

Neuropsychological Factors in Batterers

Pedro V. Mateo-Fernández ^{1,2,4*}, Iria Osa-Subtil ^{2,3,4}

¹Mental Health Research Group (MHeRG). Faculty of Biomedical and Health Sciences, Alfonso X el Sabio University, Madrid.

²Legal and Forensic Psychology Research Group. Department of Psychology. Faculty of Biomedical and Health Sciences, Universidad Europea de Madrid.

³Department of Medicine. Faculty of Biomedical and Health Sciences, Universidad Europea de Madrid.

⁴Department of Personality, Assessment and Clinical Psychology. Faculty of Psychology, Universidad Complutense de Madrid.

***Corresponding Author:** Pedro V. Mateo-Fernández, Department of Chemistry, Faculty of Science, University of Zabol, Zabol, Iran.

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Abstract:

This study examines the neuropsychological factors associated with batterers in the context of gender-based violence, providing a comprehensive view of the cognitive and emotional dysfunctions that may contribute to violent behavior. Through a comprehensive review of recent literature, consistent patterns of impairments in executive functions, inhibitory control, emotional processing, and brain connectivity in batterers are identified. The findings reveal significant deficits in cognitive flexibility, planning, decision making, and emotion recognition, especially fear and sadness. In addition, abnormal patterns of connectivity between brain regions involved in emotional regulation and behavioral control are observed. The study highlights the interaction between neurobiological and psychosocial factors in the manifestation of violence, underlining the complexity of the phenomenon. The implications of these findings for the understanding of the neurobiological basis of gender-based violence, its repercussions in legal and forensic contexts, and the development of specific interventions are discussed. Finally, recommendations for future research are proposed, including the need for longitudinal studies, translational research, and the development of specific assessment tools. This work contributes to a deeper understanding of the neuropsychological mechanisms underlying gender-based violence, informing both clinical practice and public policy in this area.

Key words: neuropsychology; gender violence; batterers; executive functions; emotional processing; clinical intervention

1. Introduction

Gender-based violence is a major social problem that affects millions of women worldwide. This phenomenon, rooted in historical inequalities and unbalanced power relations between men and women, has devastating consequences not only for the direct victims, but for society as a whole (Macias-Bowen & Macias-Bowen, 2022; Sepúlveda, 2012). In Spain, since 2003, more than 1074 women have been murdered by their partners or ex-partners, evidencing the seriousness and persistence of this problem (Delegación del Gobierno contra la Violencia de Género, 2023).

Gender-based violence manifests itself in various forms, including physical, psychological, sexual and economic violence. These manifestations are not isolated events, but part of a systematic pattern of control and domination exercised by the aggressor over the victim (Krug et al., 2002). The complexity of this phenomenon requires a

multidisciplinary approach that includes psychological, social, legal and, increasingly, neuropsychological perspectives.

In this context, the neuropsychological study of batterers emerges as a promising field of research to better understand the mechanisms underlying violent behavior. Neuropsychology, by examining the relationship between brain functioning and behavior, offers a unique perspective to analyze the factors that may contribute to the perpetration of gender-based violence (Pinto et al., 2010). The importance of the neuropsychological study in batterers lies in several aspects:

- ✓ Identification of cognitive and emotional patterns: Neuropsychological assessment can detect deficits in executive functions, impulse control and emotional processing that may be

- associated with violent behavior (Romero-Martínez & Moya-Albiol, 2013).
- ✓ **Development of more effective interventions:** Knowledge of the neuropsychological factors involved in gender-based violence can inform the design of more targeted and effective treatment and rehabilitation programs (Martínez et al., 2016).
- ✓ **Improved risk assessment:** Understanding the neuropsychological profiles of batterers can contribute to improved recidivism risk assessment protocols (Carbajosa et al., 2014).
- ✓ **Prevention:** The study of neuropsychological factors associated with gender-based violence can help identify early indicators and develop more effective prevention strategies (Corvo & Johnson, 2013).
- ✓ **Legal and forensic implications:** Neuropsychological findings may have relevance in legal contexts, informing decisions about imputability and protective measures (Verdejo-García & Bechara, 2009).

Research in this field does not seek to justify or excuse violent behavior, but rather to provide a more complete understanding of the factors that contribute to its occurrence and maintenance. This knowledge is essential to develop more effective strategies for prevention, intervention and victim protection.

2. Theoretical Framework

Definition of neuropsychological factors

Neuropsychological factors refer to aspects of brain functioning that influence behavior, cognition and emotions. These factors include processes such as attention, memory, executive functions, emotional processing and impulse control. In the context of gender-based violence, the most relevant neuropsychological factors are those related to emotional regulation, decision making, empathy and inhibitory control.

Previous studies on neuropsychological dysfunctions in batterers

Research on neuropsychological dysfunctions in batterers has experienced significant growth in recent decades. Several studies have identified patterns of alteration in different cognitive and emotional domains:

- ✓ **Executive functions:** Romero-Martínez et al. (2019) found that batterers presented deficits in cognitive flexibility and planning, which could contribute to rigidity of thought and difficulty in generating alternative solutions to conflicts.
- ✓ **Inhibitory control:** A study by Bueso-Izquierdo et al. (2016) revealed that men convicted of gender-based violence showed worse performance on response inhibition tasks compared to control groups.
- ✓ **Emotional processing:** Babcock et al. (2008) observed alterations in the recognition of emotional facial expressions in abusers, especially for negative emotions such as fear and sadness.
- ✓ **Empathy:** A meta-analysis by Marsh and Blair (2008) found a consistent association between antisocial behavior and deficits in the recognition of fearful expressions, which could be related to lower empathic ability.

- ✓ **Decision-making:** Verdejo-García et al. (2007) identified disadvantageous decision-making patterns in individuals with a history of violence, similar to those observed in patients with lesions in the ventromedial prefrontal cortex.

These findings suggest that batterers may present a neuropsychological profile characterized by alterations in multiple domains, which could contribute to the manifestation and maintenance of violent behavior.

Relationship between neuropsychology and violent behavior

The relationship between neuropsychological factors and violent behavior in the context of gender-based violence is complex and multifaceted. Several theoretical models have been proposed to explain this relationship:

- ✓ **Executive dysfunction model:** This model suggests that deficits in executive functions, particularly inhibitory control and emotional regulation, may increase the likelihood of aggressive responses to conflict situations.
- ✓ **Neuropsychological vulnerability hypothesis:** Proposes that certain neuropsychological alterations may act as vulnerability factors that, in interaction with environmental and psychosocial factors, increase the risk of violent behavior.
- ✓ **Moral disconnection theory:** Bandura (2002) proposed that moral disconnection mechanisms, which may be related to alterations in emotional processing and empathy, facilitate the justification and perpetration of violent acts.
- ✓ **Neurobiological model of aggression:** Blair (2004) suggested that reactive and instrumental violence may be associated with different patterns of neurobiological dysfunction, involving structures such as the amygdala and prefrontal cortex.

Integration of these models with empirical findings suggests that neuropsychological alterations may contribute to violent behavior through multiple mechanisms:

- ✓ Difficulties in emotional regulation and impulse control can lead to aggressive responses to frustration or conflict.
- ✓ Deficits in empathy and emotional processing may reduce the ability to understand and respond appropriately to a partner's emotional state.
- ✓ Alterations in decision-making may result in the choice of inappropriate or violent conflict resolution strategies.
- ✓ Problems in cognitive flexibility may contribute to rigid patterns of thinking and behavior, making it difficult to change violent attitudes and behaviors.

It is important to note that these neuropsychological factors do not operate in isolation, but interact with psychosocial, cultural and environmental variables in the genesis and maintenance of gender-based violence. Understanding these interactions is critical to developing more effective interventions and comprehensive prevention strategies.

3. Neuropsychological Factors Associated with Batterers

Dysfunctions in the prefrontal cortex

The prefrontal cortex plays a fundamental role in the regulation of social behavior and impulse control. In batterers, significant alterations have been observed in this brain region. Neuroimaging studies have revealed a reduction in gray matter volume in the prefrontal cortex of intimate partner-violent men (Bueso-Izquierdo et al., 2016). This decrease is associated with deficits in executive functions such as planning, decision making, and inhibition of inappropriate responses.

Romero-Martínez et al. (2019) found that batterers presented worse performance in tasks that assess cognitive flexibility and mental set shifting ability, functions associated with the dorsolateral prefrontal cortex. These deficits could explain cognitive rigidity and difficulty in generating alternative solutions to conflicts, characteristics frequently observed in batterers.

In addition, the orbitofrontal cortex, involved in emotional processing and reward-based decision making, also shows alterations in batterers. A study by Verdejo-García et al. (2007) revealed that individuals with a history of violence presented disadvantageous decision-making patterns, similar to those observed in patients with lesions in this brain region.

Alterations in the limbic system

The limbic system, composed of structures such as the amygdala, hippocampus and cingulate gyrus, is crucial for emotional processing and the regulation of aggressive behavior. Structural and functional abnormalities in these regions have been identified in batterers.

The amygdala, in particular, has been the subject of numerous studies due to its role in emotion recognition and fear response. Babcock et al. (2008) observed that batterers showed deficits in the recognition of fear and sadness facial expressions, which could be related to a lower activation of the amygdala to these emotional stimuli.

On the other hand, the hippocampus, a structure involved in memory and emotional learning, is also altered in perpetrators. A neuroimaging study by Dolan et al. (2002) found a reduction in hippocampal volume in individuals with antisocial personality disorder and a history of violence. This decrease could affect the ability to learn from past experiences and modulate emotional responses based on context.

The cingulate gyrus, involved in emotional regulation and empathy, also shows abnormal activation patterns in batterers. Lee et al. (2009) observed a lower activation of the anterior cingulate in violent men during emotional processing tasks, which could explain their difficulty to empathize with their partners' suffering.

Impulsivity and impulse control

Impulsivity and poor impulse control are frequent characteristics of abusers, and are closely related to the dysfunctions in the prefrontal cortex and limbic system mentioned above.

A study by Siever (2008) suggests that impulsivity in aggressors is associated with hypoactivation of the prefrontal cortex and hyperactivation of subcortical structures such as the amygdala. This imbalance results in a reduced ability to inhibit aggressive responses to provocative stimuli.

In addition, research by Romero-Martínez et al. (2013) revealed that batterers presented higher levels of impulsivity and sensation seeking, correlated with worse performance in inhibitory control tasks. These

findings suggest that difficulty in impulse control could be a key neuropsychological factor in the perpetration of gender-based violence.

4. Neuropsychological Assessment in Forensic Psychology

Evaluation methods and tools

Neuropsychological assessment in the forensic context requires a comprehensive approach that includes various techniques and tools. According to Verdejo-García and Bechara (2009), the most commonly used methods include:

- ✓ **Structured clinical interview:** It allows obtaining information about the individual's medical, psychological and social history, as well as assessing his or her current mental state.
- ✓ **Standardized neuropsychological tests:** These tests evaluate different cognitive domains such as attention, memory, executive functions and emotional processing. Some of the most commonly used tests in the forensic context are:
 - ❖ *Wisconsin Card Sorting Test (WCST):* Assesses cognitive flexibility and mental set shifting ability.
 - ❖ *Stroop Test:* Measures the capacity to inhibit automatic responses.
 - ❖ *Iowa Gambling Task:* Evaluates decision making under uncertainty.
 - ❖ *Facial Emotion Recognition Test:* Assesses the ability to identify emotional expressions.
- ✓ **Neuroimaging techniques:** Although not always accessible in the forensic context, they can provide valuable information on brain structure and function. The most commonly used techniques include structural and functional magnetic resonance imaging (fMRI) and positron emission tomography (PET).
- ✓ **Personality assessment:** Instruments such as the Minnesota Multiphasic Personality Inventory (MMPI-2) can provide information on personality traits relevant in the context of gender-based violence.
- ✓ **Specific simulation tests:** Given that in the forensic context there is the possibility of simulation or exaggeration of symptoms, it is important to include tests designed to detect these behaviors, such as the Test of Simulation of Memory Problems (TOMM).

Interpretation of results in the forensic context

The interpretation of neuropsychological assessment results in the forensic context requires careful analysis and consideration of the legal context. According to Martínez et al. (2016), some key aspects to consider are:

- ✓ **Validity of the results:** It is essential to evaluate the internal consistency of the results and to detect possible patterns of simulation or exaggeration of symptoms.
- ✓ **Relationship between neuropsychological findings and criminal behavior:** A clear connection should be established between the identified deficits and their possible influence on violent behavior.

- ✓ **Consideration of contextual factors:** The interpretation should take into account factors such as educational level, cultural context and the possible influence of psychoactive substances.
- ✓ **Implications for criminal liability:** Neuropsychological findings can inform about the individual's ability to understand the wrongfulness of his or her actions and control his or her behavior.
- ✓ **Prognosis and treatment recommendations:** The assessment should provide prognostic information and suggest specific interventions based on identified deficits.

It is important to note that the interpretation of the results should be performed by professionals with experience in forensic neuropsychology, capable of integrating the neuropsychological information with the relevant legal aspects of the case.

5. Results

Key findings on common neuropsychological dysfunctions in maltreating batterers.

Neuropsychological studies in batterers have revealed consistent patterns of dysfunction in several cognitive and emotional areas:

- ✓ **Executive functions:** significant impairment has been observed in cognitive flexibility, planning and decision making. Romero-Martinez et al. (2019) found that malingers showed worse performance on tasks assessing these functions, such as the Wisconsin Card Sorting Test.
- ✓ **Inhibitory control:** Bueso-Izquierdo et al. (2016) reported deficits in the ability to inhibit inappropriate responses, which is related to increased impulsivity and aggressiveness.
- ✓ **Emotional processing:** Alterations have been identified in the recognition and processing of emotions, especially for expressions of fear and sadness (Babcock et al., 2008).
- ✓ **Empathy:** Abusers show a reduced empathic capacity, particularly towards the suffering of their partners (Romero-Martínez & Moya-Albiol, 2013).
- ✓ **Working memory:** Deficits have been observed in the ability to maintain and manipulate short-term information, which may affect problem solving and emotional regulation (Pinto et al., 2010).

Analysis of data and observed patterns

The analysis of data collected in various studies has made it possible to identify characteristic neuropsychological patterns in batterers:

- ✓ **Heterogeneous neuropsychological profile:** Although general trends are observed, there is variability in the neuropsychological profiles of batterers, suggesting the need for an individualized approach to assessment and treatment (Corvo & Johnson, 2013).
- ✓ **Correlation between severity of violence and neuropsychological deficits:** A positive relationship has been found between the severity of violent acts and the magnitude of neuropsychological alterations, especially in executive functions and emotional control (Romero-Martínez et al., 2013).
- ✓ **Interaction between neurobiological and psychosocial factors:** Data suggest that neuropsychological dysfunctions interact with

environmental and psychosocial factors in the manifestation of violent behavior (Siever, 2008).

- ✓ **Alterations in brain connectivity:** Neuroimaging studies have revealed abnormal patterns of connectivity between brain regions involved in emotional regulation and behavioral control in batterers (Lee et al., 2009).

6. Discussion

Interpretation of the results in the context of gender violence

Neuropsychological findings in batterers offer a new perspective for understanding gender-based violence:

- ✓ **Neurobiological basis of violence:** The results suggest that there are underlying neuropsychological alterations that may contribute to the manifestation and maintenance of violent behaviors in the context of intimate partner relationships (Verdejo-García & Bechara, 2009).
- ✓ **Complexity of the phenomenon:** The interaction between neuropsychological, psychological and sociocultural factors evidences the multifaceted nature of gender-based violence, requiring a comprehensive approach (Krug et al., 2002).
- ✓ **Implications for legal liability:** The identified neuropsychological deficits raise questions about the capacity for self-control and intentionality in violent acts, which has relevance in legal and forensic contexts (Martinez et al., 2016).
- ✓ **Cycle of violence:** Alterations in emotional processing and empathy may explain, in part, the difficulty of batterers to recognize the impact of their actions and break the cycle of violence (Babcock et al., 2008).

Comparison with previous studies and existing theories

The results obtained in neuropsychological studies with batterers are consistent with several previous theories and findings:

- ✓ **Executive dysfunction model:** The observed deficits in executive functions support the theory that gender-based violence may be related to a difficulty in inhibiting aggressive responses and generating alternative solutions to conflicts (Romero-Martínez et al., 2019).
- ✓ **Moral disconnection theory:** Alterations in emotional processing and empathy are congruent with the mechanisms of moral disconnection proposed by Bandura (2002), which facilitate the justification of violent acts.
- ✓ **Neurobiological model of aggression:** Neuropsychological findings support Blair's (2004) proposal that structures such as the amygdala and prefrontal cortex are involved in the regulation of aggressive behavior.
- ✓ **Neuroimaging studies:** Results are consistent with previous research that has identified structural and functional alterations in key brain regions for emotional and behavioral control in violent individuals (Lee et al., 2009).

7. Clinical Implications for Intervention

Recommendations for clinical and forensic practice

- ✓ **Comprehensive neuropsychological assessment:** It is recommended that a complete neuropsychological assessment be included in the assessment protocols for batterers, covering executive functions, emotional processing and inhibitory control (Verdejo-García & Bechara, 2009).
- ✓ **Consideration of neuropsychological factors in legal contexts:** Forensic professionals should take neuropsychological findings into account when assessing imputability and risk of recidivism in cases of gender-based violence (Martinez et al., 2016).
- ✓ **Individualized approach:** Given the heterogeneity of neuropsychological profiles, it is suggested to adapt interventions to the specific characteristics of each individual (Corvo & Johnson, 2013).
- ✓ **Interdisciplinary collaboration:** Close collaboration between neuropsychologists, clinical psychologists and legal professionals is recommended for a more comprehensive understanding and approach to gender-based violence.

Proposals for intervention and rehabilitation programs based on neuropsychological findings.

- ✓ **Executive function training:** Implement cognitive rehabilitation programs focused on improving mental flexibility, planning and decision making (Romero-Martínez et al., 2019).
- ✓ **Emotional regulation techniques:** Incorporate strategies to improve the recognition and management of emotions, both their own and those of others (Babcock et al., 2008).
- ✓ **Empathy training:** Develop specific interventions to increase empathic capacity, especially towards the suffering of the partner (Romero-Martínez & Moya-Albiol, 2013).
- ✓ **Mindfulness and meditation:** Include mindfulness practices to improve inhibitory control and emotional regulation (Siever, 2008).

Prevention and treatment: effective approaches

- ✓ **Early prevention programs:** Implement interventions at early ages to develop emotional regulation and conflict resolution skills (Krug et al., 2002).
- ✓ **Tailored cognitive-behavioral therapy:** Modify existing programs to specifically address neuropsychological deficits identified in batterers (Corvo & Johnson, 2013).
- ✓ **Complementary pharmacological interventions:** Consider the use of medication in cases where specific neurobiological alterations are identified, always as a complement to psychological therapy (Siever, 2008).
- ✓ **Long-term follow-up:** Establish long-term follow-up protocols to evaluate the effectiveness of interventions and prevent relapses (Martinez et al., 2016).
- ✓ **Education and social awareness:** Develop educational programs that incorporate knowledge about the neurobiology of violence to reduce stigma and promote help-seeking (Lee et al., 2009).

8. Conclusiones

Summary of key findings

This research has provided a comprehensive view of the neuropsychological factors associated with batterers in the context of gender violence, revealing consistent patterns of dysfunction in several cognitive and emotional areas:

- ✓ **Executive functions:** significant impairment in cognitive flexibility, planning and decision making has been observed in batterers (Romero-Martínez et al., 2019). These deficits may contribute to rigidity of thought and difficulty in generating alternative solutions to conflicts.
- ✓ **Inhibitory control:** Abusers show a reduced capacity to inhibit inappropriate responses, which is related to greater impulsivity and aggressiveness (Bueso-Izquierdo et al., 2016).
- ✓ **Emotional processing:** Alterations have been identified in the recognition and processing of emotions, especially for expressions of fear and sadness (Babcock et al., 2008). This may explain, in part, the difficulty of batterers to empathize with the suffering of their partners.
- ✓ **Brain connectivity:** Neuroimaging studies have revealed abnormal patterns of connectivity between brain regions involved in emotional regulation and behavioral control in batterers (Lee et al., 2009).
- ✓ **Interaction between neurobiological and psychosocial factors:** Findings suggest that neuropsychological dysfunctions interact with environmental and psychosocial factors in the manifestation of violent behavior (Siever, 2008).

These results have significant implications for the understanding, prevention and treatment of gender-based violence:

- ✓ **Neurobiological basis of violence:** The findings support the existence of underlying neuropsychological alterations that may contribute to the manifestation and maintenance of violent behaviors in the context of intimate partner relationships (Verdejo-García & Bechara, 2009).
- ✓ **Implications for legal liability:** The identified neuropsychological deficits raise questions about the capacity for self-control and intentionality in violent acts, which has relevance in legal and forensic contexts (Martinez et al., 2016).
- ✓ **Development of specific interventions:** Knowledge of the neuropsychological profiles of batterers allows the design of more effective intervention programs, focused on the rehabilitation of altered cognitive and emotional functions (Romero-Martínez & Moya-Albiol, 2013).

Limitations of the study

Despite significant advances in understanding the neuropsychological factors associated with gender-based violence, it is important to recognize the limitations of current research:

- ✓ **Heterogeneity of the samples:** Variability in the neuropsychological profiles of batterers makes it difficult to generalize the results (Corvo & Johnson, 2013).
- ✓ **Methodological difficulties:** The sensitive nature of the topic and legal implications may affect the veracity of study participants' responses.

- ✓ Limitations in neuropsychological assessment: Some neuropsychological tests may not be sensitive enough to detect subtle deficits in non-clinical populations.
- ✓ Shortage of longitudinal studies: Most research is cross-sectional, which limits the understanding of the temporal evolution of neuropsychological deficits.
- ✓ Lack of cross-cultural studies: Most of the research has been conducted in Western contexts, which limits the generalizability of the results to other cultures.

Recommendations for future research

Based on the findings and limitations identified, the following recommendations for future research are proposed:

- ✓ Longitudinal studies: Conduct long-term research to assess the stability and evolution of neuropsychological deficits in batterers, as well as their relationship with recidivism (Pinto et al., 2010).
- ✓ Translational research: Develop studies linking neuropsychological findings with specific clinical interventions, evaluating their efficacy in reducing gender-based violence (Romero-Martínez et al., 2019).
- ✓ Advanced neuroimaging studies: Use more sophisticated neuroimaging techniques, such as functional connectivity and tractography, to better understand alterations in brain connectivity in batterers (Lee et al., 2009).
- ✓ Biomarker research: Explore possible neurological and endocrine biomarkers that may be associated with an increased risk of perpetrating gender-based violence (Siever, 2008).
- ✓ Cross-cultural studies: Conduct comparative research in different cultural contexts to identify universal and culture-specific neuropsychological factors in gender-based violence (Krug et al., 2002).
- ✓ Evaluation of intervention programs: develop and evaluate the effectiveness of intervention programs based on neuropsychological findings, including cognitive rehabilitation and emotional regulation techniques (Martínez et al., 2016).
- ✓ Research on resilience factors: Study neuropsychological factors associated with resilience and nonviolence in at-risk populations to inform more effective prevention strategies (Corvo & Johnson, 2013).
- ✓ Development of specific assessment tools: Create and validate neuropsychological assessment instruments specifically designed to detect deficits relevant in the context of gender-based violence (Verdejo-García & Bechara, 2009).

In short, research on neuropsychological factors associated with gender violence has provided valuable insights that can inform both clinical practice and public policy. However, it is necessary to continue and deepen this line of research to develop more effective strategies for prevention, intervention and rehabilitation in the complex phenomenon of gender violence.

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