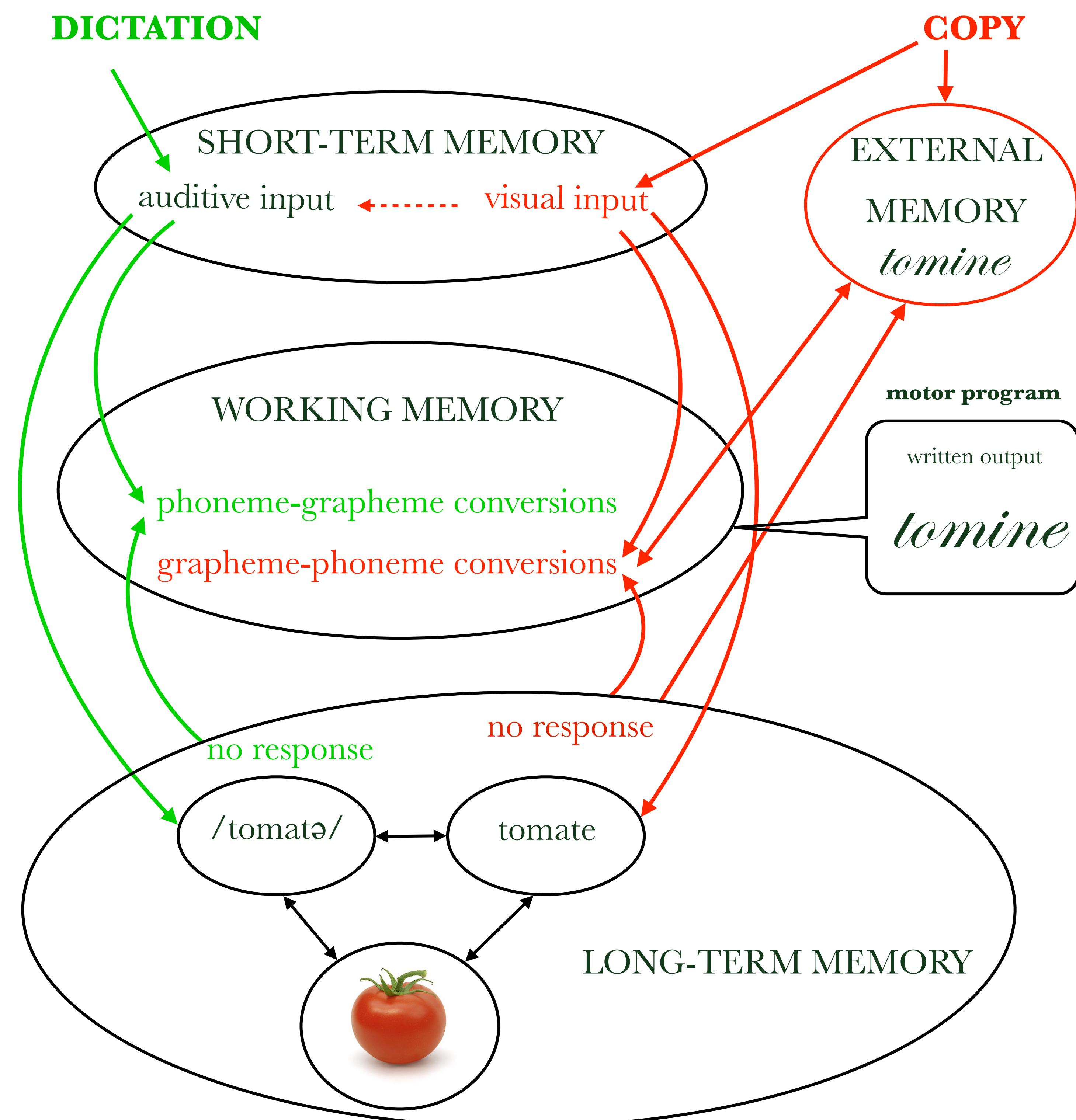
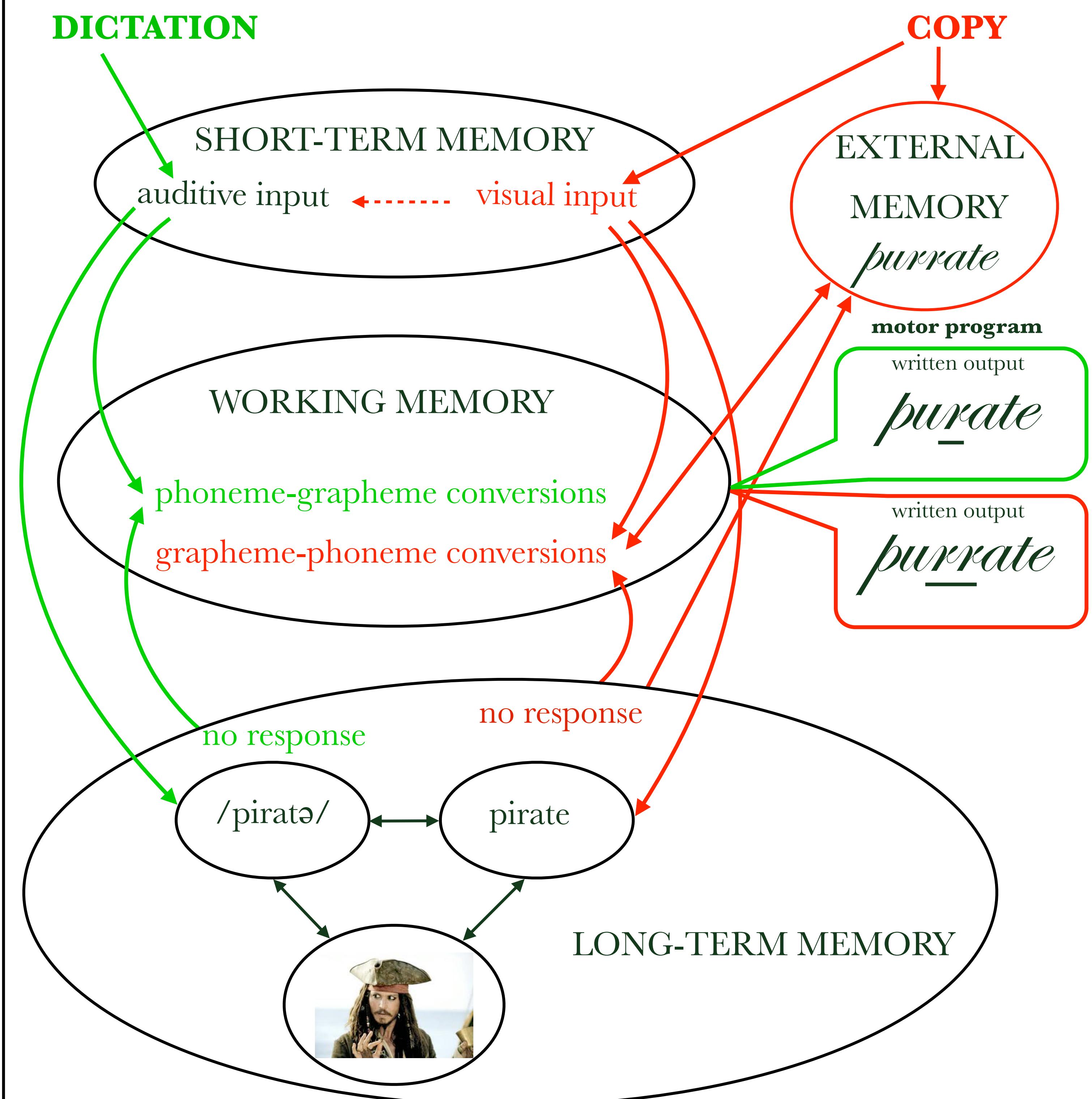


Studies on handwriting (Zesiger, 1995; Van Galen, 1991) focused on the role of copying tasks in acquiring graphic and orthographic forms simultaneously. However, the relationships between these two acquisitions have rarely been analysed according to cognitive load and patterns of word regularity. Numerous cognitive structures can be distinguished while copying isolated words: the external memory that refers to the document on which words are written (the visual input), the mental lexicon (phonological and/or orthographic representations and semantics), a motor program (the grapho-motor execution) and the working memory (phoneme-grapheme conversions + retrieving from LTM). In the present paper, we present the modelizations (following connexionist principles, see McClelland & Rumelhart, 1981) of copying task against dictation task of pseudowords (constructed according to phonotactic rules of French) that vary according to their orthographic regularity. Then we switch to familiar but irregular words in order to examine the interaction effects between phonological and orthographic representations. Experimental predictions are made on the basis of these models, they can be tested in normal writing as well as in written language disorders.

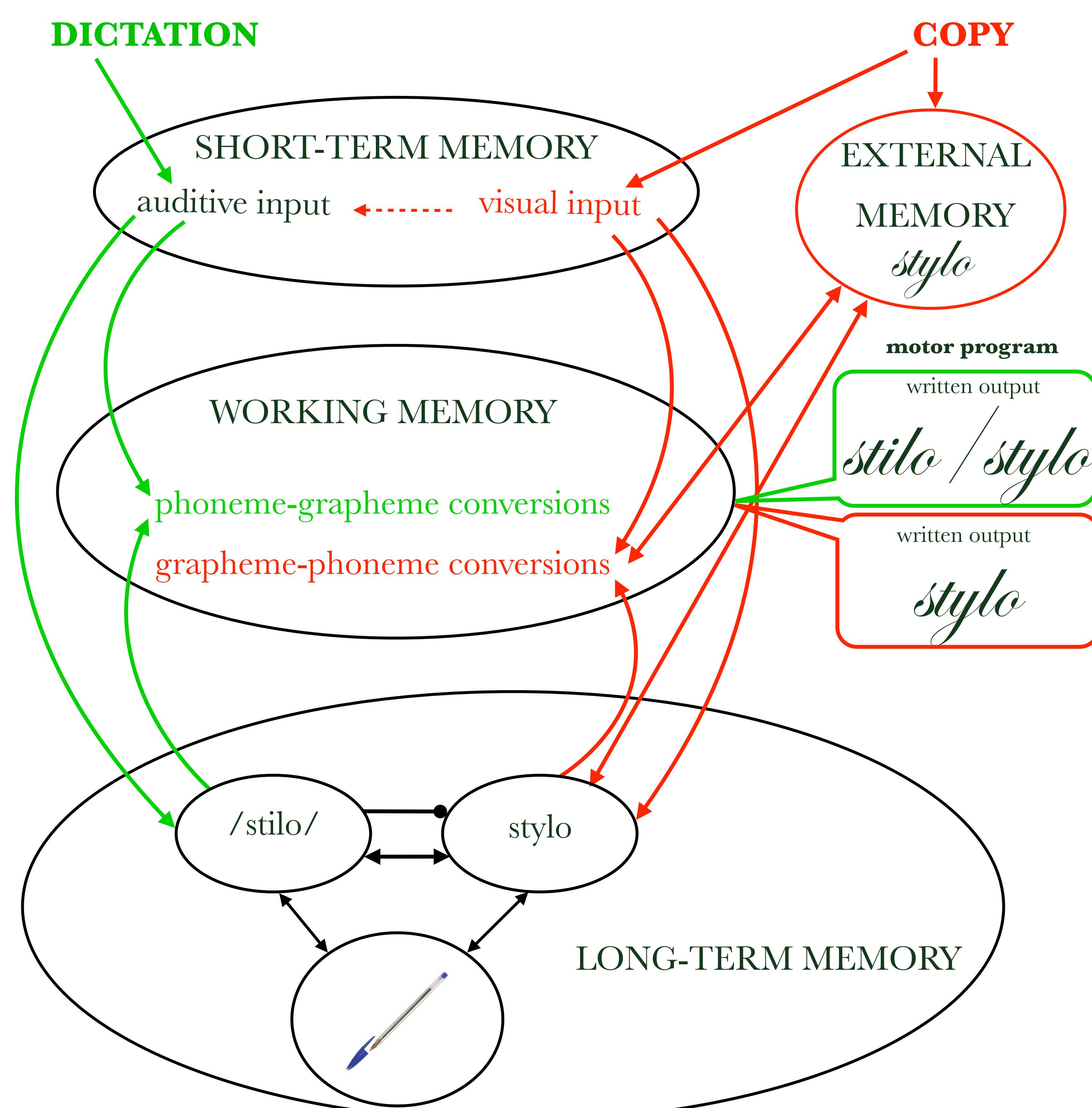
REGULAR PSEUDOWORDS (e.g., *tomine*)



IRREGULAR PSEUDOWORDS (e.g., *purrat*)



FAMILIAR BUT IRREGULAR WORDS (e.g., *stylo*)



Discussion

According to our hierarchical model of tasks, the auditive input and the visual input of regular pseudowords like *tomine* trigger the activation of both the short-term memory (that codes either the auditory form in dictation or the visual form in copy) and the long-term memory (all the surface forms that can match with the input are activated simultaneously, this is the case of *tomate*, *tomme*, *mine*, etc., however none of them reach the threshold that can feed the working memory). In the case of copy, the long-term memory interacts bidirectionally with the external memory (i.e., the pseudoword pattern written on the paper) and this pattern can be used to feed the working memory helping the grapheme-phoneme conversions. In the case of irregular pseudowords like *purrat*, the engaged processus are the same except that only the copy task can produce the correct orthographic form *purrat* thanks to the written pattern. Finally, when familiar but irregular words (e.g., *stylo* 'pen') are introduced in the model, the production via the dictation task can be either correct (*stylo*) or incorrect (*stilo*) since it depends on the activation of the orthographic representation of the input in the mental lexicon: either it is well coded or it is not. Moreover in the last case, *stylo* being irregular, its phonological representation can inhibit its orthographic representation because there are two possible issues (*i* or *y*). On the contrary, in the copy task, even if the orthographic representation is not well coded, the conflict between the phonological and the orthographic representations can be resolved by the use of the external memory containing the word pattern. Written word production is correct and the orthographic representation is strengthened by the pattern and its motor execution (it is all the more important in learning situations).

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