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Modulación de la expectativa de dolor sobre la respuesta cortical ante estimulación somatosensorial en pacientes con fibromialgia

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El dolor se viene definiendo como una experiencia subjetiva desagradable en cuyo procesamiento influyen numerosos factores psicológicos. Algunos estudios de neuroimagen destacan el papel de la expectativa a estimulación dolorosa como un factor central en la modulación de la actividad cerebral incluso ante estímulos somatosensoriales inocuos (Sawamoto y cols., 2000). Concretamente, se ha sugerido que la actividad de la corteza cingulada anterior puede estar asociada a procesos de anticipación atencional al dolor, sin embargo los mecanismos neurales relacionados con el curso temporal de esta modulación aún no están claros (Kong y cols., 2006). Además, hasta el momento estas cuestiones no se han abordado en pacientes con síndromes de dolor crónico, como es el caso de la fibromialgia. Con este objetivo, se manipuló la expectativa de dolor (ED)/ no dolor (END) mediante un paradigma E1-E2 (aviso-diana). E1 (triángulo o cuadrado) predecía correctamente la intensidad de E2 (sensación de calor [SC] o de pinchazo [SP]) en el 75% de los ensayos. La estimulación somatosensorial se proporcionó mediante un láser de CO2. Las participantes (20 mujeres: 10 diagnosticadas de fibromialgia y 10 sanas) debían informar sobre la intensidad de dolor percibida tras E2. Durante la realización de esta tarea, se registraron potenciales evento-relacionados (PER) en 60 localizaciones distribuidas homogéneamente por el cuero cabelludo. Se emplearon Análisis de Componentes Principales temporal y espacial para definir y cuantificar los componentes de los PER, así como el algoritmo de localización de fuentes LORETA para determinar su origen neural. Los ANOVAs indicaron que el componente frontal del Factor 4 (P200) fue sensible a las manipulaciones experimentales ($p<0.005$). Los análisis post-hoc revelaron diferencias significativas en la interacción tipo de estímulo x fibromialgia, siendo la amplitud de P200 mayor en la condición END-SP comparado con la condición ED-SC, únicamente en el grupo de fibromialgia. El origen neural de P200 se localizó en el precuneus. Estos datos, aunque preliminares, sugieren que la atención de expectativa a la aparición de estímulos somatosensoriales de diferente intensidad podría modular el despliegue de recursos atencionales hacia la estimulación nociceptiva. Sin embargo, para un conocimiento más profundo de esta cuestión se necesitan posteriores investigaciones.

Palabras clave: Fibromialgia, potenciales evento-relacionados, expectativa al dolor.

Finding the ERP correlates of SSA: MMN and Repetition Suppression

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Novel sounds in a regular auditory background elicit a different neural response, termed mismatch negativity (MMN) in ERP studies. This response is indicative of the detection of a rule violation and it has been broadly investigated. However, few studies report direct correlates of memory trace formation and rule encoding and its relation to auditory change detection. In the present study we aimed at investigating the temporal properties of repetition suppression in ERP components applying a new oddball paradigm, which is a combination of a roving standard and a frozen oddball sequence. Simple tones of 40ms duration with 6 different frequencies were arranged in pairs in a particular order of standard and deviant stimuli. ERP data was obtained from 19 subjects while they were watching a silent video with subtitles. Difference waves between deviants and standards showed an increasing MMN with the number of the preceding standards ($F_{2,36}$=12,099; p<0,001) mostly due to an increase in deviant N1 amplitude ($F_{2,36}$=5,582; p=0,008). This was confirmed by the existence of a true MMN obtained by means of a control condition, only after 12 standards. Grand average waves to standards revealed the existence of repetition suppression. This took the form of a reduction in N1 amplitude superimposed on a slower positive wave. Neither deviants nor standards were affected by the repetition of the whole sequence. Taken together, these results seem to indicate that the local stimulation history exerts a gradual effect on deviants. Although we were not able to distinguish this grading on standards, it could be because the adapted response reached its limit or because of methodological limitations. However, further analysis in other ERP components could reveal more temporal properties of these correlates of rule encoding.

Palabras clave: MMN, repetition suppression, multiple time scales.

EEG time-frequency analyses of syntactic and semantic gender agreement violations

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Agreement is a very important mechanism for sentence processing. Gender is one of the features languages use for agreement purposes. Some languages incorporate not only semantic gender (i.e., masculine is used for male referents and feminine for female referents so that gender categories correspond with conceptual categories) but also arbitrary syntactic gender (i.e., masculine is used for some nouns and feminine for others. For instance, the same referent "ball", can be named in Spanish with a noun with masculine or feminine gender: el balón masculine or la pelota feminine). Some studies have compared agreement to antecedents with semantic and syntactic gender to investigate the influence of semantic information on grammatical agreement processes.

In a prior experiment, Salillas, Barber and Carreiras (2004) asked subjects to read sentences that contained predicate adjectives either with the same of different gender of the noun they had to agree with (e.g., el faro El faro es luminoso /luminosa. Themasc lighthousemasc is brightmasc/fem). El abuelo estaba delgado/delgada. Themasc grandfathermasc was slimmasc/fem). The nouns could be either animate or inanimate, so that, the gender agreement could be either purely syntactic or syntactic and semantic. They recorded the ERPs while participants performed a syntactic judgment task. The results showed that amplitudes of the Left Anterior Negativiy (LAN) and the P600 were larger in the agreement violation conditions than in the agreement condition. The effects in both time windows were of the same size, regardless of whether the noun was animate of inanimate (e.g., whether it contained semantic or purely arbitrary syntactic gender).

To further investigate differences between semantic and syntactic gender in the evoked activity we examine here the so-called induced activity in the same conditions as above using the same data set. The performance of time-frequency analysis to obtain the ERSP (Event-Related Spectral Perturbation) revealed differences between the two types of gender. They also revealed differences between the two violation conditions and the agreement baseline condition as in the ERP signal. These differences have been obtained using the same temporal windows and group of electrodes which revealed effects of disagreement in the ERP signal. These results suggest that although agreement process may be a unitary mechanism, it may involve the contribution of different neural networks when based on semantic or purely syntactic gender features.

Palabras clave: EEG, time-frequency analysis, gender agreement

Hipoactividad de la corteza prefrontal anterior durante la realización de una tarea de memoria de trabajo visual en jóvenes con consumo intensivo de alcohol

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En los últimos años ha proliferado entre los jóvenes un patrón de consumo de alcohol caracterizado por la ingesta de grandes cantidades en cortos períodos de tiempo. Este patrón, denominado Consumo Intensivo de Alcohol o *Binge Drinking (*BD), se ha definido como el consumo de 5 ó más bebidas alcohólicas para hombres y 4 ó más para mujeres en un corto espacio de tiempo al menos una vez al mes.
El córtex prefrontal es una región de maduración más tardía que parece especialmente vulnerable a los efectos neurotóxicos del alcohol. El objetivo de este estudio es valorar el posible efecto de seguir un patrón de consumo BD sobre la actividad de esta región durante la realización de una tarea de memoria de trabajo por jóvenes universitarios.
Se registraron los ERP en 95 estudiantes universitarios de 1er curso de entre 18 y 20 años (53 controles y 42 BD) ante una tarea de memoria de trabajo visual y se realizó un análisis de componentes principales sobre el trazado de los PEs hasta 900 ms. después del estímulo. Este informe se centra en el componente que explica la mayor varianza del trazado (59%), una onda lenta positiva con valores máximos de voltaje aproximadamente a los 625 ms.
Los resultados mostraron que el grupo BD presentaban una onda significativamente menor que los controles ante los estímulos target, en regiones frontales, centrales y parietales. El análisis de la actividad de este componente ante los estímulos target por medio del software de tomografía electromagnética de baja resolución (eLORETA) reveló la existencia de una hipoactivación de la corteza prefrontal anterior del hemisferio derecho en el grupo BD en comparación con el grupo control.
Estos datos sugieren que el consumo intensivo de alcohol en jóvenes provoca déficits de activación en regiones prefrontales relacionadas con procesos de memoria de trabajo visual.

Palabras clave: Binge drinking, ERPs, eLORETA

Neural correlates of episodic memory at encoding: influence of semantic processing

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Since the seminal article by Craik and Lockhart (1972), different lines of research have revealed the benefit of semantic processing on episodic memory formation. However, few studies have investigated how these two memory systems interact during initial encoding. The present study aims to dissociate the neural correlates of semantic and episodic encoding that predict subsequent episodic retrieval. To achieve this goal, we evaluated event-related oscillations (EROs) while manipulating semantic processing of famous faces associated to a particular location in space. Although processing of a famous face entails accessing conceptual information, conceptual processing was further facilitated by presenting biographical cues that only matched with half of the faces. EROs were then sorted by whether or not the location of a face was later remembered. Prediction of episodic remembering was accompanied by an increase in gamma synchronization for those faces whose position in the original array was later remembered compared to those forgotten. These gamma brain oscillations, which were highly distributed and long-lasting, might be crucial for successful episodic encoding of face-location binding. In order to dissociate the neural correlates of semantic encoding from episodic encoding, we further analyzed data from subjects who showed conceptual priming in a priming memory test. Selected subjects also exhibited higher accuracy and faster RT during the episodic task for primed relative to unprimed faces. This difference in performance was correlated with a semantic-induced enhancement of theta oscillations over right-frontal and left parieto-occipital regions. These findings suggest that gamma and theta oscillations play different roles during encoding. While the former are more related to binding processes the latter seem to mediate the initial semantic processes that increase subsequent episodic retrieval.

Palabras clave: episodic encoding; semantic processing; brain oscillations

Envejecimiento, denominación exitosa y fenómeno de la punta de la lengua: Correlatos psicofisiológicos a partir de un análisis de componentes principales.

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El fenómeno de la punta de la lengua (PDL) consiste en un fallo temporal para denominar una palabra acompañado del sentimiento de conocer y estar a punto de recuperar dicha palabra. Este fenómeno tiene mayor incidencia en personas mayores, lo que ha sido relacionado con un debilitamiento de la ruta léxico-fonológica asociado a la edad (Burke et al., 1991; White y Abrams, 2002). En un estudio previo (Díaz et al., 2007) se describieron los componentes de potenciales evocados relacionados con la denominación exitosa de caras y el estado PDL en una muestra de participantes jóvenes. En el presente trabajo nuestro objetivo fue caracterizar la actividad eléctrica cerebral asociada tanto a la denominación exitosa como al fenómeno PDL en un grupo de personas mayores, y determinar si existen diferencias entre las características de los componentes en comparación con el grupo de jóvenes. Para ello se aislaron, mediante el análisis de componentes principales (ACP), los correlatos electrofisiológicos de la denominación exitosa, así como del estado PDL. Sólo los participantes jóvenes mostraron mayores puntuaciones de factor en la denominación exitosa de caras que en el estado PDL para el componente P3-tardío, que ha sido relacionado con el cierre de la categorización del estímulo. Además, mientras que para la condición PDL no se observaron diferencias entre grupos en los componentes obtenidos, en la condición de denominación exitosa los participantes mayores mostraron menores puntuaciones de factor que los jóvenes en dicho componente. Este resultado podría ser consecuencia de una menor activación, en participantes mayores, de las conexiones entre los distintos almacenes de información específica de la persona, lo que explicaría la mayor incidencia de estados PDL a mayor edad, en línea con lo propuesto por otros autores (Burke et al., 1991).

Palabras clave: denominación de caras; punta-de-la-lengua; análisis de componentes principales

The influence of the dopamine transporter on task-set reconfiguration

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Everyday life requires flexible and ongoing adjustment to different task situations. We examined the role of the genotype for the dopamine transporter (DAT) in task-set reconfiguration using a task-cueing protocol inspired by the Wisconsin Card Sorting Test and adapted for measuring event-related potentials. The cueing patterns were set to dissociate the effects of task switching (red line) from those of mere sensory change (blue line). Two experimental groups were created depending on the presence of the 9 repetition (9R) allele of the DAT 40 basepair (bp) variable number of tandem repeat (VNTR) polymorphism: twenty participants with presence of the 9R allele and thus High basal ganglia dopamine (BG DA), and eighteen with absence of the 9R allele and thus Low BG DA. A very early frontal N1 increase was found for all participants when the task switched ($F(1,29)=4.45$, $p=0.044$), even before any modulation related to sensory processing became evident. The Low BG DA group showed a delay in response time when the task switched and a specific N4 modulation for task switching ($F(1,23)=6.80$, $p=0.022$), whereas the High BG DA group had no behavioral task switch cost nor N4 modulation. However, the High BG DA group showed a substantially larger P2 than the Low BG DA, irrespective of task condition. These results suggest that task-relevance was detected before orienting attention towards auditory novelty. P2 may reflect BG activation to all sensory stimulation, while N4 could reflect task-updating processes needed to integrate any new task representation with the previous task context and seems to be specifically mediated by BG DA.

Palabras clave: DAT, ERPs, Task-switching

Modulation of involuntary attention by an emotional context is reflected by low Gamma band phase-synchronization

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An emotionally aversive situation intensifies the orienting of attention towards an unexpected novel auditory stimulus, which is reflected by an increase of the frontal event-related potential P3a. Gamma-band responses (GBRs) are generated earlier than P3a (within 100 ms after stimulus) and have been related to attentional processing of auditory information. The aim of the present study is to elucidate whether a negative emotional context can modulate involuntary attention in the early stages of auditory processing by analyzing the gamma-band activity. Twenty-two subjects performed a visual discrimination task in an auditory-visual distraction paradigm, in which a sequence of task-irrelevant frequent standard (P=80%) and infrequent novel sounds (P=20%) where followed and preceded by two images from IAPS, which could be either neutral or emotionally negative. Inter-trial phase-locking and total power were analyzed for the GBR.

Auditory novelty trials were associated with an increased phase-locking of frequency-specific GBRs at 40 Hz, whereas the negative emotional context produced a 35 Hz-specific increase of auditory GBR phase-locking at anterior locations, as compared to the neutral one (Fig. 1). For visual stimuli, total GBR power was larger in the negative than in the neutral context.

These results show that an effective orienting of attention affects the synchronization of auditory 40 Hz response. Since the emotional context affects early sensory processing in both the auditory and visual modalities, it can be assumed to modulate the functional activation state of the cortex. The contextual effect of emotion on early auditory processing appears to be mediated by frontal phase synchronization of gamma-band activity at lower frequency of 35 Hz.

Palabras clave: Gamma-band responses, Emotional context, Involuntary attention

Efectos del arousal en el priming afectivo

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Las investigaciones sobre priming y emoción se han centrado hasta la fecha en los efectos de la congruencia o incongruencia entre la valencia de estímulos facilitadores y diana. Sin embargo, los modelos teóricos dominantes en la actualidad muestran que el nivel de activación o arousal desempeña un papel fundamental en el procesamiento de los aspectos emocionales de los estímulos. En el presente estudio se predende indagar en el papel del arousal en el priming afectivo mediante el registro de potenciales evento-relacionados (ERPs). Con este fin se presentaron a 30 participantes un total de 160 pares de palabras positivas divididos en 4 grupos de 40 pares con las siguientes características: facilitador activante-diana activante, facilitador activante-diana relajante, facilitador relajante-diana activante y facilitador relajante-diana relajante. Los resultados mostraron modulaciones en los ERPs únicamente para las palabras diana de alta activación precedidas por facilitadores congruentes en arousal. En concreto, se encontró un efecto facilitador reflejado en una reducción de la amplitud de un componente positivo en torno a los 500 ms para las palabras diana activantes en comparación con las facilitadoras igualmente activantes. Dicha facilitación estaría relacionada con procesos atencionales y de memoria que aparecen involucrados en la génesis de la positividad tardía.

Palabras clave: Priming afectivo, arousal, Componente positivo tardío

Understanding brain and personality basis of neglectful parenting: an ERP analysis

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This study was designed to examine if event related potentials varied with the quality of emotion of child stimuli in neglectful and control mothers. It is also aimed at exploring some personality variables in both groups of mothers and the possible relations between these measures and ERP amplitudes.
Participants were 15 neglectful mothers, selected from a family support program and 15 matched control mothers. For both groups their EEG was recorded while they were looking at crying, smiling or neutral infant faces presented with equal probability in a random sequence. Also three personality variables were measured to further explore three psychological characteristics, Empathy, Social and Physical Anhedonia, which might be critical for the understanding of the neglectful mother's behaviour. Neglectful mothers showed higher ratings on social and physical anhedonia and lower ratings on empathy than control mothers. The ERP analysis also revealed highly significant differences between the two groups in early windows and global differences in amplitudes in LPP modulated by anhedonia and the valence of the stimuli.
Evidence was found both in personality and in electrophysiological responses showing differences between neglectful and control mothers. Knowing that parenting behavior critically shapes human infants' behavior, a better understanding of brain and personality basis of neglectful parenting probably may have implications for promoting more healthy parent-infant interaction.

Palabras clave: ERP, neglectful parenting, child stimuli

From numbers to letters: decoding units in visual word recognition.

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Word reading involves the activation of abstract representation of letters independently from the format in which they are written. In addition, it seems that regularization of the input also occurs even when numbers that resemble letters are inserted among letters (e.g., A=4, E=3, S=5, I=1). Masked priming studies (Perea et al., 2008) have shown that letter-like-numbers facilitate the recognition of the base word (e.g., M4T3R14L-MATERIAL) as much as the word does (e.g., MATERIAL-MATERIAL) when compared to a control unrelated condition (e.g., M7T6R28L-MATERIAL).

The present study is aimed at investigating the time course of the process that leads to the activation of the abstract letter representation when a letter-like-number is displayed. We recorded ERPs to a group of 26 Spanish speakers while they had to identify target words briefly preceded by masked primes as in the study by Perea et al. (2008).

ERPs time locked to the target word presentation on the occipital sites showed an early positive effect at the 130-160 ms window (P150) for the Control compared to Identity and Number conditions. However, at the 180-210 ms window the more negative trend elicited by the Number condition (N200) was similar to that of the Control condition, while the Identity condition was more positive. Finally, at 250-300 ms window, the Number condition returned to be more positive, as the Identity condition was, compared to the Control condition (P260).

As suggested by Petit et al. (2006), in a first stage the system is sensitive to the target-prime visual similarity: numbers are initially perceived as letters, probably as a consequence of a regularization process. However, in a second stage, numbers interfere with the orthographic analysis of the target word, since they also activate their own representation. Finally, at the interface between sub-lexical and lexical processing, abstract representations of the single letters are similarly activated for both Identity and Number conditions, maybe because a top-down mechanism.

Palabras clave: ERPs, masked priming, letter perception

Brain potentials in imitation

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Following the discovery of specific neurons in the monkey premotor cortex, which reacted in a similar way to observed and executed movement, a similar observation-execution matching system was proposed to exist in humans. Various brain imaging techniques like EEG have been employed to investigate the possibility of a homologous mirror system in the human brain. It was found that a portion of the alpha band (7–14 Hz) responds in a similar way to observed, executed and imagined movement and this so-called mu rhythm has since been used as an indirect measure of mirror system activity. In a pre-study, a straightforward method was developed to distinguish mu from alpha activity and to ascertain that subjects do show movement modulated activity (mu activity). Seven subjects showed marked mu activity and were then tested on an event-related paradigm, comparing observation of movement, "real" imitation (imitation following observation immediately in a sequential paradigm) and imagined movement. ERD (event-related desynchronisation) was calculated to assess mu rhythm reactivity towards the different conditions. As expected we found significant ERD in the observation condition as compared to a rest period, but interestingly no significant ERD could be detected during either imitation (real movement) or imagined movement. These results are surprising as previous research has reliable shown that movement and imagined movement result in significant ERD. As these studies did not use a sequential paradigm, direct comparisons with our findings are impossible. This sequential nature of our experiment also seems to be the reason for the unexpected results, as carry-over effects could have influenced activity changes during movement. In addition this is the first time "real" imitation was investigated using the mu rhythm as a measure, thus our findings are novel and need to be replicated. A follow-up experiment using only a simple finger movement task without an imitation component was conducted. As expected significant ERD was found during movement, suggesting that the sequential imitation paradigm was responsible for the unexpected results in the imitation experiment. In summary, a straightforward method for dissociating alpha from mu activity was developed and novel findings on mu activity changes during "real" imitation will be presented.

Palabras clave: imitation, ERD, mu rhythm

Source analysis of novelty-P3 constrained by fMRI activation

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Novel sounds presented in an oddball sequence during the performance of a simple visual classification task generally produce a distraction effect and generate a series of responses indexing three main stages of attention capture: MMN/N1-enhancement (change detection), novelty-P3 (orienting of attention) and RON (reorientation after distraction). Sources of the MMN response are known to be located on supratemporal cortex, perhaps including a frontal contribution. Lesion studies, intracranial recordings and different types of source localization approaches have found that the novelty-P3 responses are generated in multiple neocortical and limbic regions. Sources for the RON component have been hardly investigated. In the present study we aimed at investigating the spatiotemporal brain dynamics of these three responses by means of an integrated ERP+fMRI approach. In separate sessions, ERP and fMRI data were obtained during the performance of a visual task while ignoring auditory stimulation. The auditory sequence was composed of repetitive standard tones (600 Hz, 200 ms) and unexpected environmental novel sounds (200 ms, p=8%). Electrophysiological responses to standard and novel sounds were averaged separately and the novel-standard difference waveform was calculated, where MMN/N1-enhancement, novelty-P3 and RON were clearly identified. We performed a source analysis constrained by fMRI data for these responses using the BrainVoyager–BESA software platform. Sources for the electrical activity of the novel-standard ERP difference wave were seeded in the main areas of activation found contrasting novel sounds vs. standard tones in the fMRI analysis. The source activities were back projected to scalp voltage, and topographical maps were calculated at the respective latency of each ERP component of interest, to evaluate the contribution of each source to each component. The resulting model included two sources located bilaterally on superior temporal gyrus (STG) and a midline source located in the cingulate gyrus. This model explains the scalp activity of the novel-standard difference wave leaving only 6% of residual variance (RV) over the whole averaging epoch. RV over the latency windows of the specific components of interest was as follows: N1/MMN (120-155 ms) = 8%; novelty-P3: early phase (215-270 ms) = 3%, late phase (335-390 ms) = 6% and finally RON (500-590 ms) = 3%. These results support previous source models of the novelty-P3.

Palabras clave: source analysis, novelty-P3, oddball

Modulation of the N200 and VPP event-related brain potentials: Evidence for independent effects of attention and familiarity

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Event-related potentials were used to investigate brain electrical responses to face familiarity under an object-based attentional manipulation. Stimuli consisted of faces and houses transparently superimposed, half of the faces being famous and half unfamiliar. Participants had to detect consecutive repetitions of the same face or house, depending on the attention condition (attend to the faces or attend to the houses, respectively). Face familiarity was irrelevant to the task. Attention modulated brain activity both in posterior and anterior regions, in the latency of the N200 and VPP components, with larger components being elicited when participants attended to faces. Face familiarity, however, only modulated activity in anterior regions (VPP component). The amplitude of the occipito-temporal N200 was unaffected by familiarity, whereas famous faces elicited higher amplitudes than unfamiliar faces at fronto-central regions. The interaction between attention and familiarity was not significant at any of the locations. The differential effect of familiarity argues against the idea that the N200 and VPP components are two manifestations of the same brain processes. Moreover, the present results provide evidence for independent effects of attention and face familiarity at the structural encoding stage of face perception.

Palabras clave: ERP, face familiarity, attention

Cambios en la sintomatología depresiva y el procesamiento somatosensorial en pacientes con fibromialgia debidos al tratamiento con estimulación magnética transcraneal de baja frecuencia

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El objetivo principal del estudio era valorar los posibles cambios en la actividad eléctrica cerebral debidos a la aplicación de estimulación magnética transcraneal (EMT) de baja frecuencia (15 trenes de 60 segundos, con 45 segundos de intervalo entre cada tren, con una frecuencia de 1 Hz de intensidad, al 110 % del umbral motor) sobre el córtex prefrontal dorsolateral derecho en pacientes con síntomas de depresión y dolor crónico. En el estudio participaron 21 pacientes con diagnóstico de fibromialgia y depresión mayor, que fueron evaluados al principio y al final de un tratamiento EMT de 20 sesiones (4 semanas consecutivas). Nueve pacientes (48.33±5.84 años) fueron asignadas al grupo de tratamiento (estimulación real sobre el córtex prefrontal) y 12 pacientes (54.89±4.96 años) al grupo placebo (estimulación simulada, colocando la bobina de forma perpendicular al cráneo en el punto de estimulación calculado e inclinándola 45º sobre el eje). Se registraron los potenciales evocados somatosensoriales (SEP) ante dos estímulos táctiles (100 ms de duración y 2 bares de presión) presentados con un intervalo aleatorizado entre-estímulos de 550±50 ms, y separados por un intervalo fijo entre-trenes de 12 segundos. Se calculó la amplitud en los picos P1 (35-85 ms) y N1 (120-170 ms), así como la amplitud media en el intervalo (180-330 ms) desencadenados por los estímulos táctiles. El tratamiento EMT supuso una reducción significativa de la sintomatología depresiva en los pacientes con dolor crónico; mientras que el tratamiento placebo no produjo cambios significativos a nivel subjetivo. El análisis de las amplitudes registradas en los electrodos colocados sobre la corteza somatosensorial (Pz, P3 y P4) reveló que sólo el grupo que había recibido el tratamiento EMT presentaba una reducción significativa durante la evaluación post- comparada con la pre-tratamiento en la amplitud del componente más temprano (P1) y la amplitud media (180-330 ms). El grupo placebo no mostró ningún cambio significativo pre-/post-tratamiento en la amplitud de los SEP. Estos resultados sugieren que la EMT sobre la corteza prefrontal disminuye los síntomas depresivos en pacientes con dolor crónico y podría producir cambios importantes sobre el procesamiento somatosensorial de estos pacientes.

Palabras clave: EMT, EEG, fibromialgia

Lexical access in speech production:
An overt ERP-study of the frequency and cognate effect.

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In the present study we explored an ERP-marker for lexical access in speech production by manipulating the frequency- and cognate-status of pictures. An ERP study with 16 Spanish-Catalan bilinguals performing a simple picture naming task in Spanish (L1) was conducted. Individual and group (Grand Average) onset latency analysis of the divergence point between the contrasts at interest were run (splitting point analysis). Results showed that high-frequency and cognate waveforms diverged significantly from low-frequency and non-cognate waveforms between 150 – 200 ms after stimulus presentation in a positive going waveform (P2). The splitting point for the frequency contrast came 30 ms earlier (172 ms) compared to the splitting point for the cognate contrast (200 ms). We believe this difference is due to slower conceptual processing in the latter conditions. In general our results seem to indicate that lexical access in speech production (picture naming) is achieved around 150 – 200 ms after stimulus presentation and reveal an early influence of frequency and cognate status in the speech production process. These results were replicated in a second experiment with 15 Catalan-Spanish bilinguals performing the same picture naming task in their L2 (Spanish). Furthermore we believe that this splitting point method in an overt production ERP design offers a new and exciting way for manipulating and studying lexical (verbal) and conceptual (non-verbal) processing in speech production.

Palabras clave: speech production, lexical access, ERPs

Incremento de las bandas altas del EEG y correlación con el deterioro cognitivo en pacientes con Esclerosis Múltiple

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Introducción. Un posible método para encontrar posibles alteraciones espectrales consiste en la aplicación de la cuantificación espectral del EEG durante la realización de una tarea cognitiva. En particular, este estudio intentó observar modulaciones del contenido espectral que tiene lugar en el EEG de pacientes con EM remitente-recidivante (EMRR) y con la forma benigna (EMB) durante una tarea viso-espacial.
Métodos. La muestra consistió en 19 pacientes con EMRR, 10 con EMB y 21 sujetos control. La densidad de potencia espectral de las bandas de EEG era calculada mediante la transformación rápida de Fourier (FFT). Las bandas analizadas fueron: delta, theta, alfa, beta-1, beta-2 y gamma. Además, se procedió a una normalización (transformación Z) de las puntuaciones espectrales de los sujetos así como sus respuestas conductuales para poder comprobar la heterogeneidad de las alteraciones en los pacientes.
Resultados. Casi la mitad de los pacientes con EMRR (42%) mostró un aumento estadísticamente significativo de dos o más desviaciones estándar (SD) respecto del grupo control para beta-2 y gamma. Estas alteraciones se localizaron en las regiones anteriores del hemisferio derecho y bilateralmente para las áreas posteriores del cuero cabelludo. Ninguno de los pacientes EMB o de los sujetos control exhibió valores fuera del rango de ± 2 SD. El deterioro cognitivo evaluado mediante las respuestas conductuales no correlacionó con las alteraciones espectrales.
Conclusiones. Estos resultados reflejan variaciones fisiológicas en pacientes con EM al margen de los procesos de deterioro cognitivo que puedan cursar.

Palabras clave: EEG - Esclerosis Múltiple – Deterioro cognitivo

Potenciales evocados durante la toma de decisiones emocionales en pacientes con dolor crónico

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Examinamos la actividad cerebral desencadenada durante la realización de una tarea de toma de decisiones emocional (*Iowa Gambling Task, IGT)* en pacientes con dolor crónico. En el estudio participaron 10 pacientes con fibromialgia y 21 voluntarios con edades comprendidas entre los 20 y los 68 años. Para analizar el rendimiento en la tarea IGT, se computó el número de elecciones de cartas para cada bloque de 20 ensayos, teniendo en cuenta si correspondían a mazos ventajosos (CD) (baja ganancia, baja pérdida) o desventajosos (AB) (alta ganancia, alta pérdida). El análisis del EEG se basó en los potenciales visuales desencadenados por el estímulo de feedback (ganancia vs. pérdida) presentado en cada ensayo después de la elección. En cuanto al rendimiento conductual, se encontró una interacción significativa entre los factores bloques (5 niveles) y grupo, indicando una diferencia significativa entre la estrategia seguida durante el experimento entre pacientes con dolor crónico y los controles. En cuanto a los potenciales evocados, se encontraron interacciones significativas entre valencia (ganancia vs. pérdida) para las amplitudes N100 y P200 en regiones frontales, parietales y occipitales. En todos los casos, las amplitudes desencadenadas en el grupo de pacientes con dolor crónico fueron significativamente menores que en el grupo control. Asimismo, se encontró que el feedback positivo desencadenaba una mayor amplitud de los potenciales evocados que el feedback negativo en el grupo control, pero no en pacientes. Estos resultados apoyan la hipótesis de que el dolor crónico se asocia con un procesamiento anómalo de la información emocional.

Palabras clave: Potenciales Evocados, IGT.