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Grapheme-Phoneme Correspondences in German and Associated Challenges for Syrian-Arabic-Speaking Learners

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Abstract

Many participants in European literacy courses speak Arabic as (one of) their first language(s). In Switzerland, people from Syria represent the second largest group of recognized refugees. The language systems and the sociolinguistic situation in Syria and German-speaking Switzerland show several similarities. Firstly, both German and Arabic have a fairly deep orthography (in contrast, for example, to the shallow orthography of Italian or Spanish). Secondly, both languages have a rich phoneme inventory with regards to consonants. However, the vowel system in German is much more complex than the Arabic one. Lastly, both languages consist of different varieties existing in diglossic situations. In German-speaking Switzerland, both Swiss German and (Swiss) Standard German are used daily; in the context of literacy courses, however, Standard German is used almost exclusively. In Syria, Modern Standard Arabic is mainly used in written or very formal contexts and regional varieties of Syrian Arabic are spoken in less formal contexts. In this contribution, we investigate possible connections between grapheme-phoneme correspondences in (Swiss) Standard German and phonological awareness in Syrian-Arabic-speaking learners, providing suggestions for incorporating these findings into German language literacy classrooms to enhance the learning experience of Syrian Arabic speakers.

Keywords: adult literacy acquisition, phonological awareness, grapheme-phoneme correspondence, German, Syrian Arabic

Introduction

There is comparatively little research on the literacy acquisition process of adults with no or low literacy skills as well as adults with competences in a non-Latin alphabet (Guerrero Calle et al., 2023; Markov & Waggerhauser, 2018). In addition, literacy courses in German-speaking Switzerland are often attended by both learners of an additional alphabet and adults who have little or no school experience (Guerrero Calle, 2020). This has been recognized as a cause of potential problems in other German-speaking countries and has accordingly found its way into concepts for integration courses (e.g., BAMF, 2018; ÖIF, 2022). Within a project at the *Research Centre on Multilingualism* funded by the Federal Office of Culture¹, we are investigating the development of phonological awareness in learners of an additional alphabet and adults with beginning literacy levels as an important building block for the assessment of literacy skills in multilingual settings. These adults might be pre-literate, semi-literate or illiterate in their L1 (see Centre for Canadian Language Benchmarks, 2015). If they are literate in their L1, these languages use a non-Latin alphabet. The project focuses on literacy acquisition by LESLLA learners who might belong to any of the mentioned categories, or they might be literate in their L1.² LESLLA learners are “characterized as adults (age 15+) who are learning an additional language against the backdrop of interrupted formal schooling experience. These learners are often, though not always, immigrant or refugee-background individuals developing print literacy skills for the first time as adults, usually in a new language” (LESLLA, 2023). In the reference guide for *Literacy and Second Language Learning for the Linguistic Integration of Adult Migrants (LASLLIAM)*, Minuz et al., 2022, p. 17), non- and low-literate adults “cannot read and write in any language or are not able to use literacy in many simple tasks”.

In this context, the present contribution will shed light on the vowel inventories of Arabic and German as well as on the importance of so-called *basic graphemes* and *ortho-graphemes* (Thomé, 1992, 2019) within (German) literacy acquisition by Syrian-Arabic-speaking adults. First, literacy courses in German-speaking Switzerland will be introduced to better situate the possible connections between grapheme-phoneme correspondences, phonological awareness, and the involved vowel inventories of Arabic and German. Afterwards, these connections are supported by anecdotal evidence from literacy classes and possible applications of the information within this contribution are summarized. A conclusion of the raised points completes this contribution.

Literacy Courses for Adults in German-Speaking Switzerland

Like many other things in the federal state of Switzerland, literacy courses are organized and financed differently from canton to canton. In Basel-Stadt, for example, they are supervised by the social welfare office and financially supported by the cantons of Basel-Stadt and Basel-Landschaft as well as the State Secretariat for Migration. Therefore, all residents of the two cantons (Basel-Stadt and Basel-Landschaft) are entitled to a course price reduction. New residents get a voucher with which a certain number of lessons are free of charge. It is therefore crucial that these integration funds are used in a targeted manner.

In Switzerland, there is no literacy concept at a national level, as is the case in other German-speaking countries (BAMF, 2018; ÖIF, 2022). Thus, no broader strategy or framework

¹ The Federal Office of Culture is an administrative unit of the Federal Department of Home Affairs. It is the governing body tasked with formulating and executing the Confederation’s cultural policy.

² See, for example, Ardila et al. (2010) or Bigelow and Tarone (2004) on the critical effect this might have on literacy and second language acquisition.

exists for promoting literacy. Therefore, teachers focus on scenario-based teaching according to the quality approach *fide* (Geschäftsstelle fide, 2019) in many adult education institutes. This approach focuses on four basic principles: (1) action orientation, (2) needs and requirements orientation, (3) empowerment, and (4) appreciation. Thus, technical skills (such as phonological awareness or word decoding) are not mentioned here and it can be assumed that different teachers and institutions spend fluctuating amounts of time in their courses on “learning how the writing system works” (Perfetti & Marron, 1998, p. 89). However, it is known from the national curricula of Germany and Austria that literacy classes can be technically oriented. In Germany, for example, the *Konzept für einen bundesweiten Alphabetisierungskurs* [Concept for a Nationwide Literacy Course] dedicates a section to phonological awareness, language awareness, and pronunciation (BAMF, 2018). In these countries, phonological awareness is taught systematically and has also found a permanent place in frequently used teaching materials (e.g., Bachtsevanidis & Feldmeier García, 2024). Since neither the *fide* approach nor the Swiss framework curriculum for the linguistic integration of migrants (Lenz et al., 2009) are approaches specifically aimed at pre-/low-literate people or people with competences in a non-Latin alphabet, it is unclear whether technical aspects of reading and writing are systematically included in literacy classes. This contribution is an attempt to fill in the research gap.

Based on the number of asylum applications from Eritrea and Syria (together more than 60 %; SEM, 2024) as well as anecdotal evidence, the most frequent first spoken languages in classes are Tigrinya and (Syrian) Arabic. The language of instruction is (Swiss) Standard German.³ However, participants might use/hear Swiss German⁴ in everyday life as well. This contribution will thus compare the phoneme inventories of (Syrian) Arabic with those of different German varieties. Next, the concept of basic graphemes and ortho-graphemes developed by Thomé (1992, 2019) will be introduced.

Basic Graphemes and Ortho-Graphemes in German

Orthographies are traditionally classified within a continuum between deep and shallow (OECD, 2005). In shallow orthographies, there is a straightforward correspondence between graphemes and phonemes in both directions. On this end of the continuum, the international phonetic alphabet developed by the *International Phonetic Association* (2015) has only one-to-one correspondences in which every grapheme represents only one phoneme, and every phoneme is only represented by one grapheme. In deep orthographies, however, these correspondences vary greatly, and many exceptions are possible. English is often mentioned as having one of the deepest orthographies placing it on this end of the continuum. German is characterized as having a rather shallow orthography and (un-vowelized) Arabic is considered to have a rather deep orthography (Abu-Rabia & Taha, 2004). In German, there are multiple graphemic representations for almost every vowel and for some consonants. In Arabic, there are only standalone letters for consonants and the long vowels /a: i: u:/. Short vowels are sometimes represented using diacritics. However, the Arabic script uses four different shapes for its letters depending on whether they stand alone, in initial, middle, or final position (Ryding, 2005).

³ German is a pluricentric language (e.g., Ammon, 1995; Clyne, 1984) with multiple standard varieties. In German-speaking Switzerland, literacy teachers might use Swiss Standard German or other standard varieties because they are (originally) from Germany or Austria. In border regions (e.g., Basel), it is not uncommon for teachers to commute from abroad.

⁴ Swiss German is an umbrella term used for the Alemannic dialects spoken in German-speaking Switzerland.

Regarding grapheme-phoneme correspondences in German, it is possible to distinguish between so-called *basic graphemes* and *ortho-graphemes* (Thomé, 1992, 2019; Thomé & Thomé, 2024). Basic graphemes are the most frequent graphemic representations of phonemes and ortho-graphemes are additional alternatives based on orthographic rules. Usually, basic graphemes consist of single letters, while ortho-graphemes are letter combinations. Nevertheless, there are certain phonemes that correspond to letter combinations as their basic grapheme. For example, the basic graphemes for /ʃ/ and /x/ are <sch> and <ch> respectively. However, some single letters can also be an ortho-grapheme for a certain phoneme. This is the case for <s> corresponding to /ʃ/ in combination with <t> or <p>. For example, <Spiel> ‘game’ is pronounced /ʃpi:l/. While <p>, <ie>, and <l> all represent basic graphemes, <i> (together with <ih> and <ieh>) is an ortho-grapheme for the long close front unrounded vowel /i:/. Anecdotal evidence suggests that such correspondences (i.e., either letter combinations being a basic grapheme or a single letter being an ortho-grapheme) can be counterintuitive to some learners of German.

According to Thomé (1992), basic graphemes are the unmarked grapheme-phoneme correspondence and about 90% of the graphemes in a common German text belong to this category. However, this distribution is not the same for all grapheme-phoneme correspondences. Based on Thomé’s calculations, some phonemes are represented by the same grapheme in 100% of the cases (e.g., /a/ is always represented by <a> and the diphthong /aɪ/ is always represented by <ei>), but other phonemes are only in 50-60% of the cases represented by the basic grapheme (e.g., /p/ is only in 51.6% represented by <p> and /ʃ/ is only in 53.8% represented by <sch>).

Ortho-graphemes are the marked grapheme-phoneme correspondence and contain the information of the unmarked elements and other information as well. The unmarked grapheme (i.e., the basic grapheme) for /ɛ/ is <e> and according to Thomé’s calculations, this is the grapheme used in 89.2% of the cases. The marked grapheme (i.e., the ortho-grapheme) is <ä> and it contains, in addition to the phonetic information, additional information. Such additional information could be that, for instance, within the paradigm from which the <ä>-containing word is taken (e.g., <hält> ‘hold’ (3rd pers., sing.)), <a>-containing forms exist (e.g., <halten> ‘to hold’).

Literacy courses ideally begin with frequently occurring phonemes and predominantly with their basic graphemes. Gradually, less frequently occurring phonemes and all other ortho-graphemes will be taught, so that both the phoneme system and the corresponding basic graphemes and ortho-graphemes should be largely introduced by the end of the literacy training according to the *LASLLIAM* Reference Guide (Minuz et al., 2022). To teach grapheme-phoneme correspondences, various teaching methods are being used in literacy classes, which can be related to the promotion of phonological awareness (Feldmeier García & Morand, 2023).

Vowel Inventories of German and Arabic

This article delves into an in-depth analysis of several vowel systems for German and Arabic. We make this restriction because the vowel systems in German are considered extremely complex and very difficult for learners to master. The simpler vowel systems of Arabic stand in clear contrast to that. Therefore, focusing on the vowel system should be particularly fruitful. It is worth noting that while the consonant systems of both languages exhibit complexity, they also share substantial overlap. This makes the respective consonant inventories arguably easier to master due to positive transfer as “[s]imilarity between native and target language is above all a facilitating factor in second language acquisition” (Schmid, 1993, p. 417).

German

German is a pluricentric language (e.g., Ammon, 1995; Clyne, 1984) and this leads to different standard varieties, for example, in the three ‘full centers’ of German: (a) Austria, (b) Switzerland, and (c) Germany (Ammon et al., 2016). In this section, we will present the vowel inventories of the three German varieties we believe to be influencing the learners of German in German-speaking Switzerland the most (not necessarily in that order): German Standard German, Swiss Standard German, and Swiss German. Whereas there are pronunciation norms for German Standard German (e.g., Duden, 2023), there are only conventions for Swiss Standard German (see Hove, 2002). Swiss German is a non-standard variety, and it is an umbrella term for the Alemannic dialects used in German-speaking Switzerland. We will focus on the best described vowel inventory, specifically that of Zurich German.

Vowel Inventory of German Standard German

Standard German being a pluricentric language (e.g., Bickel & Schmidlin, 2004), the vowel inventory might therefore differ in the various centers. There is most information available for the pronunciation of German Standard German (see also Wiese, 2000). German Standard German has 15 pure vowels /ɪ i: ʏ y: ε ε: e: œ ø: a ɑ: ʊ u: ɔ o:/ and three diphthongs /aɪ aʊ ɔɪ/ (Willi, 2004). This contribution focuses on monophthongs. In addition, there are two central vowels (that are sometimes considered to be allophones rather than phonemes). The schwa /ə/ and the vocalized *r* (<r> in final position of a word or syllable pronounced as /ɐ/ like in the word <Mutter> ‘mother’ /ˈmʊtɐ/). Table 1 shows the respective phonemes and the corresponding graphemes (basic graphemes in bold). It also shows the distinction between tense and lax vowels, which in German is particularly important when ortho-graphemes are to be written in the orthographic stage of literacy (see Frith, 1985).

According to Bußmann (2008), the tense/lax distinction is a binary phonological opposition based on acoustically analyzed and spectrally defined differentiation criteria. In many European languages, the vowel distinction corresponds to the oppositions open/close and de-centralized/centralized. Thus, tense vowels are typically more open and less central than lax vowels (e.g., /i/ is more open and less central than /ɪ/). These features are summarized as vowel quality. In German Standard German, this opposition additionally correlates to the opposition long/short (vowel quantity) and thus long vowels are generally tense whereas short vowels are lax. However, this might not completely hold for /a/ and /ɛ/. The vowel quality of /a/ in German Standard German is controversial. The following table assumes a difference in line with Hansen-Morath et al. (2018). The lax vowel /ɛ/ is therefore the only one where quality does not completely coincide with quantity (see also Schmid, 2004). This can be shown with the help of minimal pairs such as /ˈbɛ:tə/ (1st pers., sing., subj. 2, pret. ‘to request’) vs. /ˈbɛtə/ (1st pers., sing. ‘to make the bed’) or /ˈbɛ:kən/ (‘bears’) vs. /ˈbɛ:kən/ (‘berries’).

Table 1

*Tense and lax vowels in German Standard German and their grapheme correspondences (basic graphemes in bold)*⁵

	Phonemes	Graphemes
Tense Vowels	/ɑ:/	< a >, <ah>, <aa>
	/e:/	< e >, <eh>, <ee>
	/i:/	< ie >, <ih>, <i>, <ieh>
	/o:/	< o >, <oh>, <oo>
	/u:/	< u >, <uh>
	/ø:/	< ö >, <öh>
	/y:/	< ü >, <üh>
Lax Vowels	/a/	< a >
	/ɛ/	< e >, <ä>
	/ɛ:/	< ä >, <äh>
	/ɪ/	< i >, <ie>
	/ɔ/	< o >
	/ʊ/	< u >
	/œ/	< ö >
	/ʏ/	< ü >, <y>
	/ə/	< e >
	/ɐ/ ⁶	< er >, <r>

Vowel Inventory of Swiss Standard German⁷

There are no pronunciation norms for Swiss Standard German, however, pronunciation should ‘sound Swiss’ (Moulton, 1962). Most notable differences between the two standard varieties are probably in the consonant inventories (e.g., Swiss Standard German might use /kx/ instead of /k/ or there might be a lack of distinction between /ç/ and /x/). According to Hove (2002), such differences can be used as symbols of national identity. Regarding the vowel inventories of the two standard varieties, the lack of the central /ɐ/ in Swiss Standard German is most important in the context of this contribution. Thus, words ending in <-er> are typically pronounced with /ər/. In addition, there might be quality differences of the /e/ and /ɛ/ sounds. However, there is large interindividual variation due to interferences from Swiss German. The implications this might have on teaching basic graphemes and ortho-graphemes in German-speaking Switzerland goes beyond the scope of this paper as the differences are very subtle and probably beyond the level of awareness of Arabic-speaking learners of German.

Vowel Inventory of Swiss German

Swiss German is an umbrella term used for the Alemannic dialects spoken in German-speaking Switzerland. Fleischer and Schmid (2006) list 21 monophthongs for Zurich German /i i:

⁵ According to Wells (1982), the following British English (received pronunciation; RP) keywords can be used for the mentioned vowels (vowel quantity does not always match): /ɑ:/ BATH, /e/ DRESS, /i:/ NEAR, /o:/ lacking in RP, /u:/ GOOSE, /ø:/ lacking in RP, /y:/ lacking in RP, /ɛ/ lacking in RP, /ɪ/ KIT, /ɔ/ THOUGHT, /ʊ/ FOOT, /œ/ lacking in RP, /ʏ/ lacking in RP, /ə/ lettER.

⁶ The /ɐ/-schwa is not part of Thomé’s (1992) calculations. It only occurs in word-/syllable-final position.

⁷ Only some features of the Swiss Standard German pronunciation will be presented here. See, for example, Hove (2002, 2008, 2010) for a more detailed description.

y y: ε ε: e e: æ æ: œ œ: ø ø: ɒ ɒ: u u: o o: ə/. In addition, they list 8 diphthongs (Fleischer & Schmid, 2006).⁸ According to this description, Zurich German lacks the long and short lax vowels /ɪ ɪ: ɔ ɔ: ʊ ʊ:/ which might be part of vowel inventories of other Swiss German varieties (e.g., Schlote, 2008). It is obvious that such a vowel inventory is even more complex than those presented for German and Swiss Standard German, as one would anticipate with a non-standard variety. In addition to the vowel inventories of Standard German, Zurich German (as most Swiss German varieties) has a long and short near-open front unrounded vowel /æ/. Furthermore, the a-sound in Zurich German is an open back rounded vowel /ɒ/ that sounds to some people almost like an /ɔ/. Finally, many short vowels are tense vowels (/i y e ø u o/) and the lax open-mid front rounded vowel /œ/ has a long variant. Although Swiss German is typically not used in literacy courses in German-speaking Switzerland, its vowel quality might be transferred to Swiss Standard German by some speakers of Swiss German (e.g., Zihlmann, 2021).

Arabic

Vowel Inventory of Modern Standard Arabic

According to Owaida (2015, p. 73), Modern Standard Arabic “is the official language in around 22 Middle Eastern and African countries. It is used in official and literary contexts, and it is spoken on radio, television and in schools”. It has six pure vowels /a a: i i: u u:/ and two diphthongs /aj aw/ (Alghamdi, 1998; Al Malwi et al., 2023). However, one could argue that /i: u:/ are also somewhat diphthongic in nature as they are sometimes represented as /ij uw/ (Thelwall & Sa’Adeddin, 1990). The vowel quality is context dependent; thus /a/ is produced as /a ɑ ɐ/ and /i/ is produced as /i i ɪ/ depending on the phonological environment. Obviously, this is a very simple vowel system and vowel quality does not seem to play an important role.

Vowel Inventory of Syrian Arabic

“Arabic dialects are typically classified into five groups based on bundles of linguistic features” (Cotter & de Jong, 2018, p. 48). The Arabic spoken in Syria is grouped with the Syro-Lebanese dialects that are also spoken in Lebanon, Palestine, and Jordan. These dialects spoken in the Levant can further be divided into three groups: the dialects of Lebanon and central Syria, the dialects of northern Syria, and the dialects of Palestine and Jordan.

Unfortunately, no illustrations of the IPA⁹ are available for Syrian Arabic.¹⁰ The information in this section is therefore mainly taken from Cowell (1964) and two doctoral dissertations (Almbark, 2012; Owaida, 2015). Cowell (1964) claimed that Syrian Arabic (as it is used by natives of Damascus) consists of 11 monophthongs /i i: e e: a a: ə o o: u u:/. Owaida’s study (2015, p. 76) that “focuses on the Syrian variety of Arabic as spoken in Damascus and Homs and Hama” also lists 11 monophthongs. However, instead of a short /ə/ an additional long vowel is listed, namely /ɑ:/.

Typically, short vowels have “much the same quality” or “more or less the same quality” (Cowell, 1964, p. 9, p. 10) as their long counterpart, however, they demonstrate a more central location as compared to long vowels in Syrian Arabic. As in Modern Standard Arabic, vowel

⁸ This contribution, however, will focus on monophthongs.

⁹ “*Illustrations of the IPA* are concise accounts of the phonetic structure of different languages using the Association’s International Phonetic Alphabet, accompanied by audio recordings” (International Phonetic Association, 2024).

¹⁰ The only three available at the time of writing are for Abha Arabic (Al Malwi et al., 2023), Khuzestani Arabic (Bahrani & Modarresi Ghavami, 2021), and the Arabic dialect of Gaza City (Cotter, 2022). In addition, there is a very short description of Standard/Classical Arabic in spoken form (Thelwall & Sa’Adeddin, 1990).

quality is highly influenced by the phonological environment. For /ə/, for example, velarization, backing, and/or rounding can occur depending on the proximity to other sounds. “Arabic vowels usually have pharyngealised allophones, when they are adjacent to the pharyngealised consonants /tˤ dˤ ðˤ sˤ/” (Almbark, 2012, p. 65). Table 2 lists the monophthongs used in Syrian Arabic.

Table 2

Tense and lax vowels in Syrian Arabic according to Cowell (1964; Modern Standard Arabic vowels in bold)

	Phoneme
Tense Vowels	/a:/
	/o:/
	/e:/
	/u:/
	/i:/
Lax Vowels¹¹	/ä/
	/ö/
	/ë/
	/ü/
	/ï/
	/ə/

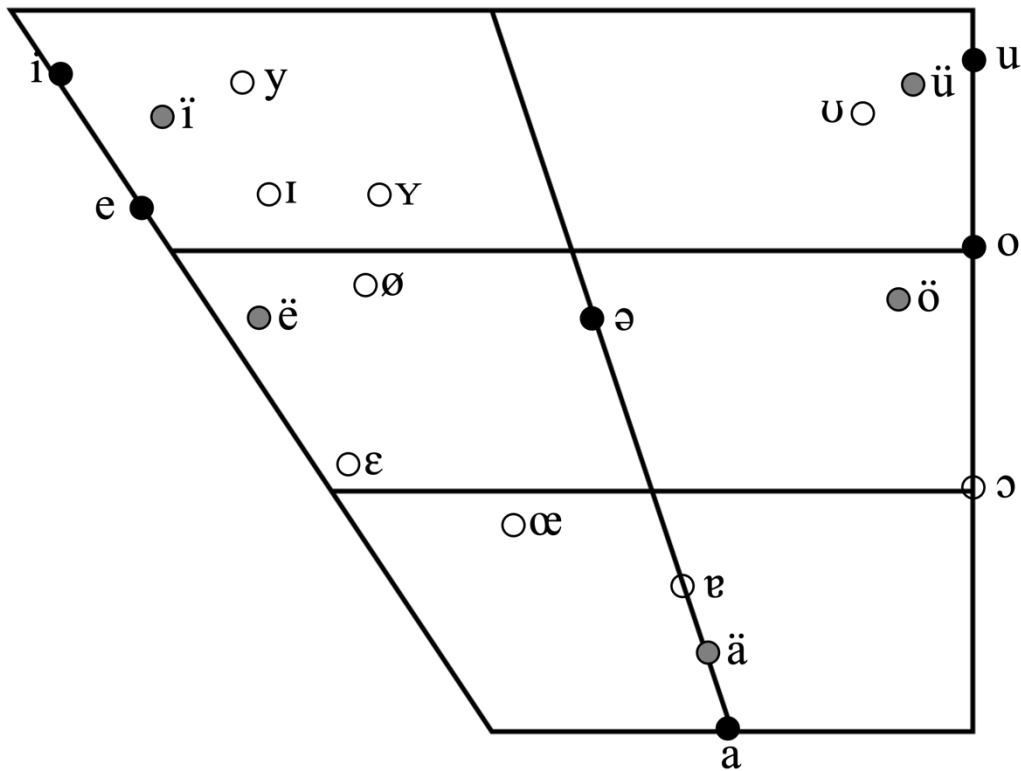
Comparison of German and Arabic Vowel Inventories

If all vowel systems presented above are compared, it becomes clear that the German vowel systems can likely represent a challenge for Arabic-speaking learners. We could assume that positive transfer can only occur for the tense and stressed vowels /a i u/ that are part of the Modern Standard Arabic phoneme inventory (Ryding, 2005). All other vowels that are either unknown in the Arabic system as they do not have phoneme status or have no equivalent in the Arabic script¹² are likely to lead to difficulties in the learning process. The vowels in Figure 1 are loosely based on Kohler (1990) for (German) Standard German and on Abou Haidar (1994, as cited in Almbark, 2012) for Syrian Arabic. The black dots represent vowels that are present in the Standard German and Syrian Arabic vowel systems. The grey dots are the more centralized versions used in Syrian Arabic for the short/unstressed vowels. The white dots are phonemes in (German) Standard German that have no equivalent in Syrian Arabic. However, acoustic analyses would be needed to investigate, whether /i/ and /ɪ/, for example, are indeed qualitatively different. The same holds for /ë ε/, /ü ʊ/, and /ö ɔ/. Lastly, the lack of /y ʏ/ and /ø œ/ in Syrian Arabic most definitely represents a challenge.

¹¹ The diacritic used for the short laxvowels is used to indicate their more centralized quality.

¹² Obviously, this does not constitute a significance for (Syrian) Arabic speakers who are pre-literate.

Figure 1: *Monophthongs of Standard German (white dots), Syrian Arabic (grey dots), and those arguably shared by the vowel inventories (black dots)*



Phonological Awareness

It has been repeatedly shown that phonological awareness is a critical skill for and a predictor of (successful) literacy acquisition within a language that uses an alphabet (e.g., Castles & Coltheart, 2004). Certain publishers of teaching materials explicitly include phonological awareness in their textbooks for literacy acquisition. For example, the *Hier! Alpha* series by Klett (e.g., Bachtsevanidis & Feldmeier García, 2024) includes exercises about phonological awareness. However, students in literacy courses may have very differently developed phonological awareness in many ways and to different degrees both in their first and second language(s). As far as instruction in Switzerland is concerned, teachers focus on scenario-based teaching according to the quality approach *fide* (Geschäftsstelle *fide*, 2019). To some teachers and students exercises about phonological awareness might therefore seem like a very technical skill. Such tasks are perceived as part of a narrow definition of literacy acquisition. According to Perfetti and Marron (1998, p. 89), the narrow definition refers to “learning how the writing system works, whereas the broader definition refers to the functional contexts of basic literacy”. Moreover, some students might find these exercises too easy and others in the same course might find them too hard as phonological awareness rarely plays a role in course allocation.

Phonological awareness is a “skill [that] involve[s], not simply unconsciously discriminating speech sounds [...], but explicitly and deliberately processing and acting upon

them” (Castles & Coltheart, 2004, p. 78). Studies provide evidence that it develops in children who learn an alphabetic writing system along the levels of syllable, onset/rhyme, and finally phoneme, and that the operations of identifying, blending/segmenting, and manipulating increase in difficulty in this order (e.g., Yopp, 1992). The Dual Route Model (Coltheart et al., 2001) assumes a lexical and a non-lexical route in reading and the latter “uses grapheme-phoneme correspondences to sound out words” (Jiang et al., 2024, p. 10). Thus, phonological awareness is assessed best using pseudowords to circumvent the lexical route, which directly taps into the orthographic representation of a word stored in the mental lexicon.

The stages of the development of phonological awareness can be presented within a matrix that includes the operationalization level (identification, blending, segmentation, and manipulation) and the sound level (syllable, onset/rhyme, phoneme). Typically, it is assumed that operationalizations on the syllable level are easiest and become more difficult as the unit becomes smaller (see the color coding in Figure 2). In addition, identification is believed to be easiest and followed by blending, segmentation, and manipulation.

Figure 1: Matrix of phonological awareness (based on Schnitzler, 2008)

	Syllable	Onset/Rhyme	Phoneme
Identification			
Blending			
Segmentation			
Manipulation			

Based on the phonological awareness matrix, writing development begins with phonological recognition of syllable structure. The first level of progression is reached when all syllables have been recognized and learners’ written realizations can be an indication for that. It appears that initial sound recognition and syllable recognition coincide. In literacy class, we see that learners segment a word phonologically at the syllable level, primarily because they write the initial letters of the syllables. In the case of <Mutter> (‘mother’), this would be <mt> as a fully developed syllable level. This is followed by the rhyme of the syllables (e.g., <mtr> for /'mʊtɐ/) and finally the sounds within syllables are included (e.g., <muta> for German Standard German or maybe <muter> for Swiss Standard German).

Thus, an almost fully developed phonological awareness allows the phonetic writing of words. Somebody who writes <muta> displays that they use alphabetic strategies, since, in German Standard German, it is not possible to hear the capital letter <M>, the double consonant <tt> and <er> either. In the case of Swiss Standard German, the word <Mutter> might be pronounced as /'mʊt:ɐ/. Therefore, a literacy learner who is relying on a fully developed alphabetic strategy would maybe already be able to write <muter> or <mutter>. In the moment when the literacy learner starts writing what is not pronounced, they start using orthographic strategies, which in the case of capital letters (in German nouns are written with capital letters) implies grammatical competence (since you must identify a noun to decide if you need to write an initial capital letter).

Possible Connections

Theoretical Considerations

Based on the points outlined above, various connections between the vowel inventories, phonological awareness in Syrian-Arabic speakers, and German grapheme-phoneme correspondences are possible. Two of them will be raised here: (1) the development of phonological awareness on the phoneme level might be connected to the overlap of the vowel inventories and (2) the introduction and use of basic graphemes especially for new/unfamiliar vowels could positively influence the development of phonological awareness in Syrian-Arabic-speaking learners of German.

Phonological awareness on the phoneme level might develop faster for long vowels. It could be assumed that those vowels that have equivalents in the Arabic script /a i u/ are easier to identify, blend, segment, and manipulate. They might be followed by the long vowels that are part of the Syrian Arabic inventory /e o/. Lastly the long vowels that are unique to the Standard German inventory /y ø/ might be mastered. Short vowels (especially in unstressed position) might be more difficult to identify, blend, segment, and manipulate. Short vowels that can be represented by diacritical marks in the Arabic script might be easier to operationalize. Again, they might be followed by those vowels that have similar equivalents in Syrian Arabic and those that are unique to Standard German.

Depending on the integration of basic graphemes and ortho-graphemes in the literacy course, basic graphemes might be used for known and additional vowels. By focusing solely on basic graphemes, new vowels might be internalized more easily. To do so, participants should be able to segment on the phoneme level.

Practical Observations in Literacy Classes

In literary courses in German-speaking countries, we typically observe specific difficulties among Arabic-speaking learners who want to master the German vowel system irrespective of their L1 literacy level. On the one hand, the level of phonological awareness plays a crucial role in these difficulties. This might distinguish Arabic-speaking learners from other learners because vowels (especially the short ones) are of low importance in the Arabic script and thus the development of phonological awareness on the phoneme level for vowels might be influenced by this fact. On the other hand, the lower complexity of the Arabic vowel system seems to be responsible for some of these difficulties.

For Arabic-speaking learners, the differentiation in German between long and short vowels in connection with the vowels' quality might be challenging. In Syrian Arabic, the vowels are pronounced more centralized, but there is no clear differentiation between stressed and unstressed vowels. However, the distinction between tense and lax vowels is important for German orthography.

In advanced literacy classes or in German classes with former participants in literacy courses, orthographically correct spelling using ortho-graphemes is important. The distinction between tense and lax vowels is very important. In the initial phase of literacy instruction, in which it is primarily expected that phonetic writing is done, i.e. that primarily basic graphemes are used, the tense-lax distinction is only relevant for /i:/ and /ɪ/. The greatest difficulties for Arabic-speaking learners arise from the fact that the Arabic script neither has /e:/ and /ɛ/ nor /o:/ and /ɔ/. Thus, Arabic-speaking learners often have difficulties to differentiate /e: ɛ/ from /i: ɪ/ and /o: ɔ/ from /u: ʊ/. Accordingly, they often have great difficulty deciding whether a word is written with the basic

grapheme <e> or <ie> on the one hand or with the basic grapheme <o> or <u> on the other hand. The words <leben> ('to live' /'le:bɪŋ/) vs. <lieben> ('to love' (/li:bɪŋ/) as well as <Kuchen> ('cake' /'ku:xŋ/) vs. <kochen> ('to cook' /'kɔxŋ/) show the problems we might expect. Further difficulties in literacy classes are often with the vowels /ø:/ vs. œ/ and /y:/ vs. /ʏ/. The /y:/ and /ʏ/ can quickly be learnt by reducing the lip rounding when producing /i:/ and /ɪ/. But the articulation of /ø:/ vs. /œ/ by reducing the lip rounding needs the production of /e:/ and /ɛ/, which are vowels that are missing in the Arabic vowel system. To hear and write the <ö>, the route chosen in literacy classes is often to identify and articulate /e:/ and /ɛ/, because if the lip rounding of these vowels is reduced, we get /ø:/ and /œ/ (see however Jolliffe et al., 2022 for practice activities).

Applicability

There are various ways in which the aspects presented in this article can be implemented in literacy courses with adults with Arabic as a first language or a language with an equally simple vowel system. The proposed ideas should not be understood as an exhaustive list but should serve as examples. Furthermore, this section is also intended to highlight how competencies in comparing vowel inventories or sound inventories in general can be improved.

Different ways to apply the findings shall be presented here. First, the information about the German and Arabic vowel inventories can guide pronunciation training. Any contrastive approach is useful in situations where inventories differ substantially which leads to systematic problems. It is essential for reading aloud that the course participants practice unknown and unfamiliar sounds. This can also be adapted to the introduction of new sounds (e.g., /ø: œ/) and letters (e.g., <ö>). For example, teachers could use a (contrastive) table that contains shared onsets in the two languages (e.g., Marschke, 2022, p. 229 for Arabic – German) and move on first to similar but different and later to completely unknown sounds. Furthermore, the development and automatization of writing and reading skills can be practiced through dictation or reading aloud exercises using (mostly) basic graphemes. Lastly, teaching vowel quantity (i.e., duration of vowels) and vowel quality (i.e., if a vowel is open/closed, front/back, and high/low) can be based on the findings described here. This could be supplemented by using a syllable analytic method (Röber, 2009), which could be helpful for difficulties in perceiving stressed and unstressed syllables as well as long and short vowels.

In Figure 1, the location of the different vowels represents the highest point of the tongue from a vertical and a horizontal point of view. Thus, we can imagine the figure as a mouth of a person facing to the left. This means that the highest point of the tongue is high up and very far in the front, when we produce the /i/ sound (which is in the top left corner in Figure 1). However, the highest point of the tongue is equally high up but far in the back when producing a /u/-sound (which is in the top right corner in Figure 1). Vowels depicted closely together are therefore produced in a very similar fashion and much more difficult to distinguish as transitions between vowels are continuous. Not shown in this figure is the lip rounding included in the production of some vowels. For German, the following vowels are rounded: /y: ʏ ø: œ/. Thus, to produce the sound in <für> ('for', /y:/), participants can be instructed to produce an /i/-sound and round their lips. This can be very helpful for teaching phoneme discriminations of vowels that are often confused (e.g., Ahmad, 1996).

Conclusion

This contribution's main focus is highlighting the grapheme-phoneme correspondence in German and possible challenges for Syrian-Arabic speaking LESLLA learners of German. It provides a comprehensive examination of vowel inventories in German and Arabic, as well as their implications for literacy learning, particularly for Syrian-Arabic-speaking learners of German. It begins by contextualizing orthographic classifications and the distinctions between shallow and deep orthographies, highlighting German's rather shallow orthography and Arabic's deeper system.

Furthermore, we present several vowel inventories for German and Arabic. First, the discussion delves into the complexities of German vowel systems across different varieties, contrasting them with the simpler structures found in Arabic varieties. German's pluricentric nature is explored, focusing on vowel inventories in German Standard German, Swiss Standard German, and Swiss German, with attention to tense/lax distinctions and phonological nuances. Second, the vowel systems of Modern Standard Arabic and Syrian Arabic are analyzed, noting their relative simplicity compared to German. Challenges faced by Arabic-speaking learners of German are highlighted, especially regarding phonological awareness and the differentiation between tense and lax vowels.

The contribution proposes theoretical connections between vowel inventories, phonological awareness, and grapheme-phoneme correspondences, suggesting that the development of phonological awareness on the phoneme level may be influenced by the overlap of vowel inventories. Practical observations from literacy classes underscore the difficulties faced by Arabic-speaking learners. We therefore emphasize the importance of understanding the intricacies of vowel inventories, phonological awareness, and orthographic systems in facilitating literacy acquisition, particularly for learners navigating the transition between Arabic and German.

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