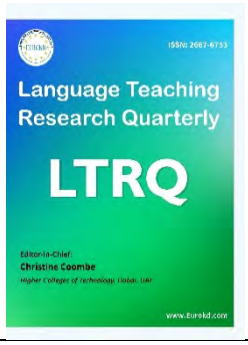

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A Need for an Aptitude Test for Young Learners in Catalan: The Case of the Modern Language Aptitude Test – Elementary in Catalan

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Abstract

Young learners' language aptitude is understudied due to a lack of tests covering this period of life. Young learners, in contrast with adults, are still acquiring their L1. Consequently, a language-dependent aptitude test should be carefully designed for it to be valid. An additional challenge is found when the young learners who are to take the test are bilingual, as is the case of the Catalan/Spanish community in Catalonia. This chapter aims at explaining the process to translate and adapt the Modern Language Aptitude Test – Elementary in Spanish (MLAT-ES - Stansfield et al., 2005) into Catalan (MLAT-EC – Suárez, 2010) so as to obtain a valid aptitude measure across grades. The results show that despite the linguistic proximity between Catalan and Spanish, several issues had to be considered, not only linguistic and cultural but also the learners' age range for the test is addressed to.

Keywords: *Language Aptitude, Bilingual Testing, Aptitude Testing, Test Adaptation, Test Translation*

Introduction

Foreign language (FL) aptitude has been defined as "an individual's initial state of readiness and capacity for learning a foreign language, and probable facility in doing so given the presence of motivation and opportunity" (Carroll, 1981, p. 86). Depending on the conceptualization of this construct, this individual difference can be measured using several types of tests, including

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working memory ones (e.g. Li, 2015). On traditional models, we find that the most widely used aptitude test to date is the Modern Language Aptitude Test (MLAT - Carroll & Sapon, 1959), initially designed for L1 English adolescent and adult populations. An adaptation of this test, the MLAT-Elementary (MLAT-E) was developed for L1 English younger populations (from grades 3 to 6) (Carroll & Sapon, 1967) and much later also adapted to Spanish (the MLAT-ES) by Stansfield et al. (2005). The fact that these tests are language-based has not gone unnoticed by psycholinguists, who have questioned their validity to detect foreign language learner disabilities, as performance on one's L1 mastery might contaminate the results (Sparks et al., 2005). Consequently, the popularity of aptitude tests which are not language-dependent has considerably grown throughout the years. This is the case of the LLAMA test (Meara, 2005) although its validity decreases when comparing the performance of learners whose L1 differs in terms of agglutination and orthography (Mikawa & De Jong, 2021) and for logographic languages (Rogers et al., 2017). It seems therefore clear that language independence is primal for aptitude testing. However, as it has been seen, not even those tests designed to meet this requirement seem to fulfill it. Consequently, researchers might as well continue using aptitude tests written in a real language though this will mean that they should bear in mind this confound when discussing results.

Accepting that an aptitude test that is completely language-neutral is not currently available, the issue of language neutrality poses even more challenges in bilingual contexts, as both researchers and practitioners might then face the dilemma of which language the aptitude test should be in. Their choice might be grounded on two factors: the learners' language dominance and the language distance between the languages in the bilingual region. It seems natural that in contexts where bilingualism is sequential, the aptitude test should be administered in the dominant language, which would usually be the first to be acquired, but it might as well be one dominant in society for socio-political reasons.

Full L1 mastery will guarantee a valid performance on the aptitude test, that is, one not hindered by incomplete L1 mastery or because of not having reached the ultimate attainment stage (Dąbrowska, 2018). Obviously, test takers should also have fully developed their L1s (usually determined by the participants' cognitive developmental stage) so that this development does not interfere with aptitude test performance, either (Suárez & Muñoz, 2011). Assuming that the bilingual participants have attained full mastery of their L1s, it would then be convenient to administer the aptitude test in the language of their preference so as to avoid an additional confound. One might feel tempted to disregard this confound when it comes to close languages, as is the case of Catalan and Spanish, both of which Romance languages whose degree of similarity in lexis is 85% according to the Ethnologue catalog (Eberhard et al., 2022). However, the remaining 15% of dissimilarity (as well as other differences in other linguistic domains) might play a greater role than one would assume considering a high similarity percentage. This would then justify why aptitude tests originally in Spanish are not to only be translated into Catalan for a Catalan/Spanish bilingual community but adapted to both the Catalan language and context.

The aim of this paper is thus to examine the challenges faced when adapting the MLAT-ES (Stansfield et al., 2005) to the Catalan language and whether these challenges were the same across grades.

Literature Review

Language aptitude and language neutrality in relation to L1 literacy and cognitive development

The ideal scenario to obtain comparable results of language aptitude tests across populations would be one where a language-neutral aptitude test exists. The LLAMA test, claimed to be neutral, though not so much so (Mikawa & De Jong, 2021), is one of the most widely used language aptitude tests in second language acquisition research, yet it has not been widely used with young learners to date. Indeed, language aptitude testing in young learners is still in an embryonic state as compared to that in adults.

The MLAT-E, published in 1967, an aptitude test aimed at young learners, has occasionally been used for research purposes (see Reed & Stansfield, 2022 for a review) and so have some of its adaptations. For instance, Carroll and Sapon's MLAT-E and Esser and Kossling's (1986) cognitive tests were a source of inspiration for Milton and Alexiou (2003, 2004; Alexiou, 2005, 2009) when researching aptitude in both young and very young learners (aged 5 to 9). The use of pictures in these studies is due to the search for language neutrality and test adaptation to younger populations.

Both Ottó's (1996) aptitude test, based on Carroll's MLAT, and recently validated by Yamashita (2022), and Pimsleur's Language Aptitude Battery (PLAB) were also the basis for Kiss (2004; in Kiss & Nikolov, 2005), who simplified their resulting test in Hungarian so that it suited the needs and cognitive level of their 12-year-old Hungarian participants. Their results show that the 2-graders' scores in Kiss (2009) using this same test were much lower degrees than that of the older ones, who had a stronger domain of their L1.

The latest studies on aptitude with young learners do not supply any new tests. This is the case of Lambelet (2021), who used the LLAMA test (mostly used in adults to date) with children aged 7-16, and Steiner et al. (2021), who tried to use standardized tools whenever possible. Consequently, they translated into German and adapted to their own population already existing tests, namely MLAT-E, part 2, Matching Words, and PLAB 4 for language analysis (Pimsleur, 1966); and both the LLAMA-E test for sound-symbol association and phonemic working memory and the LLAMA-D for sound recognition (Meara, 2005). The MLAT-EC has also proven useful to delve into the role of aptitude in vocabulary learning through subtitles (Gesa, Miralpeix & Suárez, in review).

The existing young learners' language aptitude tests tend to rely on the students' L1. However, it has also been found that young learners' literacy skills, along with their cognitive development and their L1 development, are the cause of significant statistical differences between grades 3 and 4 in such tests (Suárez & Muñoz, 2011), coinciding with the end of the preoperational stage and beginning of the concrete operational stage (Piaget, 1964). A plateau is also found in the results between grades 6 and 7 when learners are entering the formal

operational stage. Cognitive developmental stages seem to coincide with young learners' performance patterns on aptitude tests and that, therefore, not only one's cognitive developmental stage but also one's L1 literacy stage become a confound if the same aptitude test is used across grades cross-sectionally (Suárez & Muñoz, 2011). Nevertheless, the use of such aptitude tests seems to be supported by the fact that the patterns found in the L1 acquisition are also found in L2 development, including those dependent on orthography and phonology (Ellis, 1996). Indeed, this correspondence seems to have long-lasting effects on later L2 aptitude scores and L2 proficiency (e.g. Skehan, 1986; Sparks et al., 2011).

These findings also question the concept of aptitude as innate and untrainable (e.g. Carroll, 1981; see Singleton, 2017, for an overview), as not only one's L1 developmental stage but also any difficulties in phonological decoding skills will certainly transfer to one's performance in language aptitude tests, as stated in the Linguistic Coding Deficit/Difference Hypothesis (LCDH) (e.g., Sparks & Ganschow, 1993).

Bilingualism, Language Preference, and FL Aptitude

The lack of language neutrality in aptitude testing might blur the results of language-dependent aptitude tests. But what happens when learners taking such a test are bilingual? Which language should they take the test in? Given the connections, as explained above, between one's L1 development, L2 development, and language aptitude, one might consider that the wisest option would be the one they are stronger in or, at least, that of their preference.

Research to date has not yet reached clear results as to how bi/multilingualism may affect cognitive abilities including aptitude, considering its supposed (un)trainability. However, one's L1 preference is not strong enough to significantly alter one's performance in language-dependent aptitude tests as are the MLAT-ES and the MLAT-EC, at least in the lower grades (Suárez & Stansfield, in review).

On the other hand, Spanish and Catalan are close Romance languages. Also, in most of the territory where Catalan is spoken so is Spanish, and with a higher presence. Consequently, it would be very tempting to think that an almost word-per-word translation would be enough to adapt the original test in Spanish to the Catalan language. This paper, therefore, also aims to shed light on the challenges that a test in Spanish, the MLAT-ES, presents in its translation and adaptation to Catalan, given the high degree of similarity not only linguistic but also territorial between these two Romance languages.

The Present Study

Aims and Research Questions

This paper delves into the challenges posed by the adaptation of the MLAT-ES (Modern Language Aptitude Test – Elementary in Spanish) (Stansfield et al., 2005) to the Catalan language (MLAT-EC, Suárez 2010) so as to validate a new version of the MLAT-E (Carroll & Sapon, 1967) which might result in a suitable alternative for the Catalan/Spanish bilingual population in addition to the MLAT-ES. Therefore, the aim of this

The resulting research questions are:

RQ_1: What type of challenges does the adaptation of the MLAT-ES into Catalan pose?

RQ_2: Are those challenges the same effect across ages?

Participants and Procedure

A convenience sample of 629 Catalan/Spanish bilingual students between grades 3 to 7 (age range 8.3 – 14.9) participated in the main validation study (Suárez, 2010), where both the MLAT-ES and the MLAT-EC were analyzed in detail. These 629 students took both tests in counterbalanced order to eliminate the test-training effects found. This means that in this study, we will only consider the students who took the MLAT-EC in the first place (N= 304). They were all schooled in immersion schools, where Catalan is meant to be the vehicular language, except for both the Spanish and the English language subjects.

Table 1

Participants' Age and Grade

	All subjects			MLAT-EC group		
Grade	N	Age	SD	N	Age	SD
3	123	8.8	.52	57	8.8	.66
4	137	9.8	.43	62	9.7	.36
5	118	10.8	.33	61	10.8	.34
6	120	11.8	.3	60	11.9	.33
7	131	12.9	.45	64	12.8	.44

When asked about which language they considered as their preference, half of the students showed a preference for Catalan (N=147), while 87 expressed their preference for Spanish and 70 claimed to have no preference over any of the two. As stated above, though, this preference did not play any role in their language aptitude test performance, regardless of the language of the test (Suárez & Stansfield, in review). Consequently, in this study, they will all be considered fully proficient in both Catalan and Spanish as they were all simultaneous bilinguals. Besides, only those participants who had learned both languages in early childhood were included.

Instruments

The MLAT-EC (Suárez, 2010), a paper and pencil test, was developed from the Spanish version of the MLAT-E, the MLAT-ES. It is beyond the scope of this study to explain the latter in detail. Both the MLAT-EC and the MLAT-ES, widely validated in South America (Colombia, Costa Rica, and Mexico) and in Spain (Madrid and Catalonia) consist of the same parts. After the MLAT-ES validation study, the test was rendered with 123 items, 42 less than in the first version. The Catalan version also included, in the first version, 123 items. These items were equally distributed as in the MLAT-ES, in the following subtests:

Part 1: Hidden Words (*Paraules ocultes*). Based on the MLAT's Spelling Clues, this test presents easier vocabulary. It is believed to measure L1 vocabulary and sound-symbol association. (30 items)

Part 2: Words in Sentences (*Palabras que es corresponen*). This part measures grammatical sensitivity without using formal grammatical terms. Learners are to find the word in a sentence performing the same function as the capitalized word in the item's stem. (29 items)

Part 3. Rhyming Words (*Palabras que rimen*). This test has no counterpart in the MLAT. It measures the ability to hear speech sounds while selecting words that rhyme. (38 items)

Part 4. Learning Numbers (*Números en un altre idioma*). In this test, test takers learn six numbers (units and tens) and must learn six numbers and how to combine them in an artificial language. This part taps into rote memory learning as well as vocabulary learning and the ability to form and remember associations between speech sounds. (25 items)

The wrong answers were not penalized, while the right answers were awarded one point. The results were computed in SPSS. Cross-cultural and cross-linguistic issues were already detected when running an item analysis and analyzing it from a qualitative perspective due to the bilingual status of these participants. In spite of this, most of the items were kept in the Spanish version and, therefore, adapted to the Catalan one so as to be able to compare the results with the official MLAT-ES norming study data.

After running item discrimination, item difficulty, and reliability analyses, the MLAT-EC was left with 122 items (Part 2 contained 29 items instead of the 30 in the MLAT-ES). Although an effort was made to keep both tests as similar as possible, the MLAT-EC ended up being slightly more difficult than the MLAT-ES across grades (Suárez, 2010). Nevertheless, it continues to have the same behavior across grades, with no statistical differences found in any of the pairs, but with still the same patterns proving a dependence of test performance on the participants' cognitive development (Suárez & Muñoz, 2011).

After removing the red-flagged items, the MLAT-EC is to be considered a valid and reliable aptitude measure, also proven when correlated with the EFL criterion measures used (a cloze passage and a listening) and with some written measures (Suárez, 2014).

Analysis

Qualitative Perspective

A thorough item analysis was run for both the MLAT-ES and the MLAT-EC. Following are the items per part that posed a challenge when translating them from the original test version in Spanish, with the solutions that were taken to avoid faulty items in the resulting test in Catalan, the MLAT-EC.

Part 1 Paraules Ocultes

Whenever possible, the same stems and distractors in the MLAT-ES were kept but translated into Catalan. Translating them, however, oftentimes implied noticeable changes in the meaning of the word of the item stem as the aim was for the MLAT-EC to have similar cognitive challenges to those in the MLAT-ES. For instance, MLAT-ES item 7 <ddo> – *está en la mano*, which refers to "*dedo"* (a finger) became <ungl>, meaning "*ungla"* (a nail), because it was very difficult to play with the spelling of the equivalent Catalan word, "*dit"*. With this change, the distractor "*para jugar*" (to play) was pointless (which would correspond to the Spanish distractor "*dado*" (dice). The solution was to opt for "*part d'un triangle*" (part of a triangle), as <ungl> could lead test takers to interpret it as "*angle*" (an angle), which belongs to the semantic field of geometry.

The stem *esepzional* (Spanish "excepcional", "English exceptional") in item 19 on the MLAT-ES was changed into *eccpcional* so as to maintain the similarities between phonetics and spelling in the Catalan language.

Item 19

eccpcional ☐ tipus de triangle ☐ únic

☐ emocionant ☐ mur alt

Item 18 *yielo* (“*hielo”),* matching “*congelado*” (frozen), was changed for the adjective of the same family (“*gelat*” hidden as *glat,* English “frozen”) because, if kept as “*gel*” (ice), as in item 7 above, the resulting option for the stem would be rendered with just two consonants (gl). The difficulty of this item would probably have increased because of the <l> in Times New Roman, which 3-graders interpreted as capital <I>, not lowercase <l>. Also, with such few letters, test takers could have thought of several words other than “gel” (e.g., *gol, gla*), which would have also increased the item difficulty.

English “siren” appearing in item 29 as *cirrena* had “*cerrada*” (closed) as a distractor. “cerrada” shares the <c> and the <rr> with the stem. However, its Catalan translation “*tancada”* (closed) was very different from a phonetic perspective. Instead, “serena” (English “serene”) was more similar, but it might have turned into a weak distractor due to this phonetic similarity with the stem. Consequently, "*fruita*” (fruit) was chosen instead, considering that *cirrena* could also be related to Catalan “*cirera*” (a cherry), a type of fruit.

One of the distractors of the hidden work *bakka* (“*vaca”,* English “cow”) in the MLAT-ES was “*con manchas”* (spotted). This distractor attracted many test takers, as one iconic image human beings have of cows is that they are white with black spots, which could be also considered “stains”. This is the reason why “*amb arrugues*” (wrinkled) was chosen instead.

In item 30, there was an interchange between one distractor in the MLAT-EC and the corresponding stem in the MLAT-ES. Indeed, *dzpacio* (“despacio” – slow / slowly) corresponds to an adverbial locution in Catalan *(*“*a poc a poc*”). Consequently, its corresponding one-word adverb was used instead: *lntamnt* (“*lentamente*” – slowly).

Part 2 Paraules que es Corresponen:

The items in this part were also literally translated from the Spanish version whenever possible, but some isolated words were deliberately changed as they got the participants confused. Thus, the uncommon proper nouns in the Peninsular variety of Spanish “Leila” and “Perla” became “Laura” and “Paula”.

Catalan uses more words than Spanish in the construction of some verb tenses, possessive adjectives, and proper nouns. While the Spanish preterite consists of one word (“*ellos compraron*”), that same tense consists of a two-word verb phrase in Catalan: the auxiliary verb “*anar*” (go) in preterite followed by the main verb in the infinitive (“*ells van comprar*”). The also equivalent one-word past tense in Catalan (“*ells compraren*”) was not so much used because it is a rather formal and unusual form. Indeed, some participants even modified the spelling of such forms thinking that they were misspelled future tense forms ("*ells compraran*” – they will buy). When the compound verb form appeared, the checkbox beneath appeared in the content word (the infinitive). Adapting possessive adjectives was also a challenge as in Catalan they consist of a determinate article and a possessive adjective, where the checkbox was placed, while in Spanish the possessive adjective takes only one word. Catalan proper nouns are preceded by a

determinate article, while they are not in Spanish. In this case, the articles were obviously added, but not a checkbox so as to maintain as many distractors as in the Spanish test version.

Part 3 Paraules Que Rimen:

While the stems in Part 3 were rewritten taking the MLAT-ES as a model, the distractors were not as the aim in this part was matching the words with the rhyming peer, regardless of the meaning. However, the main rationale here was the type of rhyme, rather than the similarity with the Spanish test counterpart. Besides, Catalan phonology is overall more complex than Spanish one. Catalan may have up to 9 vowel phonemes depending on the regional variety, while Spanish only has 5. Catalan <e> may be pronounced as /e/, /ə/ or /ɛ/, and <o>, as /o/ or /ɔ/. Moreover, these variations are not hinted at by spelling except for the occasional graphical stress. When unstressed, <o> may also be pronounced /u/ and <a> as /ə/ in the central and northern varieties of Catalan. In a nutshell, Spanish spelling is more intuitive as there is a one-to-one correspondence between the vowel grapheme and the phoneme.

Item 24, targeted the pronunciations of <e>, as you pronounce "*PROMESA*" (a promise) with an open /ɛ/ whereas the target-distractor "*peça*" (a piece) is pronounced as /e/.

Item 24

PROMESA …….☐ mossa ……☐ permesa ……. ☐ camisa ……☐ peça

Item 29 *ESTORA* (a rug) rhymes with "*rentadora*" (washing machine), both pronounced with /o/, but not with "*perola*" (a saucepan), with an open /ɔ/ or "*cotorra*" (a parrot), which was also an appealing distractor with a closed /o/, though also with double <rr>.

Item 29

ESTORA ……. ☐ perola ……☐ cotorra …….. ☐ tara……. ☐ rentadora

The stem "*FLABIOL*" (a piccolo) in item 45 rhymes with Oriol, with an open /ɔ/, but it does not rhyme with "*pèsol*" (a pea), in which <o>is pronounced /u/ in the standard Catalan variety.

Item 45

FLABIOL…….. ☐ pèsol …… ☐ Oriol …… ☐ flascó ……. ☐ avió

The *seseo* and *ceceo* phenomena are exclusive of Spanish. When someone *sesea,* they pronouncing all <c+e> and <c+i> as /s/ instead of /θ/). When someone *cecea,* they pronounce all the <s+vowel> combinations as /θ/. On top of that, some Spanish-dominant bilinguals find it difficult to produce the /z/ phoneme, that is, the voiced Catalan <s> Catalan, and so they utter /s/ instead.

Intervocalic Catalan voiced fricative alveolar /z/ is spelled <-s-> except for some borrowings and words of Latin and Greek roots, in which case it is written <z> (e.g. "*protozou*" – "protozoa"). Catalan <z> is always voiced, regardless of its surrounding phonemes or its position within the word. Catalan <s>, in contrast, is pronounced differently depending on its position in the word and its surrounding phonemes. Catalan <s-> is always pronounced /s/ (unvoiced alveolar fricative consonant). When preceded by consonants, <s> sounds like /s/, but for some exceptions, and when it closes a syllable followed by a voiced consonant. The spelling rules of /s/ might not be easy, though it is not a source of pronunciation problems for Spanish dominants except when they overcorrect their pronunciation. The Catalan graphical representation of intervocalic /s/ is <-ss-> most of the time, but it might also take the form of <-ç- + a, o, u> in the

middle of a word, as in "*caçar"* (to hunt) as well as of <-c- + e, i>, as in "*cacera"* (the hunt). Only <ç> and <s> can represent graphically the unvoiced alveolar fricative at the end of a word except for some borrowings or some verb endings in the Balearic dialect.

Examples playing with these combinations are, for instance, item 16 *CAMISA* (a shirt), matching *"llisa"* (plain), both of which contain a voiced alveolar fricative /z/. Two of the distractors contain /s/, but with different spellings: <-c-> ("*Patrícia*" – Patricia) and <-ss-> ("*cloissa*" – a shell).

Item 16

CAMISA……...☐ llisa ……☐ Patrícia …….. ☐ camèlia ……☐ cloïssa

Item 24 *PROMESA* (a promise), rhyming with the option "*permesa"* (allowed), but also potentially matched with "*peça*" (a piece) tackles the issue of /z/.

Item 24

PROMESA ……. ☐ mossa ……. ☐ permesa …… ☐ camisa ……☐ peça

The aim of item 5 (FLETXA – *fitxa – metxa – metge – pedra*) was also written to cause some confusion to Spanish dominant speakers, who tend to devoice <-tge> /dʒ/ and pronounce it as /tʃ/ instead.

Also, like in Spanish, <b> and <v> sound identical nowadays in most Catalan regional varieties. That is why <v> was used in item 46 *VALL* (a valley) to be matched with "*ball*" (a ball).

Item 46

VALL… …… ☐ bell …… ☐ vella …… ☐ bala …… ☐ ball ……..

Part 4 Aprenguem Números

The items of this part were kept as in the MLAT-ES although the recording was remade in Catalan. This decision was taken because no test-retest effect was foreseen if the participants were going to take the test in the other language four months after the first time:

Table 2

MLAT-ES and MLAT-EC Part 4 Number–Word Correspondences

	MLAT-ES numbers	Spanish correspondence	Catalan correspondence
1	co	uno	u
2	vein	dos	dos
3	ras	tres	tres
10	silca	diez	deu
11	silca co	once	onze
12	silca vein	doce	dotze
13	silca ras	trece	tretze
20	vinca	veinte	vint
21	vinca co	veintiuno	vint-i-u
22	vinca vein	veintidós	vint-i-dos
23	vinca ras	veintitrés	vint-i-tres
30	rasca	treinta	trenta
31	rasca co	treinta y uno	trenta-u
32	rasca vein	treinta y dos	trenta-dos
33	rasca ras	treinta y tres	trenta-tres

Keeping the same translation was made on purpose as the similarities between the invented numbers in Spanish and Catalan had different targets. For example, “vein” resembles (“*veinte”*-twenty) in Spanish but not so much Catalan "*vint*", which, instead, shares the same starting syllable with “vinca”.

Quantitative Perspective

All items were inspected for content validity, difficulty, and reliability. The index of the facility was calculated following these criteria: IF > 0.74: very easy - < 0.25: very difficult. The coefficient of discrimination power of items (D_i) ranged from -1 to +1, with positive numbers over 0.2 reliably implying that carried a positive D_i. The corrected item-total correlations were considered, like other types of correlations, low if they were <.300 and high if they were >.600. All tests had excellent Cronbach alphas across grades and parts, but individual item performances were nevertheless inspected to see if overall reliability was affected when removing the red-flagged items. For word limit constraints, only the most relevant results will be reported.

Results and Discussion

Having detected the potentially problematic items, a thorough item analysis was run. This analysis does not contemplate the participants’ language preference as it did not have any effect (Suárez & Stansfield, in review).

In the lower grades, especially grades 3 and 4, the test speed was an influential factor in parts 1 to 3. The percentage of participants who left parts 1 and 3 unfinished is rather larger than those in part 2 in these lower grades. From grades 4 to 7, most of the students managed to finish the test. The decrease across grades or parts is not totally linear. While the blank items in the lower grades can be attributed to L1 literacy development, those in the upper grades might be due to different strategies taken when answering the test the rest are probably due to the test answering strategy each test taker adopts, regardless of their age/grade. Part 4 is not analyzed in this regard as it is a timed test.

Table 3

Percentages of Unfinished Parts in the MLAT-EC Across Grades

Grade		3	4	5	6	7	All grades
N		57	62	61	60	64	304
Part 1	Unfinished	46	21	16	18	11	112
	Percentage	37%	15%	2%	15%	6%	14%
Part 2	Unfinished	22	10	6	14	11	63
	Percentage	38.6%	16%	10%	23%	17%	20.7%
Part 3	Unfinished	39	13	16	15	12	95
	Percentage	6.8%	21%	26.2%	25%	18.8%	31.3%

Let us now examine the functioning of especially challenging items for each of the parts.

Part 1 – Paraules Ocultes (Hidden Words)

Some items, like 19 (eccpcional) and 30 (lntamnt), became increasingly easier across grades. The use of abstract words might be the cause for this. The students felt attracted by the distractor

"*emocionant*" (exciting) instead of the right answer ("*únic*"- unique). Consequently, distractor C obtains a positive index of facility across grades except for grade 6 (IF=-0.04).

Table 4

Item 19 the MLAT-EC Part 1 Paraules Ocultes: P-Values and Distractor Behavior Analysis

Item 19. eccpcional	Grade	N	A tipus de triangle	B* únic	C emocionant	D mur alt	Missing	Attempts	IF - A	IF – B*	IF - C	IF - D
	3	57	0	8	10	2	37	20	-0.3333	0.2	0.3333	-0.2
	4	62	6	25	15	2	14	48	-0.1666	0.3611	0.0833	-0.277
	5	61	2	29	18	0	12	49	-0.2789	0.4557	0.1564	-0.333
	6	60	1	37	11	1	10	50	-0.3066	0.6533	-0.04	-0.306
	7	64	3	39	18	1	3	61	-0.267	0.5191	0.0601	-0.311
	all	304	12	138	72	6	76	228	-0.2631	0.4736	0.0877	-0.298

* correct answer

Item 30 (lntament) was found to be difficult, in contrast, not only because of its position towards the end of this part but also because of the misleading <l> starting the word, which made it become a difficult item, especially for 3-graders, as indicates its smaller though positive IF.

Table 5

Item 30 the MLAT-EC Part 1 Paraules Ocultes: P-Values and Distractor Behavior Analysis

Item 30. lntament	Grade	N	A ample	B blau	C* a poc a poc	D rodó	Missing	Attempts	IF - A	IF – B	IF – C*	IF - D
	3	57	2	1	2	2	50	7	0.0476	-0.1428	0.0476	0.0476
	4	62	6	2	15	1	38	24	0	-0.2222	0.5	-0.277
	5	61	7	1	20	3	30	31	-0.0322	-0.2903	0.5268	-0.204
	6	60	6	2	23	0	29	31	-0.0752	-0.2473	0.6559	-0.333
	7	64	1	0	41	3	19	45	-0.3037	-0.3333	0.8814	-0.244
	all	304	22	6	101	9	166	138	-0.1207	-0.2753	0.6425	-0.246

<l> also appears at the beginning of the stem of items 1 (lfant – "*elefant*", an elephant) and 5 (lkòpter – "*helicòpter*" – a helicopter), items where this consonant might also be the reason why these are not easy items for the lower grades. Indeed, three participants wrote, though it was not required, "*infant*" (a child) below the stem <lfant> of item 1, and thirteen 3-graders (23%) left item 5 unanswered despite its early appearance in the test.

Some participants in the lower grades also understood that they had to choose the option of rhyming with the stem. This response pattern can be found in item 2 (kstell – *clatell*), 8 (tlbizió – *divisió*), 23 (hincndi – indi), and 24 (skltar – *estudiar*). This also happens at times in the upper grades.

In item 14 (nmigo – *hormiga //* an enemy – an ant), the stem-distractor resemblance was gone, as *nmic* does not sound like ant in Catalan "*formiga*". If the feminine alternative *nmiga* had been used, this effect might not have taken place. Something similar occurs in item 3 (vlena – *animal marí enorme,* a huge sea animal), as the ambiguity with "*va plena*" ("*va llena*" – 'it is crowded')

is lost. Changing "*con manchas*", which caused some confusion in item 15 "bakka", renders item 3 slightly easier than in the Spanish version. The change succeeded, though, in the fact participants had no doubts about the appropriateness of "*tiene manchas*".

Other appealing distractors in the Catalan version, especially in the lower grades, are those in item 4, literally translated from the MLAT-ES, and those in item 7, in which *ddo* was changed for *ungl*. Although item 4 was still difficult for 3-graders, it was not for 4-graders, unlike it occurred in the MLAT-ES. While 17% of the 3-graders did not answer this item on the MLAT-ES and 20% of them opted for distractor A, only 5 MLAT-EC test takers left it unanswered, but 35% of them marked A "*angle*" as the correct answer, probably misled by the geometrical term.

Item 7 *ddo* in the MLAT-ES was difficult for grades 3 and 4 and mid-difficult for grades 5 and 6. On the MLAT-EC, *ungl* was much easier than *ddo.* However, participants were not as attracted to distractor C (*part d'un triangle* – part of a triangle). The percentage of missing values in grade 3 in the MLAT-EC (22.9%) resembles that in the MLAT-ES (24.3%).

Table 6

Item 7 on the MLAT-EC Part 1 Paraules Cultures: P-Values and Distractor Behavior Analysis

Item 7 ungl	Grade	N	A despertador	B* és a la mà	C part d'un triangle	D dur	Missing	Attempts	IF - A	IF – B*	IF - C	IF - D
	3	57	0	41	2	1	13	44	-0.3333	0.9090	-0.272	-0.303
	4	62	0	57	3	0	2	60	-0.3333	0.9333	-0.266	-0.333
	5	61	0	54	5	1	1	60	-0.3333	0.8666	-0.222	-0.311
	6	60	0	55	4	0	1	59	-0.3333	0.9096	-0.242	-0.333
	7	64	0	61	2	0	1	63	-0.3333	0.9576	-0.291	-0.333
	all	304	0	268	16	2	18	286	-0.3333	0.9160	-0.258	-0.324

* correct answer

The distractor "*fruita*" (fruit) in item 29 was added to create confusion with "*cirera*" (a cherry). This change was successful as it turned out to be a little more difficult than in grades 5 to 7 on the MLAT-ES. 14% of those who answered it opted for distractor C. Naturally, a stimulated recall procedure would help us know if the participants chose this distractor following the test adaptor's intentions.

Table 7

Item 29 on the MLAT-EC Part 1 Paraules Ocultes: P-Values and Distractor Behavior Analysis

Item 29. cirrena	Grade	N	A camina de pressa	B estri	C fruita	D* viu al mar	Missing	Attempts	IF - A	IF – B	IF - C	IF – D*
	3	57	0	0	3	13	41	16	-0.3333	-0.3333	-0.083	0.75
	4	62	2	2	3	36	19	43	-0.2713	-0.2713	-0.240	0.7829
	5	61	0	3	7	36	15	46	-0.3333	-0.2463	-0.130	0.7101
	6	60	1	0	8	38	13	47	-0.3049	-0.3333	-0.106	0.7446
	7	64	1	3	8	43	9	55	-0.3090	-0.2606	-0.139	0.7090
	all	304	4	8	29	166	97	207	-0.3075	-0.2818	-0.146	0.735

* correct answer

Part 1 D_i was, on average, strong. However, as this part became slightly easier, the discrimination power diminished a little. This is the case of item 3 (vlena), which was finally removed from the test (D_i=0.14).

The point-biserial correlation coefficient *(r_{pb})* of this item (.221) is lower than .300, the required coefficient so an item can be considered discriminant. The calculation of the reliability of this part was also further proof that this item needed to be eliminated. Initially, Cronbach's alpha for this part was an excellent .931 but the corrected item-total correlation for item 3 is much lower than desirable (item-total *r* = .181).

Part 2 – Paraules Que es Corresponen (Words in Sentences)

While it was foreseen that the potentially problematic aspects when adapting the MLAT-ES to Catalan would be those described above (i.e., essentially, the addition of auxiliaries in preterites and the addition of articles preceding possessives and proper nouns), the item analysis led to a new direction: the problematic items were those which presented non-canonical word order or those which presented explicit subjects, a feature considered marked in Spanish and Catalan.

Thus, item 4 appeared to be red-flagged due to the changes in the position of qualitative adjectives (when fronted, adjectives take on a literary tone). This sentence was purportedly changed so the type of adjective used in the sentence coincided with that of the stem regardless of its position. Consequently, the fronted adjective "*GRAN*" (great) was expected to be matched with "*intel·ligents*" (intelligent), which postmodifies the noun it qualifies. "*intel·ligents"* is chosen by 160 out of 292 of the participants who answered this item although "classe" and "matemàtiques" were also appealing to test-takers, as 46 and 54 of them chose them respectively.

Table 8

Item 4 on the MLAT-EC Part 2 Paraules Que Es Corresponen: P-Values and Distractor Behavior Analysis

Item	Grade	classe	matemà-tiques	alumnes	intel·ligents*	Missing	Attempts	IF- classe	IF- matemàtiques	IF– alumnes	IF– intel·ligents*
4	3	13	7	8	23	3	54	0.158	0.0476	0.0661	0.3439
4	4	3	15	3	36	3	59	-0.004	0.1985	-0.0048	0.5544
4	5	6	9	3	41	1	60	0.0547	0.1047	0.0047	0.6380
4	6	9	16	4	27	2	58	0.0788	0.1995	-0.0073	0.3891
4	7	15	7	5	33	3	61	0.1803	0.049	0.0163	0.475
4	all	46	54	23	160	12	292	0.0929	0.1203	0.0141	0.4833

*correct answer

"*classe"* (class) may have been appealing because of its position within the sentence, while the reason for choosing "*matemàtiques*" (maths), a noun, not an adjective like "*gran*", may have been due to its complementary function in relation to "*classe*". In any case, most participants chose "*intel·ligents*" because it coincides both in form and category with the word in capitals "*GRAN*". The IF of this item varied unevenly across grades (difficult for grades 3 and 6, mid-difficult for grade 7, and easy for grades 4 and 5), which also supports its potential of being removed. This item also had a very low discrimination index (D_i=.019) and so was its point-

biserial correlation (r_{pb} = .189) and a corrected item-total correlation of .129. For all these reasons, this item was eliminated.

Part 3 – Paraules Que Rimen (Rhyming Words)

The qualitative analysis of the items in this part already flagged a few items due to the slightly higher complexity of Catalan in terms of phoneme-grapheme correspondence. From the quantitative item analysis, it seems that those potential issues were successfully overcome. For instance, item 24 *PROMESA – permesa*, the only item dealing with the different pronunciation of <e>, does not show to be conflictive. Combining consonants <ss, s, ç> in the distractors may have made the consonant pronunciation more salient to participants instead. Also, there is an exact sound-grapheme correspondence in this item, which might have also contributed to it being consistently easy across grades.

Items 18 and 45, containing the sound-grapheme combination of <o> were not confusing except in item 29 *ESTORA – rentadora* (washing machine). 30% of the participants who answered item 29 chose the distractor "perola", which did not even rhyme in an assonant way with the stem. "*perola*" has an open /ɔ/ while "*cotorra*" has a closed /o/.

The items containing fricative alveolar phonemes were also challenging to some participants. For instance, more than 41.7% of those attempting item 16 *CAMISA – llisa – Patrícia – camèlia – cloïssa* failed it. The most powerful distractor in this item was the last one, sharing both the same ending as the stem and the number of syllables. Another mid-difficult item was item 44 *PALLASSOS – eficaços – carbassons – pastissos – pressupost.* 47 participants opted for "*pastissos*", probably seeing that the first syllable coincided with that of the stem word.

Finding similarities in consonant-vowel combinations was probably wade made lower-graders, mainly those in grade 3, choose the wrong option, with similar grapheme combinations, but not necessarily rhyming with the stem. This phenomenon can be found in items whose distractors started with the same syllables though they ended unlike the stem and, therefore, they did not rhyme at all. Also, item 5 (the one containing the conflictive /dʒ/ and /tʃ/ for Spanish-dominant speakers), proved to be a good discriminator. However, the response pattern was not the one expected. Instead of choosing "*fletxa*" (an arrow) because of the tendency to devoice voiced fricatives of these speakers, they opted for "*fitxa*" (a token) instead, which shares the consonants with the item stem *FLETXA.*

The total number of difficult and very difficult items in Grade 3 (15.2% difficult and very difficult in the MLAT-EC versus 8.7% and 4.2% respectively in the MLAT-ES) is higher than in the Spanish version. As a consequence, the more difficult items might as well be removed to obtain a similar index of the facility.

Part 4 – Number Learning (Learning Numbers)

As explained above, no significant changes were made in this version of the test. Consequently, the item behavior was similar across tests. As happened in the MLAT-ES, "*rasca*", equivalent to the number 30 was not very confusing because it was loaded with meaning ("it itches") and so, it probably was easy to remember. The participants are, though, clearly confused when they are expected to write the number 2 (vein) but write 20 (vinca) instead. The percentage of learners making a mistake writing number 20 instead of 2 is slightly lower than that in the MLAT-ES

when this number appears (20.7% and 21.4% in the MLAT-EC versus 25.2% and 26.8% in the MLAT-ES). Number 2 (*vein*) in the artificial language used in this part resembles the real name for the Spanish number 20 ("*veinte*"), but it does not in Catalan, where the number 20 is "vint". As happened in the MLAT-ES, 44 out of 304 participants (14.5%) wrote 20 (vinca) for the last two questions in the test, even though they were dictated differently. This could be explained, perhaps, test fatigue.

Conclusions

This paper aimed at explaining the difficulty in adapting a language-dependent aptitude test like the MLAT-ES to Catalan, a very closely related Romance language, and to see how this adaptation was challenged in certain items, depending on the learners' age. Though those learners showing a preference for Catalan outperform the other groups (Suárez & Stansfield, in review), this only happens in the upper grades, once the acquisition process of both bilinguals' L1s has finished. Therefore, this type of performance could be due to the fact that Catalan is the language used in formal instruction and so, the students applied their formal knowledge to answer the aptitude test.

Catalan and Spanish are certainly close Romance languages, but that does not mean that a light translation of the MLAT-ES into Catalan could guarantee a perfect fitting test in the minoritarian language for several reasons. On the one hand, phonetics and spelling were a challenge for parts 1 and 3, as Catalan does not offer the almost perfect one-to-one correspondence of grapheme and phoneme. Also, the fact that certain translations implied the use of words that were not cognates, but that came from other linguistic roots meant changing items completely or reusing one of the distractors for the sake of comparability. These slight changes did not prevent the MLAT-EC from being slightly more difficult than the MLAT-ES, though not significantly so, across ages.

Regarding part 2, the challenges posed by the two languages at work involved care in the selection of distractors. However, the resulting adaptation did not pose any significant challenges or problems except for, once again, those verb forms that due to the not-so-common use were rather novel for the test takers.

Finally, as for Part 4, tapping into rote memory, the same patterns of response are found regardless of the test version, thus proving that, in this particular part, the challenges do not seem to be language-related but, rather, both age- and ability-related and, perhaps, one could venture, test-fatigue also contributed to the response pattern found as well.

Some patterns are also to be observed across grades, with the MLAT-EC being significantly more challenging for participants in grade 3 than those in grade 4, especially in specific items. This difficulty, as seen above, is due to two main factors: the learners' cognitive developmental stages, with 3-graders being in the impasse between the preoperational and the concrete operational stages on the one hand, and still mastering their literacy skills and vocabulary on the other hand. While an aptitude test meant to cover grades 3 to 6 will necessarily show an evolution in the scores (despite the innateness and untrainability claims regarding aptitude), test

adaptors can adjust their decisions on other factors such as the learners' familiarity with certain words or unfortunate similarities with other words in the same language.

While the validity and reliability of both the MLAT-ES and the MLAT-EC have been proven in a Catalan/Spanish population across ages (Suárez, 2010), the MLAT-EC solves some specific linguistic and cultural problematic items in the MLAT-ES, especially for grade 3. The version in Catalan also covers the Catalan language specificity in all parts, while respecting the rationale behind the creation of the original MLAT-ES and without being significantly affected by the participants' language of preference. Therefore, it can be concluded that it is an instrument that covers the gap of a lack of an aptitude test in a minoritarian language as is Catalan, with 4.1 million native speakers according to the 2021 version of the *Ethnologue*, and whose extinction might have already started (Junyent, 2020).

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