THE INFLUENCE OF MORPHOLOGICAL KNOWLEDGE ON L2 READING COMPREHENSION

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Abstract

This paper deals with the issue of morphological knowledge and its effect on reading comprehension in L2. The weight of evidence suggests that grooming of the awareness of English morphological structure, specifically derivational structure, may be a significant help in that regard. The research also clearly suggests that morphological awareness parallels between L1 and L2 morphological structure be exploited and that morphological awareness be taught in conjunction with the explicit teaching of vocabulary.
1. Introduction

Experts agree that second-language (L2) learners are facing particular difficulties in L2 English reading comprehension. The following paper deals with the issue of morphological knowledge and the question of whether students’ awareness of the internal structure of English can help L2 learners decode the meaning of texts. Though there has so far been no clear answer to the question of what is the most efficient way improve the English reading skills of L2 learners (Kieffer and Lesaux, 2007, p. 784), the weight of evidence suggests that grooming of the awareness of English morphological structure, specifically derivational structure, may be a significant help in that regard.

The understanding of the morphemic structure of words is essential when it comes to decoding texts. Droop and Verhoeven (2003), who based their conclusions on Bernhardt’s (2000, p. 122, 169) model of text-driven and conceptually driven factors of reading comprehension, describe reading comprehension as the product of word decoding, vocabulary knowledge, morphosyntactic processing, and oral text comprehension, the combined effect of these factors initially being much stronger for L2 readers than for L1 readers (p. 99). Kern (2002) points out that, in contrast to native speakers (L1), L2 learners are much less likely to master word recognition automatically; thus, they have a particular need to pay conscious attention to morphology. Unfortunately, if morphological decomposition is not automatic, the effort to penetrate morphological structure can result in the neglect of other processes, such as the comprehension of what lies beyond the surface structure of the text (p. 135). Thus, word recognition and morphological analysis, which are strongly linked to reading comprehension, need to become much more automatic in order to facilitate textual understanding.

Morphological awareness can be described awareness of the “morphemic structure of words and their ability to reflect on and manipulate that structure” (Carlisle 1995, p. 194). Wang et al. (2006) state that morphological awareness is more than identifying the constituent morphemes of complex words and discriminating them from semantically or phonologically similar words. Children have to apply their knowledge of word-formation rules to interpret complex words correctly and to produce new word forms for themselves. Wang et al. (p. 543) divide the knowledge of morphology into four categories of ability: identification, discrimination, interpretation and manipulation. These different skill categories are acquired in a long and gradual process.

Morphological knowledge has to be distinguished from two other closely related, but distinct, types of knowledge, vocabulary knowledge and phonological awareness. According to Qian (1999), the knowledge of morphological structures is part of vocabulary depth, which refers to the learner’s level of knowledge of various aspects of a given word, or how well the learner knows a particular word. This stands in contrast to vocabulary breadth, i.e. the size of vocabulary (p. 284). There is a strong interdependence between morphological awareness and vocabulary depth and breadth. Indeed, morphological awareness is actually based on the knowledge of a certain amount of vocabulary (Droop and Verhoeven, 2003, p. 81, 99). That is to say, the learner has to have a certain vocabulary in order to begin to see morphological parts in words and relationships of those parts to other words. The same applies to phonological awareness, which Wang et al. (2006, p. 543) found to be another foundation of morphological knowledge. Phonological awareness is awareness that a word is made up of individual sounds. Carlisle and Nomanbhoy (1993, pp. 178-179) explain the relationship between phonological and morphological awareness as follows: Children have to segment the speech stream into recurrently smaller sound units and learn to distinguish those repeating clusters of phonemes that are meaningful (e.g., the syllable un- in undo) from other sound units which do not carry a distinct meaning (e.g., un in under). Just as morphological awareness is based on and nourished by an adequate and varied vocabulary, so too is phonological awareness.
2. The link between morphological awareness and reading comprehension

Research concludes that there is a link between morphological knowledge and reading comprehension. This has been established by studies focusing on different language groups, different age groups, different proficiency levels, different social contexts, and using different methodologies. With respect to social context, for example, students’ performance depends on how much time is spent on the instruction of the L2 language and on whether students were learning English in a monolingual or bilingual context. Both Wang et al. (2006) and Qian (1999) tested students who learned English in an English speaking country. Their exposure to the English language was thus much broader than was the case with the EFL learners investigated by Zhang and Koda (2012; 2013) and Jeon (2011). Wang et al. (2006) underlined that their Chinese-English speaking students all attended an English-medium school and had particularly supportive parents who conscientiously spoke English at home. Their results showed an especially strong link between morphological awareness and reading comprehension.

A number of other studies have also found a relationship between morphological awareness and reading comprehension, though the strength of their results has varied depending on the populations they have studied. Droop and Verhoeven (2003) tested bilingual children of Turkish and Moroccan origin who lived in the Netherlands. Goodwin et al. (2012) tested Spanish-speaking English language learners in the USA. However, even though they learned English in an English-speaking environment, more than half of the participants reported speaking exclusively Spanish at home. Thus, in anticipating the strength of the benefit of morphological awareness to reading comprehension, it is vital to distinguish between monolingual and bilingual settings as well between ESL and EFL, and to consider the impact of the particular social background of the students.

Results have also varied according to the age of the participants studied. Droop and Verhoeven (2003) investigated a group of eight- and nine-year-old students. Wang et al. (2006) based their study on a group of students in grades one to four (about six to ten years of age). Goodwin et al. (2012) investigated Spanish English language learners in grade five, while the participants in the study by Jeon (2011) were slightly older; Jeon concentrated on Korean tenth graders (about 14-15 years old) who had been learning English for around eight years. Given that the most significant increase in the acquisition of morphological knowledge has been found to occur between fourth and fifth grades, it seems logical that the most reliable results could be observed with students in the 8-10 year age group.

However, some studies focusing on university students have also found a link between morphological awareness and reading comprehension. Zhang and Koda (2012) investigated a group of adult EFL learners in China who had already been instructed in English for about nine years. Qian’s (1999) participants were ESL university students in Ontario. It is interesting to note that both these studies could, in contrast to many other studies, make out only an indirect contribution of morphological awareness on reading comprehension (p. 300), an issue that is discussed in the next section.

Most of the studies reviewed here have dealt with reading comprehension in English (Qian, 1999; Goodwin et al., 2012; Zhang and Koda, 2012; 2013; Wang et al., 2006; Jeon, 2011; Singson et al., 2000; Kieffer and Lesaux, 2007; Nagy, 2007). However, the studies differ widely with regard to their participants’ L1. There have been quite a number of studies focusing on Chinese and Korean. Zhang and Koda’s as well as Wang et al.’s (2006) participants were native Chinese-speaking students. Qian (1999) investigated both Chinese and Korean students, while Jeon’s (2011) research focused on students from South Korea. It seems that the connection between Chinese and Korean on the one hand and English on the other hand is a matter of great interest which might be due to the large number of Chinese English learners, but also due to their specific structural differences and similarities. Like English, Chinese and Korean rely strongly on compounding as a word formation device, but they do not have similar derivational or inflectional properties as English. Hence, it is clear that the outcome of the studies including Chinese or Korean differs considerably from studies dealing with L1s that have other common properties. Goodwin et al. (2012), for example, who tested native Spanish-speaking learners of English, observed much stronger parallels with regard to the derivational structure of L1 and L2, whereas the results for compounding or inflections were not significant.

A few studies have dealt with L2s other than English. Kern’s (1989) research was based on a small group of American university students learning French and Droop and Verhoeven’s (2003) interest lay in three different groups of elementary school students in the Netherlands: one group of native Dutch speakers, one Turkish L1 group and one Moroccan L1 group, the latter two being learners of Dutch as a second language.
In sum, the strength of the relationship between increased morphological awareness and better reading comprehension has been hard to generalize, due to the different language groups, age groups, proficiency levels and social contexts involved. However, this variety in the studies also strengthens the conclusion that there is a relationship between morphological awareness and reading comprehension: those students who are more aware of morphology in complex words tend to also be better readers.

While the link between morphological awareness and reading comprehension has been well established, several studies have shown that awareness of derivational structure is more related to L2 reading comprehension than awareness of inflectional structure. Generally speaking, derivation creates a different part of speech via the addition of affixes (e.g. good\textit{ADJ} + -\textit{ness} \rightarrow goodness\textit{NOUN}; quiet\textit{ADJ} + -\textit{ly} \rightarrow quietly\textit{ADV}; bake\textit{VERB} + -\textit{er} \rightarrow baker\textit{NOUN}), whereas inflection adds affixes that carry purely grammatical meaning (e.g. cat + -\textit{s} \rightarrow cats; jump + -\textit{ed} \rightarrow jumped). The reading comprehension of young Chinese learners of English in the study by Zhang and Koda (2013) was most significantly affected by awareness of derivational and compound structure (pp. 909, 911). They hinted at the higher level of complexity of derivational morphology, which, once mastered, significantly improves textual comprehension, as the students can profit from their insight into derivational structures in order to divide sentences and infer the meaning of the smaller parts (Nagy, 2007, p. 64). The fact that Kieffer and Lesaux (2007) focused on derivational morphology, too, suggests that derivation is likely to be the part of morphology playing the most significant role in reading comprehension (p. 784). It seems that, due to its complexity and varying degrees of opacity, a lack of morphological awareness of complex derivational structure can remarkably inhibit reading comprehension. On the other hand, knowledge of derivational morphology can “unlock meanings” and contribute enormously to an enhanced understanding of texts (Zhang and Koda, 2013, p. 911). Students are likely to acquire awareness of English inflectional structure and compounding before they acquire awareness of English derivational structure. However, it is awareness of English derivational structure that offers the greatest benefits when it comes to reading comprehension.

Studies have found that the relationship between morphological awareness and reading comprehension strengthens over time, as L2 proficiency increases. Zhang and Koda (2013) argued that the connection between these two factors becomes stronger with the learners’ increasing overall proficiency in English (p. 910). They also pointed out that, as hinted above, different facets of morphological knowledge are acquired at different ages and different levels of proficiency, which means that the acquisition of morphological knowledge and its unique contribution to reading comprehension is a gradual process.

According to the research, the contribution of morphological awareness on reading comprehension is very closely related to word knowledge, which is acquired over time and with schooling (Goodwin et al., 2012, pp. 1406-1407). As previously mentioned, the learner needs a certain vocabulary before he/she can become morphologically aware. Kieffer and Lesaux (2007) argue that the threshold vocabulary needed to recognize related words and to understand texts has to consist of at least 3,000 word families in the mental lexicon, i.e. 3,000 groups of words, many of which share the same base but have different affixes, such as health, healthy and unhealthy; bake, baker, baking; happy, unhappy, happier, happiness, etc. Qian (1999) underlined the importance of a threshold vocabulary size to reading comprehension, claiming that for minimum comprehension of a text, a 95\% lexical coverage would be needed. He further confirmed the results of Kieffer and Lesaux (2007) and other researchers who claimed that in order to register a considerable positive effect on textual understanding it was essential to teach 3,000 English word families or about 5,000 individual word forms (pp. 286-287).

Numerous researchers (Zhang and Koda, 2013; Kieffer and Lesaux, 2007; Tong et al., 2011; Verhoeven et al., 2003; Qian, 1999) agree that the crucial time for building vocabulary knowledge and thus developing and exploiting the morphological knowledge that is useful for reading comprehension, is between the fourth and fifth grade and the upper elementary years. While Kieffer and Lesaux’s findings (2007) point to a unique contribution of morphological knowledge on reading comprehension in the group of fifth graders, they do not do so in their group of fourth graders, where vocabulary breadth was still rather limited (p. 798). Though Singson et al. (2000) dealt with reading comprehension in L1, their results were in line with these findings. They showed that not only vocabulary breadth, but also vocabulary depth, namely derivational suffix knowledge, increases notably between the third and sixth grades.

Interestingly, the contribution of phonological awareness to reading comprehension is decreasing at the same time as the contribution of morphological awareness is becoming stronger (Singson et al. 2000, p. 245). This observation indicates that from grade five on, the identification of units of meaning, i.e. morphemes, needs to become more important for textual understanding than the processing of words letter-by-letter and
sound by sound. In brief, the relationship between morphological awareness and L2 reading comprehension strengthens considerably in the upper elementary years when students have acquired a certain vocabulary knowledge, both breadth and depth, and have thus attained a certain overall proficiency level in their second language, which allows them to deal with unknown words more autonomously.

Is the link between morphological awareness and reading direct or indirect?

Some research suggests that the contribution of morphological awareness to reading comprehension is direct, which is to say that morphological awareness in and of itself leads to improved reading comprehension. Other research can make out only an indirect contribution of morphological knowledge to reading comprehension through vocabulary knowledge. That is to say, morphological knowledge leads to increased vocabulary breadth and depth, which in turn leads to better reading comprehension. Studies also show that the acquisition of morphological knowledge can be facilitated considerably by L1 transfer. Research also provides insight into the development of morphological knowledge and the different contributions of awareness of inflectional versus derivational structure on reading comprehension.

Studies that suggest a direct link between morphological awareness and L2 reading comprehension clearly outweigh those that only find an indirect influence. Kieffer and Lesaux (2007) demonstrated that morphological knowledge acts independently from breadth of vocabulary since students in their study used their morphological awareness to understand not just individual words but also to decode the entire texts (pp. 798-799). Tong et al. (2011) concluded that there had to be a direct link between morphological awareness and reading comprehension. They investigated a group of “poor comprehenders” who displayed specific weaknesses in decoding texts. Given that all of these students lacked the ability to process the morphemic structure of complex words, although their phonological and orthographic skills were comparable to the control group, they concluded that morphological knowledge made a unique and independent contribution to reading comprehension (p. 529). Kieffer and Lesaux (2008) attested a direct but independent influence of both morphological awareness and vocabulary knowledge on the reading performance of their grade five Spanish ESL learners (p. 798). In other words, each makes a distinct contribution to reading comprehension. Nagy (2007) explained the unique contribution of morphological awareness to reading comprehension over and above vocabulary knowledge by indicating the mediating effect of lexical inferencing ability, which he called “on-the-spot vocabulary learning” (p. 64). This means that the knowledge of word structure helps students decode the meaning of complex words during reading, which in turn results in a better textual understanding because vocabulary gaps can be immediately resolved (ibid.).

Despite the predominance of studies that see a direct influence of morphological awareness on L2 reading comprehension, some studies can make out only an indirect influence. Goodwin et al. (2012) found a direct interdependence between morphological knowledge and vocabulary depth on the one hand and between morphological knowledge and phonology on the other hand (pp. 1405-1406). This suggests that morphological knowledge contributes to vocabulary breadth and depth, which then enhances reading comprehension. Zhang and Koda (2012) also suggest that morphological awareness does not affect reading comprehension directly, after adjusting for word knowledge. However, its indirect effects on reading comprehension are significant, both through the mediation of vocabulary knowledge alone, and the multiple mediations of lexical inferencing ability and vocabulary knowledge (pp. 1211-1211). Both Goodwin et al. (2012) and Zhang and Koda (2012) concluded that the essential mediator between morphological awareness and reading comprehension was word recognition. However, as morphological awareness is generally considered to be part of vocabulary depth, and thus word knowledge, it can be assumed that the differing results vis-à-vis direct versus indirect effects of morphological knowledge are less important than the agreement that morphological awareness and L2 reading comprehension are related, with better reading comprehension resting (either directly or indirectly) on a foundation of better morphological awareness.

3. Teaching morphological awareness to improve reading comprehension

Despite some limitations, research clearly suggests the value of morphological awareness to L2 reading comprehension and offers implications for teaching. These include the importance of direct instruction of morphology and processing rules, the special focus on derivational morphology as well as a twofold approach that encourages L1 transfer and at the same time offers a rich exposure to L2 vocabulary.

The most prominent finding of the studies surveyed revolves around the idea that direct instruction of morphological awareness is crucial for improving students’ reading performance. One might think that
morphological awareness is purely a function of age and that it will develop on its own as students get older. Research suggests that this is not the case. Kieffer and Lesaux (2007), for example, concluded that an increasing focus on teaching the structure of a particular word contributes to broader vocabulary knowledge and morphological awareness and thus enhances textual understanding (p. 799). Zhang and Koda (2013, p. 912), along with Kern (2002, p. 144-145), also conclude that morphological awareness is not acquired automatically and thus that it is not enough to simply teach unfamiliar vocabulary. It is pivotal to provide students with metacognitive strategies and processing rules, including word-formation schemata, which help them tackle unknown words by using knowledge of the structure of words. Such strategies aim to improve word recognition, inferring meaning of unfamiliar words and also the synthesis of the meaning of larger segments of a text (p. 145). As weaknesses in L2 reading predominantly originate from a lack of vocabulary knowledge, the significance of explicit training in systematic procedures for exploiting morphology for word learning and contextual inference is immeasurable according to many studies.

However, the success of such morphological awareness training presupposes the teachers’ proficiency in the field of morphology and as Tong et al. (2011) stated in their article, this has unfortunately not always been the case (p. 531). They argued that many teachers were much more familiar with phonology than with morphology, which, according to Carlisle, resulted in an observable “neglect of attention to instruction in the morphological structure of words” (p. 311). Improving the explicit instruction of morphology thus also requires a more comprehensive training of teachers with regard to morphology. Nagy (2005) claimed that teachers have to help students build word consciousness and recognize morphological and semantic relationships between words (pp. 41-42). Goodwin et al. (2012) offered more concrete suggestions for the teaching application. For them, an efficient way to improve morphological awareness is to incorporate the teaching of the meaning of affixes and roots (Baumann et al. 2003), practice building words from morphemic units (Berninger et al., 2003), instructing students in suffixing patterns (Bowers and Kirby, 2010) as well as providing students with information on the origin of words (Abbott and Beringer, 1999) (p. 1409).

The above-mentioned results also offer guidelines for special focuses within morphological training. Recall that numerous authors have claimed that the students’ reading comprehension was most significantly influenced by their knowledge of derivational morphology. Hence, as Kern (2002) pointed out, teachers have to provide appropriate classroom learning activities and multimedia packages to draw students’ attention to the functions of English derivational affixes and to the structure of English derivational words (p. 145). Conceivable exercises could incorporate segmenting affixes from derived words and identifying base morphemes, grouping derived words according to their suffixes, and inferring meanings of unfamiliar derived words with familiar base words. Droop and Verhoeven (2003) underlined that it is essential to encourage learners to tackle those seemingly more complex and opaque words, and explicit instruction in derivational morphology can certainly contribute to reducing their fear of such seemingly difficult words (p. 101).

Instruction in English morphology should always be twofold, as L2 morphological awareness is the result of the effects of learners’ L2 lexical input and their knowledge of L1 morphology (Zhang and Koda, 2013, p. 912). The first aspect of instruction is to exploit L1 transfer. Teachers should encourage their pupils to make parallels between L1 and L2 whenever possible (p. 912). There is research to support the view that transfer can work for the student. While Zhang and Koda (2013) demonstrated that Chinese students could profit remarkably from the similarities between English and Chinese compound structure (p. 910), Goodwin et al. (2012) found comparable results for Spanish ELL speakers. They contended that students can use units of meaning in their native language, such as the affix mal-, to infer the meaning of lower frequency English words such as malicious (p. 1408). However, as mentioned earlier, students are likely not to make these parallels automatically and so it is the teachers’ task to make them aware of these useful links between L1 and L2.

The improvement of morphological knowledge essentially hinges also on exposure to rich oral and written language. Nagy (2005) emphasized how important rich and multifaceted vocabulary instruction was for students’ success in understanding texts (p. 41), given the causal but complex relationship between vocabulary knowledge and reading comprehension. Comprehensive word training has to start early but is only efficient if adapted to the respective age and proficiency level of the learner. Furthermore, effective instruction must not only increase students’ general word knowledge, but has to extend their knowledge of individual words, too. Ultimately, taking into account that phonology is a significant base for morphological awareness, it is pivotal to expose learners to both a wide range of written language and to rich oral language. Support for this suggestion can be also found in Droop and Verhoeven (2003), who claimed that students had
to develop a large sight vocabulary in order to access word meanings automatically and thus accelerate reading comprehension (p. 101). They see it as necessary to specifically train L2 learners in low-frequency words and to encounter the same words in different contexts. Extensive vocabulary knowledge, which means both vocabulary breadth and depth, is crucial when it comes to improving students’ reading comprehension. Of course, knowing vocabulary is not sufficient in itself, but it makes a major contribution to L2 learners’ textual understanding (Nagy, 2005, p. 42).

4. Conclusion

There is little doubt that the different studies on the relationship between morphological knowledge and reading comprehension are potentially valuable for both theory and practice. While they build a solid foundation for more profound and refined future research into L1 and L2 language processing and the relationship between language and the written word, they could also provide teachers with guidelines for their pedagogical approach in the ESL or EFL classroom. Several studies have underscored the serious need for intervention, in the form of teaching and promoting morphological awareness, as L2 English students display considerable weaknesses in their reading skills.

As for concrete suggestions, all the studies surveyed here emphasize the importance of morphological awareness training in conjunction with vocabulary teaching. Promoting vocabulary breadth and depth seems to be the factor that makes the most significant contribution to morphological knowledge and thus to reading comprehension. Providing learners with comprehensive vocabulary training that includes insight into the structure of complex words and relationships among them might be one of the most important educational implications of the studies on the subject.

References


