The contribution of morphological skills to L2 reading comprehension

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1 Background

Over the last decades, psycholinguistic research has convincingly demonstrated the role of morphology as one of the organization criteria of the mental lexicon, both in adult speakers (see, e.g., Amenta & Crepaldi 2012 for review) and in developing readers (Burani et al. 2008; Colé et al. 2012). While such studies have mostly concentrated on the implicit unconscious processes underlying morphological organization, studies exploiting explicit metalinguistic measures of morphological skills have highlighted that speakers can also exhibit awareness of words' internal structure, and that such awareness is strongly associated with general reading comprehension abilities. Specifically, studies on L1 reading development have identified morphological awareness, defined as the ability of the speaker to perceive words' structure and to manipulate the smallest units of meaning in language (Carlisle 1995, 2000), as one of the strongest correlates of reading achievement. According to such studies, morphological skills can exert their influence in successful text comprehension, as demonstrated by the fact that children's knowledge about word structure emerges quite systematically as having a positive correlation with reading abilities and text comprehension skills. In other words, young readers with a high level of morphological awareness can better analyse meaning in morphologically complex words with cascading benefits to the understanding of the text as a whole (Carlisle 1995, 2000; Nagy et al. 2003; 2006). In this vein, Levesque, Kieffer & Deacon suggest that "[a]s a metalinguistic skill reflecting the synergy of sound and meaning, morphological awareness may be a foundational element of the linguistic system that works alongside other integration processes to build a mental model of the text while reading" (Levesque, Kieffer & Deacon 2017:18). Interest towards explicit metalinguistic abilities about morphology and how developing readers might put them to good use when reading a text have recently expanded to the field of L2 studies, with particular attention dedicated to children of immigrant families attending the L2 school system. A growing body of evidence has shown that morphological skills play a role in the reading skills of L2 and bilingual speakers too (e.g., Kieffer & Lesaux 2012; see Jeon & Yamashita 2014 for review), with findings indicating that the relationship between knowledge of morphology and reading comprehension becomes stronger between fourth and fifth grade, consistent with what has been observed in monolingual children.

2 Our study

So far, despite a growing attention to the issue of morphological knowledge in bilingual children in other languages (e.g., Vernice & Pagliarini 2018 on Italian, Fejzo 2020 on French), research on such population has mostly focused on English L2. Our study proposes to contribute to fill this gap, by focusing on Italian, for which studies focusing on children's morphological knowledge have largely made use of implicit on-line experimental techniques, focusing mainly on the contributions that morphology brings to L1 decoding skills, with the notable exception of the recent study by Vernice & Pagliarini (2018), which examined the relationship between morphological awareness and both decoding and reading comprehension skills in monolingual and bilingual pupils. Contrary to the literature on English L2, however, the study did not clearly find a correlation between reading comprehension skills in bilingual speakers (with Arabic L1) ranging from 3rd to 5th grade.

The goal of our study is twofold. First, we aim at further exploring the role of morphological knowledge in bilingual children's reading comprehension skills. By doing so, we will also reflect on the different dimensions underlying the construct of morphological awareness and on how they contribute to reading comprehension. It has indeed been acknowledged that the variety of tasks used in the literature may possibly tap different levels of morphological knowledge, not all of which may be relevant for text comprehension (McCutchen & Logan 2011). Recent literature (McCutchen & Logan 2011; Kuo & Anderson 2006; Deacon et al. 2017; Levesque et al. 2019; see also Carlisle 2000) tends to distinguish between morphological decoding, i.e., the ability to use morphemes to pronounce a word accurately, morphological structure awareness, i.e., awareness of the morphological structure of complex words, and morphological analysis, i.e., the ability to infer meaning from words' parts, identifying the latter as the crucial subcomponent of morphological knowledge involved in text understanding. On such premises, in order to disentangle the potential role of some of the subcomponents of morphological knowledge, we chose to assess the participants of our study through a combination of different tasks, focusing especially on the constructs of morphological (structure) awareness and morphological analysis, which are possibly more likely to impact on textual understanding.

2.1 Materials and Procedure

Participants were second-generation pupils with various language backgrounds attending 6th to 8th grade (n=47; mean age: 11,8) in three secondary schools located in Northern Italy. Preliminary tests were administered to ensure homogeneity of levels of the participants by using standardized assessment tools.

With regard to morphological skills, since no standardized measure is available for Italian, tests were specifically designed by the researchers, following some of the common proposals found in the literature. Specifically, we used the test of morphological structure (Carlisle 2000) to assess the subjects' sensitivity to the internal structure of the words, i.e., what is most commonly referred to as morphological (structure) awareness. In this task, subjects are required to identify either the derivative form or the base form of a word given as clue to be used in the context of a sentence provided, as in the following examples:

> [Decomposition] *Pescatore* ('fisherman'). *È severamente vietato* _____ *in quel tratto di lago* ('It is strictly forbidden _____ in that stretch of the lake')
> [Derivation] *Coltivare* ('cultivate'). *In Irlanda la* _____ *di patate è molto diffusa.* ('In Ireland potatoes _____ is widespread').

The test was designed to assess both decomposition (i.e., identifying the base of a derivative word) and derivation skills (i.e., creating a derivative word starting from its given base).
The second task was a non-word suffix choice test (Tyler & Nagy 1989; Nagy et al. 2003): subjects were presented with sentences missing a word and were required to choose one among four given alternatives to fill in the gap. Crucially, such alternatives were all derived non-words, created through a legal combination of a non-existent base and an existent suffix, as exemplified below:

> *Dopo una lunga battaglia, i soldati infine si arresero a causa della* _____. ('After a long battle, the soldiers finally surrendered because of the_____.')
> a) *ruvante;* b) *ruvabile;* c) *ruvezza;* d) *ruvista.*

This test assessed the subject's competence in the use of derivational suffixes, since it implicitly verified the students' ability to recognize the grammatical category of the word needed and to identify, among the given choices, the words that contained a suffix that was compatible with the needed grammatical category. While such a task is commonly supposed to assess morphological awareness, we believe it may tap into a more fine-grained aspect of morphological awareness, i.e.,

what Tyler & Nagy (1989) defined as syntactic knowledge about derivational morphology ("knowing that derivational suffixes mark words for syntactic category" Tyler & Nagy 1989:649). Finally, we administered a word knowledge test presenting morphologically complex words as target items (Deacon et al. 2017). The task consisted in a questionnaire in which subjects were presented with low-frequency words and were asked to indicate the meaning of such words by choosing among four given options. Crucially, in this test, the target words were composed of both a high-frequency base and a high-frequency suffix and were transparent from the point of view of the compositionality of meaning, as exemplified below:

Target word: *passivismo* ('the behaviour of someone who is passive')

a) *il comportamento di chi si crede superiore agli altri* ('the behavior of someone who believe her-/himselves superior to others')
b) *una persona che crede di essere superiore agli altri* ('a person who believes (s)he is superior to others')
c) *il comportamento di chi non prende l'iniziativa* ('the behavior of those who do not take the initiative')
d) *una persona che non prende mai l'iniziativa* ('a person who never takes the initiative')

The goal was indeed to encourage subjects to engage in meaning guessing strategies, relying on their knowledge of the meaning of word parts, rather than on their knowledge of the words as wholes. In other words, the test aimed at verifying pupils' awareness of suffixes' prototypical meanings and their ability to use such knowledge to infer the meaning of low-frequency semantically transparent complex words, i.e., what the literatures has defined as morphological analysis.

Finally, reading comprehension skills were measured through a standardized test specifically designed for Italian, *Prove di Lettura MT* (Cornoldi et al. 2017), in which participants are given a text and asked to answer a series of multiple-choice questions on its contents.

3 Results

Reading comprehension data show that, on average, subjects answered correctly to 7,9 questions out of 15 (52%), but almost half of the participants did not reach a sufficient level of performance in this test, according to the performance ranges set by the authors of the test. For what concerns morphological knowledge, taking into consideration the combined scores for the three tests, we observed that 74% of answers provided (globally) were correct, indicating overall a fairly good level of morphological skills. However, looking at the results of each specific test, there is an evident disproportion, in that the lexical knowledge test and the suffix choice test yielded respectively 59% and 65% of correct answers *versus* the 87% registered in the test of morphological structure. More specifically, in the derivation section of this test, 79% of the answers were correct, while in the decomposition section, the accuracy rate reached 94%.

Such results confirm the need to assess morphological knowledge on multiple levels: while pupils may have a generally well-developed sensitivity to the internal structure of words, this does not guarantee that they will be able to benefit from their knowledge of morphological structure. Indeed, recognizing word boundaries does not automatically entail being able to recognize affixes' prototypical meanings and syntactic functions. Crucially, since reading for understanding is a complex process implying a continuous integration of information in order to construct meaning, it is legitimate to expect that being able to use morphological information for understanding might be related to reading comprehension abilities. This hypothesis finds confirmation in our correlation analysis. Specifically, strongest correlations were found for the word knowledge test and the non-word suffix choice task (respectively, $r=0.52$, $p < .001$ and $r=0.47$, $p < .001$), while the

correlation with the results of the derivational section of the test of morphological structure was weaker ($r=0.35$, $p < 0.015$) and no significant correlation with the results from the decomposition section was found. Ultimately, our study confirms the role of morphological skills in reading comprehension in second-generation bilingual pupils attending middle school in Italy, in line with the results found with other bilingual populations. At the same data, our data confirms the necessity of considering morphological knowledge as a multifaced construct, comprising different kinds of abilities which affect comprehension on multiple levels.

References

Amenta, Simona & Davide Crepaldi. 2012. Morphological processing as we know it: An analytical review of morphological effects in visual word identification. *Frontiers in psychology* 3:232.

Burani, Cristina, Stefania Marcolini, Maria De Luca & Pierluigi Zoccolotti. 2008. Morpheme-based reading aloud: evidence from dyslexic and skilled Italian readers. *Cognition* 108, 243–262.

Carlisle, Joanne F. (1995). Morphological awareness and early reading achievement, in Laurie B. Feldman (ed.), *Morphological Aspects of Language Processing*, 189–209. Hillsdale, NJ, England: Lawrence Erlbaum Associates.

Carlisle, Joanne F. 2000. Awareness of the structure and meaning of morphologically complex words: Impact on reading. *Reading and Writing: An Interdisciplinary Journal* 12. 169-190.

Colé, Pascale, Sophie Bouton, Christel Leuwers, Severine Casalis & Liliane Sprenger-Charolles. 2012. Stem and derivational-suffix processing during reading by French second and third graders. *Applied Psycholinguistics 33*(1). 97-120.

Deacon, Hélène S., Xiuli Tong & Kathryn Francis. 2017. The relationship of morphological analysis and morphological decoding to reading comprehension. *Journal of Research in Reading* 40(1). 1-16.

Fejzo, Anila. 2020. The contribution of morphological awareness to vocabulary among L1 and L2 French-speaking 4th-graders. *Reading and Writing* 34. 659–679

Jeon, Eun Hee & Junko Yamashita. 2014. L2 Reading Comprehension and Its Correlates: A Meta-Analysis. *Language Learning* 64(1). 160-212.

Kieffer, Michael J. & Nonie K. Lesaux. 2012. Direct and indirect roles of morphological awareness in the English reading comprehension of native English, Spanish, Filipino, and Vietnamese speakers. *Language Learning* 62(4). 1170-1204.

Kuo, Li-jen & Richard C. Anderson. 2006. Morphological awareness and learning to read: A cross-language perspective. *Educational Psychologist* 41. 161–180.

Levesque, Kyle C., Michael J. Kieffer & Hélène S. Deacon. 2017. Morphological awareness and reading comprehension: Examining mediating factors. *Journal of Experimental Child Psychology* 160. 1-20.

Levesque, Kyle. C., Michael J. Kieffer & Hélène S. Deacon. 2019. Inferring meaning from meaningful parts: The contributions of morphological skills to the development of children's reading comprehension. *Reading Research Quarterly* 54(1). 63-80.

McCutchen, Deborah & Becky Logan. 2011. Inside incidental word learning: Children's strategic use of morphological information to infer word meanings. *Reading Research Quarterly* 46(4). 334-349.

Nagy, William E., Virginia Berninger, Robert Abbott, Katherine Vaughan & Karin Vermeulen. 2003. Relationship of Morphology and Other Language Skills to Literacy Skills in At-Risk Second-Grade Readers and At-Risk Fourth-Grade Writers. *Journal of Educational Psychology* 95(4). 730-742.

Nagy, William E., Virginia Berninger & Robert Abbott. 2006. Contributions of morphology beyond phonology to literacy outcomes of upper elementary and middle-school students. *Journal of Educational Psychology* 98. 134-147.

Tyler, Andrea & William E. Nagy. 1989. The acquisition of English derivational morphology. *Journal of Memory and Language* 28. 649–667.
Vernice, Mirta & Elena Pagliarini. 2018. Morphological awareness a relevant predictor of reading fluency and comprehension? New evidence from Italian monolingual and Arabic-Italian bilingual children. *Frontiers in Communications* 3(11). 1-15.