Cross-linguistic Transfer: The Role of L1 Grammatical Morphology in L2 Reading Comprehension among ELLs from Low SES

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1. Introduction

Morphemes are the smallest meaningful units of language and considered to be building blocks of language in spoken and written modalities. Morphological awareness (MA) refers to the ability to manipulate the structure of the word at the level of morphemes. Morphemes have long been identified as a contributing factor in reading and spelling abilities, as they provide clues to the meaning of the text (Carlisle, 2003; Deacon & Kirby, 2004; Nagy, Berninger & Abbott, 2006). However, MA is not a one-dimensional construct, but is rather a multi-dimensional factor that consists of different components, such as inflections, derivations and compounding. Each factor serves specific purpose in constructing a meaning. For example, inflectional morphology reflects the relationship between words within the sentence and indicates syntactic awareness. Derivational morphology, on the other hand is a reflection of lexical knowledge, i.e., the ability to generate new words or transform the existing word into a new grammatical category (Kirby, Deacon, Bowers, Isenberg, Wade-Woolley, & Parilla, 2012). Compounding morphology is a way of combining two lexical items into a new word formation with its own special meaning (air+plane=airplane) (Zhang, Koda & Sun, 2014). MA has been suggested as a facilitator for broad lexical knowledge – an important aspect of reading comprehension and an area of deficit among English Language Learners (ELLs). Good MA also allows students, including ELLs, a quick and accurate access to word identification and extraction of semantic and syntactic information, leaving more cognitive resources to be allocated for reading comprehension (Kieffer & Lesaux, 2012). Therefore research on the role of MA among ELLs learning English as L2 is a very important area in identifying specific factors that influence English language proficiency and academic achievements among this group of students.

Derivational morphology has often been the focal point of research that identifies the role of MA in reading comprehension, particularly among the population of ELLs (Kirby et al., 2012): It is considered to be a great measure of depth and breadth of vocabulary knowledge required for academic advancement.

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for all students and for ELLs in particular (Pasquarella, Chen, Lam, Luo & Ramirez, 2011; Ramirez, Chen, Geva, & Kiefer, 2010; Kieffer & Lesaux, 2012; Kieffer, Biancarosa, & Mancilla-Martinez, 2013). Compounding morphology has been suggested as an important part of literacy skills development in native language (L1) and in L2, particularly for children from Asian linguistic background, such as Korean, Chinese and Vietnamese (Wang, Ko, & Choi, 2009; Kieffer & Lesaux, 2012; Zhang et al., 2014). The role of inflectional morphology represented by grammatical morphemes (GM) in the process of literacy acquisition has been explored as well, with Kuo and Anderson (2006) providing a good overview of its developmental and influential aspects. However, due to the nature of the inflectional morphology development, i.e., early acquisition and use, this important part of language development and subsequent use in literacy and reading comprehension has not been explored in depth with population of ELLs, specifically from Spanish (L1) linguistic background.

1.1. The role of grammatical morphemes in language proficiency

As mentioned above, grammatical morphemes reflect the relationship between the words within the sentence, indicating syntactic knowledge and allowing meaningfully connect lexical items within the sentence for full comprehension. Acquisition of GM differs from language to language based on the complexity of morphosyntactic structure of the ambient language, and therefore may follow different developmental trajectory. However, even within the languages with most complex inflectional morphology, such as Russian, for example, children as young as three-years of age, who are already exposed to L2, very seldom make mistakes marking verbal aspects, the skill that is prone to attrition among older immigrants (Bar-Shalom & Zaretsky, 2008). Previous studies examining the long-term acquisition of grammatical proficiency were conducted with adult L2 learners from different linguistic backgrounds and suggested that earlier exposure to L2 will results in better proficiency in that language regardless of L1 (Birdsong & Molis, 2001; Jia, Aaronson & Wu, 2002; Flege, Yeni-Komshian & Liu, 1999; McDonald, 2000; Jia, Aaronson, Young, Chen & Wagner, 2005).

The relationship between the knowledge of GM and reading comprehension has rarely been explored beyond second grade of school (Kuo & Anderson, 2006), mainly because, as mentioned above, acquisition of GM is an earlier development, compared to acquisition of derivational morphology. In addition, the underlying relationship between GM awareness and reading comprehension is not adequately explained in the literature. This fact is especially notable in the literature regarding the development of English language proficiency and issues of reading comprehension among ELLs, particularly ELLs from low SES. The importance of investigating the relationship between knowledge of GM in L1 and ensuing achievements in L2 cannot be underestimated, as educators are looking at the factors that can increase L2 proficiency among this group of students.
1.2. Difficulties faced by English Language Learners

One of the issues surrounding L2 proficiency and academic achievements of ELLs from Spanish (L1) background is heterogeneity of this population. They differ by the age of arrival, which may affect the age of exposure to and subsequent acquisition of L2, and country of origin, which represent different variance of the same language. Some of the ELLs are actually U.S.-born and therefore are acquiring their L1 as a “heritage” language. The majority of Spanish-speaking ELLs are concentrated in the low-income urban areas and as a result show lower vocabulary and grammatical skills at the time of entering school. Moreover, these low skills are seen in both, L1 and L2 (Hoff, Rumiche, Burridge, Ribot, & Welsh, 2014; Hammer, Hoff, Uchikoshi, Gillanders & Castro, 2014).

Research consistently points out the importance of L1 proficiency in oral modality as a predictor of subsequent achievements in L2 (Koda, 2008; Sparks, Patton, Granschow, Humbach & Javorsky, 2006). However, there is another construct that plays a role in achieving L2 proficiency, which is reading skills in L1. Most of the ELLs are not readers and writers in their native language: children who attended school in their native country and acquired initial reading skills may not keep it up, because they are faced with the task of rapidly learning L2 in order to progress through school. U.S.-born ELLs may never acquire reading skills in their L1. The importance of reading in language proficiency has been shown to be one of the most important factors, as reading provides additional information about orthographic structure of language and supports learning through visual modality (Köpke, 2007), leading to cross-linguistic transfer. ELLs who are proficient readers in their L1 show similar skills in L2 (Zaretsky, 2014).

1.3. Why examine cross-linguistic transfer? Present study

Knowledge of L1 grammar and the use of specific grammatical morphemes, as a metalinguistic skill, may play a significant role in the acquisition of L2 grammar and subsequent L2 reading comprehension and overall L2 proficiency. According to the Interdependence Hypothesis (Cummins, 2000), cross-linguistic transfer should occur because application of morphosyntactic knowledge in L2 is cognitively demanding task and may have support from the L1 morphosyntactic knowledge. Therefore, researchers stress the point that there is a need to examine all possible factors that may lead to cross-linguistic transfer, including knowledge of L1 GM as a possible influence in developing L2 reading comprehension, even if L1 GM awareness and use is in oral modality only.

The aim of the present study was to examine the influence of L1 GM knowledge in oral modality on L2 proficiency, including reading comprehension. We posed specific research questions and hypothesized possible outcomes based on the previous literature in cross-linguistic transfer. The difference between
previous studies and the present research is that we examining the effect of L1 GM knowledge in oral language, based on the assumption that the majority of ELLs from low SES are not readers in their native language.

The following research questions were addressed in this study:

1) Is there a relationship between L1 (oral) morphosyntactic knowledge and L2 language skills?
2) Does schooling/reading in L1 increase L2 reading comprehension? Or
3) Does the age/length of exposure to L2 make the difference in L2 achievements?
4) And finally, Do readers in L1 show better skills in L2 written language (decoding, spelling, reading comprehension) than L1 non-readers?

We hypothesized that 1) possible effect of L1 morphosyntactic knowledge on achievements in L2 reading comprehension will signify cross-linguistic transfer as postulated by the Interdependence Hypothesis (Cummins, 2000); and 2) L1 reading and schooling may be a mitigating factor in achieving English language proficiency.

2. Methodology
2.1. Participants

Thirty ELLs (12 f & 18 m, \( M_{\text{age}}=11.8, \text{SD}=1.2 \)) attending 5th and 6th grades in an urban Title I school, participated in this research. All children were at the Levels 2 through 5 of English Language proficiency (LP), which allowed them to understand the test materials and participate in all assessments.\(^1\) The questionnaire, as part of the assessment administered to all students (see below), was designed to identify the country of origin, age of arrival to the U.S., school attendance in the native country (if applicable) and the ability to read. Through the questionnaire we identified 13 participants who attended school prior to their arrival in the U.S. for up to three years and therefore were considered readers in L1 (6 f & 7 m). Seventeen participants were either U.S.-born or arrived prior to the school-age and therefore did not learn to read in L1 (6 m & 11 f).

2.2. Assessments and procedures

_Vocabulary Knowledge_ subtest of KBIT-2 was administered as a measure of L2 receptive vocabulary. To assess L1 expressive vocabulary, the participants were asked to immediately provide Spanish word equivalent.

_Single Word Reading_ in L2 was assessed by reading 34 monosyllabic nonsense words (Kahn-Horwitz, et al. 2011).

\(^1\) LP is assigned through the ACCESS testing (Assessing Comprehension and Communication in English State-to-State for English Language Learners), where Level 1 = entering; Level 2 = beginning; Level 3 = developing; Level 4 = expanding; Level 5 = bridging; and Level 6 = reaching (formerly ELL).
Spelling on a Single Word level was assessed by dictating 34 monosyllabic nonsense words (Kahn-Horwitz, et al., 2011) to all the participants.

Grammatical Judgment Task (Assessment of GM knowledge in L1) consisted of a widely used perceptual measure to assess knowledge of inflectional morphology through syntactic structure. Total of 30 sentences were constructed for this task: 10 grammatically correct sentences; 10 plausible sentences to account for regional variants; and 10 sentences that violated the use of correct GM in obligatory context.

L2 Grammatical knowledge was assessed by 2 tasks. The first task consisted of 20 sentences that children had to read and decide if the sentence was grammatically correct or used wrong grammatical structure (e.g., use of incorrect GM in obligatory context). The second task used 10 multiple choice sentences in a close format that required students to find nonsense words, out of three choices, with grammatical inflection to fit the obligatory context.

Reading Comprehension scores from ACCESS (Assessing Comprehension and Communication in English State-to-State), a school-based comprehensive yearly measure of oral and written language, was used as our dependent measure. ACCESS also gives scores for overall oral language proficiency (speaking and listening) and literacy (decoding, spelling, comprehension), which were used in the analysis.

Questionnaire: All participants filled out the questionnaire designed to identify the country of birth, age of arrival in U.S. (if born outside of the U.S.), knowledge of English prior to arrival in U.S., years of schooling (if any) in the native country, and reading in L1 (see also description within 2.1. section).

All assessments were conducted by four psychology-major students, who were trained on test administration and scoring procedures. To account for inter-rater reliability on all collected data, four additional students trained in scoring procedure rescored the data, resulting in a substantial agreement of 0.79 (Landis & Koch, 1977). The participants were tested one-on-one in a quiet room at the school that the participants attended.

3. Results

For all statistical analysis the alpha level was set at 0.05 for statistical significance.

To answer our first research question regarding possible interaction between L1 knowledge of GM (and therefore morphosyntactic structure) and different aspects of English LP (oral and written, as assessed by ACCESS), as well as knowledge of L2 GM, we used correlational analysis (two-tailed Pearson correlations). The correlations were run separately for readers and non-readers in L1. Our results showed strong and significant correlations between L1 GM and L2 LP, but the correlations had different directions based on the reading status of our participants: positive correlations for readers and negative correlations for non-readers. (Table 1).
Table 1. Relationship between L1 GM and L2 language proficiency among L1 readers and non-readers.

<table>
<thead>
<tr>
<th>Skill in L2</th>
<th>Task in L1 (readers)</th>
<th>Task in L1 (non-readers)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gram Judgment</td>
<td>Gram Judgment</td>
</tr>
<tr>
<td>Oral (Speaking/Listening)</td>
<td>r=.609*, p=.027</td>
<td>r=-.557*, p=.020</td>
</tr>
<tr>
<td>Written (Reading/Writing)</td>
<td>r=.575*, p=.040</td>
<td>r=-.630**, p=.006</td>
</tr>
<tr>
<td>L2 GramMorphemes</td>
<td>r=.807**, p=.001</td>
<td>NS</td>
</tr>
<tr>
<td>Reading Comprehension</td>
<td>NS</td>
<td>r=-.605*, p=.010</td>
</tr>
</tbody>
</table>

Note: *=significant at p=.05; **=significant at p=.01; GramJudgment=perceptual test of L1 inflectional morphology; GramMorphemes=written test of L2 inflectional morphology.

To answer our second research question regarding the possibility that reading/schooling in L1 increases L2 proficiency, we ran an ANCOVA analysis with Reading Comprehension as our dependent variable, L1 Reading as independent variable and Schooling as a covariate. We assumed that the ability to read in L1 includes understanding of L1 morphosyntactic structure, which includes the use of correct GM. (Table 2.) There was significant effect of L1 reading ability on L2 reading comprehension (F(1,27)=7.992, p=.009, η=.22), while schooling in L1 did not contribute to L2 reading comprehension.

Table 2. Effect of L1 Reading and Schooling on L2 Reading Comprehension.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>43.467a</td>
<td>2</td>
<td>21.733</td>
<td>10.332</td>
<td>.000</td>
</tr>
<tr>
<td>Intercept</td>
<td>16.466</td>
<td>1</td>
<td>16.466</td>
<td>7.828</td>
<td>.009</td>
</tr>
<tr>
<td>SchoolingSp</td>
<td>0.37</td>
<td>1</td>
<td>0.37</td>
<td>.017</td>
<td>.896</td>
</tr>
<tr>
<td>Reading Spanish</td>
<td>16.810</td>
<td>1</td>
<td>16.810</td>
<td>7.992</td>
<td>.009</td>
</tr>
<tr>
<td>Error</td>
<td>56.792</td>
<td>27</td>
<td>2.103</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>490.500</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>100.259</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* R Squared=.434 (Adjusted R Squared=.392)

Two-tailed Pearson correlations were used to address possible effect of participants’ age of initial exposure to L2 and years they spent immersed in L2 on the level of L2 proficiency. Our results indicated negative relationship between the age of exposure and L2 proficiency, while years of exposure to L2 showed significant effect on L2 proficiency (Table 3).
Table 3. Effect of Age and Length of Exposure to L2 on achieving L2 proficiency.

<table>
<thead>
<tr>
<th>Skill in L2 (English)</th>
<th>Age</th>
<th>Years in L2 (English)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grammatical Morphemes</td>
<td>r=-.373, p=.042</td>
<td>r=.574**, p=.001</td>
</tr>
<tr>
<td>Years in English</td>
<td>r=-.686, p=.000</td>
<td>-</td>
</tr>
<tr>
<td>Reading Comprehension</td>
<td>r=-.793**, p=.000</td>
<td>r=.839**, p=.000</td>
</tr>
<tr>
<td>Oral Language</td>
<td>r=-.651**, p=.000</td>
<td>r=.831**, p=.000</td>
</tr>
<tr>
<td>Decoding</td>
<td>NS</td>
<td>r=.488**, p=.006</td>
</tr>
<tr>
<td>Spelling</td>
<td>NS</td>
<td>r=.719**, p=.000</td>
</tr>
</tbody>
</table>

Note: * = significant at p = .05; ** = significant at p = .01

To address our last research question regarding possible advantage of L1 reading on acquiring L2 proficiency and increasing reading comprehension, we ran t-tests, comparing the results of all assessments between L1 readers and non-readers. Contrary of our predictions, readers in L1 showed better skills in knowledge of L1 GM only, while non-readers were more skilled in knowledge of L2 GM, spelling and reading comprehension. The results are presented in Fig. 1.

Note: *=significant at p=.044/.055; **=significant at p=.018; ***=significant at p=<.000
GramJudg=Grammatical Judgment, knowledge of GM in L1;
GramMorphemes=Grammatical morphemes, knowledge of GM in L2;
ReadComp=reading comprehension in L2 (ReadComp is on a scale of 1-6).
4. Discussion

This study was conducted to address an important issue in L2 acquisition, i.e., possibility of cross-linguistic transfer from L1 to L2 and specific factors that may increase L2 proficiency as a result of cross-linguistic transfer. The idea that children who are exposed to L2 earlier in life will achieve better L2 proficiency was supported by multiple research studies across different linguistic backgrounds. However, the nature of acquisition of L2 proficiency continues to occupy an important place in the research with bilingual individuals. One of the important views on acquisition of L2 proficiency, *Interdependence Hypothesis* (Cummins, 1981, 2000, 2012) suggests that languages are interdependent and that knowledge of L1 should support acquisition of L2. However, the *Interdependence Hypothesis* points out that the level of L1 proficiency will ultimately influence the development of proficiency in L2.

Many studies in cross-linguistic transfers look at the specific linguistic factors that can show transfer from L1 to L2. Morphological awareness (MA) is one the factors that are often under investigations because it plays an important role in reading abilities (Deacon & Kirby, 2004; Nagy, et al., 2006). However, as pointed out elsewhere in this paper, MA is a multi-dimensional, rather than one-dimensional factor and therefore it is important to examine the role of different aspects of L1 MA, e.g., derivational component, inflectional component, on L2 acquisition. This paper makes an attempt to understand the role of L1 GM knowledge on L2 language proficiency and reading comprehension among ELLs who are either non-readers in their L1 or have acquired some L1 reading skills because they attended school in their native country, although they are not actively practicing reading in L1.

As our results indicate, certain conclusions can be made regarding the relationship between knowledge of L1 GM and achieving L2 proficiency, including reading comprehension. Correlational analysis between L1 GM and oral and written L2 proficiency among L1 readers showed that there was positive interaction between assessment of L1 GM, oral and written achievements in L2, as well as with specific knowledge of L2 GM. We did not see any interaction with L2 reading comprehension. Different picture emerged with the same correlational analysis among non-readers in L1: we saw strong negative correlations between L1 GM and oral and written L2, and L2 reading comprehension, but not between L1 and L2 knowledge of GM. This type of relationship suggests that there may be an interference with cross-linguistic transfer when L1 is not acquired to a sufficient level of proficiency. This finding directly supports the main tenet behind *Interdependence Hypothesis*, which suggests the importance of L1 proficiency in acquisition of proficiency in L2.

Support for this interpretation also came from the results of ANCOVA, which examined the role of L1 reading and schooling in L1 in supporting reading comprehension in L2. We were assuming, that part of the reading process in L1 (or any language) would include knowledge of that language GM.
We saw significant effect of L1 reading ability on L2 reading comprehension, while schooling per se did not make an impact. This particular finding suggests that if ELLs who were learning L1 as a ‘heritage’ language were exposed to or taught how to read in their native language, they may have a much better chance in achieving better L2 proficiency. This particular statement is strongly supported by research examining cross-linguistic transfer and L1 attrition as a factor of L1 reading skills. Zaretsky (2014) found that L1 Russian-speaking children who were readers in their native language had similar skills in L1 and L2, regardless of years of exposure to L2 (English). Zaretsky and Bar-Shalom (2010) provided evidence that reading in L1 slows down native language attrition.

Regarding the interaction between the age of L2 onset of participants vs. years of exposure to L2, we found support for previous research that pointed out the relationship between earlier exposure to L2 (or, in our case, years our participants were using L2) and achieving L2 proficiency. We saw strong negative correlations between age of participants and L2 achievements, while years of exposure to L2 resulted in strong positive correlations, signifying the importance of early exposure to L2 in achieving proficiency (Birdsong & Molis, 2001; Jia, et al., 2002; Jia et al., 2005).

By far the most interesting finding was that readers in L1 did not show overall better L2 proficiency, although we saw positive interaction between L1 GM knowledge and all aspects of L2 proficiency among L1 readers. The only skill that was higher among L1 readers was knowledge of L1 GM, which is supportive of neuro-linguistic data that reading provides additional orthographic access to linguistic constructs (Köpke, 2007). The non-readers in L1, however, were significantly better at the knowledge of L2 GM, as well as at spelling (but not decoding) and reading comprehension. We believe that we can offer specific interpretations and educational implications based on these results.

As mentioned above, better performance on L1 GM among the L1 readers is explainable by the exposure to orthographic structure of the words within sentences and therefore enhancing correct knowledge and use of GM. Pure decoding skills in L2 at a one-word level may not require support of L1 reading and therefore both groups performed similarly. However, when a child has been exposed to reading in native language for a limited time and did not have sufficient exposure to solidify grammatical information, this ‘incomplete’ knowledge in written modality may actually interfere with acquiring linguistic information in L2. At the same token, children who were not exposed to L1 reading started to learn L2 linguistic elements ‘de novo’ and therefore had less interference. Performance of each group on spelling task at a one-word level, where non-readers in L1 showed better skills lands additional support to our claim. First, spelling requires the internalization of orthographic representations and non-readers learned L2 spelling patterns without interference from L1. And secondly, L1 readers may still draw on their incomplete knowledge of L1
spelling\(^2\), confusing appropriate application of phoneme-grapheme conversion in L2. With these explanations it becomes clearer why non-readers in L1 also showed better L2 reading comprehension.

As far as the educational implications of this study go, we can suggest that support of the initial L1 literacy may provide ELLs with important tool in acquisition of L2 proficiency and reading comprehension. Students who are good readers in their L1 will be good readers in their L2, as they increase their vocabulary knowledge required for reading comprehension. In addition, reading increases metalinguistic awareness due to the exposure to orthographic representation of the spoken words. Previous research strongly suggests that L1 proficiency in any aspect of linguistic knowledge results in similar skills in L2 (Durgunoğlu, Mir, & Ariño-Martin, 2002, Sparks, et al., 2006).

5. Conclusions, limitations and future directions

5.1. Conclusions

In conclusion, this study offered additional information on possible areas of cross-linguistic transfer, as well as provided support for specific hypothesis, e.g., Interdependence Hypothesis, that postulates important interaction between L1 and L2. In addition, this study suggested why cross-linguistic transfer may support or impede acquisition of L2 proficiency and provided possible explanation for the observed outcomes of our assessments. The study also illuminated possible ways of helping ELLs from low SES to achieve better L2 proficiency, specifically by supporting reading in L1, which has been shown to enhance L2 language skill among bilingual population (Zaretsky, 2014).

5.2. Limitations

One of the limitations of this study is its small participant pool. Another limitation is seen in the range of L2 proficiency levels (between levels 2 and 5). Different levels of L2 proficiency may have affected the results of L2 vocabulary knowledge test, administered during testing, as well as identifying L2 grammatically correct sentences, although overall performance by participants showed rather even pattern of results.

5.3. Future directions

For the future research, it will be important to assess L1 GM knowledge not only through perceptual Grammatical Judgment task but also through oral narratives. The narratives are an important indication of language proficiency and provide a good assessment of the morphosyntactic structure in any language.

\(^2\) We may also point out that Spanish is a transparent orthography and phoneme-grapheme conversion for spelling is practically one-to-one, while English is a deep orthography with one-to-many, many-to-one spelling patterns, which requires explicit teaching.
References


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