Knowledge of Spelling Consonant Clusters in Young ESL Learners: A Study

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Abstract

This study aims to examine children's knowledge of English consonant cluster in mono and disyllabic spelling skills. It looks at the development of consonant clusters across two grades in the lower primary section of an ESL school. A total of 41 subjects from Grades 2 and 3 participated in the study, with ages ranging from 7 to 9 years. A word dictation test of 30 words was used, in which the subjects had to listen to the words and write the spellings. The test took around 45 minutes. An analysis of the test results showed that the students of Grade 3 are more consistent in their knowledge of consonant clusters than the students of Grade 2. Further, students of both the grades used both phonological as well as orthographic cueing in spelling the words. Of the two cueings, orthographic cueing was more prominent in Grade 3 participants compared to Grade 2 participants.

Introduction

Knowledge of spelling is deeply rooted in the orthographic format of a language. Treiman and Bourassa (2000), speak about optimal and deep orthography. Languages with optimal orthography have transparent phoneme-grapheme relation, whereas languages with deep orthography have little transparency between the two. English, is a deep orthographic language with phonological and orthographic regularities and irregularities. The following sections will elaborate more about these properties in the context of spelling acquisition.

Phonological Knowledge

By the age of 3 to 4 years, children can distinguish writing from drawing (Lavine, 1977), but they still need to understand that alphabetic writing aims to represent the sounds of a language. Some young kids believe that the written forms of words should reflect their meanings. According to some scholars (Ferreiro & Teberosky, 1982; Levin & Korat, 1993) children think that the names of large objects such as bear, should be spelt with more letters than the names of small objects, such as fly. Children are sensitive to syllable units in their earliest attempts at writing. They tend to represent each syllable of a spoken word with a single symbol/letter. Ferriero and Teberosky (1982), found in their study that for the monosyllabic words "should" and "be", the subjects had used – "c" for "should" and "b" for "be". As phonological awareness develops, children analyse /kar/ "car" (for example) as a sequence of the phoneme /k/ followed by /ar/. At this phase, they use their knowledge of grapheme-phoneme correspondences, and may represent /k/ as "c" or "k", and /ar/ as "r". In other words, "cr" or "kr" spellings predominate for the word car. Again, in this phase, children sometimes group separate phonemes. They sometimes fail to spell the second and third consonants if they are present in these clusters, as in "pa" for "play", "bl" for "bell", "had"for"hand" and "set" for "street". These examples, especially, "hand" and "street" (spelt as "had" and "set"), demonstrate spelling patterns that can be understood from a child's point of view. Children consider the vowel /a/ and /n/ of the word "hand" as a single unit rather than as a sequence of two sound units. Similarly, they consider /s/ for the letter string "str" and /e/ for the long vowel "ee" in the word "street" as a single unit, rather than as a sequence of two sound units. Their omissions of consonants in the initial and final clusters of these words reflect their groupings of sounds (Ehri, 1986; Gentry, 1982; Treiman, 1993, 1994). Children in this early phase of writing typically fail to represent the initial consonant of a final consonant cluster, especially when there are nasals and liquids—/n/, /m/, /r/, and /l/.

Orthographic Knowledge

The ability to do phonological analysis develops further with exposure to print. Children can discern that /ar/ comprises two separate phonemes—/a/ and /r/. During this phase, they can identify that the vowel in the word /kar/ is a separate letter and positioned in relation to the two consonants. While they might not be able to produce the correct spelling with the correct vowel letter yet, they use some vowel grapheme in the middle of their spelling. Bourassa and Treiman (2007)

emphasize that the ability to identify all phonemes in a spoken word is no guarantee that the word will be spelt correctly. Children have several choices to represent the phonological structure of words. Bourassa and Treiman (2007) discuss a few salient orthographic patterns that influence spelling. One pattern is where phonemes have more than one possible spelling; the correct choice sometimes depends on the position of the phoneme in the word. For example, the consonant digraph "ck" may occur in the medial position, or at the end of English words, as in "packet" or "pack". The other orthographic patterns involve doublets, or two-letter spellings, where the two letters are identical. These typically occur in the medial position or at the ends of words as in "little" and "bell". Generally, children are not taught these patterns explicitly, but they appear to infer these patterns on their own when they come across them; for example "ck" in "sick" or "package"; and "ll" or "tt" in "bell"or "little". In this phase, they realize that each sound represents a separate phoneme and hence a separate letter needs to be positioned (Treiman, 1994).

Apart from the ability to recognize the positioning of letter strings in a word, children are also adept at dealing with more sophisticated orthographic patterns. For instance, they are sensitive to the vowel context. Children are able to spell a consonant cluster correctly depending on the preceding vowel position. They are aware that there will be a two letter consonant in the final position if there occurs a short vowel, and a one-letter consonant if there occurs a long vowel, as in "pull", "kill", and "cool", "peak". Hayes, Treiman & Kessler (2006), found in their study that children in Second, Third and Fifth Grades showed sensitivity to the preceding vowel context, and that sensitivity to these patterns increased across the age groups.

This paper aims to assess young ESL learners' knowledge of consonant clusters across five categories of words—onset, coda, rhyme, doublet and silent. As mentioned earlier, two linguistic properties—phonological and orthographic—are seen to influence spelling skills in young learners. In this study, I raise two research questions and will attempt to answer them by assessing the knowledge of the two above mentioned properties among young learners through an analysis of their spelling skills.

Research Questions

The study comprised two research questions as below:

1. Do young learners use phonological or orthographic properties in spelling words?
2. Does the learning process vary in each of the five-word categories?

Methodology

Subjects

A total of 41 subjects from Grades 2 and 3 participated in the study; 22 from Grade 2 and 19 from Grade 3. The ages of the participants ranged from 7 to 10 years. English was the second language for all of them.

Material and Tasks

A total of 30 words (monosyllabic and disyllabic) were used for the dictation test. These words fall under five consonant clusters, namely, (a) Onset, defined as the consonant preceding the vowel, (b) Coda, defined as consonants following the vowel, (c) doublets, are

words where two identical letters are repeated (eg: butter), (d) rhyming words in which the same sounds are repeated, and (e) silent words a letter that does not correspond to any sound in pronunciation. The list of words for each category is given in the following table (Table 1).

Table 1
Spread of Words for Each Word Category
(Total words=30)

Onset(5)	Coda (5)	Doublet (4)	Rhyming (4)	Silent (12)	
Drop	Turn	Sorry	Sing	Knot	Comb
Swim	Jump	Carry	Ring	Knife	Thumb
Plate	Bird	Button	Bring	Talk	Wrong
Stop	Gift	Butter	String	Calf	Wrist
Frog	Hunt			What	Island
				Wheel	Sign

Procedure

All 30 words were randomized and dictated to the participants. The participants had to carefully listen to the words and write down the spellings in the answer sheet provided. Pictures of each word were simultaneously shown on the computer screen to help the participants construct the meanings of the words. This task took approximately 45 minutes from start to finish. A ratio measurement was used to assess the spellings. The participants were awarded 1 mark for each correct spelling and 0 for each incorrect spelling. In correcting the words, the focus was on whether the target consonant cluster was correctly written. For example, in the onset category, if a participant had attempted to spell the word "frog" as "frg", it was considered to be correct, as he/she had written the consonant cluster "fr" correctly, even if the word was misspelt. However, if the participant had written the word "frog" as "fog", or completely a different word where the target consonant cluster was missing, then the word was considered incorrect. The findings were then subjected to t tests. An error analysis was also undertaken on the way the words were spelt out.

Results of the Study

Results of the dictation test were evaluated on the basis of correctness and incorrectness of the respective consonant clusters. The correct responses were collated; the mean and standard deviation for each cluster is presented in table 2.

Table 2
Mean and SD Scores of the Overall Performance by Grades

Consonant Clusters	Grade 2	Grade 3
Onset(5)	4.68 (0.78)	4.68 (0.82)
Coda(5)	4.32 (1.29)	4.84 (0.37)
Doublet(4)	3.14 (0.94)	3.74 (0.45)
Rhyming(4)	3.50 (0.91)	3.68 (0.58)
Silent(12)	3.91 (2.65)	8.37 (3.56)

Error Analysis

An analysis of the errors made by the participants shows omissions, additions and substitutions in the spelling. Now let us look at the overall error rate across the five consonant clusters in terms of percentage scores.

Table 3
Percentage (%) Scores of the Error Rates

Consonant Clusters	Grade 2	Grade 3
Onset	6.36	3.15
Coda	13.63	3.15
Doublet	21.59	6.57
Rhyming	12.5	7.89
Silent	67.42	30.26

Table 3 shows that grade 2 participants commit more mistakes in writing the consonant clusters compared to grade 3 participants. This finding is consistent across the five categories of words. The silent word category has the maximum error rate across both the grades. This finding indicates that young ESL learners are not able to represent an accurate orthographic format when spelling the words. In the remaining four-word categories, the consistency of accurate representation in terms of phoneme-grapheme is not very alarming.

The following five tables (table 4-table 8), shows the error rate for each consonant cluster. Besides the error rates, a list of incorrect words is also provided for the target word.

Table 4
Percentage (%) Scores of the Error Rates

No.	Onset Words	Grade 2	Grade 3
1	Drop	9.09	-
2	Swim	18.18	15.78
3	Plate	4.54	-
4	Stop	-	-
5	Frog	4.54	-

Table 4 shows that error rates for the word "swim" is higher than for the remaining four target onset words across both grades; the second consonant of the onset cluster has been dropped. A few examples of the erroneous spellings of the target words across both grades are "soema", "wirre", "seme", "smeen", "suwing", "wuwm", "sire"; "dot", "dat"; "peate", "forg".

Table 5
Percentage (%) Scores of the Error Rates for Coda Words

No.	Coda Words	Grade 2	Grade 3
1	Turn	13.63	15.78
2	Jump	9.09	-
3	Bird	27.27	-
4	Gift	13.63	-
5	Hunt	4.54	-

Table 5 shows that Grade 3 performed better than Grade 2 for coda words. There is only one error for the word "turn". The erroneous spellings of the target words across both grades are "ture", "trun", "tron", "town", "trun"; "jamg", "jumg"; "bead", "bod","grid", "bred", "barty", "got", "get", "gemt", "herat".

Table 6
Percentage (%) Scores of the Error Rates for Doublet Words

No.	Doublet Words	Grade 2	Grade 3
1	Sorry	22.72	10.52
2	Carry	9.09	-
3	Button	40.90	15.78
4	Butter	13.63	-

Table 6 shows that error rates of the target words for grade 2 is high. Two of the target words have been difficult for Grade 3 also. Recall that in both grades, the error rates are high in this word category when compared with the other word categories, with 21.59 percent error rate in Grade 2 and 6.57 percent error rate in Grade 3(Refer to Table 3). Only the silent letter word category has a high error rate. Learners tend to understand doublets as comprising one letter and a sound and therefore write one letter instead of two identical letters. Some of the erroneous spellings found in this word category are as follows: "samy", "sory", "soil", "sot", "soly", "sery", "sory"; "co", "sroop"; "batn", "butun", "baien", "duton", "buton", "bunten", "bunt", "batan", "bunta", 'beten"; "buther", "data".

Table 7
Percentage (%) Scores of the Error Rates on Rhyming Words

No.	Rhyming Words	Grade 2	Grade 3
1	Sing	4.54	5.26
2	Ring	13.63	5.26
3	Bring	9.09	-
4	String	22.72	21.05

The difficulty level of the words has increased in this category of words for both grades when compared with other word categories. Even though the error rates are lower than those of doublets (Grade 2), there are errors in almost every word, except for one word in Grade 2. The error rate for Grade 2 (12.5 percent) is higher than that for Grade 3 (7.89 percent). Participants from both grades tend to have problems with the cluster "ing", which they have reproduced as "en", "in", etc. The erroneous spellings in this word categories across the two grades are: "caeg", "sion"; "riga", "ran", "ren", "rino"; "baein", "bruck"; "streeg", "strmg", "sren", "sty", "staren", "stearn", "streef".

Table 8
Percentage (%) Scores of the Error Rates in Silent Words

No.	Silent Words	Grade 2	Grade 3
1	Knot	90.90	57.89
2	Knife	77.27	15.78
3	Talk	45.45	15.78
4	Calf	86.36	31.57
5	What	22.72	5.26
6	Wheel	72.72	26.31
7	Comb	36.36	10.52
8	Thumb	31.81	10.52
9	Wrong	90.90	57.89
10	Wrist	81.81	57.89
11	Island	90.90	36.84
12	Sign	81.81	36.84

Table 8 shows that while both grades have attempted to write the silent words, they have failed miserably. Notably, the words "knot", "knife", "calf", "wheel", "wrong", "wrist", "island", "sign", have the highest error rates for Grade 2 participants. The same goes for Grade 3 participants, even though their percentage error rate on the particular target words is lower than that for Grade 2. The most difficult words for Grade 3 are "knot", "wrong" and "wrist", as they have an error rate of more than 50 percent.
From the table, it is clear that the word "what" has been produced correctly and has the least error rate for both Grade 2 (22.72 percent) and Grade 3 (5.26 percent), when compared to other words. The word "knot" on the other hand is found to pose the maximum difficulty across both grades with (90.90 percent) error rate in Grade 2 and (57.89 percent) error rate in Grade 3. The participants were not able to figure out the rules for sounds becoming

silent, for example, when “k”is followed by “n” in the initial position, then “k” becomes silent, as in “knot”, “knife”, when “m”precedes “b”, then “b” becomes silent; Children are yet to develop the nuanced ability to spell silent letters, but they have begun using orthographic cueing as shown by the correct answers by grade 3 children. By grade 3, children have a better phonological representation of the sounds, and they are aware that for additional letters need to be inserted in the spellings silent consonant clusters. Phonological cueing is helpful if the word has a phoneme-grapheme correspondence, which can be found in onset and coda words. Words with silent letters however lack transparency. In order to correctly use silent letters, more exposure to print is a prerequisite. For instance, even though the word “what” is a silent letter word, due to its familiarity through its frequent use as a function word, it is known to most children. However, a word such as “knot” is unfamiliar to them as it is not used very frequently; instead, it is mistaken for another frequent word “not”. Again, words such as “wrist”, “island” and “wrong”, which have silent letters at the beginning of the word, also posed difficulties across both grades. In such words, children frequently omit the first silent letter as they go by phonological cueing.
The grade-wise performance revealed that Grade 3 is more exposed to orthography, and therefore their error rate (30.26 percent) was lower for silent words than Grade 2 (67.42 percent).

Findings and Discussions

The statistical results show that the performance of Grade 3 is better than that of Grade 2 for accurate spelling knowledge (Error rate of Grade 3 is 30.26% while for Grade 2 it is 67.42%). This finding indicates that spelling skills develop as children move to higher grades. Students from both grades use phonological as well as orthographic cueing for spelling words. However, orthographic cueing seems to be more prominent for Grade 3 participants, as is evident from their accuracy in the silent word category. Further, the higher performance of Grade 3 (69.73%) on silent letters proves that their grapho-tactic knowledge is better than that of Grade 2 (31.81%). Grade 3 students can decode words such as “comb”, “thumb”, “calf”, “talk”, “knife” and “knot”,unlike Grade 2 students, who are not able to do so. It is clear that increased exposure to print leads to developing higher spelling skill. Therefore, it can be said that knowledge of grapho-tactic cueing helps students' to spell abstract and complex words better.
The consonant cluster word categories in the present study demand knowledge of both phonological and orthographic cueing to spell words correctly. If we rank the word categories in order of performance, onset and codascored the highest and second highest respectively. An explanation for this ranking is that these words have a large extent of phoneme-grapheme correspondence. Also, since children tend to apply their phonological knowledge, they find it easy to produce these words. However, when it comes to spelling words with doublets or silentletters, they require a rich exposure to orthography. Mere knowledge of phonology does not help in producing words in the doublet and silent word categories. So, children do not perform well on doublet and silent word categories.

Conclusion

To conclude, based on the findings, one can surmise that the learning process varies with the nature of the consonant clusters. Children find Coda and Onset words easier compared to doublet, rhyming or silent words. Young children can use their phonological knowledge in spelling words and find words that have phoneme-grapheme correspondences easier. As they grow older, their ability to use orthographic cueing also develops. This study has examined phonological and orthographic patterns in spelling. As a direction for future research, the study can be extended to investigate the influence of morphological patterns on spelling.

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