

# TREATMENT OF LEXICAL-SEMANTIC DISORDERS IN EARLY ALZHEIMER'S DISEASE: PRESENTATION OF THREE INTERVENTION PROGRAMS

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## INTRODUCTION

Alzheimer's disease (AD) is one of the most common neurodegenerative diseases. It leads to a **disorganization of the semantic memory (SM)** from the **early-stage of the disease**, which results in **lexical-semantic difficulties** (anomia, words confusion, etc.). In this study, we aim to investigate **three different methods to improve lexical retrieval skills** of AD patients: 1) the **Elaborated Semantic Feature Analysis (ESFA)**, 2) the **Sensory-Motor Stimulation (SMS)**, and 3) the **hybrid method (HM)**. These methods are based on different theoretical models. The ESFA is based on **abstract models of SM** [1]. According to these models, semantic concepts are represented by interrelated nodes within a network. The activation of a concept will lead to the activation of another concept that is linked to it via the **principle of activation propagation**. The ESFA relies on this propagation principle to facilitate lexical retrieval. The SMS is based on the principles of **embodied cognition** [2]. According to this theory, knowledge is not abstract, and conceptual retrieval is only possible through the **activation of old sensory and motor traces**. Finally, the last method is based on a **hybrid conception**. According to this conception, conceptual recovery would be possible thanks to a **semantic hub** located in the temporal region [3]. This is a convergence zone that allows the co-activation of sensory and motor traces and abstract semantic features.

## METHODOLOGY

### POPULATION

30 AD participants will be selected according to the following criteria :

Inclusion criteria	Exclusion criteria
French as mother tongue	Uncorrected visual/hearing disorders
Diagnosis of AD	Other neurological disease than AD
MMSE > 20	Psychiatric disorders
Lexical-semantic deficits	Pervasive affects of anxiety-depression

Table 1: Selection criteria

The selected participants will be divided into three groups and for each treatment program, there will be 10 participants.

### PROCEDURE

The experimental design will be composed of three assessment phases and one treatment phase (Figure 1). During the pretest phase, several screening tests will be administered (Table 2). In addition, lexical-semantic abilities will be assessed via a semantic knowledge battery, a semantic matching task and a verbal fluency task. Concerning the naming abilities of participants, a naming task of 100 pictures will be repeatedly assessed in order to have a baseline. During the treatment phase of 8 weeks, participants will be seen twice per week for 50-minutes sessions and 14 concepts among the failed concepts will be trained. After the treatment phase, all assessment tools will be administered again during the posttest phase and follow-up phase (one month after the end of the treatment), in order to demonstrate the improvements following the treatment.

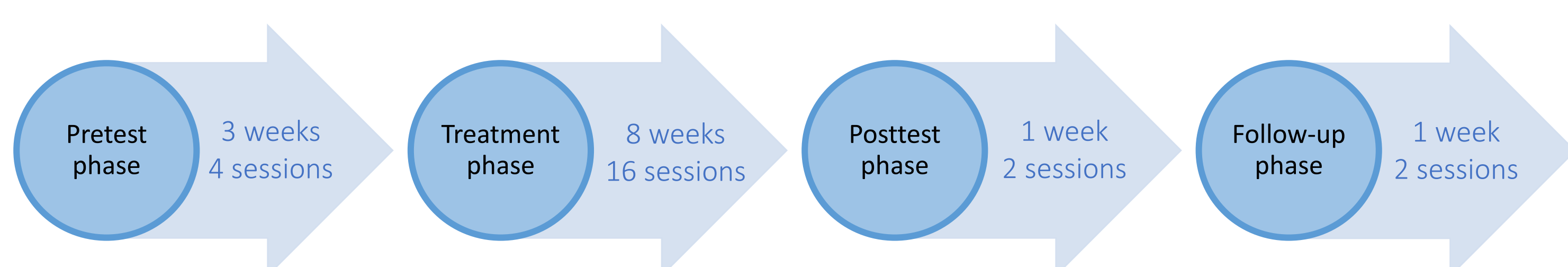


Figure 1: Design experimental

	Tools
General cognition assessment	Mini Mental State Examination
Psychoaffective assessment	Geriatric Depression Scale 15 Covi
Quality of life assessment	Alzheimer's disease-Quality of life
Executive functions assessment	Frontal Assessment Battery
Episodic memory assessment	5 words of Dubois
Lexical-semantic abilities assessment	BECS-GRECO Camel and Cactus Test Picture naming task Verbal Fluency
Speech assessment	Speech task of GrémOTS

Table 2: Assessment tools

### MATERIAL

The first method is based on the use of the ESFA chart (Figure 2). The aim is to repeatedly activate many semantic features belonging to the target concept in order to reinforce the links between the semantic features and to allow the activation of the target concept.

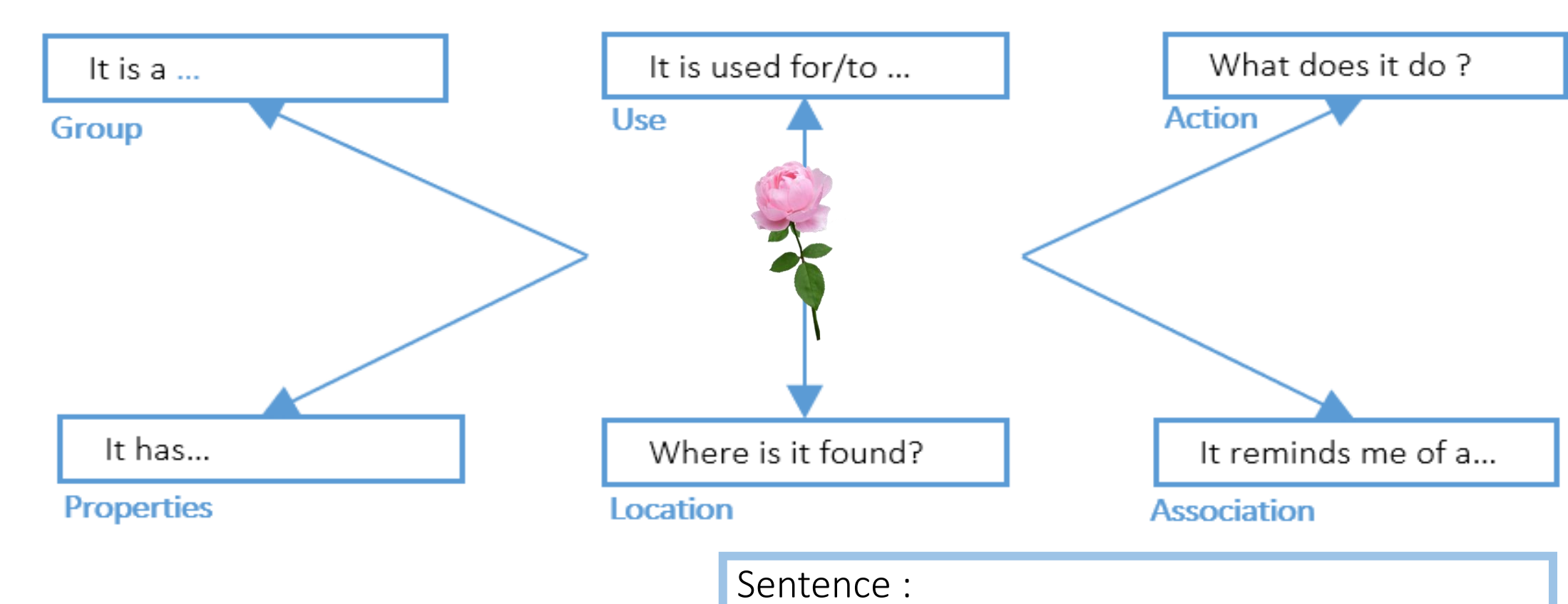


Figure 2: Elaborated Semantic Feature Analysis chart

The SMS aims to propose sensory and motor stimulations to the participants in order to activate the old traces and to allow a conceptual retrieval. The stimulation will always start with the dominant sensory modality (Figure 3).

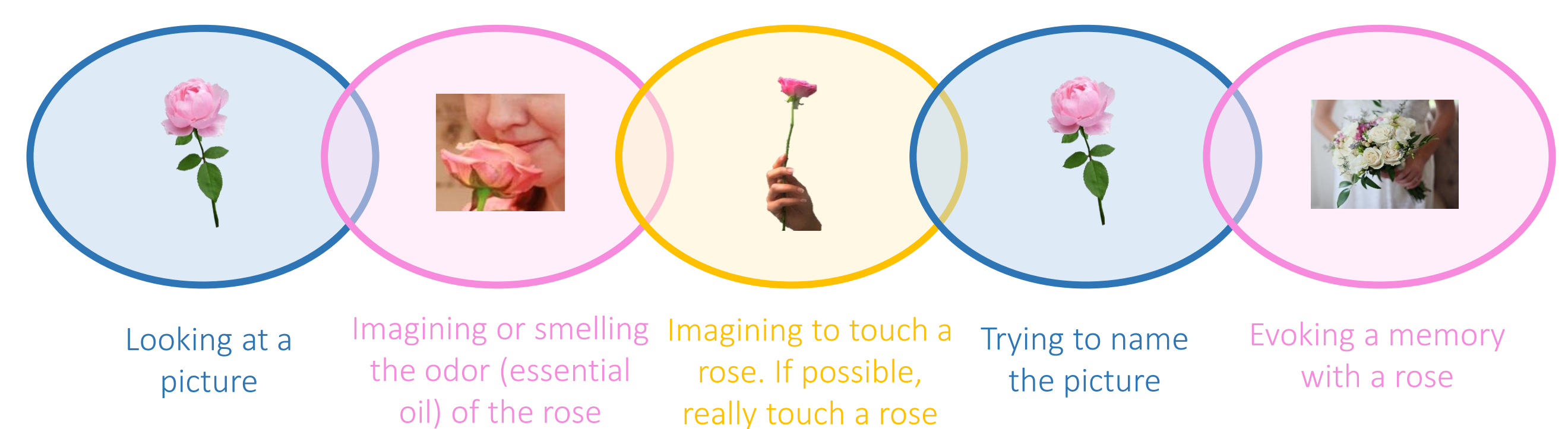


Figure 3: Sensory-Motor Stimulation

The hybrid method, as shown on figure 4, proposes a simultaneous activation of both abstract and sensory-motor features in order to allow a conceptual retrieval.

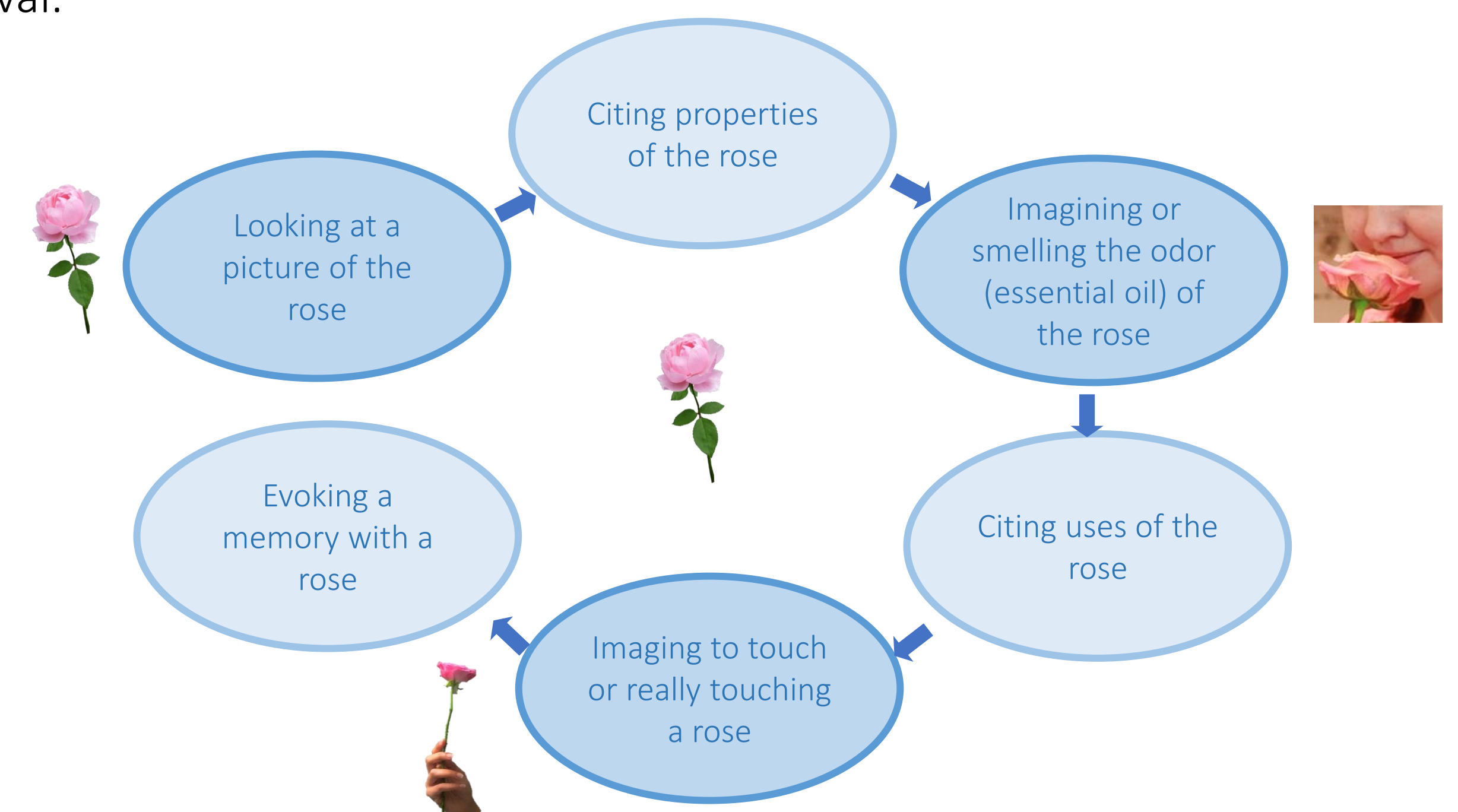


Figure 4: Hybrid method

## PRELIMINARY RESULTS AND CONCLUSION

The results of this study are not yet available, as it started recently. However, the preliminary results of a previous study investigating SFA in two participants with early AD were **very interesting** [4]. It was possible to find that SFA resulted in a **statistically significant improvement in one of the participants**. Apart from this significant improvement, a **reorganization of SM** was found. In both participants, **a change was found in the lexical errors produced**. Indeed, following the treatment, the rate of non-responses decreased and was replaced by lexical production (semantic/visuo-semantic paraphrases and circumlocutions). In conclusion, these preliminary results allow us to affirm that the **treatment of anomia in the early stage of AD is possible** and show the interest of investing new methods of treatment. Thus, our treatment programs based on different theoretical models will advance current knowledge in terms of treatment and identify the best strategies for treating lexical-semantic difficulties in AD.