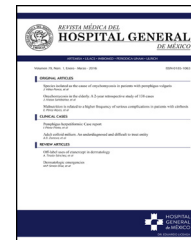




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ORIGINAL ARTICLE

Semantic emotional processing (N400) in violent individuals from a community sample

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KEYWORDS

Semantic processing;
Violent behavior;
Community sample

Abstract

Background: Several studies have suggested different brain abnormalities and cognitive impairment in violent individuals, all of them associated with brain areas like the prefrontal and temporal cortex and limbic regions involving executive functions, decision making, language and emotional regulation. However, most studies have focused on EEG quantitative analysis or other components like the P300; additionally, the majority have been performed on forensic samples.

Objective: To explore semantic/emotional processing using an N400 paradigm in a general population sample.

Material and methods: 60 adult males were recruited and divided into two groups: control group (healthy men from the general population; $n = 30$), violent group (violent men from the general population; $n = 30$). All subjects were assessed with an aggression questionnaire (RPQ; Raine et al.¹⁶) to be classified into one of the groups. Repeated-measures [Group (violent, control) \times condition (congruent, incongruent)] ANOVA was used. Separate analyses were performed on the peak amplitude of the N400 difference wave and the original peaks from the incongruent and congruent conditions.

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Results: We found no significant differences in behavioral responses. However we found that the control group elicited different activity for each condition (congruent and incongruent); the violent group did not. We found significant differences in the N400 difference wave in medial and lateral lines between the groups. There were differences in the congruent condition in all the lines between groups; there were no differences in the incongruent wave between groups. In the brain mapping we observed that the control group elicited negative activity during the incongruent condition and positive activity during the congruent; meanwhile the violent group elicited similar activity in both conditions.

Conclusions: Semantic emotional processing is impaired in violent individuals, suggesting deficient processing in the integration of language elements in an emotional context. The biological risk of violence in these individuals is disputed.

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PALABRAS CLAVE

Procesamiento semántico;
Conducta violenta;
Población general

Procesamiento semántico emocional (N400) en individuos violentos de la población general

Resumen

Antecedentes: Estudios sugieren anomalías estructurales y cognitivas en individuos violentos, asociadas con la corteza pre frontal, temporal y la amígdala involucrando funciones ejecutivas, toma de decisiones, lenguaje y regulación emocional. Los estudios han realizado análisis cuantitativo (EEG) o análisis del P300; además, se han llevado a cabo en muestras forenses institucionalizadas.

Objetivo: Explorar el procesamiento emocional/semántico utilizando un paradigma de N400 en una muestra de la población general.

Material y método: Participaron 60 hombres adultos divididos en dos grupos: grupo control (n = 30), grupo violento (n = 30). Los sujetos fueron clasificados de acuerdo a la escala de agresión reactiva y proactiva (RPQ; Raine A, Dodge K, Loeber R. et al., 2006). Se utilizó una ANOVA de medidas repetidas [Grupo (violento, control) x condición (congruente, incongruente)]. Se realizaron análisis por separado para la diferencia de la amplitud N400, y para los picos originales (congruente e incongruente).

Resultados: No se encontraron diferencias significativas en las respuestas conductuales entre los grupos. Sin embargo, el grupo control genera actividad diferencial para cada condición, mientras que el grupo violento no. Se observaron diferencias en la diferencia de la amplitud del N400 derivaciones mediales y de la línea media. También se encontraron diferencias en las 3 líneas de electrodos en la condición congruente. No se encontraron diferencias entre los grupos en la condición incongruente. Con un mapeo cerebral se observó que el grupo control genera actividad negativa durante el procesamiento del estímulo incongruente y actividad positiva durante el congruente, mientras que el grupo control generó actividad similar ante ambas condiciones.

Conclusiones: El procesamiento semántico emocional se encuentra afectado en los individuos violentos, sugiriendo un procesamiento deficiente en la integración de los elementos del lenguaje en un contexto emocional. Se discute el posible riesgo biológico en estos individuos para la comisión de conductas violentas.

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Introduction

The main results obtained in ERPs studies in violent psychopathic individuals have been made using P300, and they have shown reduced amplitudes. This result has been interpreted as a deficient frontal processing¹ and/or a diminished capacity for distributing attentional resources in a sustained way in time.²⁻⁵

Other studies in violent individuals with high psychopathic traits have reported that they elicit a negative component (N300), that is sensitive to the affective rather than the physical attributes of the stimulus.⁶ Moreover, late negativities with large amplitudes located in frontal and central areas that appear after 300 ms have been previously reported in individuals with a criminal record in odd-ball tasks^{7,8} where the target stimulus required attention,

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