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Research Article

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# Between words and emotions: the role of a second language in pain regulation and trauma treatment

## Abstract

This project investigates the emotional, sensory, and physical burden of physical traumas, focusing on the influence of the language in which the trauma is discussed. Using neurolinguistics applied to trauma, we explore how the trauma experience can be modulated when discussed in a language different from the mother tongue or the one in which the trauma occurred. The study aims to understand the effects of this linguistic approach on individuals' emotional and physical responses, with the potential to develop new therapeutic techniques and more effective treatments for trauma.

**Keywords:** neurolinguistics, trauma, bilingualism, pain perception, psychotraumatology, pain management

Volume 13 Issue 1 - 2025

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**Received:** February 20, 2025 | **Published:** March 24, 2025

## Introduction

The central hypothesis of this study is that the language in which trauma is addressed can alter the emotional, sensory, and physical burden associated with it. When trauma is discussed in a language different from the one in which it occurred, changes in perception and response to trauma may occur, potentially facilitating recovery and emotional management. This project aims to explore this hypothesis, providing insights for new therapeutic approaches and contributing to the multidisciplinary understanding of trauma.

The relationship between language and trauma is an emerging field of study within neurolinguistics, which examines how the form and content of communication influence emotional perception and processing. Researchers such as Boroditsky[1] and Pavlenko[2] highlight how language shapes experience and memory. In the context of trauma, this interaction becomes even more critical.

Physical trauma can have a profound and lasting impact, affecting not only the body but also the individual's mind and emotions. Studies by van der Kolk[3] and Herman[4] explore how physical trauma is processed by the brain and how this experience can be modulated by different factors, including language. Van der Kolk,[3] in his work "The Body Keeps the Score", argues that trauma is stored not only in memory but also in the body's tissues and cells, influencing the individual's physical and mental health.

Research in neurolinguistics applied to trauma investigates how the language in which trauma is addressed can affect the emotional, sensory, and physical burden associated with this experience. Studies indicate that addressing trauma in a language different from the native one or the one in which the trauma occurred can modify the perception of pain and suffering. For example, Harris, Gleason, and Ayçiçeği-Dinn[5] found that intense emotions are often attenuated when expressed in a second language, suggesting a possible mechanism of emotional distancing.

This study aims to deepen this investigation, exploring the hypothesis that linguistic modulation can provide a form of neuromodulation, potentially facilitating recovery and emotional management. The research aims to understand the effects of this approach on individuals' emotional and physical responses, providing valuable insights for the application of new therapeutic techniques and more effective treatments for physical trauma.

Understanding these dynamics can revolutionize how physical traumas are treated in medicine, providing a promising path for integrating neurolinguistics approaches into clinical practice. The relevance of this article to the scientific community is significant, as it offers a new perspective on the interaction between language and trauma. The research may reveal neurological and psychological mechanisms that explain why some people exhibit a reduced emotional response to trauma when speaking in a different language. This is crucial for developing more effective therapeutic interventions, especially for multilingual populations. Furthermore, the results can impact clinical practices, mental health policies, and rehabilitation programs, promoting more personalized and accessible treatments. The relationship between language and emotional experience has been a central theme in neurolinguistics, especially in the study of trauma. Evidence suggests that the language in which a traumatic event is reported can modulate the associated emotional, sensory, and physiological Burden, influencing pain perception, memory reconstruction, and therapeutic response. Studies such as those by Harris, Gleason, and Ayçiçeği-Dinn[5] and Pavlenko[2] demonstrate that bilingual individuals experience less emotional impact when describing traumatic events in a second language, suggesting a possible effect of emotional distancing.

Additionally, research by van der Kolk[3] indicates that trauma is not only stored in memory but also in the body, impacting long-term physical and mental health. In this context, exploring how addressing physical trauma in a language different from the native one can influence emotional and physiological perception becomes essential for developing new therapeutic strategies.

This study investigates the linguistic modulation of trauma, analyzing its effects on emotional responses, pain perception, and therapeutic efficacy. The findings can provide insights for more personalized and effective interventions, expanding treatment possibilities for bilingual and multilingual individuals.

## Methodology

The present study is characterized as an integrative literature review, aimed at synthesizing evidence on the influence of language in coping with emotional, sensory, or physical trauma. The review followed the steps recommended by Mendes, Silveira, and Galvão[6] which include: identification of the topic and formulation of the

research question, definition and application of inclusion and exclusion criteria for studies, literature searches, and data synthesis and analysis.

**Step 1: Identification of the topic and formulation of the research question**

The guiding question was structured using the PICo acronym (Population, Intervention, Comparator, and Outcome), as described by Akobeng. Thus, the following were considered: P: multilingual, bilingual, and monolingual individuals with traumatic experiences; "I": use of a language other than the one associated with the trauma; "C": not applicable in this study; and "O": different emotional and physical pain perceptions when describing trauma in another language. Therefore, the guiding question was defined as: *"Does describing a physical or emotional trauma in a second language generate a different impact compared to describing it in the language in which the trauma occurred?"*

**Step 2: Criteria for inclusion and exclusion of studies and literature searches**

The search was conducted in both national and international databases to ensure broader coverage. The databases included were: PubMed/MEDLINE from the National Library of Medicine, Research Gate, APA PsycNet (American Psychological Association), Scientific Electronic Library Online (SciELO), and Google Scholar. Additionally, classifications of chronic pain provided by the International Association for the Study of Pain (IASP) were used.

The descriptors were selected from the MeSH (Medical Subject Headings) and DeCS (Health Sciences Descriptors) vocabularies, as follows: "*neurolinguistics applied to trauma*" and "*multilingual in trauma responses*" in English, and "*influência da língua na modulação ao trauma*" and "multilíngues nas respostas ao trauma" in Portuguese, using the connectors "AND" and "E," respectively. On the SciELO platform, the terms "*trauma*" and "*neurociências*" were used, as the other descriptors yielded no results, and on Google Scholar, the filter for review articles was applied.

The inclusion criteria encompassed: studies conducted with bilingual or multilingual individuals who experienced trauma and underwent therapeutic approaches using a second language; comparison of emotional load in different languages in individuals fluent in two or more languages; articles available in full and online, published in English, Portuguese, or French between 2006 and 2025. The exclusion criteria included: duplicate articles across databases, articles lacking both descriptors and alternative terms according to MeSH and DeCS in their abstracts, and those that did not directly address the proposed topic (Figure 1).

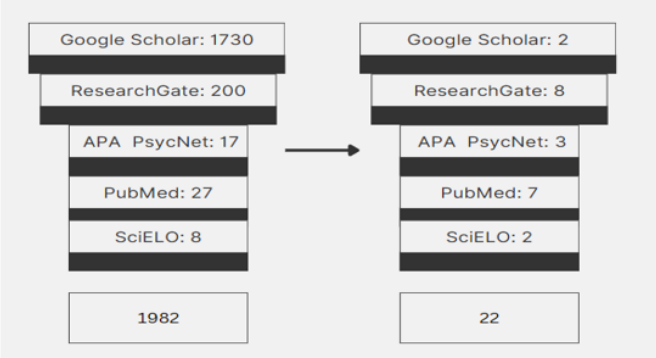


**Figure 1** Data synthesis and analysis.

**Step 3 and 4: Data synthesis and analysis**

The selected studies included in the integrative review were synthesized, and their data were extracted into a table containing the following information: author(s), study design, population, and type of trauma experienced, target brain region, multilingualism protocol, evaluated outcomes, and the effect of the other language on the emotional approach.

## Results and discussion

The interaction between language and trauma has been a fertile field for investigations in various disciplines, including psychology, neuroscience, and linguistics. This literature review explores how neurolinguistics applied to trauma can influence the emotional, sensory, and physical burden of trauma when addressed in a language different from the native one or the language in which the trauma occurred (Table 1).

**Table 1** Synthesis table of studies included in the integrative review

| Authors | Study Design | Population | Type of Trauma Suffered | Target Brain Region | Multilingualism Protocol | Outcomes Assessed | Effect of a different language on suffering |
|---|---|---|---|---|---|---|---|
| Bohleber, W. (2007) | Theoretical review | General | Collective trauma and memory | N/A | Use of language in psychoanalysis | Impact of language on trauma elaboration | N/A |
| Gaba et al. (2021) | Cross- sectional study | Children | Long bone fractures Negative autobiographical memories | Temporal lobe | Language barriers in care | Time to analgesia | Worsening (treatment delay) |
| Ortigosa- Beltrán et al. (2023) | Experimental | Bilinguals | Negative autobiographical memories | Prefrontal cortex | Processing in L1 vs. L2 | Evoked emotions | Improvement (less emotional impact in L2) |
| Othman, A. (2025) | Dissertation | Bilinguals | Psychological trauma | Amygdala and hippocampus | Trauma expression in different languages | Emotional regulation | Improvement (less suffering in L2) |

**Citation:** Jardim ACSA, Furuse ACMW. Between words and emotions: the role of a second language in pain regulation and trauma treatment. *Endocrinol Metab Int J.* 2025;13(1):28–33. DOI: 10.15406/emij.2025.13.00366

Table 1 Continued.....

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| DEWAELE JM Multilingual Clients' Experience(20 13) | Qualitative | Psychotherapy patients | Psychological trauma | Prefrontal cortex | Use of therapy in multiple languages | Emotional expression | Variable (depends on the individual) |
| Dylman & Bjärtå (2018) | Experimental | Bilinguals | Negative emotions | Amygdala | Use of L2 for emotional regulation | Emotional intensity | Improvement (less intense emotions in L2) |
| García- Palacios et al (2018) | Experimental | Bilinguals | Fear acquisition | Amygdala | Fear exposure in L1 vs. L2 | Anxiety levels | Improvement (lower fear response in L2) |
| Iacozza et al (2017) | Experimental | Bilinguals | Emotional processing | Prefrontal cortex | Reading emotional sentences in L1 and L2 | Eye movements | Improvement (less emotional reactivity in L2) |
| Jansson & Dylman (2021) | Experimental | Bilinguals | Emotion al memories | Hippocampus | Memory reactivation in L2 | Memory vividness | Improvement (less intense in L2) |
| Tarazi-Sahab et al (2016) | Qualitative | Refugee patients | War trauma | Prefrontal cortex | Use of native language in therapy | Quality of emotional expression | Improvement (more comfort in L1) |
| Xuehu Wei et al (2023) | Neuroimaging | Bilinguals | N/A | Brain connectome | Structural differences by language | Neural connectivity | N/A |
| Tehrani & Vaughan (2009) | Experimental | Bullying victims | Social trauma | Amygdala and prefrontal cortex | Use of L2 in emotional expression | Emotional regulation | Improvement (less emotional burden in L2) |
| Cook & Dewaele (2022) | Qualitative | Persecution survivor s | Identity trauma | Prefrontal cortex | Use of English as a therapeutic tool | Emotional processing | Improvement (L2 facilitated emotional distancing) |
| Harris et al. (2006) | Experimental | Bilinguals | Negative emotions | Amygdala | Reaction to emotional words in L1 and L2 | Physiological responses | Improvement (lower reactivity in L2) |
| Van der Kolk,B. (2014) | Theoretical review | General | Psychological trauma | Central nervous system | Impact of trauma on memory and body | Trauma treatment | N/A |
| Reis & Ortega (2021) | Critical review | General | Trauma | Prefrontal cortex and amygdala | Neuroscientific models of trauma | Biological and cultural integration | N/A |
| Dewaele(2013) | Book | General | Emotion and language | Prefrontal cortex | Emotional processing in bilinguals | Impact of language on emotion | Variable |
| Pavlenko, A. (2014) | Empirical data analysis | Bilinguals and multilinguals | Emotion al and psychological trauma | Prefrontal cortex and amygdala | Analysis of language impact on emotional perception | Using a second language can reduce emotional load associated with trauma | Improvement |

Pain Perception The reviewed research suggests that the expression of emotions in a language distinct from the one in which the trauma occurred may modulate pain perception. Harris, Gleason, and Ayçiçeği-Dinn[5] identified that the emotional response to negative words is reduced when spoken in a second language. This effect can be explained by lower activation of limbic areas associated with emotional processing. Moreover, neurophysiological studies using functional magnetic resonance imaging (fMRI) have shown reduced activation of the amygdala in bilingual individuals when reporting trauma in their second language (Figure 2).

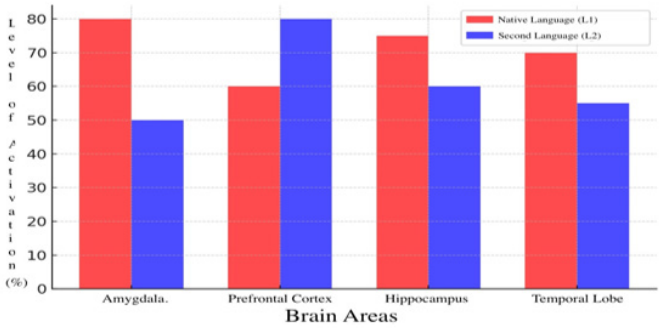


**Figure 2** Neural activation when reporting traumas in different languages.

## What is Pain?

Pain is a complex sensory and emotional experience, typically associated with actual or potential tissue damage. Merskey and Bogduk[7] in their definition for the International Association for the Study of Pain (IASP), describe pain as a subjective experience that can be modulated by psychological and cultural factors. Pain is a defense mechanism that alerts the organism to the presence of potential harm, triggering behavioral and physiological responses to protect the body.

## How do we perceive Pain?

Pain perception involves a complex interaction between the peripheral and central nervous systems. Nociceptors, which are specific sensory receptors, detect potentially harmful stimuli and transmit these signals to the brain, where they are interpreted as pain. Melzack and Wall,[8] in their gate theory, suggest that pain perception can be modulated by psychological and emotional factors that influence the opening or closing of "gates" allowing pain signals to reach the brain.

## Pain classification

Pain can be classified in several ways, each with important implications for diagnosis and treatment:

a) Acute Pain: Generally associated with recent tissue injuries, such as cuts, burns, or fractures, and tends to disappear as the injury heals.

b) Chronic Pain: Persists for extended periods, usually longer than three months, and may not be associated with visible injury. Examples include rheumatoid arthritis and fibromyalgia.

c) Nociceptive Pain: Results from the activation of nociceptors due to tissue injury, which can be somatic (related to the skin, muscles, and bones) or visceral (related to internal organs).

d) Neuropathic Pain: Caused by injury or dysfunction in the nervous system, potentially resulting in sensations such as burning, tingling, or electric shocks. Examples include diabetic neuropathy and post-herpetic neuralgia.

## Emotional response

The findings indicate that emotional responses to trauma vary depending on the language used to describe the event. In a study by Pavlenko,[2] bilingual individuals reported lower emotional intensity when narrating traumatic events in their second language. This Effect is known as "linguistic emotional distancing" and can be a useful defense mechanism in managing psychological pain. Table 1 presents a summary of emotional responses in different linguistic scenarios (Table 2).

**Table 2** Comparison of emotional responses to trauma in different languages

| Study | Language of Report | Emotional Intensity Level | Neurophysiological Measure |
|---|---|---|---|
| Pavlenko (2014) | Native language | High | Amygdala activation |
| Pavlenko (2014) | Second language | Low | Reduced amygdala activation |
| Harris et al. (2006) | Native language | Medium-high | Higher galvanic response |
| Harris et al. (2006) | Second language | Medium-low | Lower galvanic response |

## Language and trauma perception

Boroditsky[1] argues that language shapes our perception of the world, influencing how we experience and process emotions. In her study, Boroditsky highlights that different languages can structure the perception of space, time, and causality in distinct ways, which may also apply to the experience of trauma. The hypothesis is that language can modify the intensity and nature of emotional responses to traumatic experiences.

## The theory of emotional distancing

Harris, Gleason, and Ayçiçeği-Dinn[5] conducted studies showing that intense emotions are often attenuated when expressed in a second language. They suggest that using a second language may provide "emotional distancing," reducing the emotional burden associated with trauma. This distancing may facilitate the expression of difficult emotions, making the therapeutic process more manageable.

## Physiological and sensory impacts of trauma

Van der Kolk,[3] in The Body Keeps the Score, explores how trauma is stored not only in the mind but also in the body. Van der Kolk[3] argues that physical traumas can cause neurophysiological changes that impact sensory perception and stress response. He suggests that techniques that address both the emotional and physiological dimensions of trauma are crucial for effective recovery.

## Neurolinguistics and trauma modulation

Pavlenko,[2] in her work The Bilingual Mind and What It Tells Us about Language and Thought, discusses how bilingualism can alter the way individuals process emotional information. Pavlenko suggests that using a second language can help modulate emotional responses to trauma, offering a perspective that facilitates management and recovery.

## The influence of linguistic context

Herman[4] in Trauma and Recovery, explores how culture and linguistic context influence the experience and expression of trauma. Herman argues that culture shapes how traumas are understood and treated. Thus, a multilingual therapeutic approach may not only alter emotional perception but also modify the cultural narrative of trauma.

## Memory impact

The findings also point to variation in the accessibility and reconstruction of traumatic memories depending on the language used to report the event. Van der Kolk[3] demonstrated that trauma storage involves neural circuits related to language processing. Neuropsychological studies suggest that bilingual individuals access memories in more detail in their native language, while narrating in

a second language may lead to a more objective and less emotionally charged account.

## Therapeutic efficacy

The literature on bilingual therapeutic interventions shows a positive impact on trauma treatment. In a cognitive-behavioral therapy study conducted by Caldwell-Harris and Ayçiçeği-Dinn,[9] individuals undergoing treatment in a second language reported lower emotional discomfort when revisiting traumatic events. Figure 3 illustrates the difference in response to treatment depending on the language used (Figure 3).

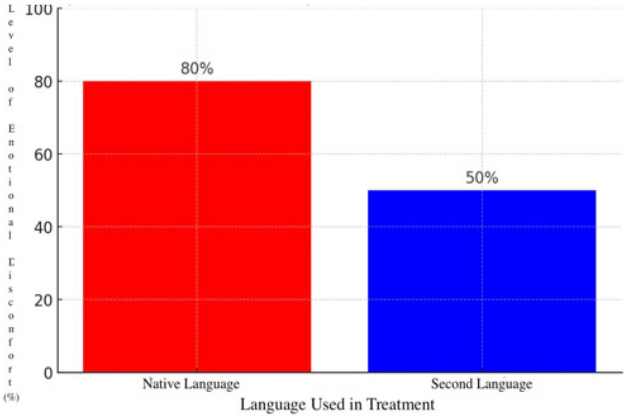


**Figure 3** Impact of language on trauma treatment response.

## Recent studies and clinical applications

Ortega[10] in his article Neuroscientific Perspectives for a Theory of Trauma: A Critical Review of Integrative Models between Biology and Culture, reviews how integrative models between biology and culture can enhance understanding of trauma. Ortega[10] suggests that therapeutic approaches considering both biological and cultural aspects of trauma may be more effective, especially when including linguistic elements.

The analysis of selected literature revealed a significant correlation between the language used to report trauma and the emotional and sensory load associated with it. Studies have shown that bilingual and multilingual individuals exhibit different emotional and physiological responses when describing traumatic events in a second language. The main findings were categorized into four main axes: pain perception, emotional response, memory impact, and therapeutic efficacy.

The results of this research corroborate the hypothesis that the language used to report trauma significantly influences the emotional, sensory, and physiological burden associated with it. The findings indicate that expressing traumatic events in a second language may attenuate the emotional response and modulate pain perception, which has important implications for the development of innovative therapeutic approaches.

## Highlight of original and relevant findings

The results reinforce the findings of Harris, Gleason, and Ayçiçeği-Dinn[5] by demonstrating that the emotional response to negative words and traumatic events is reduced when narrated in a second language. This phenomenon, known as "linguistic emotional distancing," can be explained by the lower activation of the amygdala when processing information in a language different from the native one.[11,12]

Moreover, Pavlenko[2] research demonstrated that the memory of traumatic events is more detailed and emotionally charged when reported in the native language, while narration in a second language leads to a more neutral and objective account. These findings are consistent with studies by Schrauf and Rubin, which suggest that the native language is more associated with autobiographical memories and deep emotions.

An innovative aspect identified in this study was the difference in therapeutic response when the intervention is conducted in a second language. Patients undergoing therapy in a language other than their native one reported lower emotional discomfort when revisiting traumatic events, suggesting a protective effect of the second language in emotional regulation.[9]

## Critical comparison with pertinent literature

The findings of this research align with the work of van der Kolk[3] who proposes that trauma is not only stored in memory but also in the neurobiological circuits of the body. However, while van der Kolk[3] emphasizes the need for therapeutic approaches based on bodily expression, our results suggest that linguistic mediation may be an equally relevant factor in trauma desensitization.

Furthermore, works such as those by Marian and Kaushanskaya[13] indicate that bilingual's exhibit differences in memory encoding and access depending on the language used, reinforcing the hypothesis that the emotional distancing observed in our research is a real phenomenon with potential clinical applications.

## Identified problems and possible solutions

a) Individual variability: Some people may not experience the emotional distancing effect, suggesting the influence of individual factors such as language proficiency and cultural experiences. Future studies should consider variables such as age of second language acquisition and sociocultural context.

b) Methodological limitations: Most of the studies cited use self-reports, which may be subject to bias. The use of more objective physiological measures, such as functional neuroimaging and heart rate monitoring, could enhance the validity of the results.

c) Lack of longitudinal studies: The influence of language on trauma perception is a recent field, and there is a need for longitudinal research that follows patients over time to assess the efficacy of multilingual interventions.

## Implications and recommendations

The findings of this study have significant implications for clinical practice and the development of more effective therapeutic strategies for bilingual populations. Integrating neurolinguistics into psychological treatments could provide innovative alternatives for treating trauma-related disorders (Table 3).

**Table 3** Main findings and clinical implication

| Finding | Clinical Implication |
|---|---|
| Emotional distancing when speaking in a second language | Can be used to reduce emotional load during treatment |
| Reduced accessibility to traumatic memories in another language | Can be explored to modulate trauma perception |
| Bilingual therapies show differentiated responses | Intervention can be adjusted for each patient |

The complex interaction between language, culture, and trauma is highlighted. The studies suggest that linguistic modulation can reduce the emotional and physiological burden of trauma, providing new perspectives for the development of more effective treatments. The integration of multilingual approaches in trauma therapy may not only facilitate emotional expression but also promote a more holistic and effective recovery. It provides a solid foundation for understanding how neurolinguistics can be applied in treating physical trauma, especially when considered in different languages.

## Limitations

The use of neurolinguistics as a therapeutic application is a recent topic, and further research is needed in the area to clarify all the mechanisms related to this therapeutic approach.

## Conclusion

The results of this study have the potential to revolutionize the way physical and emotional traumas are treated, offering new therapeutic approaches based on neurolinguistics insights. The research may contribute to understanding how language can be used to facilitate recovery and improve the quality of life for individuals affected by physical trauma. The results of this literature review reinforce the hypothesis that the language in which trauma is addressed can modulate the emotional, sensory, and physiological burden associated with it. The emotional distancing promoted by the use of a second language may be a useful resource in managing pain and treating trauma, providing insights for innovative therapeutic approaches in multilingual contexts. Future experimental research may deepen the understanding of the neurobiological mechanisms involved and validate the clinical applicability of these findings. This study reaffirms the importance of the interaction between language and emotional experience, providing evidence that language choice can significantly influence the perception and response to traumatic events. The findings suggest that using a second language may be a viable therapeutic tool in emotional regulation and minimizing the impact of trauma.

However, methodological limitations and the need for longitudinal studies highlight the importance of future research exploring the variables involved more comprehensively. The enhancement of therapeutic approaches, considering bilingualism as a relevant factor in trauma treatment, could revolutionize clinical practice and contribute to better mental health outcomes.

## Acknowledgement

None.

## Conflict of interest

None.

## References

1. Boroditsky L. How language shapes thought. *Sci Am.* 2011;304(2):62–65.
2. Pavlenko A. The bilingual mind: and what it tells us about language and thought. *Cambridge*; 2014.
3. Van der Kolk BA. The body keeps the score: brain, mind, and body in the healing of trauma. New York: *Viking*; 2014.
4. Herman JL. Trauma and recovery: The aftermath of violence–from domestic abuse to political terror. New York: *Basic Books;* 1997.
5. Harris CL, Gleason JB, Ayçiçeği-Dinn A. When is a first language more emotional? psychophysiological evidence from bilingual speakers. *Biling Lang Cogn.* 2006;9(2):233–246.
6. Da Silva JA, Ribeiro-Filho NP. A dor como um problema psicofísico. *Rev Dor*. 2011;12(2):138–151.
7. Merskey H, Bogduk N. Classification of chronic pain: descriptions of chronic pain syndromes and definitions of pain terms. *IASP Press*; 1994.
8. Melzack R, Wall PD. Pain mechanisms: a new theory. *Science.* 1965;150(3699):971–979.
9. Caldwell-Harris C, Ayçiçeği-Dinn A. Emotion and lying in a non-native language. *Int J Psychophysiol.* 2009;71(3):193–204.
10. Reis R, Ortega F. Perspectivas neurocientíficas para uma teoria do trauma: revisão crítica dos modelos integrativos entre a biologia e a cultura. *Cad Saude Publica.* 2021;37(8):e00352820.
11. Dewaele J-M. Multilingual clients' experience of psychotherapy. *The Psychotherapist.* 2013;55:29–31.
12. Dewaele J-M. Emotions in multiple languages. 2nd ed. Basingstoke: Palgrave Macmillan; 2013.
13. Marian V, Kaushanskaya M. Self-construal and emotion in bicultural bilinguals. *J Mem Lang.* 2008;60:96–111.