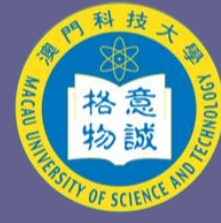


The effect of Chinese character components on lexical priming and access from the perspective of biolinguistics: An analysis of the pathogenesis and rehabilitation case of anomie aphasia

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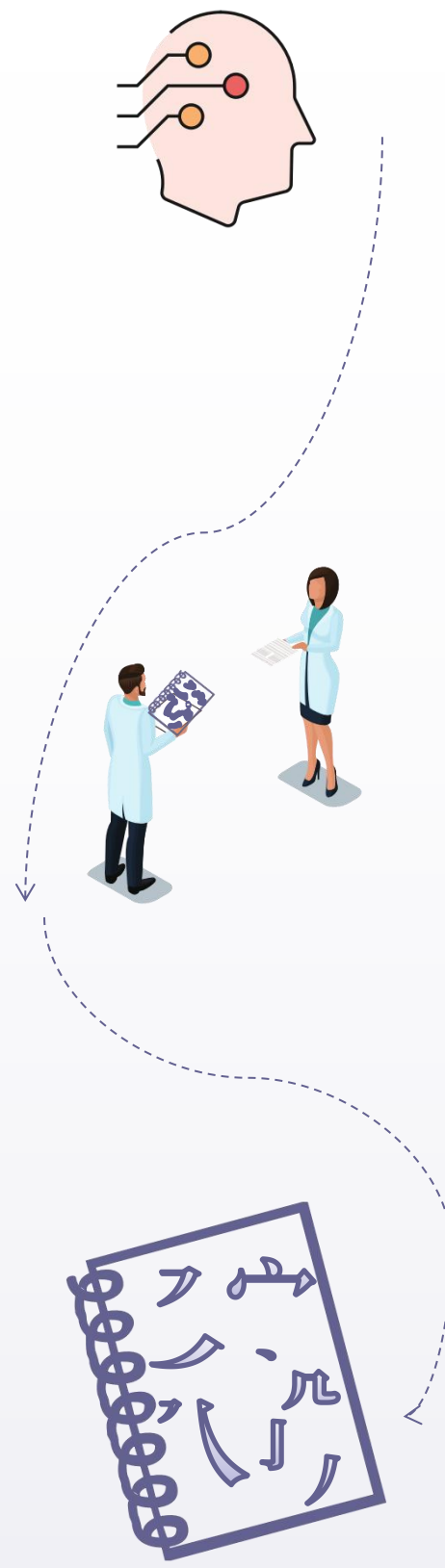
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INTRODUCTION

- The specific type of aphasia depends on the region of the brain lesion. Naming is a crucial component of language processing. Clinically, **anomic aphasia** is distinguished by "anomia." Lesions associated with anomia are primarily located in the temporal lobe, which is closely linked to the brain's lexicon, lexical storage and retrieval, and language production mechanisms¹.
- The discussion on lexical priming centers on the involvement of the phonetic component in processing, as well as its role and function in language processing. Currently, **three prominent theoretical models of lexical recognition and priming** are: the Phonological Intermediary Channel Model², the Dual-Channel Model³, and the Semantic Direct Model⁴.

OBJECTIVES

- From a biolinguistic perspective, this study aims to explore the **neural mechanisms and linguistic pathology** of anomic aphasia.
- To explore the effects and influences of the Chinese character components (phonetic radicals, semantic radicals, characters from the same character family) on lexical storage, retrieval and priming in the brain lexicon of people with anomia. While studying the priming and influence of the writing system as a language re-encoding system on the elements of the language system, to further explore **the mechanisms of language processing** from the perspective of biolinguistics.
- To design a more targeted and multimodal **language rehabilitation training therapy** for patients with anomic aphasia to clinical rehabilitation.



PROCEDURES, METHODS & MATERIALS

- Analyze and discuss the pathogenesis of anomic aphasia from the perspective of biolinguistics. Based on the **theory of diversity of language centers in the brain**⁵, the brain damage of anomia is specifically located, and its neural basis is analyzed; based on the **theory of Ogden and Richards's meaning triangle**⁶, its linguistic basis and pathology are analyzed.
- Select subjects with anomia to participate in the **experiment on the priming effect of Chinese character components on lexical retrieval/the experiment on the rehabilitation of anomia**.
- Subjects and Inclusion Criteria:** Participants will include individuals with anomia who exhibit significant difficulty in lexical retrieval during spontaneous speech and visual naming. Subjects must meet the diagnostic criteria for anomia, be right-handed, and native Mandarin speakers.
- Materials:** This study aims to explore the priming effect of Chinese character components (phonetic radicals, semantic radicals, characters from the same character family) on the lexical retrieval and access of aphasic patients. To control the variables, the experimental components and whole characters selected are all morphophonetic characters with balanced left-right and top-bottom structures.
- Adjustment of **rehabilitation treatment plan** based on the experiment results

RESULTS & DISCUSSIONS

1. Neural Basis, Linguistic Basis, and Pathology of Anomic Aphasia

The common damaged areas in patients with anomia include the **dominant temporal pole**, with the **temporo-occipital junction** involved with a certain frequency. In English anomia, the specific lesion areas include the middle temporal gyrus (MTG), whereas in Chinese anomia, temporo-parietal junction is involved.



Fig. 1. Language specific localization of brain damage centers in anomia

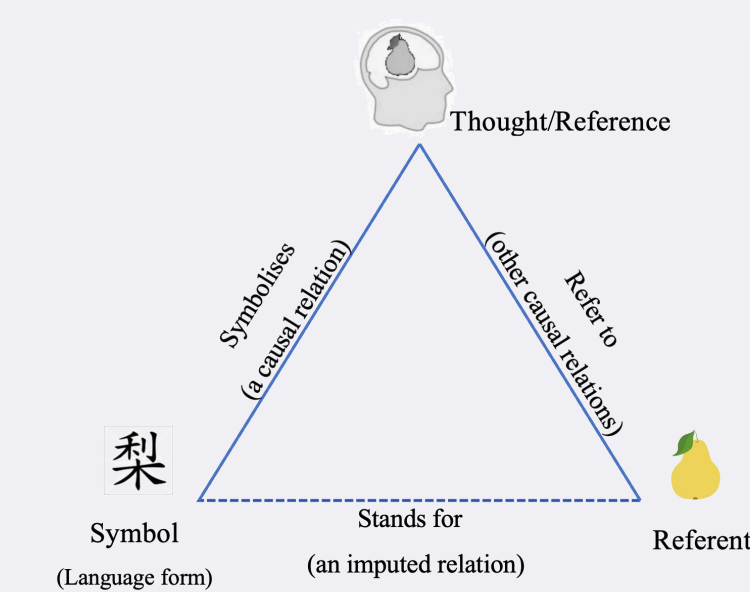


Fig. 2. Example of semantic triangle pattern and pathology of anomic aphasia

Linguistic Pathological Analysis of Anomia: The conceptual mediation deficit in anomia patients, specifically the difficulty in lexical extraction and priming, leads to a **weakening of the memory** of the indirect attribution relationship between the linguistic form and the objects it refers to. This **disruption in connection** prevents anomia patients from assigning a linguistic name to an object upon seeing it.

2. The Chinese Character Radical Priming Experiment on Lexical Retrieval in Anomia

- Compared with the semantic radical group and the character family group, the **phonetic group had the highest mean score, shorter reaction time and higher accuracy rate**. For characters of the same family, the mean reaction time score of this group was the lowest among the three groups, while that of the semantic character group was in between.
- The study found that as visual stimulus symbols that store phonetic information, Chinese character phonetic radicals were the fastest in inducing word/lexical retrieval in patients with anomia. In the lexical priming and processing mechanism of patients with anomia, **both phonetic radicals and semantic radicals had priming effects**. When unable to name a word, patients demonstrated a **greater tendency toward phonetic radical priming**, which also resulted in better rehabilitation outcomes.

3. Verification and Supplementation of the Lexical Priming and Access Mechanism Model

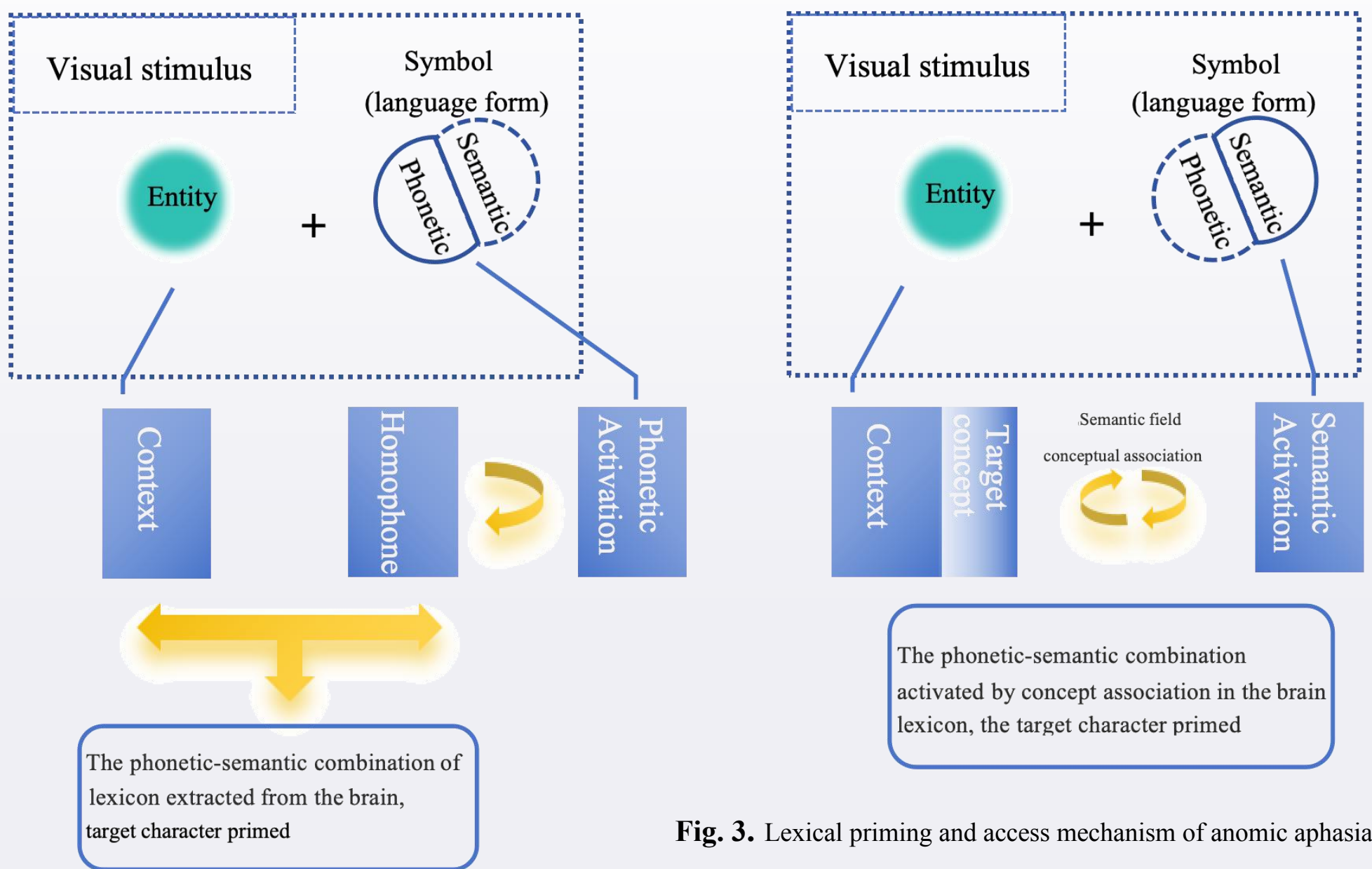


Fig. 3. Lexical priming and access mechanism of anomic aphasia

- People with anomia tend to rely more on phonetic mediation, that is, in the dual-channel model, during language acquisition and rehabilitation, the lexical priming of **the graphic-phonological-semantic of the phonological intermediary channel is dominant**, and the processing frequency of this channel is higher than the graphic-semantic direct channel.

4. Interdisciplinary Collaboration With the Clinic Rehabilitation Field

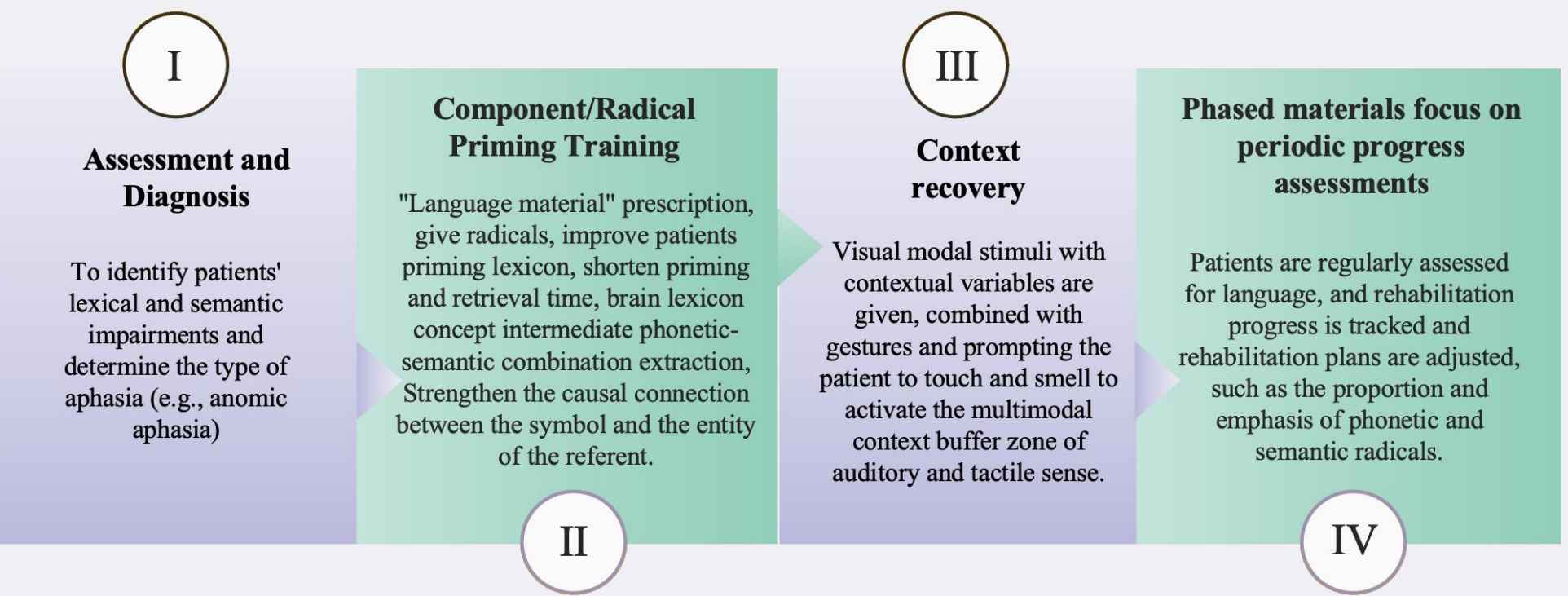


Fig. 4. Chinese Character Radical Priming Therapy -CPT



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