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Does Teaching Your Native Language Abroad Increase L1 Attrition of Speech? The Case of Spaniards in the United Kingdom

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Abstract: The present study examines the perceived L1 accent of two groups of native Spaniards in the United Kingdom, Spanish teachers, and non-teachers, alongside monolingual controls in Spain. While the bilingual groups were carefully matched on a range of background variables, the teachers used Spanish significantly more at work where they constantly need to co-activate it alongside English. This allowed us to test the relative effect of reduced L1 use and dual language activation in first language attrition directly. To obtain global accentedness ratings, monolingual native Spanish listeners living in Spain participated in an online perception experiment in which they rated short speech samples extracted from a picture-based narrative produced by each speaker in terms of their perceived nativeness, and indicated which features they associated with non-nativeness. The results revealed significantly greater foreign-accent ratings for teachers than non-teachers and monolinguals, but no difference between the latter two. Non-native speech was associated with a range of segmental and suprasegmental features. These results suggest that language teachers who teach their L1 in an L2-speaking environment may be particularly prone to L1 attrition since they need to co-activate both their languages in professional settings and are regularly exposed to non-native speech from L2 learners.

Keywords: L1 attrition; speech; foreign accent; accent perception; Spanish; English; bilingual; teacher

1. Introduction

A growing body of research on speech development in early and late bilinguals has documented changes occurring in a speaker's first language (L1) pronunciation that affect areas, such as vowels, consonants, and intonation patterns (e.g., (de Leeuw 2019; Fowler et al. 2008; Mayr et al. 2019; Mennen 2004; Nodari et al. 2019)). Such changes can take place rapidly, affect novice second language (L2) learners (Chang 2012, 2013; Kartushina et al. 2016a), and may be fully (Kartushina and Martin 2019) or partially (Chang 2019) reversed. Alternatively, they may occur over time in proficient L2 learners who are long-term residents in an L2-speaking environment (e.g., (de Leeuw et al. 2018a; Dmitrieva 2019; Mayr et al. 2012; Ulbrich and Ordin 2014)). Only the latter scenario is usually referred to as “L1 attrition”, that is, the non-pathological and non-age related decrease in an individual's proficiency in a previously learnt language ((Köpke and Schmid 2004; Schmid 2010), but see (Schmid and Köpke 2017) for a broader definition).

While L1 attrition of speech has been widely documented, not all individuals who are long-term residents in an L2-speaking environment exhibit observable changes to their native accent (de Leeuw et al. 2018a; Major 1992; Mennen 2004). The specific factors that facilitate or hinder attrition

of speech are, however, still poorly understood, and few studies have systematically investigated relevant predictor variables (but see (Hopp and Schmid 2013)). One of the ongoing debates in this context is whether attrition is predominantly caused by reduced L1 use or by cross-linguistic interactions arising from contexts of dual language activation (de Leeuw et al. 2010; Schmid 2007; Stoehr et al. 2017). The present study aims to contribute to this issue by examining the perceived L1 accent of two groups of native Spanish speakers in the United Kingdom: (1) Spanish language teachers, who use their L1 regularly in professional settings and frequently need to switch between Spanish and English, and (2) non-teachers, who virtually never use the L1 in the workplace, with the two groups exhibiting similar use of the L1 in social situations. This design allowed us to test the role of low L1 use and regular dual language activation in L1 attrition of speech directly.

1.1. Plasticity in Native Speech, Phonetic Drift and L1 Attrition

Research into late bilingualism has until recently been primarily concerned with L2 acquisition where prevailing notions have been that a critical period (Lenneberg 1967) and processes of fossilization (Selinker 1972) constrain ultimate attainment in the L2. Whether this putative end state is maturationally constrained or conditioned by increasing entrenchment is still subject to ongoing debates (e.g., (Bylund et al. 2013; Piske et al. 2001)); nonetheless, traditional perspectives on bilingualism have largely ignored the L1, assuming it to be stable and unlikely to undergo significant development (e.g., (Gregg 2010)).

Such suggestions, however, are not supported by empirical findings which show that bilinguals' L1 speech patterns typically differ from those of monolinguals (see (Kartushina et al. 2016b) for an overview, and below). Moreover, they are at odds with a holistic view of bilingualism, which argues that the L1 and L2 do not exist in isolation but constantly interact with each other (Grosjean 1989). In line with this account, the Speech Learning Model (SLM) (Flege 1995; Flege and Bohn 2020) posits that the L1 and L2 share a common phonological space and influence each other, which may lead to cross-linguistic assimilation and dissimilation patterns, both of which will differ from those of monolinguals. Moreover, the SLM claims that the more experienced an L2 learner is, the greater the effect of the L2 will be on the L1 (Flege 1995).

A static view of the L1 has also been challenged by the advocates of Dynamic Systems Theory (e.g., (de Bot et al. 2007)). According to this account, language constitutes a system with multiple components that are continually in a state of flux. These components are interconnected and sensitive to feedback, both from internal stimuli (i.e., other components within the system), and social and environmental factors. Thus, native speech patterns are dynamic and subject to change throughout the lifespan. Indeed, there is widespread evidence from longitudinal studies that show that even monolinguals modify their L1 accent in response to changes in the norms of their speech community (Harrington 2006; Harrington et al. 2000; Sankoff and Blondeau 2007). Amongst these, a particularly well-known example is the work of Harrington and his associates which showed systematic changes over several decades in the Queen's vowel realizations during her annual Christmas address.

Changes in L1 accent have also been widely documented in longitudinal work on bilinguals. For example, Sancier and Fowler (1997) present the case study of a Brazilian Portuguese-English bilingual who regularly travelled between Brazil and the United States (see also (Tobin et al. 2017) for a recent extension to Spanish-English bilinguals). They found that her voice onset time (VOT) values in both languages were longer after several months in the United States and shorter after months in Brazil, a change to which native Portuguese listeners were receptive. The authors ascribe the observed variation to what they call a "gestural drift" (more recently "phonetic drift" (Chang 2012, 2013), suggesting that L1 phones begin to adopt characteristics of the ambient language as a result of their similarity to L2 phones, the speakers' propensity to unintentionally imitate what they hear, and the effect of recency on memory. Since phonetic drifts of this kind do not coincide with a decline in L1 proficiency, they are not considered instances of attrition (see also (Chang 2012, 2013; Kartushina et al. 2016a)).

In contrast, an extensive body of literature has documented pervasive changes in L1 accent in bilinguals who are long-term residents in an L2-speaking environment. At the phonetic level, such instances of L1 attrition have been shown to affect the production of VOT in plosives (Flege 1987; Major 1992; Mayr et al. 2012; Stoehr et al. 2017), formant frequencies in vowels (Bergmann et al. 2016; Guion 2003; Mayr et al. 2012), laterals (de Leeuw et al. 2013; de Leeuw 2019) and rhotics (de Leeuw et al. 2018b; Ulbrich and Ordin 2014), and the realization of tonal alignment (de Leeuw et al. 2012; Mennen 2004). Attrition has also been shown to affect L1 perception (Ahn et al. 2017; Dmitrieva 2019) and may result in the neutralization of native phonological contrasts (Cho and Lee 2016; de Leeuw et al. 2018a).

Moreover, there is ample evidence that listeners are receptive to changes in L1 accent and may perceive speakers as foreign accented in their native language (Bergmann et al. 2016; de Leeuw et al. 2010; Hopp and Schmid 2013). For example, de Leeuw et al. (2010) examined the global foreign accent in the L1 of native German speakers who were long-term residents in Anglophone Canada or the Netherlands. The results revealed that they were perceived to be significantly less native-like than native control speakers in Germany, irrespective of geographical setting. Similarly, the native German speakers in Anglophone North America in Bergmann et al. (2016) were perceived as significantly less native-like in their L1 than control speakers in Germany, with 40% of attriters rated below the monolingual range.

Together, the extant literature hence suggests that L1 attrition of speech is widespread and may be observed both in the productions of bilinguals and in their global foreign accent ratings. Nevertheless, attrition is not inevitable since not all individuals who are long-term residents in an L2-speaking environment end up with changes to their L1 accent. For example, de Leeuw et al. (2018a) showed that while one of their Albanian-English bilinguals completely neutralized the L1 phonemic contrast between light and dark laterals, and two additional ones did so only in coda position, others produced their laterals entirely like Albanian monolinguals. Similarly, in Mennen's (2004) study of tonal alignment, four out of five of her Dutch learners of Greek exhibited changes in their L1 alignment patterns, but one speaker did not, producing tonal alignment entirely natively in both languages (see also (de Leeuw et al. 2013; Major 1992)). Finally, instances of individual variation were found in studies of accent perception (Bergmann et al. 2016; de Leeuw et al. 2010). Thus, while 14 bilinguals in de Leeuw et al. (2010) received a clear non-native rating, 20 were consistently perceived as native.

1.2. L1 Use and Dual Language Activation in L1 Attrition

One of the variables that may account for such individual variation in L1 attrition of speech is language use. For example, Flege et al. (1997) showed that Italians in the United States had stronger foreign accents in L2 English if they used Italian a lot than if they used it rarely. Similarly, Lloyd-Smith et al. (2020) found a strong effect of Italian use scores on the perceived nativeness in Italian heritage speakers in Germany, while the age at which the heritage language was introduced was inconsequential. Stangen et al. (2015), in turn, found high non-native accents in the majority language German for Turkish heritage language speakers in Germany with high use of Turkish (see also (Kupisch et al. 2014)).

Similar effects of language use have also been documented in attrition contexts. Thus, Stoehr et al. (2017) examined VOT production in two groups of late Dutch-German bilinguals living in the Netherlands, L1 German speakers and L1 Dutch speakers. Native German speakers were exposed to their L1 only at home, whilst speaking Dutch in other environments, whereas the native Dutch speakers had more contact with their L1 given its status as the majority language, only coming into contact with L2 German at home. The study found that L2-immersed bilinguals produced nativelike L2 plosives, yet also exhibited L2-like characteristics in their L1 productions. Conversely, bilinguals living in the L1 environment did not produce nativelike L2 plosives but maintained nativelike L1 VOTs. Together, the results suggest that being immersed in an L2-speaking environment can be advantageous for L2 speech learning, but reduced L1 use may increase the likelihood of L1 attrition.

The idea that low L1 use should lead to attrition is based on the premise, consistent with exemplar theoretic and usage-based approaches, that language use reinforces memory representations, and that its absence may lead to retrieval difficulties (Bybee 2001). Nevertheless, the role of L1 use in attrition is not straightforward. First, a number of studies have shown that changes to L1 accents can occur despite continued high L1 use (Chang 2012; Mayr et al. 2012; Mennen 2004). For instance, Mayr et al. (2012), who investigated L1 attrition of speech in Dutch-English twin sisters, documented changes in L1 accent in the L2-immersed twin despite regular high use of her native Dutch. Mennen (2004), in turn, showed in her study of Dutch-Greek bilinguals in the Netherlands that L1 phonetic changes can even occur in an L1-speaking environment provided the frequency of L2 use is high. Second, L1 use and exposure must be seen as distinct from L2 immersion, in that residence in an L2-speaking environment can co-occur with wide and varied patterns of L1 communication. As such, simple measures of frequency and quantity of L1 contact may not be sufficient, since “[...] among bilinguals, L1 use does not necessarily equal L1 use” (Schmid 2007, p. 137). That is to say, L1 use encompasses a diverse range of situations that do not fit comfortably within a single definition, and therefore cannot be considered a single predictor of attrition.

One of these concerns situations that require co-activation of the L1 and L2. Thus, in de Leeuw et al.’s (2010) study, native German speakers in Anglophone Canada and the Netherlands were more likely to be perceived as foreign-accented in the L1 if they used German in contexts in which code-switching was likely to occur. Bilinguals who reported a high amount of L1 contact in situations with minimal expected code-switching, on the other hand, were less likely to be perceived as non-native, suggesting that L1 contact of this type may promote stability of pronunciation. Note, however, that in this study, participants were not directly asked whether they code-switched in specific settings. Rather, the authors postulated *ex post facto* that code-switching was more likely to occur in certain settings. These included L1 use with family members and friends in Canada and the Netherlands and use in church settings; in contrast, code-switching was deemed less likely to occur in work settings, during visits to Germany, and during telephone conversations and written correspondence with native German speakers.

These findings are consistent with a large body of evidence that has shown cross-linguistic interactions to occur in contexts of dual language activation, such as code-switching, where inhibition of the non-target language is particularly difficult (Green 1998). The state of activation of a bilingual’s two languages at a given point in time is referred to as language mode (Grosjean 2001) and can range from bilingual mode, where both languages are fully activated, to monolingual mode, where the non-target language is inhibited as much as possible, although never entirely, based on sociolinguistic factors. Studies of phonetic code-switching have shown unidirectional interactions, in which the speech patterns of only one language are affected by those of the other one (e.g., (Muldner et al. 2019; Olson 2013)) as well as bidirectional interactions, in which both languages mutually affect each other’s speech patterns (e.g., (Bullock and Toribio 2009; Piccinini and Arvaniti 2015)), with few studies revealing no effect of switching (but see (Grosjean and Miller 1994)).

1.3. The Present Study

The present study sought to build on previous work that has examined the role of L1 use and dual language activation in L1 attrition by investigating the perceived L1 accent of two groups of native Spanish speakers in the United Kingdom, (1) Spanish language teachers, and (2) non-teachers, alongside monolingual controls in Spain. As such, it is the first to examine L1 attrition of speech across specific professional groups. To the best of our knowledge, only one other study on L1 speech production has included individuals who teach their native language in an L2-speaking environment, that is, Chang (2019). However, unlike the present study, the speech of the L1 English speakers in that study, who taught their native language to L2 learners in Korea, was not compared to that of a group of non-teachers. Moreover, the focus of that study was the effect of bilinguals’ L2 use on L1 pronunciation patterns.

The case of teachers is particularly pertinent, given the high proportion of foreign citizens who work teaching their native languages: Of an estimated 116,000 Spaniards in the United Kingdom between 2013 and 2015, nearly 10% were working in education ([Office for National Statistics 2017](#)). While other migrants may also have frequent L1 contact, the experience of language teachers is quite distinct, given their high levels of L1 exposure and use under specific circumstances. Thus, language teaching is one of the few professions in which language is not merely a medium of communication, but also its object. As such, individuals who teach their native language to L2 learners may have what [Chang \(2019, p. 108\)](#) refers to as an “instructional orientation” towards the L1, which would typically encompass “high metalinguistic awareness and explicit knowledge of rules, norms, and standards” (*ibid.*). Moreover, the need for them to provide a clear, carefully articulated model for their students’ pronunciation patterns means that they may be particularly concerned about retaining a native-like accent. Finally, teaching one’s native language necessitates sustained high use of the L1. Together, these factors suggest that the L1 accent of individuals who teach their native language may be especially protected from attrition.

On the other hand, teaching one’s L1 in an L2-speaking environment requires regular use of the L2, not only in social contexts but also professionally. Thus, even if foreign language teachers aim to maximize the use of the target language in the classroom, regular recourse to the ambient language, and the use of both languages in alternation, is virtually inevitable ([Littlewood and Yu 2011](#); [Turnbull and Dailey-O’Cain 2009](#)). Moreover, recent pedagogical approaches, notably “translanguaging” ([Cenoz and Gorter 2019](#)), have moved away from strict adherence to monolingualism and actively embrace the use of more than one language in language classrooms, in line with [Cook’s \(2008\)](#) notion of “multicompetence” (see also ([Illman and Pietilä 2018](#))). Individuals teaching their native language, therefore, need to keep both their L1 and L2 fully activated for extended periods, and hence operate in a sustained bilingual language mode in the classroom ([Grosjean 2001](#)). As discussed previously, this has been shown to enhance the likelihood of cross-linguistic interactions, and as a result changes to individuals’ L1 accent (cf. ([de Leeuw et al. 2010](#))).

In addition, language teachers are regularly exposed to L1-influenced pronunciations in their students’ L2 productions. However, the effect that foreign-accented input has on their native speech patterns is unclear. On the one hand, experimental studies examining phonetic convergence in native–non-native dyads have failed to document instances of native speaker accommodation towards the accents of non-native speakers ([Kim 2009](#); [Kim et al. 2011](#)), suggesting that language teachers may be impervious to the influence of their students’ accented speech patterns. On the other hand, in these studies, accommodation is based on singular events during which rapid phonetic adjustments are assessed in conversations with unfamiliar individuals, and hence they do not allow conclusions to be drawn about the effects of repeated exposure to, and interaction with, familiar foreign-accented speakers in professional educational settings. It is certainly plausible that sustained accented input of this kind may affect the representations of teachers’ L1 speech sounds, in line with [Chang’s \(2019\)](#) Incidental Input Hypothesis, which argues that ambient input is incidentally processed and cannot be ignored. Moreover, evidence from both adults who were raised in bilingual homes ([Bosch and Ramon-Casas 2011](#)) and bilingual children in immersion school settings ([Caldas 2006](#); [Mayr and Montanari 2015](#)) supports the idea that foreign-accented input may affect L1 pronunciation patterns. Thus, [Bosch and Ramon-Casas \(2011\)](#) showed that Catalan-Spanish bilinguals who were raised with both languages and received inconsistent phonetic input produced Catalan/e-ε/ less accurately as adults than bilinguals raised in Catalan-only homes. [Caldas \(2006\)](#), in turn, reported that his daughters’ L1 French was English-accented, which he attributed to their exposure to non-native speech at their dual language school in Louisiana. In contrast, his son, who was solely educated through the medium of English, but like his sisters received native French input in the home, had a native-like accent in French. Similarly, [Mayr and Montanari \(2015\)](#) found that the two Italian-English-Spanish trilingual children in their study had native-like VOT patterns in Spanish, but English-accented ones in Italian, even though both languages contain a prevoiced—short lag VOT contrast. The authors

attributed this finding to the fact that the children were regularly exposed to English-accented Italian from their classmates in their Italian-English dual language school in Los Angeles, while they only learnt Spanish from their monolingual Mexican nanny.

Based on these considerations, the present study sought to answer three inter-related research questions. First, it aimed to find out whether Spanish speakers who teach their native language in an L2-speaking environment are perceived as more or less native-like in their L1 than non-teachers in the same L2 environment who rarely use it. Second, it sought to determine to what extent perceptions of non-nativeness are characterized by individual variation. Finally, it attempted to identify the specific accentual features that are associated with non-native speech in native Spanish teachers and non-teachers who are long-term residents in an L2-speaking environment.

2. Method

An accent rating experiment was carried out in which monolingual Spanish listeners, resident in Spain, were exposed to short extracts of Spanish speech from a picture-based narrative produced by two groups of native Spanish speakers in the United Kingdom, language teachers, and non-teachers, alongside monolingual controls in Spain. Listeners were asked to state whether they detected a non-native accent in the speech samples and to provide an indication of their level of confidence in their judgement. Moreover, if they considered a sample to sound non-native, they were prompted to identify the accentual features that had led them to this conclusion.

2.1. Participants

Two groups of consecutive bilingual Spaniards living in the United Kingdom were recruited to participate in the study: (1) Spanish language teachers (BIL-T, $N = 10$, 9 females), and (2) non-teachers (BIL-NT, $N = 9$, 5 females). Those in the latter group practise a diverse range of professions, ranging from social work to accountancy and nursing, and none habitually use Spanish in their communication at work or at home. The participants in BIL-T, in turn, were either employed as Spanish teachers in schools ($N = 5$) or in university settings ($N = 5$). Further to being long-term residents—that is, having lived continuously in the UK for at least five years—an inclusion criterion for both of these groups was that migration took place after the age of 18. In this way, any differences identified in their speech can be attributed to attrition as opposed to incomplete L1 acquisition (Schmid 2014).

In addition to the two bilingual groups, a group of monolingual Spaniards residing in Spain participated in the study (MON, $N = 8$, 7 females). The speakers in this group had never lived anywhere other than Spain, had never spoken a language other than Spanish at home, as a medium of education or at work, and reported low levels of proficiency in English or any other language. As such, they meet Best and Tyler's (2007) definition of functional monolinguals as “not actively learning or using an L2” (p. 16).

Participants were recruited through ELE-UK (www.eleuk.org) and the Instituto Cervantes (www.cervantes.es), both of which are institutions dedicated to the teaching of the Spanish language, and through Spanish departments at English universities as well as via existing networks in the United Kingdom and in Spain. They came from a range of regions in Spain with no systematic differences across the groups: Andalusia (BIL-T: 2, BIL-NT: 1, MON: 1), Asturias (BIL-NT: 1, MON: 1), Castile-La Mancha (BIL-NT: 1, MON: 1), Catalonia (BIL-T: 2, BIL-NT: 1, MON: 1), Galicia (BIL-T: 3), Murcia (BIL-T: 1), Madrid (BIL-T: 1, BIL-NT: 1, MON: 1), Basque Country (BIL-T: 1), Valencia (BIL-NT: 4, MON: 4).

All subjects gave their informed consent for inclusion before they participated in the study. The research reported in this manuscript was reviewed and approved by the Cardiff School of Health Sciences Research Ethics Committee, Cardiff Metropolitan University, United Kingdom (ethics reference number: UG-265).

Initial contact was established by email and, in order to ensure groups were matched for key variables, demographic and linguistic background information was collected by means of an online questionnaire created using Qualtrics XM (Qualtrics 2019). A summary of participant characteristics

is included in Table 1. Comparisons on all variables in the table were made across the two bilingual groups, while comparisons across all three groups were only made on the first three variables in the table, that is, education, English proficiency, and chronological age, as well as on gender distributions.

Table 1. Participant characteristics.

	BIL-T (N = 10)		BIL-NT (N = 9)		MON (N = 8)	
	Median	Min-Max	Median	Min-Max	Median	Min-Max
Education	6.00	5.00–7.00	5.00	4.00–7.00	4.50	2.00–6.00
ENG proficiency	4.00	3.00–5.00	3.00	3.00–5.00	1.00	1.00–2.00
	Mean	SE	Mean	SE	Mean	SE
Chronological age (years)	41.60	3.11	33.56	2.16	31.63	1.29
AOA (years)	28.20	2.78	24.44	0.93	-	-
LOR (years)	13.10	2.18	8.89	1.84	-	-
Use of ENG at home	41.50%	12.26	79.67%	10.96	-	-
Use of SPAN at home	33.50%	12.03	9.22%	4.72	-	-
Use of ENG at work	54.20%	7.48	95.11%	2.77	-	-
Use of SPAN at work	40.60%	6.66	4.33%	2.69	-	-
Social use of ENG in UK	63.30%	5.72	76.22%	6.96	-	-
Social use of SPAN in UK	33.00%	5.16	23.78%	6.96	-	-

Notes: AOA = age of arrival in the UK; LOR = length of residence.

2.1.1. Comparisons across the Two Bilingual Groups

The two bilingual groups were carefully matched on a range of background variables¹. Thus, they did not differ from each other in gender distribution (Chi-square test: $\chi^2(1) = 2.898$, $p = 0.089$), chronological age (BIL-T (mean: 41.60, SE: 3.11); BIL-NT (mean: 33.56, SE: 2.16); Independent t -test: $t(17) = 2.08$, $p = 0.053$), age of arrival in the UK (BIL-T (mean: 28.20, SE: 2.78); BIL-NT (mean: 24.44, SE: 0.93); Independent t -test: $t(17) = 1.223$, $p = 0.238$) or length of residence (BIL-T (mean: 13.10, SE: 2.18); BIL-NT (mean: 8.89, SE: 1.84); Independent t -test: $t(17) = 1.458$, $p = 0.163$). Moreover, they were matched in terms of their highest level of education (BIL-T (median: 6.00, min-max: 5.00–7.00); BIL-NT (median: 5.00, min-max: 4.00–7.00); Mann–Whitney test: $U = 27.500$, $p = 0.126$), using a seven-point Likert scale ranging from 1 (less than secondary school education) to 7 (doctorate), as well as their self-reported competence in English (BIL-T (median: 4.00, min-max: 3.00–5.00); BIL-NT (median: 3.00, min-max: 3.00–5.00); Mann–Whitney test: $U = 35.000$, $p = 0.374$), based on a six-point Likert-type scale ranging from 1 (less than basic knowledge of English) to 6 (Native or near-native proficiency) in line with the classifications of the Common European Framework of Reference for Languages (Council of Europe 2001).

The bilingual groups were also matched on some of their language use patterns. Thus, they did not differ in their estimated use of Spanish and English in social situations outside their home and work in the UK (Spanish: BIL-T (mean: 33.00, SE: 5.16); BIL-NT (mean: 23.78, SE: 6.96); Independent t -test: $t(17) = 1.079$, $p = 0.296$; English: BIL-T (mean: 63.30, SE: 5.72); BIL-NT (mean: 76.22, SE: 6.96); Independent t -test: $t(17) = 1.446$, $p = 0.166$), the amount of time they spent in Spain per year (BIL-T (median: 1.00 (<1 month), min-max: 1.00 (<1 month) to 2.00 (1–3 months)), BIL-NT (median: 1.00 (<1 month), min-max: 1.00 (<1 month) to 2.00 (1–3 months)); Mann–Whitney test: $U = 43.500$, $p = 0.879$), the frequency of spoken contact with family and friends in Spain, for example, via telephone

¹ To compare groups on scalar variables, such as chronological age, we ran parametric tests (independent t -test; one-way ANOVAs); for comparisons on ordinal variables and Likert scales, we ran non-parametric tests (Mann–Whitney test; Kruskal–Wallis test); the relation between nominal variables, in turn, was explored using chi-squared tests. When running independent samples t -tests across the two bilingual groups on the use of English and Spanish at work as well as on the use of Spanish at home, the variances turned out not be equal based on Levene's tests. In these cases, the t -values, p -values, and degrees of freedom were adjusted accordingly.

conversations (BIL-T (median: 1.00 (once or twice a week), min-max: 1.00 (once or twice a week) to 3.00 (less than once a month)); BIL-NT (median: 1.00 (once or twice a week), min-max: 1.00 (once or twice a week) to 3.00 (less than once a month)); Mann–Whitney test: $U = 38.500$, $p = 0.492$), or the frequency of written contact with family and friends in Spain, for example, email correspondence (BIL-T (median: 2.00 (once or twice a day), min-max: 1.00 (multiple times a day) to 4.00 (once or twice a month)); BIL-NT (median: 2.00 (once or twice a day), min-max: 1.00 (multiple times a day) to 3.00 (once or twice a week)); Mann–Whitney test: $U = 27.500$, $p = 0.129$).

In contrast, crucially, the two groups differed from each other in terms of their language use patterns in work, and to a lesser extent at home. Thus, the BIL-T group used English significantly *less* at work (BIL-T (mean: 54.20, SE: 7.48), BIL-NT (mean: 95.11, SE: 2.77); Independent t -test: $t(11.390) = 5.130$, $p < 0.0005$) and at home (BIL-T (mean: 41.50, SE: 12.26), BIL-NT (mean: 79.67, SE: 10.96); Independent t -test: $t(17) = 2.30$, $p = 0.034$) than the BIL-NT group, but Spanish significantly more at work (BIL-T (mean: 40.60, SE: 6.66), BIL-NT (mean: 4.33, SE: 2.69); Independent t -test: $t(11.862) = 5.047$, $p < 0.0005$) than the BIL-NT group. On the other hand, the two groups did not differ significantly from each other in their use of Spanish at home (BIL-T (mean: 33.50, SE: 12.03), BIL-NT (mean: 9.22, SE: 4.72); Independent t -test: $t(11.674) = 1.878$, $p = 0.086$). Note that two of the BIL-T speakers and one of the BIL-NT speakers live by themselves and therefore indicated no use of any language in the home. Note also that the BIL-T speakers, but not the BIL-NT speakers, indicated occasionally using a language other than Spanish or English that was not specified further. This accounted for circa 5% of the use patterns at work and 7% at home.

2.1.2. Comparisons across the Monolingual Group and the Two Bilinguals Groups

Finally, comparisons were made across all three groups, that is, BIL-T, BIL-NT, and MON. They differed significantly on self-rated competence in English (MON (median: 1.00, min-max: 1.00–2.00), BIL-T (median: 4.00, min-max: 3.00–5.00); BIL-NT (median: 3.00, min-max: 3.00–5.00); Kruskal–Wallis test: $\chi^2(2) = 10.16$, $p = 0.006$) with a Dunn’s post-hoc test revealing significantly lower scores for the MON group than BIL-T ($p = 0.002$) and BIL-NT ($p = 0.016$). Moreover, while the MON speakers did not differ from the other two groups in terms of gender distribution (Chi-squared test: $\chi^2(2) = 3.873$, $p = 0.144$), they differed in chronological age (MON (mean: 31.63, SE: 1.29), BIL-T (mean: 41.60, SE: 3.11); BIL-NT (mean: 33.56, SE: 2.16); One-way ANOVA: $F(2,24) = 4.810$, $p = 0.018$) and formal education level (MON (median: 4.50, min-max: 2.00–6.00), BIL-T (median: 6.00, min-max: 5.00–7.00); BIL-NT (median: 5.00, min-max: 4.00–7.00); Kruskal–Wallis test: $\chi^2(2) = 6.74$, $p = 0.034$), with the MON group significantly younger ($p = 0.030$) and less well educated ($p = 0.029$) than the BIL-T group, but not the BIL-NT group ($p > 0.05$).

2.2. Speech Materials

Participants audio-recorded themselves telling the story “I will help you” (Abbott et al. 2015) in Spanish. To do this, they were given access to an adapted version of the picture book online, which contained 17 pictures, but with all words removed. Participants could view the pictures as many times as they wished to ensure they understood the story before recording. Recordings were completed with a mobile phone or computer in a quiet environment, avoiding background noise, to promote optimum quality for subsequent use in the accent rating experiment. They were asked not to plan the exact wording beforehand and to imagine telling the story to a monolingual Spanish child. This approach was chosen to obtain quasi-spontaneous speech, whilst ensuring comparable samples in terms of lexical and grammatical content, and thus minimizing the likelihood of judgements resulting from differences in linguistic complexity (Schmid and Hopp 2014).

From each of the 27 narratives, a randomly selected speech sample of approximately 15 s was extracted in PRAAT (Boersma and Weenink 2019). This duration was considered sufficient for listeners to make a reliable judgement (de Leeuw et al. 2010; Flege 1984; Schmid and Hopp 2014). In order to minimize the likelihood that the listeners’ judgements are based on areas other than

pronunciation, samples were carefully screened to ensure they contained no lexical or grammatical errors and constituted grammatically complete utterances. Long pauses and hesitations were also avoided. A one-way ANOVA revealed no statistically significant difference in sample duration across groups (Mean BIL-T: 16.33 (SD: 1.14); Mean BIL-NT: 15.53 (SD: 0.763); Mean MON: 15.89 (SD: 0.524); $F(2,24) = 1.979$, $p = 0.160$), nor in terms of speaking rate, as measured in syllables per second (Mean BIL-T: 5.21 (SD: 0.649); Mean BIL-NT: 5.54 (SD: 0.852); Mean MON: 5.70 (SD: 0.502); $F(2,24) = 1.201$, $p = 0.318$). To further reduce variability across samples, peak intensity was normalized, using PRAAT software (Boersma and Weenink 2019).

2.3. Listeners

The samples were presented as part of an online questionnaire created in Qualtrics XM software (Qualtrics 2019), which was distributed via an anonymous link to students at the Faculty of Education, University of A Coruña as well as existing networks across Spain. A total of 28 native Spanish listeners (20 females) with a mean age of 32 (SD: 11.25) completed the online accent rating experiment. Competence in English was controlled for with none of the listeners reporting higher than intermediate proficiency (mean 2.5, SD 0.75) comparable to the MON speakers' scores (cf. Table 1). Like the MON speakers, the listeners had never lived outside Spain and had never spoken a language other than Spanish at home, as a medium of education, or at work. Like the speakers, they come from a variety of regions, including Andalusia ($N = 6$), Castile-La Mancha ($N = 1$), Catalonia ($N = 3$), Extremadura ($N = 1$), Galicia ($N = 3$), Madrid ($N = 1$) and Valencia ($N = 13$).

2.4. Experimental Procedure

As the experiment was conducted online, listeners were given detailed written instructions regarding the task at hand. They were asked to use headphones, and an audio test was incorporated into the questionnaire to ensure adequate browser and volume settings had been selected. Participants were informed they would hear samples from fluent Spanish speakers, though no indication of whether they were native or not was given. Following the method established by Moyer (1999) and adopted in various studies on bilingual populations since then (e.g., (Bergmann et al. 2016; de Leeuw et al. 2010; Lloyd-Smith et al. 2020)), samples were played in random order and after each recording listeners were instructed to give a binary rating of the speaker's accent (native/non-native), indicating subsequently their degree of confidence (confident/neither confident nor not confident/not confident). They were further instructed to select "non-native" in the event they detected a non-native accent, however slight. Listeners heard each sample only once and were asked to guess if unsure, indicating their lack of confidence accordingly.

For samples rated "non-native", a follow-up question was included immediately after the rating was given, requesting details of what aspects of pronunciation had created a perception of non-nativeness, as well as any specific words that sounded non-native. In addition to the rating task, the questionnaire contained a range of demographic and language background questions to ensure the listeners met the inclusion criteria.

No time limit was imposed for responding and listeners controlled the pace at which they progressed through the samples. They were encouraged to take as many breaks as they deemed necessary. The average duration for the experiment was 25 min.

2.5. Analysis

In line with previous accent rating experiments (Bergmann et al. 2016; de Leeuw et al. 2010; Moyer 1999), listeners' responses were converted to a six-point scale in which a "native" rating marked as "confident" appeared at one end of the scale (1) and a "confident" rating as "non-native" at the other (6). As such, the lower the numerical foreign accent rating (FAR), the nearer to nativelike the speaker was perceived to be. The experimental data were subsequently transferred to a CSV file for statistical analysis. In order to assess whether the groups differ in their FAR, linear mixed-effects models were

run in R (R Core Team 2018) using the LmerTest function (Kuznetsova et al. 2017). To analyze the features identified by the listeners, content analysis was used (Krippendorff 2018). This first involved screening responses for relevant phonetic information. Comments that did not relate to accentual features were disregarded. Items referring to accentual features, in turn, were initially coded as relating to either segmental or suprasegmental phenomena before being assigned to more specific subcategories. These were then quantified. As a measure of reliability, coding was repeated on all 174 comments, yielding an agreement score of 95.98%. Divergences between the two sets of analysis only concerned a small number of comments with unclear/ambiguous meanings. For example, reference to “una pronunciación muy marcada, muy fuerte” (a very marked pronunciation, very strong) was coded as referring to rhythm/stress in the first analysis, but as being too general to include in the re-analysis. These comments were discarded from further analysis.

3. Results

3.1. Accent Rating

To assess inter-rater reliability, we ran a Cronbach’s alpha analysis across the ratings made by the 28 listeners. The results revealed a value of 0.81, which suggests a high degree of homogeneity. Figure 1 depicts the distribution of FAR scores across the three groups.

Inspection of the figure suggests that the samples were predominantly perceived to be native-like, with median scores of “1” for the participants in BIL-T and MON, and of “2” for the participants in BIL-NT, although the scores in all groups exhibited a certain degree of variation. Overall, a total of 221 of the $28 \times 27 = 756$ samples were rated as non-native, that is, 29.23%, with 107 (i.e., 14.15%) attracting the highest FAR score of “6”, that is, “non-native with certainty”. To examine whether the FAR scores differed across the groups, linear mixed-effects models were run in R (R Core Team 2018), with “group” as fixed effect and “participant” as random intercept. Using the LmerTest function (Kuznetsova et al. 2017), the Satterthwaite approximation was used to obtain degrees of freedom, from which *p*-values could be calculated.

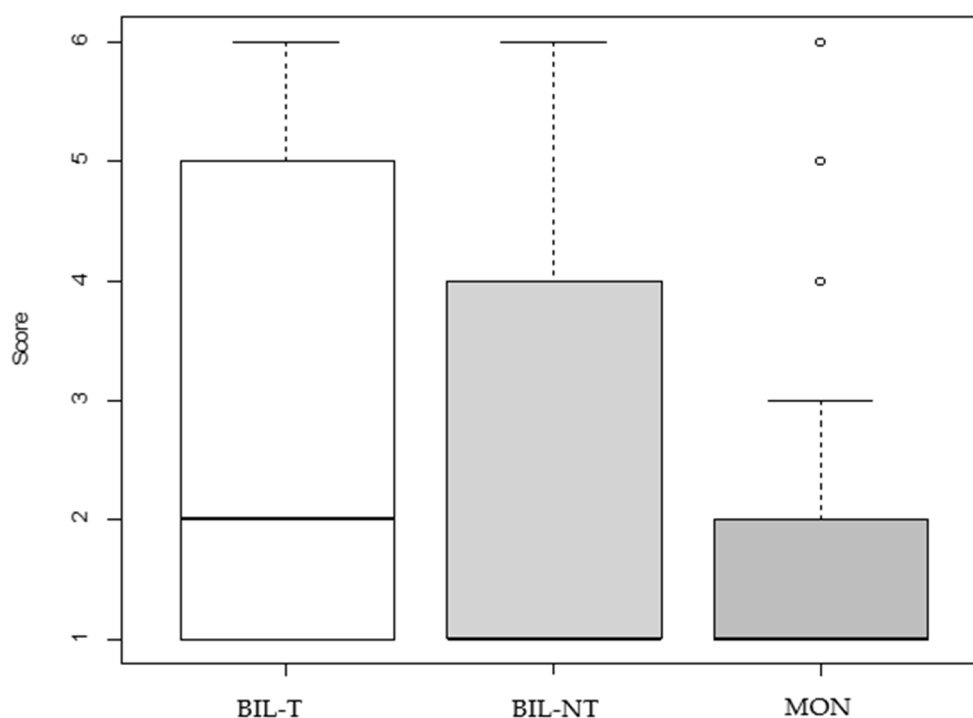


Figure 1. Distribution of FAR scores by group.

Our initial model was run on all 756 ratings and across the three groups. The results, depicted in Table 2, revealed highly significant between-group differences ($p < 0.001$). This analysis was subsequently followed up with pairwise comparisons, with a Bonferroni-adjusted α -level of 0.0167.

Table 2. Results of linear mixed-effects models: FARs.

Model		β	SE	t	p
All groups	Intercept	3.59455	0.20179	17.813	<0.001
	Group	−0.54772	0.07986	−6.859	<0.001
BIL-T vs. BIL-NT	Intercept	3.8944	0.2751	14.16	<0.001
	Group	−0.7766	0.1625	−4.78	<0.001
BIL-T vs. MON	Intercept	3.6567	0.2115	17.29	<0.001
	Group	−0.53884	0.08054	−6.69	<0.001
BIL-NT vs. MON	Intercept	2.9435	0.4012	7.337	<0.001
	Group	−0.3011	0.1552	−1.94	0.053

The results revealed significantly higher and thus less native-like FAR scores for the participants in BIL-T than in BIL-NT ($p < 0.001$) and MON ($p < 0.001$). The difference between the latter two, in contrast, was not significant ($p = 0.053$). Together, these results suggest that the L1 accent of Spaniards in non-teaching professions in the UK was perceived as equally native-like as that of monolinguals resident in Spain. Spaniards teaching their L1 in educational settings in the UK, in contrast, whilst also attracting relatively low FAR scores, were perceived as significantly less native-like, suggesting a certain degree of L1 attrition.

3.2. Perceived Non-Native Features

All 28 listeners provided comments on the samples they deemed non-native; however, this was only the case for 174 of the 221 samples (i.e., 78.73%), while 47 of the non-native ratings were left uncommented. Following a careful screening, 71 of the 174 comments were removed from the analysis as they were too general, referring, for example, just to “pronunciation of some words” or “the speaker’s accent”, and an additional three were removed that referred to features unrelated to pronunciation, for example, lexical or grammatical choice. The remaining 100 comments were analysed further; of these, 84 referred to a single feature, while 13 referred to 2 features, and 2 to 3 features, for a total of 116 feature tokens. Table 3 shows a breakdown of the features identified, alongside illustrative examples. Since they did not exhibit any systematic differences between the speakers in BIL-T and BIL-NT, the data were pooled.

Table 3. Perceived non-native features.

Features Identified	Tokens (N = 116)	%	Example
<i>Segmental features</i>	75	64.7%	
Consonants	63	54.3%	
s	28	24.1%	<i>La pronunciación de la S muy forzada</i> (Very forced pronunciation of the S)
r	24	20.7%	<i>La pronunciación de la letra R en algunas palabras</i> (Pronunciation of the letter R in some words)
t	4	3.4%	<i>Pronunciación de las Tes</i> (Pronunciation of the Ts)
d	3	2.6%	<i>Pronunciación letra D</i> (Pronunciation of the letter D)

Table 3. Cont.

Features Identified	Tokens (N = 116)	%	Example
β	1	<1%	<i>Pronunciación letra V</i> (Pronunciation of the letter V)
l	1	<1%	<i>Dudosa pronunciación con la letra L</i> (Dubious pronunciation of the letter L)
ʌ	1	<1%	<i>La “ll” de polluelos ha sonado rara</i> (The “ll” in “polluelos” (chicks) sounded odd)
General	1	<1%	<i>Parece hablar con una pronunciación no nativa en distintas consonantes</i> (She seems to speak with a non-native pronunciation in different consonants)
Vowels	8	6.9%	
General	3	2.6%	<i>Ha abierto demasiado las vocales.</i> (She opened her vowels too much)
Diphthongs	2	1.7%	<i>La pronunciación del último diptongo</i> (Pronunciation of the final diphthong)
a	1	<1%	<i>La pronunciación de las As</i> (Pronunciation of the As)
e	1	<1%	<i>La pronunciación de la E de forma más cerrada</i> (Pronunciation of E [is] closer)
i	1	<1%	<i>Las “y” muy señalada</i> (“y” (and) [were] very marked)
Phoneme omission	4	3.4%	<i>No pronuncia todos los fonemas</i> (She does not pronounce all phonemes)
Suprasegmental features	41	35.3%	
Intonation	26	22.4%	<i>Me parece una persona no nativa por la musicalidad en la pronunciación, más típico del italiano</i> (He seems non-native to me due to the musicality in the pronunciation; more typical of Italian)
Rhythm/Stress	8	6.9%	<i>Acentuación en la terminación de palabras</i> (Accentuation/stress at the end of words)
Speaking rate	7	6.0%	<i>La aceleración al hablar</i> (Acceleration when speaking)

Inspection of the table shows that judgements of non-nativeness were based on both segmental and suprasegmental features, albeit with a preponderance of the former. Amongst segments, listeners most commonly perceived consonantal items as non-native, notably realizations of /s/ and rhotic consonants, but some also referred to vowel deviations and phoneme omissions. Comments on suprasegmental items predominantly referred to intonation, mostly expressed in terms of “melodía” (melody) or “musicalidad” (musicality), but there were also some mentions of rhythm/stress and speaking rate.

3.3. Individual Variation

Finally, in addition to the analysis at the group level, we investigated individual variation. This was done by converting median FARs into a categorical rating of “clearly native” (between 1.0 and 2.5), “uncertain” (greater than 2.5 but less than 4.5), and “clearly non-native” (between 4.5 and 6.0) following de Leeuw et al.’s (2010) approach. The categorizations for the participants in the three groups are shown in Table 4.

Table 4. Categorization of nativeness by group.

	BIL-T (N = 10)	BIL-NT (N = 9)	MON (N = 8)
Clearly native	5 (50%)	7 (77.8%)	8 (100%)
Uncertain	1 (10%)	1 (11.1%)	-
Clearly non-native	4 (40%)	1 (11.1%)	-

Inspection of the table shows that, as one would expect, all MON speakers were consistently classed as “clearly native”. In contrast, in line with previous work on attrition (e.g., (de Leeuw et al. 2010, 2018a; Mennen 2004)), the results for the two bilingual groups were more varied. Thus, although the BIL-NT speakers were not found to differ from the MON ones at the group level, as we have seen, the analysis of individual classifications shows that one BIL-NT speaker was considered “uncertain” and another one “clearly non-native”. At the same time, while 4 in the BIL-T group were classed as “clearly non-native” and one as “uncertain”, half of them were considered “clearly native”. As a result, teaching one’s native language in an L2-speaking environment does not automatically lead to perceived attrition in L1 speech; it merely appears to increase its likelihood. Table 5 displays the characteristics of the participants identified as non-native.

Table 5. Characteristics of participants perceived as non-native.

Participant	Gender	Age	Region	EN Proficiency	AOA (Years)	LOR (Years)	Median FAR	Non-Native Ratings	Features Identified
BIL-T_1	F	33	GA	5	25	7	5	20	intonation (3) s (2) r (1) e (1)
BIL-T_2	F	27	CT	4	23	5	5	21	s (3) t (2) intonation (2)
BIL-T_3	F	48	GA	5	34	14	5	21	r (6) s (4) intonation (1) l (1) d (1) rhythm/stress (1)
BIL-T_4	F	41	PV	6	23	18	5	20	intonation (5) r (4) s (3) rhythm/stress (2) t (1) vowels (1)
BIL-NT_1	F	34	AN	5	27	6	4.5	17	r (2) phoneme omission (1) intonation (1) rhythm/stress (1) consonants (1) d (1) s (1)

Note: AN = Andalusia; CT = Catalonia; GA = Galicia; PV = Basque Country; the figures in parenthesis denote the number of comments per feature.

As the table shows, all participants considered “clearly non-native” were female, aged between 27 and 48 years, and considered their English competence as upper intermediate to near-native. They had moved to the United Kingdom in their twenties or thirties and had been living there between 5 and 18 years. Of the 28 listeners, 20 or more considered the four BIL-T speakers as non-native; slightly fewer listeners, that is, 17, classified BIL-NT_1 as non-native. The latter also received a slightly lower FAR and was hence perceived as less clearly non-native than the four BIL-T speakers. Finally, the table

shows that the Spanish accent of each of these participants was associated with multiple non-native features. All were perceived to produce their L1 with non-native intonation patterns and realizations of /s/, and all but one, that is, BIL-T_2, were perceived to realize Spanish rhotics non-natively.

4. Discussion

This study aimed to gain a better understanding of the role of L1 use and dual language activation in the perceived attrition of native speech patterns. To this end, we examined the L1 Spanish accent of two groups of native Spanish speakers who are long-term residents in the UK, Spanish language teachers and non-teachers, alongside monolingual Spanish speakers in Spain in an accent perception experiment. The results revealed significantly greater non-native ratings for the teachers than the non-teachers and the monolinguals, but no difference between the latter two, with listeners' impressions of non-nativeness based on a range of segmental and suprasegmental features. An analysis of individual patterns, in turn, showed a fair amount of variation, with half of the speakers in BIL-T perceived as "clearly native" and one of the BIL-NT speakers as "clearly non-native". In what follows, the implications of these findings will be discussed.

To begin with, let us consider why the participants in BIL-T were perceived as significantly more foreign-accented in their L1 than monolinguals in Spain. At first glance, this finding is surprising. After all, they regularly use their L1 both in work and outside of it, and Spanish plays an essential role in their professional identity. As [Chang \(2019, p. 108\)](#) states, being a language teacher typically comes with an "instructional orientation", and likely coincides with a particular concern for retaining native-like proficiency in the L1, including its accent, although this was not formally assessed here. One might expect these factors to provide a certain degree of protection from attrition. However, this was not the case in the present study, at least not at the group level.

The likely reason for the perceived attrition in the teachers' L1 accent is dual language activation, which, in turn, is a direct consequence of the specific professional setting in which they operate. In other words, it is essentially impossible for foreign language teachers who teach their L1 in an L2-speaking environment to activate only their L1 during classroom activities and only their L2 outside of it, and hence function in alternate monolingual language modes ([Grosjean 2001](#)). Instead, both their languages need to be highly active for most or all of the time, resulting in them operating in a sustainable bilingual language mode. This will be true even if the extent of dual activation varies somewhat from context to context. For example, it is likely to be particularly high during activities that actively encourage a bilingual approach, such as translanguaging ([Cenoz and Gorter 2019](#)), while it will be comparatively lower during activities in which sole use of the target language is encouraged, in particular in students with high L2 proficiency levels. Nevertheless, whatever the specific circumstances, the very nature of foreign language classroom settings makes dual activation inevitable.

Crucially, dual activation has been shown to lead to cross-linguistic interactions in speech patterns. Such interactions have been widely attested in contexts of phonetic code-switching ([Amengual 2018](#); [Bullock and Toribio 2009](#); [Muldner et al. 2019](#); [Piccinini and Arvaniti 2015](#)), where cognitive demands to inhibit the non-target language are particularly high. While they may initially occur in such circumstances, that is, during ad hoc dual language activation, over time they may give rise to more persistent accentual changes and become entrenched. This is likely to have happened to the teachers in the present study and is consistent with [de Leeuw et al.'s \(2010\)](#) finding that L1 attrition was more common in native German speakers in Anglophone Canada and the Netherlands who regularly used their L1 in contexts of code-switching than those who did not.

In addition, unlike the non-teachers, the teachers will have been systematically exposed to non-native Spanish accents via their students' productions. These may have either independently caused the observed changes in their L1 accent or enhanced the effects of their own concurrent use of the two languages, thereby reinforcing deviations from monolingual Spanish patterns. While the direct effect of sustained English-accented input in Spanish cannot be isolated in the present context, it will have led to an additional burden on teachers' inhibitory control mechanisms. The suggestion that

foreign-accented input can increase the likelihood of non-native speech patterns is certainly consistent with evidence from adults raised in bilingual homes (Bosch and Ramon-Casas 2011) as well as bilingual and multilingual children in immersion school settings (Caldas 2006; Mayr and Montanari 2015), although its role in L1 attrition of speech needs to be explored further in future research. Taken together, the results for the participants in BIL-T suggest that, ironically, it is the very nature of the professional context in which teachers operate, with its requirement to keep both languages active and the need to switch between them, that enhances the likelihood of L1 attrition.

The participants in BIL-NT, in contrast, do not face these cognitive demands in a professional setting. While they work in a diverse range of areas, such as nursing, social work, and accountancy, none of them involve professional use of Spanish. As a result, the BIL-NT speakers virtually exclusively use their L2 in work, and hence operate in a consistent monolingual English language mode. Their lower overall amount of L1 use (and greater amount of L2 use), compared with the BIL-T group, in turn, did not lead to perceived attrition since they were rated the same as monolingual controls in Spain. Previous research suggests a somewhat ambiguous role for overall amount of language use in L1 attrition: while some studies have shown an effect of reduced L1 contact on attrition of speech patterns (e.g., (Stoehr et al. 2017)), others either revealed no effect (e.g., (Hopp and Schmid 2013)), or exhibited mixed results. For example, Chang (2019) showed no greater overall persistence in L1 phonetic drift in English-Korean bilinguals with high L2 use compared to those with low L2 use—only one of three areas investigated yielded a significant effect. While it is conceivable that the complete lack of L1 use over many years may cause attrition, independent of other factors, due to the gradual loss of long-term memory representations, this was not the case here. After all, even though the participants in BIL-NT hardly ever used their L1 in work contexts, they indicated using it regularly in social interactions outside of work as well as in written and spoken forms of remote communication with family and friends in Spain. The reduction in L1 use that typically occurs in L2 immersion contexts is hence unlikely to cause L1 attrition of speech in and of itself. It appears that what is critical is the contexts in which the L1 is used (cf. (Schmid 2007)). In the present study, it may well be the absence of L1 use in the kinds of contexts in which the teachers use their native language professionally, that has protected the BIL-NT speakers' speech from attriting. At the same time, their high L2 competence will have protected them from experiencing L1 phonetic drift as a result of a novelty effect (Chang 2012, 2013).

These considerations notwithstanding, the results of the present study also show a fair amount of individual variation, with half of the participants in BIL-T being perceived as “clearly native-like” and one participant in BIL-NT as “clearly non-native”. Moreover, while the BIL-T participants were rated as significantly more non-native than those in BIL-NT and MON, their median FAR was “2”, that is, “native-like with medium confidence”. This suggests that L1 attrition in the context of teaching one's L1 in an L2-speaking environment is by no means inevitable. Perhaps the five teachers in BIL-T who were rated as “clearly native” in Spanish developed enhanced inhibitory control which allowed them to counteract cross-linguistic interactions from dual language activation and exposure to foreign-accented speech by their students. This may have coincided with a range of factors relating to individual differences, such as attitudinal, socio-psychological, and cognitive ones. For example, they may ascribe particular importance to the retention of a native accent in Spanish. Or they may have a particular phonetic talent (e.g., (Jilka 2009; Lewandowski and Jilka 2019)). Moreover, they may actually be perceived as non-native, but only in settings not assessed here, for example, in casual encounters (Major 1992). By the same token, the absence of particular skills or attitudes may explain attrition in BIL-NT_1's L1 accent. However, explanations of this nature remain wholly speculative as these variables were not investigated in the present study. Suffice it to say that L1 attrition of speech is a complex multi-factorial phenomenon (cf. (Kartushina et al. 2016b)) and that the patterns observed here must have been caused, in part, by factors other than dual language activation and language use. Although challenging, future work, based on a larger sample of potential attriters, is needed that systematically teases the various predictor variables for L1 attrition of speech apart and includes a more sophisticated approach to the assessment of L1 use. In the context of language teachers, this could

involve obtaining details on interaction patterns with students of varying levels of proficiency during different types of classroom activity, but also language use and code-switching patterns with fellow foreign language teachers outside the classroom.

While we have so far discussed differences between the teachers' and non-teachers' use of languages at work, their language use patterns at home also need to be considered. Our results showed that BIL-T not only differed from BIL-NT participants in their language patterns in the workplace, but also in their language patterns at home. Crucially though, the language differences at home only pertained to the use of the L2, which was used more frequently by the non-teachers than the teachers. In contrast, no differences were found between the two groups in their use of Spanish at home. This shows that the perceived attrition in the teachers' L1 accent, cannot be explained by a reduction in L1 use at home, given that their amount of L1 use was similar to that of the non-teachers.

Finally, let us consider the features that the listeners associated with non-native speech. They encompass a range of consonants, vowels, and prosodic phenomena, in particular realizations of /s/, rhotics and intonation patterns, in line with evidence that perceptions of non-nativeness arise from the interplay between segmental and suprasegmental characteristics (Ulbrich and Mennen 2016). Importantly, there were no systematic differences in the features associated with non-nativeness in the BIL-T and BIL-NT speakers. Moreover, the speech of all speakers who were identified as "clearly non-native" was characterized by multiple non-native features and at both segmental and suprasegmental levels. This suggests that listeners did not erroneously mistake them as non-native due to their unfamiliarity with individual features that are associated with native dialectal variation, such as the phenomenon of seseo/ceceo in the context of /s/ (Martínez-Celdrán et al. 2003). While the features identified must have been perceptually salient for the listeners, their relative importance to the impression of non-nativeness remains unclear. Moreover, the listeners' judgements may have been influenced by accentual patterns that they were not consciously aware of or that they were unable to verbalize. It is also difficult to ascribe the features to specific types of interaction with L2 English, for example, assimilation or dissimilation patterns (cf. SLM (Flege 1995; Flege and Bohn 2020)), due to a lack of detail in the comments provided. Future research exploring the salience of features in global accent ratings is needed that extends the work presented here, using a more sophisticated methodology, such as an interactive interview-based approach (Mayr et al. 2020) or one that allows listeners' judgements to be linked directly to specific items in the speech samples (Montgomery and Moore 2018).

5. Conclusions

The present study examined the role of L1 use and dual language activation in L1 attrition by investigating the perceived L1 accent of two groups of native Spanish speakers in the United Kingdom: (1) Spanish language teachers, who use their L1 regularly in professional settings that require frequent switching between Spanish and English, and (2) non-teachers, who virtually never use their L1 in the workplace. In addition, the study included a control group of monolingual speakers in Spain. As such, this study is the first to examine L1 attrition of speech systematically in a specific professional group. The results of a global accent rating experiment revealed significantly greater non-native ratings for the teachers than the non-teachers and the monolingual controls, but no difference between the latter two. Listeners' impressions of non-nativeness, in turn, were based on a range of segmental and suprasegmental features, notably /s/, rhotics and intonation. These results suggest that language teachers who teach their L1 in an L2-speaking environment may be particularly prone to L1 attrition. This is likely due to a need to co-activate both their languages in professional settings as well as regular exposure to non-native speech from L2 learners. In contrast, low L1 use was not associated with non-native features in the non-teachers' Spanish accents. Together, the findings hence suggest that cross-linguistic interaction is more likely to lead to L1 attrition of speech than reduced L1 use in and of itself. However, since not all teachers were perceived as non-native, future research based on a larger sample is needed that assesses the factors further that facilitate or hinder L1 attrition in such educational settings.

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