

Case report

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Neuropsychological evaluation of pragmatics in a patient with acquired brain injury

Evaluación neuropsicológica de la pragmática de la comunicación en un paciente con daño cerebral adquirido

Abstract

Studies in patients with brain injury have provided to clinical practice a wide range of valuable language assessment tools and rehabilitation strategies. In contrast, the ability to make a proper use of language adapted to a specific social and cultural context has been scarcely explored in brain-damaged patients. Therefore, clinicians still lack specific assessment batteries to diagnose pragmatic difficulties in these patients. Given the importance of such disorders on their social and professional reinsertion, we aimed at studying the usefulness of the Montréal Protocol for the Evaluation of Communication (MEC) in order to detect abnormal pragmatic capacities in a patient with a brain injury, as compared to a control participant. In addition, we explored the role of other cognitive processes, such as executive functions and social cognition on pragmatics. Results revealed that the MEC is a useful protocol to structure and guide the evaluation process of pragmatics, and it is sensitive to most of the symptoms observed at baseline. A partial dissociation between executive control and pragmatics was evident in the presented case, along with an impaired ability to recognize facial emotions, a difficulty that might explain some of the symptoms observed at the pragmatic level.

Keywords

communication, brain injury, assessment

Resumen

El lenguaje y sus alteraciones en pacientes con lesiones cerebrales han sido extensamente estudiados, y han aportado a la práctica clínica valiosos instrumentos de evaluación y diversas estrategias de rehabilitación. En contraposición, la habilidad para realizar un correcto uso del lenguaje adaptado a un contexto social y cultural, ha sido muy poco explorada en pacientes con lesiones cerebrales. Por ello, hasta la fecha, los clínicos carecen de baterías de evaluación específicas para diagnosticar las dificultades pragmáticas en pacientes con daño cerebral. Dada la importancia que este tipo de alteraciones tienen sobre la reinserción social y laboral, nos planteamos estudiar la utilidad del Protocolo para la Evaluación de la Comunicación de Montréal (MEC) para la detección de las alteraciones de la pragmática en un paciente con una lesión cerebral en comparación con un sujeto control. Además, exploramos el papel de otros procesos cognitivos, como las funciones ejecutivas y la cognición social en la pragmática de la comunicación. Los resultados revelaron que el Protocolo MEC es útil para estructurar y guiar la exploración y es sensible a la mayor parte de la sintomatología observada al inicio. Se aprecian signos de disociación entre ciertos aspectos ejecutivos y la pragmática de la comunicación junto con una alteración en la capacidad de reconocimiento facial de emociones. Este aspecto podría explicar parte de la sintomatología observada a nivel pragmático en el paciente.

Palabras clave

comunicación, daño cerebral, evaluación

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Introduction

Language and aphasia have been studied extensively¹ but that's not the case with communication, which requires interaction among several interlocutors and is governed by rules and conventions determined by the socio-cultural context. Pragmatics is of special importance in dialogue: the way in which interlocutors make use of the language in a given context. The respect for taking turns in conversation, an adequate understanding and expression of prosody, the ability to follow social rules, grasp intentionality and understand indirect language are fundamental skills for effective communication. The alteration of these features has a significant impact on the social and work life of the affected individual.² Communication is a complex social behavior with an underlying diversity of social and cognitive variables.³ Traditionally, the focus has been placed on the executive functions such as variables that explain the alterations in social behavior,⁴ whose recent development opens the door to recognition of facial expressions⁵ or Theory of Mind⁶ as new hypotheses. However, clinicians do not possess sufficient instruments to evaluate in a systematic and standardized way all these aspects in adults with acquired brain injuries.

The following is the case of a patient with trouble maintaining an adequate communicative interaction due to important pragmatic deficits, and an evaluation protocol is proposed to try to collect information in a structured way of all the variables involved in the communication process. These instruments are administered to a control participant to compare the performance on tests that have no scales.

Case report

L.S. is a 38-year-old male, with no relevant medical history. On 10/8/2011 he suffered severe cranioencephalic trauma. He scored 7/15 on the Glasgow Coma Scale (GCS) and on TAC presented multiple bilateral temporoparietal subcortical contusions, a right temporoparietal subdural hematoma and a longitudinal fracture of the right petrous part. It required a bifrontal decompressive craniotomy. He remained in an induced coma for 12 days and the post-traumatic amnesia lasted five weeks. Three months after the injury he started outpatient rehabilitation treatment. At that moment he had overcome the state of post-traumatic confusion, was able to saunter, and was self-sufficient in his daily life activities.

However, he presented a significant verbal disinhibition, hasty speech, and frequent articulation errors (altering the sounds /l/, /r/, /z/, /d/ and consonant groups such as /tl/ or /dr/). He presented a slightly monotonous prosody and expressive blocks caused by difficulty in accessing vocabulary, difficulty with social skills and infantilism, showing a partial awareness of the deficit (5 points over 7). In contact with his social environment, he had difficulty adjusting the conversation topic to his interlocutor, as well as the amount of information transmitted. He tended to interrupt and to not cede the conversation turn, tending towards monolog, giving extensive replies that were imprecise. He showed behavior inappropriate for the context and gave advice to strangers. Furthermore, the family noticed a change in his facial expression. Considering his good progress, the absence of significant motor, cognitive, and language problems, and his personal autonomy, the issues related to his social interaction became fundamental. Henceforth, the recovery of social and conversational skills became one of the main objectives, for they would determine his social reintegration. For contrast, a 41-year-old control participant was selected with equivalent educational level and social environment.

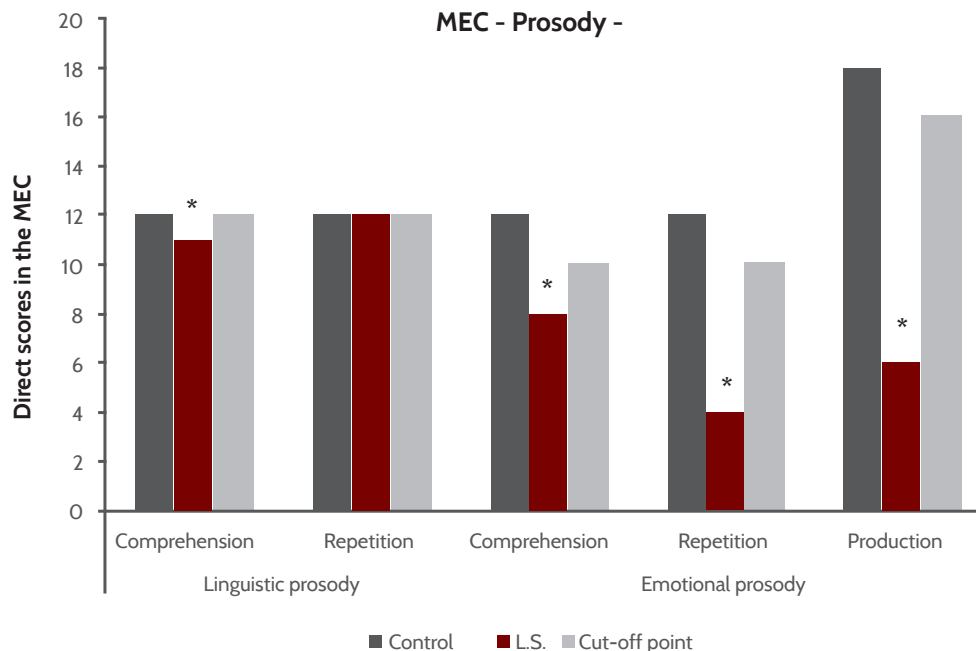
The following tests were administered to the patient and to the control subject.

- The Montreal Protocol for the Evaluation of Communication (MEC):⁷ evaluates alterations in communication, including the discursive, prosodic, lexical-semantic, and pragmatic components. Faces test:⁸ evaluates the ability to comprehend basic mental states¹⁶ (happiness, sadness, anger, surprise, fear, and disgust) and complex ones (desire, interest, preoccupation, suspicion) through facial expressions. Eyes test - revised:⁹ evaluates the comprehension of complex mental states observing the eyes. Faux Pas Recognition Test:⁵ measures the comprehension of social situations and the capacity to infer mental states through short stories describing different social situations with and without inadequate commentaries to detect. Other instruments: The Wisconsin Card Sorting Test (WCST),¹⁰ the Tower of London (TOL),¹¹ and the Trail Making Test (TMT-A y TMT-B)¹² were administered to evaluate executive functions.

The results obtained in the MEC (Figure 1) show difficulty in the ability to comprehend and express emotion through voice inflection, using the same

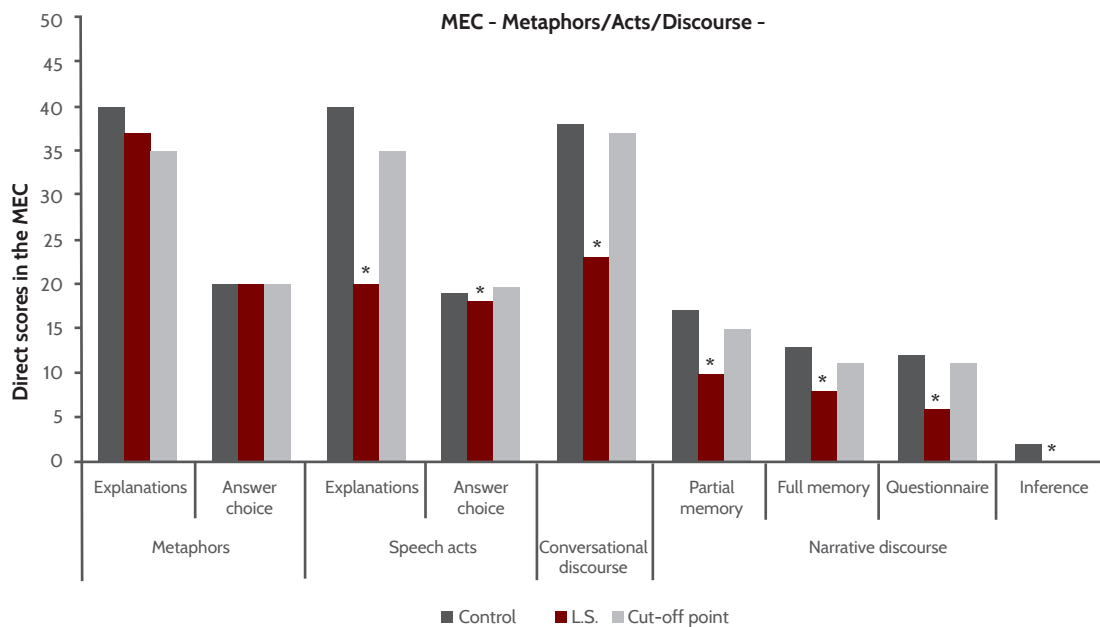
melody to express happiness, sadness, and anger. It is below the average and the control in the interpretation of indirect speech acts (Figure 2), in which he should decipher non-literal messages based on the context ('I have a headache' implying to lower the music volume). In the interpretation of metaphors ('My son is a saint') and idiomatic expressions ('He made a decent woman out of her'), he situated in the normal, though showing a marked tendency to add unnecessary information and to use inappropriate arguments. In narrative discourse, there are major difficulties to handle information as it is broadened (Figure 2). Does not perform an adequate selection of relevant information and adds, omits, and modifies details, resulting in an unclear discourse with no conductive thread. In the assignment to give a title to the text, there was no inference in the two given opportunities. In the analysis of conversational discourse there is a marked tendency to logorrhea, constantly using crutches ('no worries', 'phenomenal'), repeats content and makes sudden changes in the conversation topics, continuously bringing them back to his focus of interest: his present situation. He does not cede and even 'steals' the conversation turn.

Figure 1. Scores in linguistic and emotional prosody (MEC).



Note: * Process altered, according to the cut-off point established by scales.

Figure 2. Scores for metaphors, speech acts, and narrative discourse (MEC).

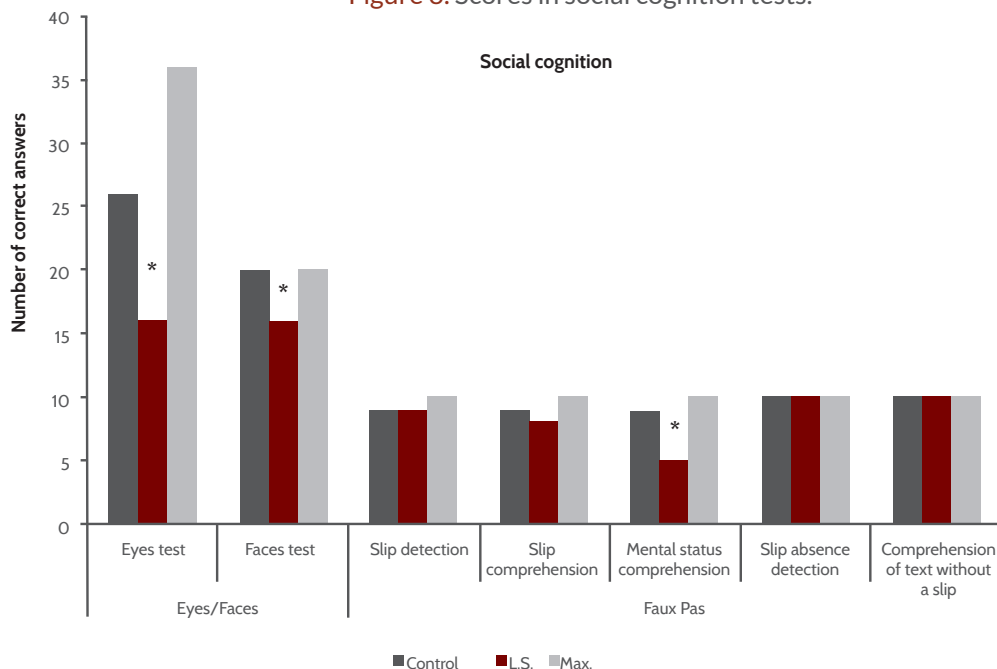


Note: * Process altered, according to the cut-off point established by scales.

In the facial recognition tests (Figure 3) L.S. made four mistakes out of 20 in the faces test, three of them in the complex mental states items (bored, interested, and arrogant), while the control subject made no mistakes. In the eyes test, he made twice as many

mistakes as the control and is below average according to the scale.13 In the Faux Pas test, he gets 9 out of 10 situations right, though he has difficulty understanding the mental state of the characters and recognizing the emotions of the victims of the slip (Figure 3).

Figure 3. Scores in social cognition tests.



In the WCST he shows a number of perseverative errors far above the control and as for the TMT, according to scale 14 a slight slowing down is observed.

The TMT B-A tool that evaluates alternating attention was in normal ranges (Table 1). His TOL results are adequate.

Table 1. Results of the executive functions tests.

	L.S.	Control
The Wisconsin Card Sorting Test	6 categories	6 categories
	106 cards*	69 cards
	(40 perseverative mistakes ^a)*	(3 perseverative mistakes)
Tower of London	34/36 ^b	33/36
Trail Making Test	TMT A t=30"	TMT A T=34"
	TMT B t=69"	TMT B T=67"
	TMT B-A T=39"	TMT B-A T=33"

^a: Formula for calculation: $[n \text{ (total cards)} - (n \text{ categories} \times \text{cards/category} + \text{random mistakes})]$;

^b: Score obtained in function of the number of movements performed to carry out the test; t = time; PC= percentile;

*: Low scores regarding the scale and/or the control subject to clinical judgement.

Discussion

The MEC protocol has been sensitive to the majority of L.S.'s clinical symptomatology and picks up on difficulties that were not revealed in observation, such as the alteration of the ability to express and comprehend emotional prosody. The protocol allows a finer evaluation than simple observation since it makes a distinction between linguistic and emotional prosody. Along this line, it's been found that brain injury patients with inappropriate social behaviors have as much difficulty recognizing emotional expressions correctly as for recognizing prosody.¹⁵ However, L.S.'s clinical symptomatology revealed other problems which the MEC did not detect, such as the difficulties in the interpretation of non-literal language. The results showed difficulty only in the comprehension of indirect speech acts, but not of metaphoric or idiomatic expressions. These difficulties could explain his uncertainty, which leads to a continuous search for explanations for every arising comment. The MEC has not been sensitive to the problems adapting to the context and interlocutor in regards to the

choice of what and how much to say, as well as to whom. There is a preservation of the abilities related to planning (TOL) and alternating attention, but not in regards to cognitive flexibility (WCST). Therefore, there is a relative dissociation between the pragmatic processes and some of the executive processes in this patient. These results support previous studies that showed that the abilities encompassed in the term 'social cognition' can be relatively independent of the ones related to the executive control.¹⁶

The results in the Faces Test, the Eyes Test, and the Faux Pas show his difficulties identifying the emotions of his interlocutors. Therefore, he is unable to tune the content and length of discourse according to the interest of his interlocutor leading him to lead the conversations. All these aspects highlight the complexity of the analysis of communication and social behaviors, as well as the importance of a fine-tuning of these tests to the cultural characteristics of the evaluated subject.

Conclusion

The MEC Protocol and other evaluation instruments have provided relevant information about this patient's pragmatic abilities, objectifying part of his clinical symptomatology and expanding the information to that obtained in the interview. The alteration in the pragmatics presents with a high frequency of perseverative behaviors. It is recommended to adapt the MEC Protocol to the Spanish-speaking population and design situations closer to quotidian life to value the pragmatics in patients with acquired brain damage.

Conflict of interest

There are no potential conflicts of interest for any of the authors in this scientific report.

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