INTRODUCTION

In interactive models of receptive language processing such as those by Dell (1986) and Martin and Safran (1992) (Figure 1), spreading of activation between language levels is determined by 2 properties:

- **Decay rate of phonological, lexical and semantic activations**

  During speech comprehension, a decay impairment leads to a reduced impact of phonological representations, activated first and thereby suffering to a greater extent from the severe decay rate, as opposed to semantic representations.

- **Connection strength between phonological, lexical and semantic levels of representation**

  During speech comprehension, a reduced connection strength leads to an increased impact of phonological variables, and a reduced impact of lexical and semantic variables.

These two processing impairments can parsimoniously explain the co-occurrence of a number of language processing impairments in aphasic patients while classic box-and-arrow-type models of language processing often need to post the existence of multiple deficits. However, neuropsychological evidence supporting interactive accounts of language processing deficits is currently limited to a small number of cases.

AIM

Present a single case study providing further new support for the existence of decay rate impairments as an underlying cause of receptive language impairment.

METHOD

**Participants**

MF (aged 52) is an aphasic patient with a left hemisphere ischemic lesion and has subtle speech comprehension impairments. The control group is composed of 15 normally developing adults (mean age: 55 years).

**Tasks**

- Auditory lexical decision with phonologically and semantically related primes: if decay impairment, reduced phonological priming effect
- Judgement of synonyms for high and low imageability word pairs
- Single word repetition for high or low imageability words
- Consonant oppositions
- Vowel oppositions
- Minimal pair discrimination (without delay)

**Results**

The interpretation of MF’s language processing deficits differs according to theoretical approaches:

- **According to classic box-and-arrow models:** multiple deficits have to be posited at the level of speech perception (auditory analysis system), phonological processing (acoustico-to-phonological conversion), lexical-semantic access (auditory input lexicon and semantic system) and short-term memory.

- **But according to the interactive account of Martin and Safran (1992):** a single decay rate impairment (as expressed by a reduced impact of phonological variables as opposed to semantic variables) explains all aphasic symptoms.

MF illustrates the conceptual parsimony of computational accounts of language processing and their usefulness for the assessment of aphasia.

References


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