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Pronunciation Learning Strategies, Aptitude, and Their Relationship with Pronunciation Performance in Pre-service English Language Teachers in Chile

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ABSTRACT

The study aimed to establish whether there is a relationship between L2 aptitude, pronunciation learning strategies (PLSs), and pronunciation performance in pre-service English language teachers in Chile. In so doing, the study also uncovers PLS use by the participants. Through a correlational and statistically descriptive methodology, all participants took three tests, namely the Modern Language Aptitude Test (MLAT), the Strategic Pronunciation Learning Survey (SPLS), and a pronunciation test, each of which was intended to gather data for the three major variables. The study was conducted at a teacher education university in Chile, with a sample of 43 Year 1 and Year 2 students. Pearson and Spearman correlation coefficients showed that no major correlations were found between PLS frequency/duration and pronunciation accuracy; nor was a major correlation found between language aptitude and pronunciation accuracy. Nonetheless, the application of a statistical model comprising the most frequently used PLSs and those with the longest duration yielded a positive correlation between these PLSs and pronunciation intelligibility levels. Future studies incorporating motivational elements are required to establish how they correlate with pronunciation accuracy, in particular.

Keywords: pronunciation learning strategies; learning strategies; language aptitude; pronunciation performance; MLAT

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Introduction

In foreign language learning research, both Language (and Pronunciation) Learning Strategies (L/PLSs) and pronunciation teaching and learning have been treated separately and have received dissimilar attention over the last three decades (Celce-Murcia, Brinton, & Goodwin, 2011; Chang & Liu, 2013; Dörnyei & Skehan, 2003; Foote, Trofimovich, Collins, & Soler, 2016; Lee & Oxford, 2008), the former with a focus on the knowledge that can be gained by uncovering the mechanisms that good language learners employ (Cohen and Macaro, 2007; Griffiths, 2008; Habok & Magyar, 2018), and the latter with a longer yet fluctuating focus on phonetic descriptive studies and pedagogical priorities (Foote *et al*., 2016; Jenkins, 2005).

English language teachers are expected to meet demanding linguistic standards in Chile. For one thing, they are expected to model language use, and the first aspect that is most often (mis-) judged is precisely their pronunciation. Thus, English language teacher education programmes in Chile continue to strive to develop a near-native accent in their students, with limited regard for the value of an international, non-native, English as a Lingua Franca type of pronunciation, despite a call for "understanding their students' needs and understanding the role of English in their contexts." (Swan, 2013, p. 63). (Near-)native pronunciation attainment is believed to be greatly affected by language aptitude in adult language learners (Robinson, 2013) and pronunciation learning strategy use (Baker & Haslam, 2012). Thus, the main aim of this study is to explore PLS use in teacher education students and whether there is a correlation between (i) PLSs, (ii) language aptitude, and (iii) L2 English pronunciation performance.

Literature review

LLSs and PLSs

The notion of LLSs has been examined for the last four decades. The literature presents several attempts to classify LLSs (Ellis, 1994; Naiman, Froanhlich, Stern, & Toedesco, 1978; O'Malley, Chamot, Stewner-Manzanarez, Russo, & Küpper, 1985; Oxford 1990; Wenden & Rubin, 1987). Oxford's (ibid.) popular taxonomy, by far the most widely used, can be divided into two different macro-types: *direct* or *indirect*, where the former encompasses *memory*, *cognitive* and *compensation* strategies, and the latter comprises *metacognitive*, *affective*, and *social* strategies. LLSs have been largely conceived of as oriented towards language competence development in rather holistic terms, and not as skill-specific strategies, as is the case of pronunciation performance, for example. Broadly speaking, direct strategies "require mental processing of the language" (ibid., p.37) in slightly different ways, while indirect strategies are those that "underpin the business of language learning… without (in many instances) directly involving the target language" (p. 135). Within the latter, *metacognitive strategies* relate to how learners control their learning process; *affective strategies* relate to how learners regulate their emotions, motivations and attitudes; and *social strategies* relate to how the learner learns through interaction with others.

More recently, the study of LLS use has been recently associated with other variables. Habok and Magyar (2018) examined LLS use and its relationship with language attitudes and general school achievement. Hismanoglu (2012) investigated the LLSs used by advanced English language learners; Soodmand Ashfar and Movassagh (2014) carried out a study aimed to study the relationship among different variables, amongst which are critical thinking, strategy use, and academic achievement at university. Seifoori (2014) investigated the use of metacognitive strategies in diverse groups of students with a view to establishing any possible discipline and gender variations. The latter was only observed in the use of self-evaluation strategy.

The study of LLSs has resulted in more focused areas of interest, as is the case of pronunciation learning in the present study. As Eckstein (2007) points out, there is very little research on PLSs in particular. The few studies on PLSs (Baker & Haslam, 2012; Derwing & Rossiter, 2002; Eckstein, 2007; Osburne, 2003; Peterson, 2000; Vitanova & Miller, 2002) can be grouped into three categories: (1) *Studies in PLS identification* aimed at identifying PLSs using qualitative data-gathering methods, which mostly relied on the learners' reports, diaries, and interviews, usually employing limited samples of participants, as is the case of Peterson (2000) and Osburne (2003); (2) *PLS-related studies*, which do not deal with PLSs exclusively, but which have yielded interesting findings. Derwing and Rossiter (2002), for instance, inquired into a perceived mismatch between what ESL students felt their pronunciation needs were and the strategies they used to deal with pronunciation breakdown. Vitanova and Miller (2002) identified some PLSs by inquiring into the learners' perceptions of the usefulness of diverse instructional elements; and (3) *PLS research*, which seeks to inquire directly into PLSs *per se*, generating or consolidating quite robust taxonomies of PLSs, as is the case of the work of Eckstein (2007). Also, Baker and Haslam (2012) conducted a study to find out whether language aptitude and the use of language strategies predict pronunciation improvement in both ESL and EFL contexts.

Thus far, a gap in the literature can be identified: On the one hand, very few studies have been conducted on the use of PLSs in English language teacher education students, in EFL contexts; on the other hand, there are virtually no studies linking PLSs and language aptitude. In this respect, Baker and Haslam (2012), rightly claim that "[T]the numbers of L2 English [pronunciation] strategies investigated in EFL contexts pales in comparison to those done in ESL environment. This denotes a gap in our understanding of English learning strategies used in EFL contexts." (p. 32).

Language aptitude

As Dörnyei (2010) puts it, "nobody would question that the innate ability to learn another language, as a child or as an adult, varies significantly from individual to individual" (p. 33). Carroll (1958) defined language aptitude as "some characteristic of an individual which controls, at a given point of time the rate of progress that he will subsequently make in learning a foreign language" (as cited in Sawyer & Ranta, 2001, p. 310). To some, language aptitude deals with the learners' degree of facility to learn an L2 or, simply, a specific talent for learning foreign languages' (Wen & Skehan, 2011). Wen, Biedron´and Skehan (2017) concur with the previous definitions in that it "refers to a specific talent for learning a foreign or second language" (p. 1) and add that it is an umbrella term comprising a set of cognitive abilities. However, as Artieda-Gutiérrez (2015) suggests, the construct of language aptitude has ceased to be viewed as a unitary concept and is now widely conceived of as a collection of abilities, although it continues to be viewed as a purely composite cognitive variable.

From the 1950s, a psychometric approach to measuring language aptitude emerged and prevailed for a few decades. This test-driven approach to language aptitude saw the launch of the most widely used language aptitude test to date: The Modern Language Aptitude Test (MLAT), devised by Carroll and Sapon (1959). The components for language aptitude are those that resulted from a series of test administrations to large student samples and that seemed to best predict language proficiency. As Dörnyei (2010) puts it, "the tacit understanding in the L2 research community has been that language aptitude is what language aptitude tests measure" (p. 35). Notwithstanding the criticisms, the MLAT has been able to successfully withstand interrogation on the basis of its predictive power, which is why it is used in this study. The MLAT comprises four components, namely (1) Phonetic coding ability, (2) Grammatical sensitivity, (3) Inductive language learning ability, and (4) Rote learning activity for foreign language materials. Over the last two decades,

language aptitude has been researched into as being closely linked to or explained as working memory (DeKeyser & Koeth, 2011; Sáfár & Kormos, 2008). Indeed, Miyake and Friedman proposed the so-called 'working memory as language aptitude' hypothesis, according to which working memory plays a fundamental role in language aptitude. Yalçin, Çeçen, and Erçetin (2016) report that working memory capacity correlates with total language aptitude measures, with the exception of grammatical inferencing, yet they are treated as two separate constructs.

As hinted earlier, while there is a greater understanding of language aptitude, together with a considerable body of knowledge of pronunciation teaching - yet to a lower extent of learning -, and learning strategies, no previous studies have attempted to elucidate the relationship among those variables. Consequently, this study attempts to answer the following research questions:

- How frequently do English language teacher education students use PLSs?

  For how long have English language teacher education students used PLSs?

- Is there a correlation between PLS frequency/duration of use and pronunciation performance levels in semi-spontaneous speech contexts?

- Is there a correlation between language aptitude levels and pronunciation performance levels in semi-spontaneous speech contexts?

Method

The participants

The sample was made up of 43 Year 1 and Year 2 English language teacher education students. The sample was clearly female-dominated, with figures that virtually replicate the Chilean nationwide context (62 per cent of the participants are females, while 72 per cent of teacher education students are females at a national level). Only 2.3 per cent have lived in an English-speaking country. Also, only 7 per cent of the participants have travelled to an English-speaking country. The participants seemed the most appropriate of all the five different cohorts, for they had just begun taking the first or second of the five English phonetics courses, which means that they had received very little formal training in English transcription; indeed, they had only taken a workshop course titled *Introduction to Pronunciation* and/or *English Phonetics I-II*.

Design and Data collection instruments

The study uses a correlational design, due to the nature of the research questions mentioned above. To this end, quantitative data were collected by means of three instruments, namely the Modern Language Aptitude Test (MLAT), the Strategic Pronunciation Learning Survey (SPLS), and a Pronunciation Test (PT).

The MLAT

Even though the MLAT was originally intended for native speakers of English, the few studies available on the use of PLSs (Baker & Haslam, 2012; Eckstein, 2007) have employed the same instrument (or an equivalent one, as is the case of the *Pimsleur Test*) with participants whose level of English language competence allowed them to understand the directions easily and complete the test in the time allocated for this purpose. Also, as suggested by Stansfield (personal communication, April 23, 2013), in order to ensure construct validity, it was considered advisable only to administer the first two sections of the test, namely Number Learning and Phonetic

Script, which precisely deal with sounds, since the scores obtained from the rest of the sections would have reflected language competence, rather than language aptitude.

The MLAT was piloted on a small group of language learners and yielded minor procedural changes, which ultimately added to a more contextualised level of reliability.The first part, *Number Learning*, has 43 possible points and tests auditory and memory abilities with sound-meaning relationships. The second part, *Phonetic Script*, requires that examinees learn to associate speech sounds with (non-International Phonetic Alphabet) phonetic symbols.

The SPLS

The instrument used for collecting data relating to the participants' frequency and duration of use of PLSs primarily draws on two previous instruments, originally developed by Tseng, Dörnyei and Schmitt (2006) and later modified by Eckstein (2007), and Baker and Haslam (2012). It consists of 36 statements containing strategies used to learn L2 pronunciation, according to which the respondents are expected to mark their preference in terms of *frequency* and *duration* of use. A five-point Likert-type scoring system, aimed at gathering frequency counts, was used for the two variables measured, i.e. frequency and duration.

For ease of processing and understanding the results of this investigation, Oxford's taxonomy was used to classify the PLSs contained in the present SPLS. Following Oxford's taxonomy, 19 of the PLSs can be said to fall under *direct strategies* and 17 under *indirect strategies*, a relatively even distribution.

A few changes were introduced into the base instrument designed by Baker and Haslam (ibid.). These changes were driven by the careful analysis of the base instrument and its piloting on three senior students of an English language preparation course. The changes are described as follows:

(1) A few strategies contained in Baker and Haslam's modified version of the SPLS were dismissed altogether, for they did not seem to reflect what is expected to occur in a setting where (upper) intermediate English language learners are taught pronunciation within a context of formal and systematic phonetic training;

(2) A handful of strategies were slightly modified in order to better contextualise the participants' English language learning environment. As a way of illustration, the concept *native speaker*, is complemented with the concept *pronunciation tutors* or *qualified people*.

Below is a sample item from the SPLS, with the frequency and duration options.

Table 1
Sample of a PLS Item

	How often do you use the pronunciation activity or skill?					How long have you used the pronunciation activity or skill?				
	Several times a day	About once a day	About once a week	About once a month	Less than once a month	Never	0 - 6 months	7 - 12 months	1 - 2 years	3 or more years
I infer the pronunciation of words I do not know how to pronounce, based on my previous knowledge.	□	□	□	□	□	□	□	□	□	□

The Pronunciation Test (PT)

The PT used in this study was developed around the following principles and assumptions, all of which have been widely discussed in the relevant literature:

(1) It exclusively centres on production;

(2) The PT largely takes an atomistic approach to the assessment of pronunciation, following Šebestová (2007), where the assessors pay attention to specific pronunciation features. The major assessment construct is *accuracy*, which is given a weight of 70 per cent of the total score for the pronunciation test, whereas 30 per cent was allocated to *intelligibility*;

(3) Pronunciation can be assessed from two different angles, namely *accuracy* and *intelligibility*. In this study, a stronger emphasis on accuracy can be observed. This is justified on the grounds of the nature of language learner under consideration in the study, a prospective English language teacher, who must evidence an altogether different set of attributes as far as language proficiency levels are concerned, as also acknowledged by those advocating an English as a Lingua Franca approach to pronunciation (Jenkins, 2000).

The test consists of four sections: The first features 20 isolated words and 10 short phrases, which focus on vowel quality and vowel quantity contrasts, as well as consonant sounds; the second section contains 10 sentences, which present a number of pronunciation features, namely vowel contrasts, consonantal differences, and consonant clusters; the third section contains three short dialogues, where closer attention is paid to sentence accent and intonation. Finally, the fourth section contains two open-ended questions, which allow for a freer type of pronunciation performance. The pronunciation features described above also correspond to those aspects that have been acknowledged as particularly problematic for Spanish speakers (Finch & Ortiz-Lira, 1982; Rogerson-Revell, 2011).

For rating purposes, two rubrics were devised, one dealing with accuracy and the other dealing with intelligibility. Both rubrics feature a five-level performance gradation system ranging from Level 1 (poor) to Level 5 (excellent) and present clear performance indicators for each performance level. Two raters were used to ensure inter-rater reliability. An interrater correlation test, in the form of Intraclass Correlation Coefficient (ICC), was run, which yielded an ICC of .77.

Data analysis

For the first research question, descriptive statistics were run. All 36 PLSs were subjected to a statistical model made up of five statistics, namely the mean, median, mode, standard deviation and percentile, with the purpose of establishing PLS frequency and duration of use. Cut-off points denoting high frequency and duration of use were set for each statistic. Also, an alternative method (Model 2) was applied, which consisted in adding the percentage points for the two options denoting higher frequency and longer duration of PLS use. Later, the degree of independence of the predictor variables was established. Then, the Kaiser-Meyer-Olkin (KMO) and the Barlett's tests were applied with a view to running a factor analysis, which was eventually statistically impossible. In order to establish possible correlations amongst the variables, a multivariate saturated model was run with accuracy and intelligibility as dependent variables, followed by Spearman correlations tests using single predictor variables. Lastly, a Spearman correlation test was applied to all 36 strategies individually with accuracy, intelligibility, and overall pronunciation as the dependent variables.

Results

Research questions 1 and 2: PLS frequency and duration

The scores stem from the administration of the SPLS, where participants were asked to indicate the *frequency* and *duration* of their use of 36 PLSs. The range of means per strategy goes from 3.07 to 4.6, if a single 'outlier' with a mean of 1.95 is removed. Additionally, the mean scores for strategy use, per strategy, are evenly spread over this 1.53 interval between the lowest (3.07) and highest (4.60) mean. Indeed, the mean score for PLS frequency of use is 3.9, with a standard deviation of 0.5.

Statistical Model 1 was applied, which consisted of five different statistics put together. For the mean, '4' -*about once a day*- was set as the accepted reference value as it denotes high frequency of strategy use. Additionally, the mode, a more robust measure of central tendency, and the median were set at '5', *several times a day* as it (option '5') denotes the highest frequency possible. Similarly, the standard deviation was set to 1 point. Finally, a 75 percentile was set as the cut-off point for the PLSs as it accounts for slightly more than the zone representing observations within one standard deviation, in a normal distribution curve. The model yielded the following PLSs as the most frequently used.

Table 2
Most Frequently Used PLSs

Strategy number	Strategy description in brief
10	Pronounce the words in my head.
16	Pay close attention to pronunciation when listening to or conversing in English.
28	Infer the pronunciation of unknown words based on previous knowledge.
29	Correct the pronunciation if people do not understand my English pronunciation.
13	Try to visualise unknown word's pronunciation in my head.
25	Guess the pronunciation of words I do not know how to pronounce.

Statistical Model 2 was also applied, which consisted in adding the percentage points for the two options denoting higher frequency of strategy use, namely *about once a day* and *several times a day*. This procedure yielded the following results:

Table 4
Most Frequently Used PLSs by Percentage Points

Strategy number	Strategy description in brief	PLS frequency in percentage points
10	Pronounce the words in my head.	95.3
2	*Use English media to learn and practise new English sounds.*	*88.4*
16	Pay close attention to pronunciation when listening to or conversing in English.	88.4
28	Infer the pronunciation of words I do not know how to pronounce.	86.0
27	*Imitate English language speakers and my pronunciation tutors.*	*86.0*
29	Correct the pronunciation if people do not understand my English pronunciation.	83.7
25	Guess the pronunciation of words I do not know how to pronounce.	83.7

If the results obtained from the application of the two models are compared, we can observe that all the top six strategies, save one, are the same. Model 2 incorporates two more strategies, Strategies 2 and 27, in italics. Thus, there is a high level of coincidence when the two types of analyses are compared, as far as PLS frequency of use is concerned.

As per PLS duration, the overall results indicate that the scores for strategy duration seem clustered together around a mid-high point, with a narrow range: 3.14 – 3.98 – if two outliers are removed. Indeed, the mean score for strategy duration is 3.5 globally, with a standard deviation of 0.3.

The same statistical models used for PLS frequency were applied for PLS duration. For Model 1 the mode was set at '5'; the median was set at '4', while the standard deviation was set at '1.2', due to the greater variability; finally, the percentile was maintained at 75. The mean scores were not set at any particular value, due to the high variability. However, the resulting seven strategies with the highest duration do feature some of the highest means. Table 5 presents the seven PLSs that meet all five statistical criteria.

Statistical Model 2 was also applied to establish PLS duration, which consisted in adding the percentage points for the two options denoting the longest duration, as can be seen in Table 6.

Table 5
PLSs Used for the Longest Period of Time

Strategy number	Strategy description in brief
2	Use English media to learn and practice new English sounds.
13	Try to visualise unknown word's pronunciation in my head.
16	Pay close attention to pronunciation when listening to or conversing in English.
25	Guess the pronunciation of words I do not know how to pronounce.
27	Imitate English language speakers and pronunciation tutors.
28	Infer pronunciation of unknown words based on previous knowledge
29	Correct the pronunciation if people do not understand my English pronunciation.

Table 6
PLSs Used for the Longest Period of Time by Percentage Points

Strategy number	Strategy description in brief	*PLS duration in percentage points*
2	Use English media to learn and practice new English sounds.	83.7
16	Pay close attention to pronunciation when listening to or conversing in English.	65.1
29	Correct the pronunciation if people do not understand my English pronunciation.	65.1
34	*Change my speed of speech if people don't understand my English pronunciation*	65.1
32	*Change my volume of speech If people don't understand my English pronunciation*	62.8
10	Pronounce the words in my head.	60.5
25	Guess the pronunciation of words I do not know how to pronounce.	60.5
27	Imitate English language speakers and my pronunciation tutors	60.5

Research question 2 and 3: Correlations

First, the independent variables were analysed in terms of the actual statistical independence to later establish the possible relationships with the dependent variable. As Figure 1 shows, PLS frequency of use and PLS duration of use present considerable dispersion that attests to the independence of the two variables.

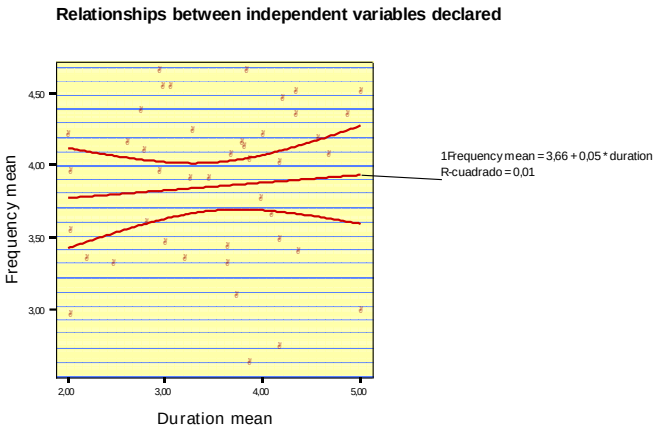


Figure 1. Independence of variables

A Spearman correlation test reveals that no major correlations are found amongst any of the independent variables (PLS frequency of use, PLS duration of use, and aptitude) and the dependent variable (pronunciation performance, as accuracy), as can be seen in Table 7.

Table 7
Correlations between All Variables and Accuracy

			Pronunciation accuracy	Frequency mean	Duration mean	Aptitude
Spearman's rho	Pronunciation accuracy	Correlation coefficient	1.000	.121	-.071	.197
		Sig. (2-tailed)	.	.440	.650	.204
		N	43	43	43	43
	Frequency mean	Correlation coefficient	.121	1.000	.107	-.035
		Sig. (2-tailed)	.440	.	.494	.825
		N	43	43	43	43
	Duration mean	Correlation coefficient	-.071	.107	1.000	.114
		Sig. (2-tailed)	.650	.494	.	.465
		N	43	43	43	43
	Aptitude	Correlation coefficient	.197	-.035	.114	1.000
		Sig. (2-tailed)	.204	.825	.465	.
		N	43	43	43	43

A multivariate model incorporating the same variables as those included in Table 7, using a saturated model and later removing individual independent variables, shows no significant correlations. Consequently, the analysis of variance for the tested models attests to no statistical significance for the coefficients. When running a Spearman correlation test, using pronunciation *intelligibility* as the dependent variable, together with PLS frequency and duration of use, and aptitude, yet again, no major correlations were found. The correlation coefficient is in most cases lower than .1. A multivariate model, this time using intelligibility as the dependent variable and PLS frequency and duration of use, and aptitude as the predictor variables, shows no major correlations, either in the saturated model, or in the individual variables removed.

An alternative correlational test was performed, this time using aptitude, the most frequently used PLSs, and those PLSs that have been used for the longest period of time, with pronunciation accuracy as the dependent variable. The results suggest a slightly higher degree of correlation, particularly in the case of aptitude (predictor variable) and pronunciation accuracy, with a coefficient of .19. The model yielded a higher correlation coefficient (.25) – if compared to the models used thus far - in the case of PLS frequency of use and accuracy. However, the correlations found are still to be regarded as rather weak. (See Table 8).

Table 8
Correlations between PLSs with Highest Frequency/Duration, Aptitude, and Accuracy

			Pronunciation accuracy	Aptitude	Frequency mean	Duration mean
Spearman's rho	Pronunciation accuracy	Correlation coefficient	1.000	.197	.258	.002
		Sig. (2-tailed)	.	.204	.095	.989
		N	43	43	43	43
	Aptitude	Correlation coefficient	.197	1.000	.157	.175
		Sig. (2-tailed)	.204	.	.315	.262
		N	43	43	43	43
	Frequency mean	Correlation coefficient	.258	.157	1.000	.274
		Sig. (2-tailed)	.095	.315	.	.076
		N	43	43	43	43
	Duration mean	Correlation coefficient	.002	.175	.274	1.000
		Sig. (2-tailed)	.989	.262	.076	.
		N	43	43	43	43

Lastly, a Spearman correlation test was applied to all 36 strategies with a view to establishing whether separate strategies explained pronunciation performance. To this end, each individual strategy frequency and duration was correlated with pronunciation accuracy, pronunciation intelligibility, and overall pronunciation. Statistical significance was only found in two individual strategies for frequency use, Strategy 5, *I listen for new sounds when listening to people speak English*, and Strategy 33, *When I feel bored with learning English pronunciation, I regulate my mood in order to invigorate the learning process*. For strategy duration, no individual strategies presented statistical significance. Table 9 presents the correlations of frequency of use of Strategies 5 and 33 with pronunciation accuracy, pronunciation intelligibility, and overall pronunciation.

Table 9
Correlations Strategies 5 and 33 with pronunciation performance

		pronacc	pronint	overpron
AStr5	Correlation coefficient	.307*	.221	.331*
	Sig. (2-tailed)	.045	.154	.030
	N	43	43	43
AStr33	Correlation coefficient	.344*	.359*	.407**
	Sig. (2-tailed)	.024	.018	.007
	N	43	43	43

The correlation coefficients show rather a low-moderate level of correlation between the frequency of use of Strategies 5 and 33 and pronunciation accuracy, .3 and .34, respectively. If a multivariate model is applied putting the two strategies together with pronunciation accuracy, an r^2 of .14 is yielded, which is still rather weak.

As can be expected, similar results were obtained when correlating Strategies 5 and 33 with pronunciation intelligibility (r^2 .12 and statistical significance of .06).

When correlating the frequency of use of strategies 5 and 33 with overall pronunciation, it was found that 21 per cent of the variability of overall pronunciation, (comprising accuracy and intelligibility values), can be explained though the frequent use of these two strategies, with a statistical significance of .00 in the analysis of variance. However, when the coefficients are tested, only Strategy 33 presents statistical significance. Finally, after correlating the frequency of use of Strategy 33 alone with overall pronunciation, it was found that only 18 per cent of variability in overall pronunciation can be explained through the frequent use of Strategy 33, using a suitable statistical model featuring statistical significance.

Discussion

PLS frequency and duration of use.

Within some of the most frequently used PLSs are strategies 25, 27, 28 and 29, which belong to the *hypothesis forming* type. i.e., they entail processes that attempt to bridge the gap between actual and target pronunciations. This is what seems to happen when these learners *imitate English language speakers and* [their] *pronunciation tutors* (Strategy 27), for there seems to be an awareness of the degrees of distance between the current pronunciation level of the language learner and the target pronunciation level. This may be triggered by the interlocutor's inability to understand the learner's pronunciation, as in *I immediately correct my pronunciation if people don't understand my English pronunciation* (Strategy 29). These strategies may correspond to Schmidt's (1990) *noticing the gap*. Following Oxford's taxonomy, a few of the most frequently used strategies are of a metacognitive type (Str. 16 and 29) in that the learner uses devices that "coordinate their own learning" (Oxford, 1990, p. 136) by centring their learning (Str. 16) and correcting their pronunciation, noticing a gap with respect to the target pronunciation (Str. 29).

Another frequently used strategy corresponds to what Eckstein (2007) refers to as *input practice,* a type of strategy which entails activities that promote the reception and production of sounds. Strategy 2, *I use English media such as television, movies and the radio to* ***learn and practise*** *new English sounds* is within the top five most frequently used strategies; the same occurs with Strategy 10, *When I'm* ***reading I pronounce the words*** *in my head.* Both strategies can be grouped under the

direct strategies set, following Oxford's (1990) taxonomy. Within cognitive strategies, practising plays an important role (Oxford, 1990). The only strategy, still within the direct macrotype suggested by Oxford (ibid.) that is of a compensational nature is Strategy 25, *I am willing to guess the pronunciation of words I do not know how to pronounce*. Within this subtype, Oxford suggests two subtypes: guessing intelligently, which corresponds to the PLS under consideration, and overcoming limitations. This type of guessing leans towards Strategy 28, where the learner infers pronunciations '…*based upon* [his/her] *previous knowledge'*, i.e. the inference – or 'informed' guessing – results from mental relations deliberately carried out to achieve a close approximation to the pronunciation of an unknown word.

Within this relatively direct cognitive-dominated set of frequently used strategies, there is one strategy that is of a more metacognitive nature. Thus, Strategy 16, *I play close attention to pronunciation when listening to or conversing in English*, may be considered of a metacognitive type in that the learner centres his/her learning. Strategies aimed at regulating the affective and environmental conditions of learning come across as rather infrequently used strategies, as is the case of Strategy 33, *I regulate my mood to invigorate the learning process* or Strategy 1, *I persist until I reach my goals*. Strategies of a social type were conspicuous by their absence within the most frequently used PLSs. The three social PLSs (Str. 15, 19, and 22) are well below the mean for PLS use, which is of 3.9.

The findings in this study feature both differences and similarities with the most recent study of this type conducted by Eckstein (2007). One of the differences is that in Eckstein's study, one of the most frequently used strategy was *ask for pronunciation help*. In this investigation, however, only 28 per cent of the participants reported to use this strategy daily. This may be accounted for by the difference of context where the studies were conducted, as Morley (1991) suggests. Eckstein's study was conducted in an ESL context, where assistance in this area is more readily available, whereas this study was conducted in an EFL context. Likewise, the context may account for the difference associated with the strategy *changing the speed of speech*, which in Eckstein's work appears to be frequently used, while in this study it is just above the mean. As far as the similarities are concerned, *willingness to guess*, *listening for new sounds*, and *noticing pronunciation mistakes*, seem to share an element of a cognitive (and metacognitive to a lesser extent) effort to assess and eventually bridge the distance between the current level of pronunciation performance and the desired one. These three PLSs reported by Eckstein tend to coincide with Strategy 25, *I guess the pronunciation of unknown words*; Strategy 16, *I pay close attention to pronunciation*; and Strategy 4, *I notice when people speaking English make mistakes*, even though the last one does not feature amongst the most frequently used PLSs.

The findings of this study corroborate Vitanova and Miller's (2002) claims that pronunciation is best learnt when both self-correction (Strategy 29) and active listening (Strategy 16) are actively used. The same notion is present in Osbourne's (2003) work in the form of *focusing on individual sounds*, *focusing on syllables*, and *focusing on memory and imitation*. In sum, it can be concluded that strategies of a direct type (cognitive, memory and compensational) tend to predominate in terms of frequency of use.

PLS *duration* has not been researched as a factor associated with pronunciation performance, the only exception being Baker and Haslam's (2012) study. In this study, PLS duration features a good deal of variability within each strategy in the participants' responses. The scores for strategy duration can be interpreted as follows: The participants have used nearly all the strategies for a period between 1-2 years. Interestingly, this average duration seems to coincide roughly with the period of time the participants have spent training for their English language teaching degree. This claim is corroborated by the fact that some of the strategies with the lowest mean scores for duration are those which they have been exposed to more recently in their teacher education programme, for instance, Strategy 17, *I use a system of phonetic symbols that help me improve my*

pronunciation, with a mean score of 3.26 and a mode of '3'; the same occurs with Strategy 20, *I read transcribed speech*, with a mean score of 3.19 and a mode of '2'. Both strategies are within the five strategies with the lowest duration.

The strategies with the highest duration are quite varied in nature. Strategies 2, *I use English media to learn and practise new English sounds*, and 13, *I try to visualise the pronunciation in my head,* are of an input-practice type, following Eckstein (2007), in that they imply (cognitively) engaging in activities that promote the reception and production of sounds. Three of the strategies lean more towards a *hypothesis testing* type of strategy, where the language learner implements changes in pronunciation according to a particular hypothesis. These changes result from the process of analysing how to best (quickly) achieve a pronunciation capable of maintaining communication. That is the case of 29, *I immediately correct my pronunciation if people don't understand my English pronunciation*; Strategy 34, *I change my speed of speech if people don't understand my English pronunciation*; and 32, *I change my volume of speech If people don't understand my English pronunciation*. These three strategies relate very closely to cognitive processes in which the language learner engages during the very communicative act.

PLSs of a *hypothesis forming* type can be found within those with the highest duration. They entail processes that attempt to bridge the gap between the learner's current actual pronunciation and a desired target one. This is the case of Strategy 28, *I infer the pronunciation of words I do not know how to pronounce, based on my previous knowledge*. The only strategy that most clearly fits the metacognitive-indirect type is Strategy 16, *I pay close attention to pronunciation when listening to people conversing in English,* in that it suggests centering, planning, and evaluation of the learning process.

Finally, the strategies that present the highest frequency (Strategies 2, 13, 16, 25, 27, 28, and 29) are the same as those that present the highest duration, where out of the eight strategies used for the longest period of time, six of them seem to be of a direct type and only two of an indirect type. Yet again, it can be observed that no social or affective strategies came up in the indirect strategies with the greatest duration. The direct strategies with the longest duration are clearly dominated by the cognitive ones.

Correlations

None of the independent variables could account for pronunciation accuracy variability in the sample used. Indeed, the correlation coefficients were rather low. In previous research, however, Purcell and Suter (1980) found that out of the 20 independent variables they analysed to explain pronunciation accuracy, 12 of them seemed to be good predictors, out of which four seemed even more robust, namely (i) the learner's mother tongue, which appeared to be one of the most powerful predictors, (ii) aptitude for oral mimicry (aptitude), (iii) exposure, and (iv) motivation. Baker and Haslam (2012) found that "post-test pronunciation scores in global foreign accent, fluency, and accuracy were positively correlated with auditory aptitude and motivation…". (p. 435), as in Purcell and Suter's (ibid.) study. Interestingly, Baker and Haslam (ibid.) found that comprehensibility, which corresponds to one of the features of intelligibility, was explained by PLS use. Even though this earlier finding is not fully corroborated in this study, the relationship between PLS frequency of use and intelligibility turned out to be the strongest, notwithstanding a low correlation coefficient when running correlations using all variables.

While there are studies (Dreyer & Oxford, 1996; Park, 1997; Takeuchi, 1993) that have successfully demonstrated a relationship between strategy use and language proficiency, which goes beyond the scope of this work, other research has either not evidenced any positive relationship whatsoever (Politzer & McGroarty, 1985) or has shown very weak correlations between the aforementioned variables (Oxford & Ehrman, 1995). Similarly, the present

investigation corroborates Haslam's (2010) overall finding in that "…use of particular strategies did not seem to predict pronunciation gains," (p. 85). One of the reasons that might explain why PLS frequency of use does not feature any powerful correlations with pronunciation performance is because the scores on the SPLS do not discriminate between random and unfocused PLS frequency of use, and systematic and focused one (Ehrman & Oxford, 1995). Similarly, any possible correlation between PLS frequency of use and pronunciation performance may be influenced by the participants' proficiency levels (Macaro, 2006). Lastly, motivation seems closely intertwined with strategy use (Schmidt & Watanabe, 2001), and begs clarification in future studies. All in all, pronunciation performance (pronunciation accuracy in particular) cannot be explained by language aptitude as measured on the MLAT; nor can it be explained by PLS frequency/duration of use.

Other studies have sought to find possible relationships between (more general) variables that go beyond the scope of the present investigation and pronunciation. Onwuegbuzie, Slate, & Schwartz (2001) examined the predictability of four different variables, where they found that academic achievement was the best predictor, followed by anxiety. Eherman and Oxford (1995) claimed that cognitive variables present the strongest correlations with L2 achievement, followed by affective factors, and then personality factors. Sparks and Ganschow (1993, 1995) argued that the main difficulties when learning a foreign language result from the learner's inability to systematically grasp the underlying governing principles of the L2, from which negative affective dispositions result accordingly.

Conclusions

The main findings suggest that learners of the type employed in this study do utilise a fairly wide range of PLSs, with direct strategies (cognitive and compensational) predominating at the expense of indirect strategies, namely affective, social, and metacognitive, which goes counter to LLS research in L2 vocabulary size (Amirian, Mallahi, & Zaghi). However, this finding seems to corroborate previous research in the (broad) area of LLS use (Macaro, 2006) and may be explained by the distinctive nature of the participants employed in the investigation as the nature of the language learners –English language teacher education students – suggests greater dedication to the study of language accompanied by the need to meet exit linguistic standards. This particular context may in turn drive these participants to utilise – perhaps in unequal measures – various PLSs, either through explicit or implicit instruction. Aptitude, as a predictor variable for pronunciation performance was found to present rather a low-moderate correlation coefficient, which goes counter to Baker and Haslam's (2012) investigation, which found that "post-test pronunciation scores in global foreign accent, fluency, and accuracy were positively correlated with auditory aptitude and motivation…". (p. 435).

As far as PLS duration of use is concerned, an aspect that has scarcely been studied thus far, it can be established that the participants have largely been employing PLSs for a period between 1 and 2 years. This period appears to coincide roughly with the average period of time that the participants have spent learning English pronunciation, especially in the form of formal phonetics courses that their English teacher preparation programme comprises. PLSs with the highest duration greatly coincide with those that were reportedly most frequently used. Additionally, the PLSs that have been used for the longest period of time revolve around sound perception and production. Indirect, specifically in the form of affective and social PLSs appear conspicuous by their absence, particularly in PLS duration of use. Metacognitive strategies, which are also of an indirect type, are scarcely present. However, these strategies have been found to play a significant role in language learning and in pronunciation learning in particular (Cohen, 2007; Sharkey, 2003).

Regarding the three possible correlations attempting to explain pronunciation performance (dependent variable) by PLS frequency/duration of use and language aptitude (independent variables), it was found that none could be statistically determined. Some of the themes that emerge from the study are (i) strategy development and strategy training at the teacher education level, (ii) the significance of aptitude, and (iii) accuracy vs. intelligibility. Strategy-development process appears to be heavily influenced by the type of training received by the language learners. In this study, the predominance of direct (cognitive-related) strategies over metacognitive, affective and social strategies may be largely due – impressionistically speaking at least – to the type of teaching the participants have been exposed to in their teacher education programme, which is probably why PLSs with the highest duration greatly coincide with those that were reported as most frequently used. PLSs that have been used for the longest period of time and those used more frequently deal with, for the most part, sound perception and production – as opposed to, for instance, metacognitive strategies –, which seems to constitute the core of the practical aspects of pronunciation/phonetics teaching, as many of the phonetics and pronunciation materials show (Celce-Murcia *et al*., 2011; Cruttenden, 2001; Ladefoged, 2006; Roach, 2009). As for the significance of aptitude, it must be pointed out that it has been approached from diverse angles over the last 20-25 years, *working memory* being one of them (DeKeyser & Koeth, 2011; Erlam, 2005; Wen & Skehan, 2011). However, much of the research done into the role of working memory in language learning has focused on its relationship with reading skills (Mackey *et al*., 2002), vocabulary learning (Gathercole & Baddeley, 1990), and grammatical development (Ellis & Sinclair, 1996). Hence, there is still *terra incognita* for further research on the role of aptitude, however operationalised, in pronunciation learning. Finally, the accuracy-intelligibility debate continues to attract a good deal of attention, assuming – rather wrongly, though – that most people wishing to learn the English language are learning it for communicative and utilitarian purposes. This investigation has shown that there are some language learners who seemingly need to achieve higher levels of understanding and language performance.

The results obtained from the administration of the Pronunciation Test in this study suggest that accuracy receives lower scores compared to the intelligibility scores. This may suggest, in turn, that intelligibility seems more achievable than accuracy. However, even if the participants of this study will most likely teach in an expanding circle environment, they require a stable pronunciation model; otherwise they "will have nothing on which to base their attempts at pronunciation." (Walker, 2010, p. 53). Similarly, as Rogerson-Revell (2011) claims, language learners, particularly the learners in this study, could well complain that they are the victims of some sort of inverted discrimination, in that they are denied access to the full phonological repertoire of a particular variety of English (see Coskun, 2011).

Lastly, some of the limitations must be acknowledged. They mostly deal with the size of the sample, the suitability of the MLAT with non-native speakers of English, the fine line between *knowledge* and *aptitude* when assessing language aptitude by focusing on phonetic coding ability in participants with a formal grasp of phonetics, and the administration of the three instruments over a seven-month timeframe. There are also, however, a few other limitations of the study that need to be acknowledged. First, the assumption upon which this study rests is that pronunciation aptitude is either the same as or a component of language aptitude, a notion that has been interrogated, with little empirical supporting evidence (Sparks, Humbach, Patton & Ganschow, 2011). Additionally, and by implication, the need for an instrument capable of capturing, both at a cross-sectional and longitudinal level, learners' L2 pronunciation aptitude, has become apparent. Furthermore, another assumption that underlies this investigation is that aptitude is permanent and thus remains unchanged, regardless of exogenous factors, a well-established notion, yet one which has been increasingly critiqued.

As for future research, several new research avenues open up. First and foremost, pronunciation learning itself presents a good deal of potential – particularly pronunciation accuracy in (upper) intermediate language learners – as much of the work done thus far in terms of LLS research has focused either on how L2s are learned from an integrative point of view or on how specific language skills, with the exception of pronunciation, are developed through strategy use. Until this investigation the limited work on PLSs had been conducted using general language learners, where the distinction between accuracy and intelligibility had not been drawn. Consequently, further research is needed into PLSs in intermediate/advanced post-pubertal language learners from EFL contexts for whom accuracy is, at least on paper, a goal to be achieved. Future research should also consider redesigning the instrument aimed at uncovering PLSs: The new version of the SPLS should incorporate PLSs capable of discriminating more clearly between strategies used to achieve intelligibility or accuracy. Thus, it will be easier to establish whether pronunciation accuracy can actually be explained by PLS use. Also, the instrument should incorporate a section dealing with pronunciation-related motivation, as strategies and motivation have been found to be linked to each other (Schmidt & Watanabe, 2001). Also, Further research is required to determine whether the learning strategies or teaching techniques that are promoted by phonetics lecturers have an impact on pronunciation learning after systematic use. Some of these PLSs and teaching techniques are reading from phonemic transcriptions, phonetic dictations, transcribing ordinary texts using IPA symbols, auditory and phonotactic analyses, and so forth. These learning strategies seem to better tap into the learning task at hand and respond to the contextual demands the participants are exposed to. Regrettably, in this research those strategies came across as recently acquired, so they presented a low frequency and a low duration of use. Finally, the very construct of aptitude is to be further explored as there are conflicting views on its componential nature, development, and possible susceptibility to modifications.

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