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Musical aptitude and silent reading fluency in adult multilingual learners of Spanish: an exploratory study

Helena Legaz-Torregrosa^{a,b}, Francisco H. Machancoses^c, Kris Buyse^{a,d} and M. Carmen Fonseca -Mora^{e,f}

^aLeuven Language Institute, KU Leuven, Leuven, Belgium; ^bDepartment of Linguistics, University of Ghent, Ghent, Belgium; ^cPredepartamental Unit of Medicine, Science Health Faculty, Jaume I University, Castellón, Spain; ^dApplied Languages Department, Nebrija University, Madrid, Spain; ^eEnglish Studies Department, Faculty of Humanities, University of Huelva, Huelva, Spain; ^fCenter of Contemporary Thinking and Innovation for Social Development (COIDESO), University of Huelva, Huelva, Spain

ABSTRACT

Skilled adult readers are those who read fluently, but multilingual learners do not always exhibit the same reading proficiency in the different languages they know. Among the variables that influence learners' silent reading fluency, a research trend points to musical aptitude as an individual ability that affects language learners' reading competency. Common auditory features of reading and musical skills have been observed in studies with children and adolescents, but studies involving multilingual adults learning an additional language are scarce.

This study aims to observe the potential relationship of multilingual learners' musical aptitude and their silent reading fluency in all the languages the learners know and in Spanish, an additional language they are learning as adults. 157 Flemish university students were tested in Dutch, French, English, and Spanish. Learners' sociocultural data, their musical aptitude and their silent contextual word reading fluency in all languages were tested. In addition, a reading comprehension test in L4 (Spanish) was administered. The statistical results indicate a significant correlation between their musical aptitude and their L1, L2, L3 silent reading fluency, but not with L4 (Spanish).

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Introduction

Reading, or silent reading in particular, is a constant activity in our daily life and a basic tool for accessing knowledge. In an increasing multilingual world, where reading sources in different languages are more available than ever, better understanding of the multilingual reading acquisition process becomes relevant. Among the different variables that influence the reading process, a research trend has emerged in the last decade that points to musical aptitude (MA) as an individual ability that affects language learners' reading competency, but very little is known about this in multilingual contexts, such as Flanders (Belgium).

The Simple View of Reading theory (Gough & Tunmer, 1986) points to the relevance of learners' oral knowledge of language, also known as oracy. In fact, knowing a word and its meaning before learning to read it eases comprehension. According to this theory, reading depends in general on decoding skills and language comprehension, but adults' reading proficiency in a foreign language has been found to correlate significantly with their listening comprehension abilities (Lems, 2017). Even more, Tichko and Skoe (2018) pointed out that 'sensorineural auditory processing in central auditory structures is related to reading ability across the lifespan, beginning in the preliterate period and continuing into adulthood' (p.2).

On the other hand, when addressing adults' reading abilities, silent reading (SR) cannot be ignored: it is the most common way of approaching a written text, and the most rapid and efficient reading mode for older and proficient readers, to the extent that Lyon et al. (2003) identify silent reading fluency (SRF) as the hallmark of skilled readers. SR implies auditory information as the reader converts the visual form into sound via phonological recoding (Lutjeharms, 2007), activates the reader's inner voice (Gross et al., 2014; Miller & Schwanenflugel, 2008), and engages in auditory images that preserve the characteristics encoded during the actual perception of spoken language (Alexander & Nygaard, 2008). Therefore, phonological awareness, that is to say, learners' ability of discriminating and manipulating sounds at the sentence, word, syllable, and phoneme level, is -although considered a reading predictor- not enough to understand all the variables that influence reading, since a lack of sensitivity toward the rhythmic and melodic properties of a written text may produce difficulties in accessing and comprehending it (D'Imperio et al., 2016).

The common auditory features of language and music (i.e. melody and rhythm) and their mutual influence have been explored by a large number of researchers. Music and language are two forms of communication that depend on the speaker-hearer's auditory sensibility. Even in SR, traditionally seen as a visual process, auditory skills play an important role in holding auditory information that locks onto temporal patterns in working memory while text meaning is being processed (Mora Teruel, 2020). In reading, studies have focused predominantly on how musical training or musical expertise improves children's native or foreign language pre-reading skills (Degé et al., 2015; Herrera et al., 2011; Moreno et al., 2011) or reading abilities (Banai & Ahissar, 2013; Corrigan & Trainor, 2011; Strait et al., 2011; Swaminathan & Gopinath, 2013). In these studies, reading was tested orally, as the ability to read individual words aloud (oral word decoding), under the hypothesis that near transfer could occur from musical auditory skills to decoding skills (linguistic auditory discrimination and phonological awareness). Musical skills were considered in different ways: from the length of musical training received prior to the study to considering learners' general musical abilities that could be innate or acquired from any informal musical experience. Results were unequivocal, even delivering null findings as in the case of Swaminathan and Gopinath (2013), where no differences between musically-trained and untrained children in L2 reading scores were observed, possibly due to insufficient L2 experience. Banai and Ahissar (2013) detected no correlation between a short period of musical training and children's language reading skills.

Fewer studies have focused on adult readers. Tichko and Skoe (2018) replicated in adults' studies positive correlational results relating auditory processing, musical experience and reading subskills; as in the studies with children, they focused on reading tests aloud, not on SR, and explored musical experience by means of a questionnaire

of musical training history. Swaminathan et al. (2018) included a SR comprehension test, controlled previous musical training, and tested participants' musical perception skills, concluding that the associations between musical training and reading ability in native and non-native English speakers were caused by general cognitive abilities.

The mixed results are consistent with early systematic reviews and meta-analyses which could not establish a conclusive link between musical training and reading skills either (Butzlaff, 2000; Gordon et al., 2015; Lessard et al., 2011; Standley, 2008). Recent reviews claim that the positive conclusions reached are inconsistent with a causal relationship. Although there are strong correlations, musical training does not cause improvements in cognitive skills or academic achievements (Sala & Gobet, 2020; Swaminathan & Schellenberg, 2019).

Instead, musical aptitude (MA), understood as the innate ability to perceive and distinguish musical stimuli (Law & Zentner, 2012), and which is not directly related to formal music training yet open to enhancement through informal engagement with music, could be the key factor connecting linguistic and musical abilities (Swaminathan & Schellenberg, 2019).

In the context of reading, the melodic and rhythmic acoustic features are present in the inner voice activated while reading in silence, according to Fodor's Implicit Internal Prosody (1998); this has also been corroborated, among others, by Gross et al. (2014). These features are the constituent elements of prosody, defined as the music of language (Kuhn et al., 2010), and considered to be a key component of reading fluency (Rasinski, 2004). Fluency is defined as the ability to process linguistic written forms automatically in order to devote as much cognitive capacity as is needed to process the semantic level (Lutjeharms, 2007; Nathan & Stanovich, 1991; Rasinski, 2004). Prosody becomes a critical factor in adults' reading fluency once lower-level processes (phonological awareness and decoding) have been automatized in earlier stages of reading acquisition. Then, suprasegmental (vs. segmental) prosody is needed beyond word decoding in order to identify phonic groups as notional units that serve as keys for textual understanding (Cantero Serena, 2004).

From a foreign language perspective, the structural relation between L1 and L2 reading skills has been well documented: the Linguistic Interdependence Hypothesis (Cummins, 1979) states the correlation between reading skills' development in L1 and L2. Bernhardt (2011; p. 38), in the same line, exposes that the literacy level in L1 has an impact on the possible achievement in additional languages reading accomplishment: 'readers who struggle in their first language will probably also struggle in their second'. Consequently, adults who fail to properly develop SRF in their native language may also have difficulties in additional ones. Alderson (2000), in relation to the L2 language proficiency level, added that the 'linguistic threshold is not absolute', it varies according to the performing task: 'the more demanding the task, the higher the linguistic threshold' (Alderson, 2000, p. 39); Harding et al. (2015) emphasised as well that going beyond word recognition, L2 reading diagnosis need to take into account the L1 of the learner; however, Yamashita and Shiotsu (2017), brought evidence that L2 language knowledge and listening skills had more prediction weight than L1 reading.

From a multilingual perspective, research focuses on the possible transfer of skills from already known languages, on the factors that may have a facilitating effect in processing a

new language, and on how metalinguistic awareness and knowledge could enhance additional language acquisition (Cenoz, 2003; Jessner, 1999; Woll, 2019). While there is still no definitive consensus on a general cognitive model, there is evidence that transfer does not happen automatically but that it is facilitated by several factors (for a systematic review on transfer studies see Puig-Mayenco et al., 2020). Festman (2021), in a recent analysis of the evidence around the ease of learning additional languages when being multilingual, suggests that three key factors can facilitate the learning of a new language in a faster way than a non-multilingual learner, as a result of previous language experience: languages' similarity, level of literacy skills and genetic predisposition (intelligence, memory, executive functions, etc.). Other affective factors (learners' personality, motivation, learning experiences, etc.) will have additional influence in the multilingual context (Dewaele & Wei, 2012).

In the multilingual reality of Europe, multilingualism is often reflected as a dominant language constellation comprising three languages: an international language (English, German, French ...), a regionally important language, and a local one (Singleton & Aronin, 2019). European intercomprehension through receptive skills has also been analysed (McCann et al., 2003) with the objective of optimising learning inferences techniques by comparing Romance languages (later broadened to include Germanic languages), and highlighting similarities in order to offer pedagogical lines to better understand a text within the language family (Hufeisen & Marx, 2007). In this vein, reading comprehension across Romance languages (L1: Italian/French) and Germanic languages (L2: English-L3/L4: German) in adult readers was studied by Peyer et al. (2010), who observed grammatical difficulties and the possible influence of L2 in L3/L4. Their results indicate that L2 and overall foreign languages' reading competence has a correlation with learners' L3/L4 reading competence at a low level (A2), and that insufficient understanding of L3/L4 texts leads the readers to compensate with resources from their L2. They concluded that multilingual competence can benefit reading comprehension depending on the learners' reading proficiency level.

Surprisingly, not many studies have observed and compared the relationship between European multilingual adults' SRF among native and additional languages, and fewer show MA as a determining factor when comparing L1 and L2 SRF. Foncubierta (2020) concluded that MA has a crucial role in adults' SRF individual differences in the context of Italian (L1) and Spanish (L2). From a multilingual perspective, more data and experiments are needed to establish the role of MA in SRF in three or more languages.

A multilingual context

In a multilingual context, the number of factors involved in language-processing increases exponentially with the number of languages, both in terms of cognitive aspects (language awareness, learning awareness, etc.) and in language-specific (language distance, language proficiency, language exposure, context of acquisition/learning and literacy levels, etc.), and emotional ones (motivation, attitudes, language status, acceptance of the language, etc.). The number of variables can increase individual differences and research needs to be more case-specific. To date, there is not much data on specific multilingual settings and SRF among adult populations.

Belgium has been a multilingual country since the nineteenth century, with Dutch, French and German as official languages, and historically developing from societal to individual multilingualism in the last decades of the twentieth century. The linguistic landscape of Belgium is not simple, especially considering the linguistic division of the country: Belgium is a multilingual country made of several monolingual regions. In Flanders (the northern part of Belgium), the situation is even more complex due to the number of dialects and the role of the so-called *tussentaal*, a combination of the standard language, Dutch, with dialectal elements (De Caluwe, 2012).

In the current academic context of Flanders, multilingualism can be seen as a plurilingual repertoire (Figure 1), where, according to the order of acquisition by formal instruction, Dutch¹ is L1; French (L2) is mandatory from primary school on (at age 10, 5th grade); and English (L3), as an international language and lingua franca, is optional in some primary schools, and mandatory in secondary schools (age 12 or 13, 1st or 2nd year). Nevertheless, despite the language educational curriculum, English is, dating back for more than a decade, more popular than French among students (De Caluwe, 2012). De Wilde et al. (2020) showed that a large number of children have informal exposure to English prior to school (i.e. online games, use of social media), and have already achieved important language benefits before formal instruction. This contrasts with the lack of exposure to French outside of academic settings, despite this being a national language. The shift in L2 and L3 can be explained by several factors, such as the decrease of functionality of the language in Flanders in comparison with previous decades, when French was still used in different social contexts; the decline in the language's social status, previously associated with wealth and social improvement; or the lack of learners' motivation by not having contact with the language outside school (Zuallaert, 2018). L4 varies depending on what the school offers, with a common preference for Spanish or German – also an official language, but spoken only by 0.70% of the total national population— but the tendency to choose one language or another fluctuates according to many different factors. For the population in this research, L4 was Spanish.

Therefore, the language repertoire in Flanders (the sum of existing knowledge and skills in various languages, Aronin, 2019; Festman, 2021) differs from the Dominant Language Constellation (communicative linguistic unit to function in a multilingual environment; see Aronin, 2006, 2019), in that the latter comprises Dutch and English as the predominant languages, used more widely and frequently on a daily basis than French (Figure 1).

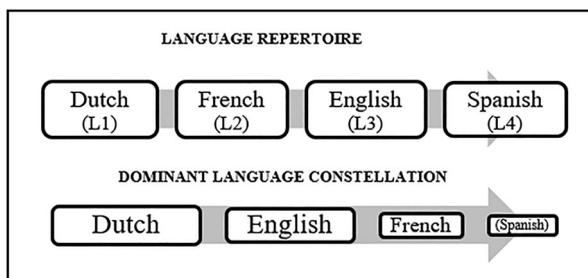


Figure 1. Language repertoire and Dominant Language Constellation in Flanders.

The present study

This study aims to examine the potential relationship between SRF and MA in the multilingual context of Flanders (Belgium) among adult university students learning Spanish. To date, data on multilingual reading skills and on SRF in adult multilingual readers, in particular, is very scarce. This study appears to be the first to observe SRF and analyses its relation with MA, hypothesising that MA could be a determining factor for individual differences in SRF in native and additional languages. We also anticipated that university students from Flanders, even after more years of official instruction in French, would perform better in their English SR test than in the French one.

Materials and methods

Participants

The participants were 170 undergraduates studying Spanish as an additional language in a university context, of whom 157 (118 women, 69.4%; mean age 23 years) completed all the tests: 81 Philosophy and Arts students (40: Linguistics and Literature and 41: Applied Linguistics) and 76 from non-linguistic studies (14 Medicine, 14 Engineering and 46 from other studies). All of them were Flemish native speakers, with a linguistic educational background of French and English (primary and secondary school, minimum of A2-B1 level), currently taking Spanish lessons in the first year of university or as a complementary course at the University Language Center (levels A2-B2).

In terms of musical background, none of the participants had a musical degree or professionally related musical activity. All of them followed the national mandatory education, which includes four years of arts education, wherein at least two are dedicated to music appreciation (not including specific instrumental training).

Data collection instruments

Three tests and one questionnaire were administered: a sociocultural questionnaire; an MA test; a contextual segmentation test in L1-L2-L3 and L4; and a reading comprehension test in L4 (Spanish).

Socio-cultural survey

Participants provided their sociological and linguistic backgrounds, including information about their multilingual education and practice. The following participants were excluded from the study: Non-Belgian; L1 other than Dutch; educated outside Belgium; and declaring dyslexia. They were also asked to self-rate their reading comprehension ability in all the languages they know.

Musical aptitude test

The Mini-PROMS test for musical aptitude is a web-based test approximately 15 min long, which constitutes a reduced version of PROMS (Zentner & Strauss, 2017). The reduced version was used given the numerous tests needed for this study. The test is designed to measure perceptual musicality among adults, by listening and judging whether a reference and a probe stimulus are the same or not, based on four different music features:

melody, tuning, tempo, and rhythmic accent, in that order. The score is given by each individual subtest, and the total score is calculated based on the results of the different subtests. It was administered in a computer room, each student with headphones, in a total data time collection of 25 min per group.

Contextual segmentation tests

The contextual word recognition tests were also administered in groups, in order to measure SRF in native and foreign languages. Based on TOSCRF (Hammil et al., 2006), they assess the number of printed words in a text that a learner can identify accurately and efficiently. It is used as an initial measure for identifying poor readers who lack the automaticity to differentiate supra-segmental chunks in order to successfully access text comprehension by creating auditory images in the working memory. The tests were created with different articles of the Universal Declaration of Human Rights, in Dutch (L1), French (L2), English (L3) and Spanish (L4). Different excerpts were used for every language, and readability tests (Flesh Kincaid: Spanish 17, English 15,5, French 15, Dutch 16; Gunning fog: Spanish 19; English 18.7; French 19.4; Dutch 18.9; SMOG: Spanish 17, English 15, French 17, Dutch 16) were performed in all the texts involved to control adequacy to college level. The written text appeared without spaces and the students had 3 min to identify as many accurate words as possible, segmenting the text by hand with a coloured pen. The total time employed to complete the test was no longer than 20 min. It was administered in the inverse order of the learned languages (Spanish, English, French and Dutch), in order to avoid anticipation effects.

The test is based on the hypothesis that a written text without spaces compels the reader to re-codify it, having to silently pronounce and internally hear the text. Eliminating the visual recognition from the text, modifies it into a visually similar way to how it is actually received by the ears while reading in silence. By reconstructing the prosodic chain of sounds as phonic groups, according to the communicative purpose -beyond the word level-, the speed of correct segmentation increases, indicating that the reader is able to perceive the text fluently by reconstructing the melody and rhythm of the sentences.

Reading comprehension proficiency test in L4

The DIALANG reading comprehension test was used to assess learners' reading comprehension proficiency in L4. Reading comprehension was solely tested in Spanish, the only new additional language for adult students where they had a lower level and more variability. For logistical reasons, due to the number of tests (9 tests) involved, testing reading comprehension in all languages was not considered feasible. Given that Spanish is not included in the educational curriculum prior to university, students' levels could present a great variance in comparison with the previously acquired languages. DIALANG is an online diagnosis system based on the proficiency scales of the Council of Europe's Common European Framework of Reference, and it assesses proficiency levels in reading, writing, listening, grammar and vocabulary. For the reading competence assessment, each participant has to complete a placement test in order to estimate the size of vocabulary and to determine which test items will be chosen for assessment of the language level.

A collection of 'words' and 'non-words' - all of them verbs - is presented. For each word, a 'Yes' or 'No' button must be pressed for the participant to determine whether it is an

existing or an invented word. This initial placement test provides the learners with a selection of texts to read and answer accordingly by typing the answer or selecting a multiple-choice option, with a total time of 45 min. The results are obtained immediately after the test, placing the participant in one of the 6 levels of the CEFR: A1, A2, B1, B2, C1 or C2.

Procedure

Participants were tested in groups during regular lessons at three different moments. First, they were given the sociological and linguistic background questionnaire, to be completed at home. In the same session, participants' SRF was tested in the four different languages.

Then, two different moments were selected to test in a computer room learners' MA (Mini-proms) and reading comprehension abilities in the additional language they were learning (DIALANG).

Data analysis

First, a Kolmogorov–Smirnov test determined the normality of variables. Given the non-normality of the variables distribution (Table 1), non-parametric tests were used for data analysis. In order to check the correlational hypothesis between SRF and MA, a bilateral correlational analysis was implemented using the Rho Spearman test, due to the non-normality of the variables ($p < .05$). All tests were conducted with SSPS.

Results

The primary goal of the analysis was to confirm the association of SRF with MA in native and non-native languages among multilingual university students. Table 1 presents the K-S Normality test and the descriptive statistics of the principal variables under study.

In order to check the relation between learners' silent reading fluency in all languages and the potential relationship between MA and SRFs, a correlational analysis was performed using Spearman Rho. The correlation study (Table 2) indicates a significant relation between four of the five variables: MA correlates with SRF in native language ($\rho = .215$, $p = .007$), but also, and slightly higher, with SRF in L2 ($\rho = .260$, $p = .001$) and in L3 ($\rho = .233$, $p = .003$); whereas in L4 (Spanish) no significant correlation was found ($\rho = .144$, $p = .071$).

In the case of L4, the most recently acquired language, we tested learners' reading comprehension (DIALANG) and found a significant correlation with SRF ($\rho = 0.189$, p

Table 1. Normality Test and basic descriptive statistics.

	Kolmogorov-Smirnov ^a			Descriptive			
	Statistic	df	<i>p</i>	Min	Max	Mean	SD
SRF Spanish	0.080	157	.016	25	147	73.76	23.410
SRF English	0.041	157	.200*	69	233	135.24	26.973
SRF French	0.056	157	.200*	56	227	107.91	26.394
SRF Dutch	0.057	157	.200*	102	262	168.50	27.519
PROMS Total Score	0.077	157	.025	9.0	30.0	18.529	4.3538

*This is a lower bound of the true significance.

^aLilliefors Significance Correction.

Table 2. Spearman's Rho Correlations.

		SRF Spanish	SRF English	SRF French	SRF Dutch	PROMS
SRF Spanish (L4)	ρ	1	.502**	.416**	.382**	0.144
	p	.	.000	.000	.000	0.071
SRF English (L3)	ρ		1	.592**	.676**	.233**
	p		.	.000	.000	0.003
SRF French (L2)	ρ			1	.697**	.260**
	p			.	.000	0.001
SRF Dutch (L1)	ρ				1	.215**
	p				.	0.007
PROMS Total Score (MA)	ρ					1
	p					.

** Correlation is significant at the 0.01 level (2-tailed).

= .018). Participants were classified according to six levels of the CEFR: the majority scored B1, followed by A2, B2 and C1 (Table 3).

The correlational analysis also shows a highly significant correlation between SRF in all languages. The relation among the different languages follows the language acquisition order according to learners' school curriculum, except in the case of English (L3), which has a higher correlation with Dutch (L1) ($\rho = .676, p < .001$).

As expected, the results of self-rating in reading comprehension in all languages showed that 100% of participants considered Dutch (L1) as the best language for understanding while reading. It was followed by English (L3) in the second position according to 86.5% of participants; 47.8% chose French (L2) in the third position; and 50.3% of informants classified Spanish (L4) on the fourth place.

Discussion

The main objective of this research was to investigate the hypothesis of a positive relationship between SRF in Dutch (L1), French (L2), English (L3), and Spanish (L4) and MA in adults. Based on previous research that found individual differences in adult FL reading fluency according to their musical aptitude (Foncubierta, 2020), we expected that MA would also have a significant role in SRF in a multilingual setting. To the best of our knowledge, there have been no studies including these variables in a multilingual context with adult students.

Table 3. Reading Comprehension L4 Descriptives.

Descriptives	Dialang Spanish	
	Counts	% of Total
N	157	
Mean	2.06	
SD	0.782	
Min.	1	
Max.	4	
Frequencies Levels		
A2	36	22.9 %
B1	82	52.2 %
B2	32	20.4 %
C1	7	4.5 %

Our analysis reveals a significant correlation between four of the five variables: MA with L1, L2 and L3 SRF correlate weakly but significantly, while L4 SRF remains not significantly related with MA. In other words, MA can account for individual differences in SRF in Dutch, French and English, in line with the previous research of Foncubierta (2020) on L1/FL SRF and MA. In comparison with this previous study, which showed a high correlation between MA and SRF in L1 (Italian) and FL (Spanish) – both Romance languages with similar syllabic structure and orthographic depth –, the languages involved in our experiment have different levels of transparency and greater interlanguage differences. These factors could affect the intensity of the correlations: from the syllabic structure point of view, English and Dutch are more complex than French and Spanish; from the perspective of orthographic depth, Dutch and Spanish are shallower than French and English, with the latter presenting more inconsistencies and complexities. In addition, there is a greater difference between the rhythmic features of the languages involved, with stress playing a greater role in Dutch and English (traditionally described as stress-timed languages) than in French and Spanish (traditionally described as syllable-timed languages) (Barry et al., 2003).

In the case of L4 (Spanish), the last language in the acquisition process, results for the reading comprehension test showed that the majority of the participants could not reach a level higher than Intermediate (A2 level, $n = 36$; B1 level, $n = 82$). A more detailed analysis of the results of the SRF tests revealed accordingly that a) the accuracy level of word recognition was much lower than in L3, L2 and, obviously, in L1 (see Table 1); and b) when answering general comprehension questions after taking the Spanish SRF test, participants showed very little understanding of the content (while being able to answer these questions in the other languages). These results could suggest that the cognitive efforts in the reading process were oriented towards decoding the written form (Lutjeharms, 2007), lacking the automaticity needed to allow suprasegmental prosody to intervene by identifying broader semantic units, in order to get access to textual meaning (Cantero Serena, 2004). From a multilingual competence and transfer point of view (Puig-Mayenco et al., 2020), we could argue that the reading level in Spanish was not sufficiently high and, in line with the study on reading competence of Peyer et al. (2010), participants could be using resources from languages previously learned (i.e. cognates from French or English; International and Pan-Romance Vocabulary in EuroComRom, McCann et al., 2003, p. 23) to identify words in the contextual segmentation test. The use of this resource could allow identification of words' form and meaning to an extent, but would not be sufficiently accurate to access global text meaning. Therefore, Spanish SRF appears to be insufficiently developed to facilitate reading comprehension, and MA cannot yet be an accountable factor for SRF.

This study also contributes by offering correlational results of adults' SRF in more than two languages. SRF data in multilingual adults are still very scarce but, given that the multilingual profile is the reality or at least the educational goal in the majority of European countries (Council of Europe, 2014, 2018), understanding SRF could be useful in order to improve reading acquisition processes in different languages beyond L2. Our results, as expected, confirm the correlation between SRF in native language and added ones, proportionally related to the language acquisition order (Table 2). One of the key factors for SRF development is listening and reading exposure (Kuhn et al., 2010; Rasinski, 2004); therefore, the earlier the exposure starts, the greater the possibility for SRF development,

especially taking into consideration an academic context, as in our case. Interestingly, in the case of L3 English SRF, the correlation is stronger with L1 Dutch SRF than with L2 French SRF, which is consistent with participants' self-rating of their reading comprehension capacity in the different languages they know.

Several factors contribute to this result: a) English is not only the lingua franca, but also, as pointed out by De Wilde et al. (2020), part of everyday life activities (social media, video games, music, etc.) and has a linguistic imprint even before receiving formal instruction; b) Dutch and English, both Germanic languages, are more closely related in suprasegmental features in comparison with French (Van de Ven et al., 2018); c) socio-political factors in Flanders have a rather negative affective and motivational influence towards the acquisition and use of French (De Caluwe, 2012; Zuallaert, 2018).

The findings in this study are the initial steps in observing MA and SRF in a multilingual context. Our conclusions are a primary approach to the general hypothesis that MA accounts as a differentiating factor in multilingual SRF development. The resulting correlations suggest further research taking other factors (i.e. auditory working memory) and statistical tests into consideration, in order to find more specific key variables or even a causal relation, should it exist.

Observing the acoustic elements in SRF in a multilingual context, and how MA has an impact on the development of reading, could help to develop a reading profile of multilingual adults with potential pedagogical implications in the learning process.

Note

1. Standard Flemish variety of Dutch used in institutional settings.

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