

# Spell new sounds with new letters. A study of how Swedish L2 learners' spelling is affected by their L1

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## Abstract

*The current study examines whether there is a connection between Swedish L2 students' L1 and their spelling in Swedish. The data were collected through a spelling test conducted at SFI course levels C and D. The experiment was conducted in an urban area in Småland in three groups consisting of 37 course participants with 12 different L1s. People with Arabic as their L1 are the focus of the study due to the selection. The results show that the spelling mistakes could to some extent be explained by the Arabic phoneme set. For example, consonant pairs were confused to a greater extent when one of the consonants was not in Arabic (i.e. p/b, k/g, v/f) than when both consonants in the pair are in Arabic (i.e. t/d, r/l).*

*A comparison was also made between the total number of spelling errors among the participants with an L1 written in the Latin alphabet (i.e. the same as Swedish) and those with an L1 written in a different writing system. The results showed that more vowel errors were made among those who used a written language other than the Latin alphabet. However, the two groups made an equal proportion of consonant errors.*

## Introduction

This study examines whether and how L2 students' L1 affects their spelling in Swedish. For example, if it is more difficult for L2 students to spell correctly when a phoneme is not part of their L1. A second purpose of the study is to investigate whether the L1's writing system can also be a variable that affects the spelling in Swedish.

The influence of L1 on the spelling of L2 learners has been investigated in several studies, mainly based on English as an L1 (Al-Busaidi & Al-Saqqaf, 2015; Al-Sobhi et al., 2017; Sun-Alperin & Wang, 2008), but also in a few studies from a Swedish perspective (Andersson, 1981; Zetterholm, 2017). The influence of the L1 writing system on L2 learning has also been studied (Oller & Ziahosseiny, 1970; Pytlyk, 2011).

## Vowels

Several studies have shown that there is a connection between the L1 and the spelling of vowels in the L2 (Andersson, 1981; Al-Busaidi & Al-Saqqaf, 2015; Sun-Alperin & Wang, 2008; Zetterholm, 2017).

A Swedish study where the influence of L1 on spelling among L2 learners was addressed is the Dictation Survey by Andersson (1981). The participants were children in primary and middle school. The study showed that difficulties in spelling vowel phonemes may not always be due to the set of vowel phonemes in the L1, but that instead different numbers of vowels in L1 and L2 can cause difficulties (Andersson, 1981). For example, Finnish children in the study had difficulties with <y> even though /y/ is found in Finnish. Andersson (1981) explains this by saying that Swedish has nine vowels whereas Finnish has eight, which changes the relations between the vowels. The vowel /y/ was

misspelled by all students with different L1s in the study. The most common mistake was to confuse <y> with <i> (Andersson, 1981).

A study by Al-Busaidi and Al-Saqqaf (2015) examined, among other things, the spelling of vowels among L2 learners of English with Arabic as L1. In this linguistic situation, the vowels can be a difficulty, as there are only six vowels and two diphthongs in Arabic, while there are twelve pure vowels and eight diphthongs in English. Another explanation is that the two languages have writing systems where the vowels are written in different ways. The results of the study showed that vowels were one of the problems that arose when spelling in English among people with Arabic as L1 (Al-Busaidi & Al-Saqqaf, 2015).

Vowel spelling errors have also been investigated in a group of L2 users of English with Spanish as L1 in a study by Sun-Alperin and Wang (2008). Spelling errors in English among children with Spanish as L1 were compared with the spelling among children with English as L1. The focus was on the spelling of vowels, based on the fact that English vowels can often be spelled in many different ways, while Spanish has a stronger connection between letters and sound. One result of the comparison was that the Spanish-speaking children made many more spelling mistakes than those with English as L1. In addition, spelling errors that were phonologically legitimate according to Spanish spelling rules were unique to the group with Spanish as L1. Other types of spelling errors, in the study divided into three types (phonologically and orthographically illegitimate, phonologically or orthographically illegitimate in Spanish and English, and phonologically and orthographically legitimate in English), were found among students with English as L1 as well as among those with Spanish as L1 (Sun-Alperin & Wang, 2008).

Difficulties with the spelling of vowels were also found in a Swedish study, where the spelling of a group of multilingual children in grades 1-3 was examined (Zetterholm, 2017). For example, a student with an Arabic L1 wrote <o> instead of <u>, which is explained by the fact that <u> is pronounced /o/ in Arabic (Zetterholm, 2017).

According to several studies, both Swedish and international, people's L1 affect how they spell vowels in their L2 (Andersson, 1981; Al-Busaidi & Al-Saqqaf, 2015; Sun-Alperin & Wang, 2008; Zetterholm, 2017).

## Consonants

Confusion of consonants is another spelling mistake that has been found in several studies (Andersson, 1981; Al-Sobhi et al., 2017; Zetterholm, 2017). Andersson (1981) found in his Swedish study, among other things, that Finnish learners of Swedish had difficulty with the

Swedish voiced plosives /b/, /d/ and /g/ which are not found in the Finnish set of phonemes. Instead, the children often wrote the graphemes for the voiceless equivalents /p/, /t/ and /k/, which are found in the Finnish set of phonemes (Andersson, 1981).

In a study of participants with Arabic as L1 and English as L2, confusions of consonant pairs were made, i.e. <b>/<p>, <f>/<v> and <ch>/<sh>. This can be explained by the fact that some phonemes used in English, such as /p/ and /v/, are not found in Arabic. Another reason mentioned is that there is not always a clear connection between grapheme and phoneme in English spelling (Al-Sobhi et al., 2017).

There were also several examples of confusions of consonant pairs in the group with Swedish children in school years 1-3 (Zetterholm, 2017). Participants with Arabic as L1 confused <b> and <p>, since Arabic lacks the voiceless consonant /p/. Students in the study with Somali as L1 mixed the consonants <f> and <v>, which can be explained by the fact that only the voiceless phoneme in the pair, /f/, is found in Somali. The same was found in the pair <p>/<b>, where only /b/ is found in Somali (Zetterholm, 2017).

All studies (Andersson, 1981; Al-Sobhi et al., 2017; Zetterholm, 2017) found results that suggest that the consonant set in the L1 could affect how L2 students spell consonants in their L2 regardless of whether it is Swedish or English. However, the Swedish studies are few, and the only large-scale that has been done, i.e. Andersson (1981), is old and is based on languages that do not represent Swedish L2 classrooms of today. There is a need for newer studies, such as this one, which can represent the current situation and be relevant for L2 teaching in Sweden today.

### Significance of the writing system

The significance of the writing system for learning and spelling an L2 is another aspect that has been investigated (Oller & Ziahosseiny, 1970; Pytlyk, 2011). Oller and Ziahosseiny (1970) studied spelling errors among students with English as L2. They assumed that those with an L1 written with the same writing system as the L2, the Latin alphabet, would make fewer spelling mistakes than those with an L1 written in another writing system than the Latin alphabet. However, their conclusion was the opposite, as their study showed that it was more difficult to learn a new language with the Latin alphabet if the L1 was also written in the Latin alphabet.

An alternative result was found by Pytlyk (2011). She examined whether the writing system could have any significance for the learning of an L2 from another perspective. The participants were people with English as their L1 who learned Mandarin as an L2. One group learned Mandarin through alphabetic writing and one group learned Mandarin through syllabic writing. In that study, no significant differences were found between the results of the two groups, meaning that the writing system had no effect, which differs from the results in Oller and Ziahosseiny's (1970) study.

### Research questions

The research questions are:

- Does the set of phonemes in L2 students' L1 affect how they spell consonant and vowel sounds in Swedish?

- Does it matter if the L1 is written in a different writing system than Swedish, i.e. the Latin Alphabet?

### Method

To answer the study's research questions, data were collected through a spelling test conducted at SFI. The reason why SFI was chosen over e.g. upper secondary school is that the groups are more homogeneous in terms of level at SFI than at upper secondary school thanks to the level grouping. In terms of other factors, such as age and previous educational background, however, the SFI group is heterogeneous.

All participants studied course level C or D. The three SFI groups were selected with the help of a teacher at SFI. The teacher was instructed that the participants should be at a level in their Swedish language learning that was high enough to understand the instructions and complete the test, but low enough for them to make spelling mistakes.

### Participants

The experiment was conducted at SFI in an urban area in Småland in three groups consisting of a total of 37 course participants with 12 different L1s (Table 1). The participants were between 22 and 51 years old, and the average age of the group was 34 years.

Table 1. Participant list. Number of participants of each L1 and the writing system used. The largest group of speakers is the Arabic L1.

L1	No.	Writing system
Afar language	1	Latin alphabet
Albanian	2	Latin alphabet
Arabic	14	Arabic alphabet
Bosnian	1	Latin alphabet/ Cyrillic alphabet
Dari	1	Persian alphabet (variety of Arabic alphabet)
English	1	Latin alphabet
Kinyamulenge	1	Latin alphabet
Kurdish	3	Latin alphabet
Somali	5	Latin alphabet
Spanish	1	Latin alphabet
Tigrinya	4	Ge'ez/Ethiopic script
Vietnamese	3	Latin alphabet
Total number of participants	37	

The participants had been in Sweden between one and ten years. How long they had studied at SFI varied, from three months to four years. However, the majority had studied at SFI for between one and three years. The participants also provided information about their previous schooling, where it had taken place and at what level it had been. A majority of the group had a previous education corresponding to compulsory school or upper secondary school, as stated by 14 and 13 people respectively. Six people had a university education and three people had no previous education at all before coming to Sweden.

### Material

The spelling test consisted of 19 sentences. The sentences contained words with vowel and consonant

phonemes that, based on previous research, are expected to be difficult for L2 learners of Swedish to spell. The selection of consonants was based on consonant pairs in Swedish that were phonetically similar, e.g. that the only difference between them was that one is voiced and the other voiceless, and that the consonants in Swedish would have a phonetic spelling. In addition to the consonants, the spelling of vowels with a focus on <i>, <y>, <o> and <u> was also examined. Other vowels were excluded, for example because the phoneme can be spelled in different ways, such as /ɛ/ which can be spelled with both <e> and <ä>.

The spelling test was constructed so that in total there would be at least 7 of each phoneme to be counted. However, since the spelling test consisted of sentences, with several words that contained graphemes that were not examined, some phonemes occurred more often due to a higher frequency in Swedish. The number of times the phoneme occurred varied between 7 and 36 times, but most occurred 10-20 times.

### Data collection

The spelling test was conducted as follows: an experiment leader (the first author) read out the 19 sentences, one by one, at a leisurely pace and several times. First, a sentence was read 2-3 times and then the participants had the opportunity to ask the experiment leader to repeat the read sentence, or to hold on before moving on, which was used by several of the participants. The number of times each sentence was read out was not noted. The participants wrote by hand.

The material was processed by the first author who sorted and counted the participants' spelling errors. The spelling mistakes that were focused on were assumed confusions, as well as omissions, of consonants and vowels. For consonants, the following assumed confusions were the main focus: b>p, p>b, g>k, k>g, t>d, d>t, v>f, f>v, r>l, l>r. Other assumed confusions and omissions were also noted.

The vowels in focus were /y/, /i/, /u/ and /ʉ/. Other Swedish vowels were excluded for various reasons. For example, vowels that can be spelled differently, i.e. /o/ that can be spelled with both <o> and <å> and /ɛ/ that can be spelled with both <e> and <ä>, were not counted due to such a misspelling would be difficult to connect to the phoneme set in L1.

Because the spelling tests were done by hand, the spelling errors were counted manually. The number of spelling errors per participant and variety was then entered into Excel.

### Results

First, the results of the percentage of spelling errors will be presented per language. After that comes a comparison between the results of the languages written in the Latin alphabet and those written in a different writing system. This is followed by a closer analysis of the results in the group with Arabic as their L1.

#### Spelling errors in all languages

The languages that made the most spelling mistakes on the consonants per person were Spanish (14.73%), Vietnamese (12.66%) and Arabic (11.18%) (Figure 1). However, some of the figures in the results section show individuals' results rather than an average, as several

languages in the survey were represented by only one speaker: Afar, Bosnian, Dari, English, Kinyamulenge and Spanish (Table 1).

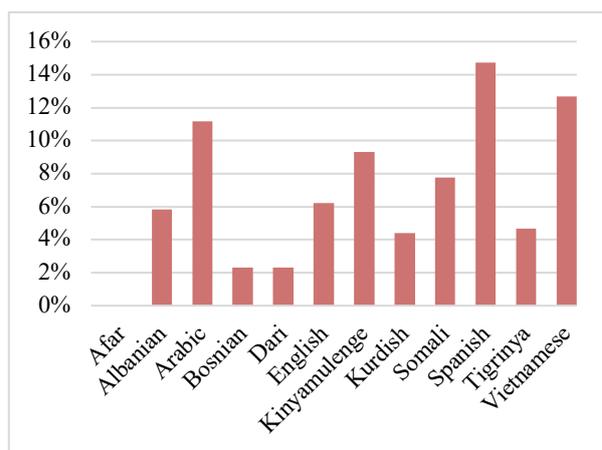


Figure 1. Results on consonant spelling errors. Bar graph showing an average percentage of the number of assumed consonant confusions and omissions made per person for each language in the survey.

Regarding the vowels, the vowel /y/ was often written with a different grapheme than <y>. This pattern was present in all languages (Figure 2). Nine of the twelve L1s in the survey have over 50% errors on /y/, and several of them close to 70%. The participant with Kinyamulenge as L1 exchanged /y/ for another phoneme about 90% of the time. Some speakers replaced <y> with <i>, but also <e> and <u> were common.

In addition to /y/, there was also a large proportion of errors in /u/ among several of the languages, especially Albanian, Kurdish, Somali, Spanish and Tigrinya (Figure 2). The most common confusion was between <o> and <u>. The most common misspelling of /u/ was with <o>. Overall, a larger proportion of vowel errors than consonant errors were made in all languages.

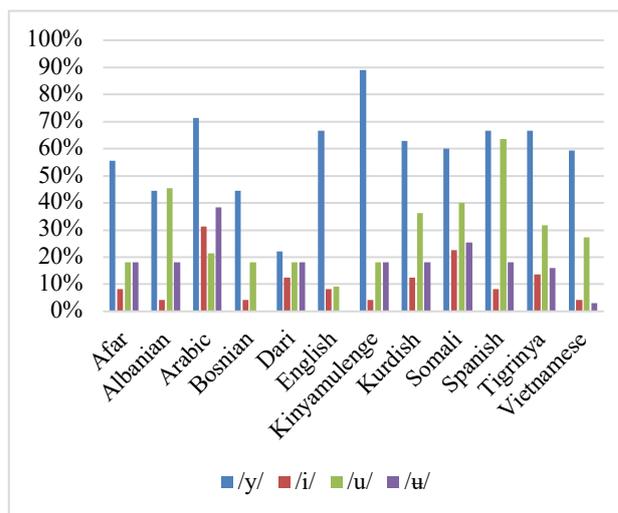


Figure 2. Results on vowel spelling errors. Bar chart showing spelling errors per person distributed in the participants' L1. Every time /y/, /i/, /u/ and /ʉ/ were confused with another vowel or omitted was counted as an error.

#### Different writing systems

In the comparison between the participants with L1s written in the Latin alphabet and those with L1s written

in a different writing system, certain differences can be seen. In terms of consonant errors, the proportion is almost exactly the same in both groups, with 7.21% (SD 4.87) errors in the group with the Latin alphabet and 7.17% (SD 3.51) in the group with other writing systems. However, there is a difference in error between the groups when it comes to the vowels. The “Latin alphabet” group has 24.65% (SD 8.40) errors and the “other writing system” group has 33.88% (SD 9.91) errors (Figure 3).

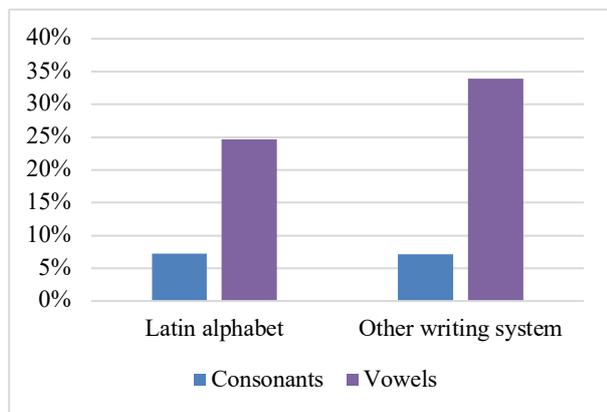


Figure 3. Spelling errors between writing systems. Bar graph showing how many spelling mistakes were made as a percentage in the groups Latin alphabet compared to other writing system. The errors are divided into consonant and vowel errors.

### Arabic as L1

Fourteen of the 37 participants had Arabic as their L1. The size of the group makes it possible to analyse the spelling errors in more detail. The educational backgrounds of the Arabic-speaking participants varied. Two people had a university education, six people had an education at a level corresponding to upper secondary school and six people had an education at a level corresponding to compulsory school. Their previous schooling had taken place in different countries: seven in Syria, three in Sudan, one in Chad, one in Kuwait, and one unknown (did not enter country for previous education). The participants' time in Sweden varied from eight months to two years and six months.

Figure 4 shows that the most common assumed confusions made by the participants with Arabic as L1 were p>b (13.10%, SD 11.19), and b>p (18.37%, SD 19.75). g>k, k>g, v>f and f>v also occurred in 5-7% of the possible cases. Assumed confusions of the consonant pairs p/b, g/k and v/f are noticeably more common than of the consonant pairs d/t and r/l. The difference is interesting because /d/, /t/, /r/, /l/ are all found in the in Arabic set of phonemes.

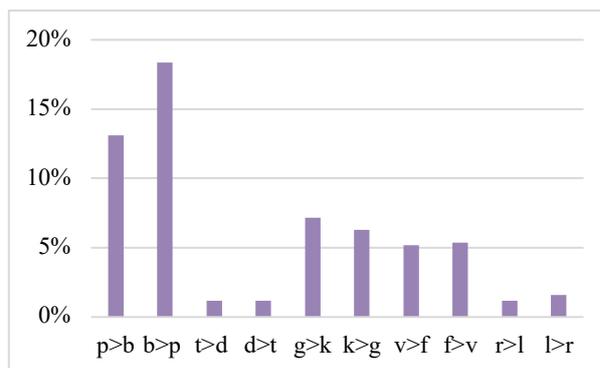


Figure 4. Consonant spelling errors in Arabic as L1. Bar graph shows average values as a percentage of the number of spelling errors in the learners with Arabic as L1. One hundred percent is the total number of possible errors per variety, i.e. the number of times each phoneme was present in the spelling test.

Figure 5 shows the proportion of times the participants with Arabic as their L1 confused the vowels /y/, /i/, /u/ and /u/ with another vowel or omitted the vowel. First of all, the amount of vowel errors is large compared to the consonant errors. More than 70% of the times /y/ occurred, it was spelled with graphemes other than <y>. The other vowels were also misspelled a relatively large number of times, /i/ 31.25% (SD 16.65), /u/ 21.43% (SD 11.61) and /u/ 38.96% (SD 22, 39) of the times.

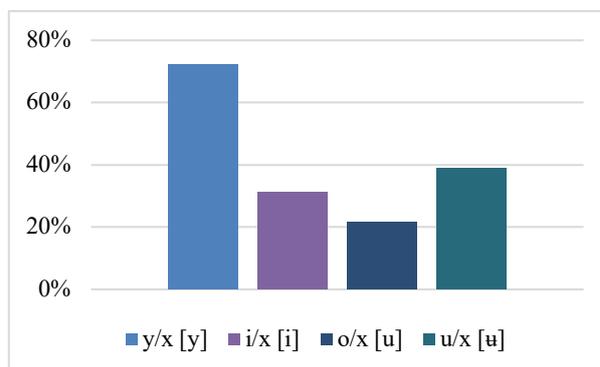


Figure 5. Vowel spelling errors in Arabic as L1. The diagram shows the proportion of times the participants with Arabic as L1 made vowel confusions and omissions.

### Discussion

The results show that the participants generally made more vowel errors than consonant errors across all languages. This was also evident in the comparison of the total number of spelling errors among the participants with an L1 written in the Latin alphabet (i.e. the same as Swedish) and those with an L1 written in a different writing system. Moreover, the results on Arabic as L1 show that the spelling mistakes could to some extent be explained by the Arabic phoneme set. For example, consonant pairs were confused to a greater extent when one of the consonants was not in Arabic (i.e. p/b, k/g, v/f) than when both consonants in the pair are in Arabic (i.e. t/d, r/l).

### The vowels

A spelling mistake that stood out in the study was the large number of confusions and omissions of the vowel /y/, among all L1s. This is what Andersson (1981) also

found in his study, where other L1s than in this study were represented. Zetterholm (2017) highlights examples where participants in her study with Somali as L1 exchange <y> for <i>. Misspellings of /y/ could, for example, be due to phonetic similarities with both /i/ and /u/, which may cause confusions.

Among the vowels, it was also common to misspell /u/, especially among the languages Albanian, Kurdish, Somali, Spanish and Tigrinya. These languages, with the exception of Tigrinya, are written in the Latin alphabet. In Swedish, /u/ is spelled with <o>, but in many other languages using the Latin alphabet, /u/ is spelled with <u>, which could be an explanation for why these particular participants misspelled /u/ to a large extent. Misspelling /u/ because it is written with a different graph in the L1 could be an example of transfer (Abrahamsson, 2013; Hammarberg, 2013; Weinreich, 1953).

The large amount of misspellings of rounded vowels is similar to the result of Andersson's (1981) Finnish participants, which he explains by the fact that the ratio between the vowels changes when the number of vowels is different. He thus believes that it can be difficult to spell /y/ even if the phoneme is found in the L1. Without making comparisons with all L1s in the study, it could be inferred that Swedish has many vowel phonemes compared with other languages in the world but a more average number of consonant phonemes (Engstrand, 2007).

Differences between the L1s are found in the study, but it is important to keep in mind that the data collection is not large enough to make conclusions on whether it is due to the languages or to other factors that are of a more individual nature.

### Different writing systems

In the comparison between different writing systems, the results indicate certain differences between participants with L1s written in the Latin alphabet and those written in another writing system. The proportion of consonant errors does not differ at all between the two groups. Regarding vowel errors, however, there is a difference of about ten percentage points between the groups, where the group with other writing systems makes more errors. The results of this comparison should be interpreted with caution. The main reason for this is that "other writing systems" in this survey are represented by Arabic to 74%. Therefore, that group's results may largely be due to the Arabic language in particular, rather than the group's L1 being written in a written language other than Swedish. With this in mind, there are still tendencies showing that it could affect the learning of Swedish negatively to have an L1 written in a different writing system than the Latin alphabet. This is something that differs from what Pytlyk (2011) concluded in his study, where there were no differences in the results. The result is also in direct contrast to what Oller and Ziahosseiny (1970) found in their study, where they came to the conclusion that it is more difficult to learn an L2 with the Latin alphabet if the L1 is also written in the Latin alphabet.

### Arabic

When it comes to consonant errors, the results of the Arabic group show that they make a larger proportion of errors in the consonant pairs where one consonant is not in Arabic (p/b, g/k, v/f) than in the consonant pairs where both consonants are in Arabic (d/t, r/l). This suggests that

the L1 affects the spelling because /d/, /t/, /r/ and /l/ are all consonants found in Arabic, while /p/, /g/ and /v/ are missing in the Arabic phoneme set. These types of spelling errors, for example confusion of /p/ and /b/, were also found in Al-Sobhi et al. (2017) who examined L2 speakers of English with Arabic as their L1. Zetterholm (2017) also found this confusion among Swedish children with Arabic as their L1. These confusions that people with Arabic as their L1 make when they write in Swedish indicate transfer (Abrahamsson; Hammarberg, 2013; Weinreich, 1953).

An interesting aspect in the result from the participants with Arabic as L1, however, is that the proportion of errors is in principle equal in "both directions" in the consonant pair, for example both k>g and g>k. Even if /k/ and /v/ are not found in Arabic and /g/ and /f/ are, the confusions k<g and v>f are almost as common as g>k and f>v, with less than a percentage difference between the pairs. The difference is slightly larger between p>b and b>p, but even in that case, the proportion of confusions is quite similar, with only a difference of about five percentage points. This phenomenon, the direction of the confusion, has not been discussed in previous research. One explanation could be that L2 learners of Swedish with Arabic as L1 are aware that there are several consonant pairs with two corresponding sounds, and that it is difficult for them to distinguish the sounds. In their learning process, they have learned that both the voiceless, /k/, /f/, /p/, and the voiced variants, /g/, /v/, /b/, exist in Swedish. However, it can be difficult for them to hear the difference because the distinction between the consonants does not exist in the L1, which leads to them using both but sometimes confusing them.

In addition, when it comes to the vowels, the results show tendencies of the L1 Arabic affecting the spelling in Swedish. In Arabic there are three vowels: /i/, /a/ and /u/. The Arabic group misspelled /y/ and /u/ which are not in their L1, to a larger extent than /i/ and /u/.

The large proportion of misspellings of the vowel /y/ stands out among all the L1s, but the Arabic speakers made a larger proportion of errors in /u/ than all other L1s. The Arabic group is also the only one that makes more mistakes on /u/ than on /i/. That people with Arabic as their L1 misspell /u/ and instead of <u> use <o> is also something that is mentioned in Zetterholm's (2017) study. Zetterholm (2017) links this confusion to the pronunciation in children with Arabic as their L1, who pronounce <u> as /o/ due to accent. However, these confusions could also be traced to Andersson's (1981) explanation of difficulties in spelling vowels, where he believes that a difference in the number of vowels changes the relationship between the vowels, which can make them difficult to spell regardless of whether they are part of L1 or not.

### Conclusion

As previously mentioned, the data collection for this study is not large enough to draw any major conclusions in the comparison between the L1s. The comparison between the Latin alphabet and other writing systems indicates that the writing system could affect the learning of Swedish negatively if the L1 is written in a different writing system than the Latin alphabet.

However, the results show some expected trends that indicate that the L1 affects the spelling of the L2, which is consistent with previous research (Andersson, 1981; Al-Busaidi & Al-Saqqaf, 2015; Sun-Alperin & Wang, 2008; Zetterholm, 2017; Al-Sobhi et al. 2017). These assumptions are in this study taken primarily from the group with Arabic as L1. There are several examples of phonemes that are misspelled to a greater degree than others, where there is an explanation for the differences between the phoneme set in Swedish and Arabic. Not all spelling errors can be explained by this, but perhaps it can be easier for both teachers and learners to be able to anticipate some errors that are common and differ between different L1s. As a teacher of Swedish as a second language, keeping the students' L1 in mind when teaching could provide better conditions for targeted and individual support for L2 students, as certain spelling errors could be foreseen.

### Further research

In order to be able to benefit from research in Swedish such as the L2 survey, it would have been interesting to study the role of the L1 in more detail in more languages. The little research that has been done on the topic, for example Andersson (1981), is largely dated and has the largest language of that time among L2 students in focus. None of the L1s represented in Andersson's (1981) study (Finnish, Danish, Greek, Macedonian, Norwegian, Portuguese, Serbo-Croatian and Turkish) were included among the participants' L1s in this study. Zetterholm's (2017) study is newer but was done in a fairly small sample group (a multilingual classroom in primary school). It would therefore have been interesting to study larger groups of learners with the same L1 and compare with other L1s in order to find out what distinguishes them. Such research could help Swedish L2 teachers to support their students more effectively and individually in their language learning.

In addition to this, it would also be interesting to further investigate the significance of the L1 writing system. For once, you could research the importance of whether the L1 is written in a logographic, syllabic, or alphabetical writing system. It would also be interesting to look at

how a difference in orthographic depth in the L1 and L2 affects the learning.

It would also have been interesting to investigate other spelling mistakes. For example, one could investigate how people with different L1s handle Swedish consonant clusters or long and short vowels.

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