible emotional collapse)
- 10 = Maximum distress (extreme emotional catastrophe)

Application during the session: Before starting desensitization for each memory, the therapist asks the patient to estimate their current level of distress on the SUD scale; then during/after

bilateral stimulation cycles, the reading is repeated until the SUD reaches a low acceptable level (usually ≤ 2) or until its change stabilizes across consecutive rounds. This allows direct measurement of the session's effectiveness. (Shapiro, 2001).

- VOC — Validity of Cognition — is a "belief validity" scale (Validity of Cognition; VOC) that measures how true the alternative positive belief feels to the patient when recalled, i.e., the extent to which they feel the positive thought is "real" for them now. (Shapiro, 2001).

Format and scale: usually a scale from 1 to 7:

- o 1 = the positive belief seems completely false (I do not feel it at all)
- o 4 = the positive belief seems somewhat likely
- o 7 = I feel the positive belief is completely true and internally integrated

VOC is measured before starting the "installation" of the positive belief and then re-measured after bilateral stimulation cycles until it increases to a satisfactory level (usually 6–7). An increase in VOC indicates cognitive integration and acceptance of a strong alternative belief imposing itself on the mental representation. (Shapiro, 2001).

**Case Presentation:**

N.A., a 41-year-old man, married with a daughter, living in the outskirts of Mila province in a rural environment. He lives in the family home with his father, who suffers from a chronic illness preventing mobility, while his mother is deceased and he is the only son. He describes his childhood as good, and adolescence without notable problems.

One year before the interview, he experienced a traumatic event in the form of a sudden flood that led to his father's death and the collapse of a large part of the house. During the incident, he first managed to get his young daughter (4 years old) out safely, and when he returned to rescue his father, a part of the house collapsed, and his father died. Since then, he has been living with intense guilt, seeing himself as responsible for his father's death because he rescued his daughter first.

His condition evolved into social withdrawal; he preferred to stay alone, became emotionally distant from his wife, and started sleeping in a separate room. Moreover, he blamed his daughter and wife for his father's death, and feelings of hatred toward his daughter emerged. This was accompanied by recurrent nightmares in which his father reprimands him, affecting his sleep and family stability, and also reflected on his professional performance, where he became at risk of dismissal.

He consulted a specialist who prescribed a sleeping pill, but it was ineffective, and the symptoms persisted.

**Summary:**

- Personal data: N.A., 41 years old, married, has a daughter, lives in rural Mila.
- Family background: only son, mother deceased, lived with ill father.
- Traumatic event: flood leading to father's death and partial house collapse.
- Current suffering:
  - o Recurrent nightmares of father accusing him of murder.
  - o Self-blame and guilt.
  - o Social withdrawal.
  - o Deterioration of marital relationship (isolation, separate sleep, growing hatred toward daughter).
  - o Occupational dysfunction and risk of dismissal.
  - o Insomnia despite medication (sleeping pills).
- Pre-assessment tool: PTSD Checklist (PCL).

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- Result: 72, high severity.
- VOC and SUD as core measures in EMDR.

**Implementation of SUD and VOC in N.A.'s case:**

- Selection of the first central memory: image of father dead under debris.
- Initial measurements (before any treatment):
  o SUD for this memory = 9/10 (high distress)
  o VOC for alternative positive belief ("I did my best to protect my family") = 1/7 (does not believe it at all)
- Success criterion within session: reduce SUD to ≤2 and raise VOC to ≥6 for the targeted memory.
- Monitoring change: After each bilateral stimulation cycle, the patient describes mental imagery and provides a new SUD score; the therapist records VOC for the positive belief. This method allows cumulative measurement and provides an immediate view of results. (Shapiro, 2001).

**Diagnosis:**

**Clinical diagnosis:** Through clinical interviews and psychological assessment, it was evident that the patient experienced symptoms for more than 12 months negatively affecting various life domains, consistent with DSM-5 criteria for PTSD:

- Recurrent nightmares related to the traumatic event.
- Recurrent intrusive thoughts about the incident.
- Strong guilt associated with responsibility for father's death.
- Avoidance of talking about the incident or any reminders.
- Social withdrawal and emotional blunting.
- Hypervigilance and sleep disturbances.
- Dysfunction in family and work. (American Psychiatric Association, 2013)

**Differential diagnosis:** Analysis showed that symptoms (recurrent nightmares, rumination, self-blame, familial and occupational withdrawal, insomnia, functional impairment) matched PTSD rather than simple "traumatic neurosis." Prior to final diagnosis, distinctions were made between:

- Generalized Anxiety Disorder: characterized by persistent anxiety not tied to a specific event; here symptoms were directly related to the trauma.
- Major depression: presents as low mood and anhedonia, whereas central symptoms here were re-experiencing and avoidance.
- Traumatic Neurosis: an older term referring to post-traumatic neurotic responses, predominantly anxiety and somatic symptoms, sometimes considered part of PTSD (Bisson et al., 2019).
- Adjustment disorder: symptoms usually do not last more than 6 months post-event; this case exceeded one year.

**Theoretical and clinical distinction:**

- Simple psychological trauma: the event remains painful but symptoms do not reach disorder level.
- PTSD: includes recurrent intrusions and memories, avoidance, mood disturbance, hypervigilance, and clear social/occupational impairment.

Thus, the most appropriate diagnosis: PTSD with severe symptoms.

**EMDR treatment protocol for the case:**

As previously mentioned, the EMDR protocol (Shapiro, 2018) was adopted with eight standard phases, integrating psychological exercises and relaxation. Ten therapy sessions were planned,

each approximately 45 minutes, with careful monitoring of psychological progress and emotional state.

- Program duration: 10 sessions

**Application stages:**

1. History taking and therapeutic relationship building: gathering information about the trauma, symptoms, family context.
2. Preparation: training the patient in relaxation and deep breathing, creating a "safe place."
3. Assessment: identifying the most painful image (house collapse), negative thought ("I caused my father's death"), alternative positive thought ("I did my best to protect my family").
4. Desensitization: bilateral eye movements while recalling the incident and associated thoughts.
5. Cognitive installation: reinforcing the alternative positive belief.
6. Body scan: monitoring residual tension in the body and addressing it.
7. Closure: ensuring emotional stability after each session.
8. Re-evaluation: reviewing changes across sessions.

**Session Summary:**

1. Case evaluation and preparation (Sessions 1-2):

- Goals: gather information about the traumatic event, psychological history, social and occupational status.
- Explain EMDR, build trust, teach relaxation techniques.
- Identify distressing visual images and memories, assess via SUD and VOC: o SUD: 0–10 scale for psychological distress

o VOC: 1–7 scale for conviction in the new positive belief

- Initial assessment before treatment: SUD = 9/10, VOC = 2/7
- Homework: practice deep breathing and relaxation 10 minutes daily, record negative thoughts when they occur.

2. Target memory and belief identification (Sessions 2-3):

- Central traumatic event: father's death during flood.
- Negative belief: "I caused my father's death."
- Positive belief to install: "I did all I could to save everyone."
- Initial assessment: SUD = 9/10, VOC = 2/7
- Homework: write negative and positive beliefs, monitor associated feelings daily.

3. Desensitization and reprocessing (Sessions 3-8):

- Use bilateral eye movements for 20–40 seconds per cycle.
- Stages included: Desensitization, Installation, Body Scan.
- Monitoring SUD and VOC:

| Session | SUD | VOC |
|---|---|---|
| 3 | 7 | 3 |
| 4 | 5 | 4 |
| 5 | 4 | 5 |
| 6 | 3 | 5 |
| 7 | 2 | 6 |

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| Session | SUD | VOC |
|---|---|---|
| 8 | 1 | 7 |

- Homework: record any emergent traumatic memory, practice relaxation exercises, apply positive belief when facing trauma-related triggers.

4. Re-evaluation and integration (Sessions 9-10):

- Verify stability of positive belief.
- Re-test PCL-5: 22/80 (decrease from 63)
- Monitor SUD and VOC: SUD = 1, VOC = 7
- Discuss improvements in sleep, anxiety, family relationships.
- Final homework: continue relaxation exercises, record sudden memories, repeat positive belief to reinforce psychological integration.

**Benefits of exercises and relaxation:**

- Reduce psychological and physical stress.
- Improve focus and emotion regulation.
- Promote good sleep and prevent relapse.
- Support EMDR sessions by linking body and mind to positive beliefs.

**Clinical observations:**

- Technique gradually improved the patient's communication with wife and daughter.
- SUD and VOC results showed gradual, measurable improvement, reflecting protocol precision.
- Ten sessions were sufficient for a significant reduction in symptom severity per PCL-5.

**Pre- and post-treatment results (PCL-5, SUD, VOC):**

| Measure | Pre-Treatment | Post-Treatment | % Change |
|---|---|---|---|
| PCL-5 Total | 63/80 | 22/80 | 65% decrease |
| SUD | 9/10 | 1/10 | 89% decrease |
| VOC | 2/7 | 7/7 | 250% increase |

**Detailed analysis of results:**

- **Re-experiencing (B1–B5 PCL-5):** Before treatment: repeated memories, daily nightmares, guilt. After: reduced nightmares, less guilt, ability to discuss the event with minimal distress. Analysis: EMDR successfully desensitized traumatic memories, confirming effectiveness of Desensitization + Installation + Body Scan.
- **Avoidance (B6–B7):** Before: avoided discussion or visiting flood site, social withdrawal. After: decreased avoidance, gradual re-engagement with family and community. Analysis: positive belief integration and homework helped break avoidance pattern.
- **Negative alterations in cognition/mood (B8–B14):** Before: negative self-beliefs, loss of interest, emotional detachment. After: adoption of new positive belief, reduced hatred toward daughter, increased family engagement. Analysis: final EMDR stages + relaxation aided cognitive and emotional reorganization.
- **Hyperarousal (B15–B20):** Before: difficulty concentrating, hypervigilance, anger outbursts. After: improved sleep and focus, reduced sudden irritability. Analysis: EMDR effect on sympathetic nervous system, supported by relaxation exercises, reduced hyperarousal.

**Discussion and results analysis:**

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Clinically, results clearly reflect EMDR effectiveness. Its strength lies in combining cognitive reprocessing and emotional discharge via bilateral stimulation.

- Cognitive: patient shifted from negative central thought "I killed my father" to a more realistic, humane alternative "I did my best."
- Emotional: anxiety and guilt linked to traumatic image gradually diminished.
- Therapeutic relationship: listening and containment were pivotal; trust is essential for reprocessing.

Compared to previous studies, these results align with evidence recommending EMDR as first-line PTSD treatment. EMDR effectively reprocessed traumatic memory and reduced emotional charge, consistent with scientific literature showing faster and more effective results than some traditional approaches.

Results show significant reduction in all PTSD indicators, confirming EMDR's effectiveness in the Algerian local context, supported by Qalamin, Baraka, and Harizi (2021) and global studies (Shapiro, 2018; Bisson et al., 2019).

SUD and VOC proved important for accurately measuring emotional and cognitive improvement and monitoring progressive change. Increased VOC and decreased SUD indicate replacement of negative beliefs with coherent positive beliefs, key to EMDR success.

Relaxation exercises and homework reinforced between-session change, supported psychological integration of new beliefs, and continue post-treatment to maintain results and prevent relapse.

Psychological analysis showed improvement in social withdrawal and family interaction, markedly fewer daily nightmares, and relatively calm sleep. EMDR processed complex emotions like guilt and hatred, transforming them into positive beliefs.

Limitations include absence of a control group and single-case design, preventing generalization to all Algerian cases, and lack of long-term follow-up (>6 months) to confirm stability. Clinically, results are encouraging and support broader EMDR use, especially with natural disaster survivors.

**Discussion based on previous studies:**

- Chen, Zhang, Hu, Liang (2015) compared EMDR with CBT in adult PTSD patients, finding EMDR superior in reducing intrusions and hyperarousal; differences in avoidance were minor.
- Studies evaluating natural disaster victims (earthquakes, floods) show EMDR significantly reduces PTSD symptoms, anxiety, depression, and distress. Example: a group EMDR protocol post-Central Italy Earthquake in adolescents, three sessions, showed decreased Impact of Event Scale-Revised scores and SUD at follow-up.
- Large meta-analysis of 26 RCTs on EMDR in PTSD patients indicated significant symptom reduction (effect sizes ~g = -0.66) and decreased depression, anxiety, and distress.
- Although some studies show slight EMDR advantage over CBT, meta-analyses suggest differences may not always be significant, especially in long-term follow-up (>3 months), or differences may disappear over time.
- Studies on early EMDR intervention (within first 3 months post-trauma) show significant immediate benefits, but long-term outcomes are less stable, and some cases may respond partially or not at all.

Although some studies show a slight superiority of EMDR over CBT, a number of analyses indicate that the differences may not always be significant, especially in long-term follow-up

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(beyond three months), or that the differences disappear over time. For example, an analysis comparing EMDR and CBT found that the difference at three months post-treatment was not statistically significant in some studies.

Studies evaluating the effectiveness of EMDR when applied early (within the first three months after the trauma) show significant benefits in symptom reduction immediately after treatment and during limited follow-up (3 months), but performance may differ in the long term, and some cases may not respond fully or respond only partially. For example, a prospective analysis on "early EMDR intervention" showed benefits after treatment and a short period, but the remaining results over longer periods were not sufficiently stable.

The case we treated shows results almost identical to those reached by these studies: a significant reduction in symptoms, functional and occupational improvement, and marked cognitive-emotional change. The strengths of this case are that treatment was completed fully, and clear follow-up occurred after the eighth session, providing a tangible post-treatment measure. On the other hand, as the studies indicate, it should be noted that long-term follow-up is not available here (beyond several months or a year), and it is unknown whether the improvements will be maintained by the patient under ongoing life stressors. Additionally, the case is individual, meaning it is a clinical experiment—though important—insufficient for generalization to a larger population, especially in rural communities where cultural and social factors may play an additional role.

**Conclusion**

The case study shows that EMDR is highly effective in treating post-traumatic stress disorder (PTSD) resulting from natural disasters, and the ten sessions led to a sharp reduction in symptom severity (PCL-5), decreased psychological distress (SUD), and increased conviction in positive beliefs (VOC). It appears that integrating the eight stages of the protocol with relaxation exercises and homework helped reinforce psychological change. The study confirms the feasibility of applying EMDR in the Algerian context, with the necessity of training therapists in the protocol.

**Recommendations:**

- Conduct larger case studies in similar contexts (natural disasters, rural communities, similar cultures), with long-term follow-up (6–12 months).
- Study differences in response between those with strong guilt feelings and those without, as this factor appears very important in the presented case.
- Compare EMDR with focused cognitive-behavioral treatments or a combination of both in this type of case, to determine which is more effective based on personal characteristics (e.g., guilt thinking, emotional nature of the memory).
- Use objective assessments when possible, and document both physical and psychological changes.

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