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ABSTRACTS

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Teaching and learning English pronunciation in
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In today's foreign language classrooms we often find third language students who do not only speak the majority language of the country they live in but also different L1s corresponding to the family languages spoken in their homes. Previous research examining third language learners has mainly focused on syntactic and lexical acquisition. Phonetic and phonological aspects of L3 acquisition have, on the other hand, often been ignored in the existing literature. Moreover, only a rather limited number of publications have related the findings of L2 and L3 speech research to the foreign language classroom (see, e.g., Derwing & Munro 2015, Hahn 2006, Hahn & Raaf 2008, Piske 2012).

The papers in this special session do not only examine phonological transfer effects shown by students learning English as an L3 in the foreign language classroom but they also discuss how teachers should deal with cross-linguistic phonological transfer in L3 English during different stages of acquisition. Previous studies have shown that – depending on various factors such as typology, psychotypology, foreign-language effect, proficiency level, recency of use, etc. – transfer happens not only from L1 (Gut 2010) but also from L2 (Llama et al. 2010, Wrembel 2010) or from both languages (i.e., combined transfer, Barkley 2010).

On the basis of the research findings reported in the different papers of the special session assumptions regarding teaching methodology such as the following will be discussed: Today foreign language teachers need materials designed to increase their awareness of errors in the production (and perception) of an L3 that may be due to phonological transfer from L1, L2 or from both languages. These materials could, for example, be integrated into the so-called flipped classroom where information about content and knowledge is offered online and application and practice happens in the face-to-face classroom situation. Classroom application and practice should include structured input activities. If these activities are combined with a prosody component, the processing of morphosyntactic information is likely to be facilitated, too.

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Phonological features trigger syntactic transfer:
Implications for the L3 English classroom

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Although the relatively new field of L3 learning has meanwhile been developed as a field of its own covering different lines of research and theories that explain the acquisition of languages beyond the first foreign or second language, plausible implications for teaching have remained under addressed. Thus, the variable of instruction moves into the center of our interest.

In line with the *Typological Primacy Model* according to which the typology determines the syntactic transfer in L3, i.e. the syntax of either the L1 or the L2 is transferred (Rothman 2010, 2011; Rothman & Cabrelli 2010), we focus on interlanguage data collected as part of the project "Multilingualism and Migration: Predicting outcomes in third language acquisition" at the LMU Munich. We use production data from learners of various L1 backgrounds that demonstrate a phonologically triggered transfer from L2 German on the mental representational level, but syntactically realized on the performance level (written and spoken medium) in the L3 English (Angelovska & Hahn 2012). Based on these cases, we offer pedagogical recommendations for overcoming harmful transfer in L3 acquisition by raising teachers' linguistic awareness (Angelovska & Hahn 2013) for phonetic similarities between L2 and L3 adverbs (i.e. triggers for verb placement transfer). We start from the existing results and non-results of L3-acquisition (transfer), their propositions and explanations, integrate these into a specific teaching framework – the so-called flipped classroom – and thus develop practical applications.

Our pedagogical recommendations are in line with the *Processing Instruction* (Benati & Angelovska 2015; VanPatten 2015) and include structured input activities. We suggest a combination of a structured input and a prosody component that facilitate the processing of morphosyntactic features and thus help to overcome harmful transfer in L3 acquisition.

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Acquiring foreign language prosody in multilingual settings: A questionnaire study with teachers of English, French, and Spanish

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Although the interest in non-native prosody has constantly grown during the past decade, little is known about the acquisition of the timing patterns of a foreign language in learners who acquired more than one language during childhood. This particularly holds for migrant children who speak a typologically distant heritage language (HL) along with their dominant language.

In the **first part** of our contribution, we will highlight the main results obtained in three related studies on the timing patterns in L3 English, French and Spanish, produced by multilingual learners (German/Mandarin Chinese; German/Turkish). In a study on the acquisition of the speech rhythm of English (stress-timed) and French (syllable-timed) in learners who speak (syllable-timed) Mandarin Chinese along with (stress-timed) German, Gabriel et al. (2015) showed that multilinguals are not *per se* advantaged over monolingual learners in acquiring the timing patterns of a foreign language. However, multilingual learners who show a high degree of cross-linguistic and phonological awareness do perform better than their monolingual classmates. This suggests that certain extra-linguistic factors facilitate positive transfer from the learners' linguistic background (comprising both the surrounding language and the HS) to the L3. This is supported by the outcomes of methodologically similar work on the acquisition of Spanish speech rhythm in Turkish/German migrant children (Gabriel & Rusca-Ruths 2015). Measurements of Voice Onset Time (VOT) performed on the data analyzed in Gabriel et al. (2015) for speech rhythm, finally, suggest that in addition to the learners' cross-linguistic awareness and attitudes, pronunciation training has a crucial impact on the learning outcomes: While the multilingual German/Mandarin Chinese and the monolingual German learners fail in producing target-like values for both voiceless and voiced stops in French as a foreign language, the monolingual Chinese learners largely pattern with native speakers for voiceless stops /p t k/ (short lag). However, they fail in pre-voicing their voiced counterparts /b d g/, thus neutralizing the phonological contrast /p t k/ vs. /b d g/ in their productions. The interviews conducted with the learners reveal that they were explicitly told in their French classes to avoid aspiration with /p t k/, but didn't learn anything about pre-voicing of /b d g/ (Gabriel & Kupisch 2016). This suggests that pronunciation training indeed has a positive effect on the learners' performance – provided that all relevant aspects are addressed by the foreign language instructors.

The **second part** reports on ongoing research focusing on the teachers' perspective. Based on the outcomes of the studies mentioned above, we developed a questionnaire for teachers of English, French and Spanish as foreign languages, addressing the following questions. (1) What do foreign language teachers know about the phonology of the language(s) they teach? (2) How do they judge the different aspects of pronunciation with respect to the specific difficulties for learners? (3) What do they know about the languages spoken by their pupils, in particular regarding their phonological shape? (4) How do they address cross-linguistic and phonological awareness in their foreign language classes? (5) What do they do to enhance the pronunciation skills of the learners against the backdrop of the multilingual situation in the classroom? First results show that most teachers' phonological background knowledge is not up to scratch and that pronunciation training is largely neglected in German foreign language classes, in particular when the learners' multilingual profiles come into play. Based on our results, we will discuss possible suggestions for the teaching of foreign language pronunciation in multilingual classrooms, thereby taking into account the fact that processing of prosodic and morphosyntactic information is closely intertwined.

Beyond transfer? The acquisition of an additional phonological system by young monolingual and bilingual learners

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Various factors have been shown to be crucial in determining the source and directionality of crosslinguistic influence (CLI) in Third Language Acquisition (L3A). While lexical (Angelovska & Hahn 2012) and morphosyntactic (Tsang 2009) development in L3A are relatively well documented, there are relatively few studies on L3 phonology (e.g., Llama et al. 2010). Furthermore, L3A studies do not systematically tease apart CLI from the contribution of multilingualism. This gap begs for new empirical studies in L3A, especially considering the previously shown connection between cognitive (Bialystok et al. 2012) and linguistic (Jessner 2006) advantages of multilingualism.

Our study investigates the nature and extent of transfer, and attempts to establish whether there is a bilingual advantage in the acquisition of an L3 phonology, by separating transfer from non-transfer conditions. In particular, we test age- and SES-matched young monolingual (German) vs. bilingual (Turkish-German) learners of English on their acquisition of segmental (e.g., interdental fricatives) and suprasegmental (e.g., word initial consonant clusters) features in the target language. These features are further grouped into three sets based on the predicted crosslanguage transfer:

    (A) those promoting positive transfer from the L1 of the bilingual learners (Turkish),

    (B) those promoting positive transfer from the respective L1/L2 (German), and

    (C) those that are not expected to provoke transfer from either language.

The experiments, which are currently underway, test the perception and production of (A), (B), and (C) by the two learner groups via an AX discrimination task using nonsense words, and a delayed repetition task using novel compound words. We further investigate whether the perception and production results are modulated by cognitive and sociolinguistic (attitudinal/motivational) variables through a phonological working memory task and questionnaires.

Based on the Cumulative Enhancement Model (Berkes & Flynn 2012), we predict the bilinguals to outperform the monolinguals in (A), and both groups to perform equally well in (B). If bilinguals enjoy the cognitive and linguistic benefits of bilingualism, bilinguals should perform better in (C). Due to insufficient statistical power at this stage, we refrain from making generalizations on our preliminary findings.

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Cross-linguistic influence in the acquisition of the L3 English /r/ segment: A developmental study

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Third language (L3) learners are distinct from typical L2 learners since the former possess a larger repertoire of both linguistic and metalinguistic knowledge, including that of phonetic-phonological parameters and phonological awareness (cf. Marx & Mehlhorn 2010). With a minimum of three sound systems in the mix, there is an increase in the number of potential sources for cross-linguistic influence (CLI), the type and direction of which can dynamically change in the learning process. The few extant studies in the area suggest that phonological CLI from L1 onto L3/Ln tends to prevail long-term, while L2-driven CLI has been related to low proficiency in the target language and recent use of L2 that is typologically similar and acquired to advanced levels (Hammarberg & Hammarberg 2005). Findings from classroom settings have further reported on the prevalence of a combined L1-L2 CLI in the initial stages of L3 phonological learning (Wunder 2012, Kopečková 2014). The present study adds to this line of L3 research by investigating the patterns of phonological CLI from a developmental perspective as evinced in young L3 instructed learners, an acquisition context that remains largely under-studied.

Ten 11-year-old multilinguals who spoke German as their L1, had been learning English in school for three years, and had also been enrolled in beginner Spanish classes participated in this longitudinal research. They were divided into three groups: two bilinguals whose L1s both include uvular rhoticity, three bilinguals whose other L1 lacks uvular /r/ consonants, and five monolingual speakers of German. The pupils did a free speech task in which the production of the English /r/ consonant was examined, and which was administered three times over the course of three years of their language study. The results indicate that L3 learners whose background languages offer opportunities for distinct interlingual comparisons were advancing best in their target English /r/ productions, whereas those L3 learners whose /r/ sounds were subject to combined interference from their L1s were challenged most in learning to realize this segment target-like. It seems to be these L3 learners in particular who require teacher's encouragement for explicit phonological comparisons. The findings of the present study offer evidence for the proposition made in this special session that learners´ awareness of the potential for phonological CLI, be it positive or negative, should be systematically addressed and enhanced in a foreign language classroom in order to help facilitate their acquisition of a new phonological system.

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Second and third language immersion students' pronunciation in L2 English oral reading

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Despite the fact that immersion students often start to learn an L2 early and receive intensive and continuous L2 input, their L2 pronunciation has repeatedly been described as differing in partially systematic ways from the speech of native speakers (e.g., Wode 2009). However, the number of studies that have systematically examined immersion students' L2 pronunciation is limited (cf. e.g., Rallo Fabra & Jacob 2014). In particular, there appears to be a lack of studies comparing the L2 pronunciation skills of immersion students from different L1 backgrounds.

This paper presents data from ten 3rd and 4th graders who attended a German-English partial immersion program in a primary school in Germany and who differed in terms of the family languages they spoke at home. In the immersion program they attended, 70% of the teaching time was conducted in the L2 English. The children read aloud texts from the *English Gray Oral Reading Test* (GORT, Wiederholt 2001) and answered comprehension questions after each text. The students' oral reading was also assessed with respect to rate and accuracy, the latter aspect being of particular interest for this presentation.

Based on auditory transcriptions, the results indicated transfer patterns from German to English, independent of the children's language background. It is argued that the minority language children rather relied on the majority language German than on their L1 because the prestige of and the proficiency in German were high (see also Williams & Hammarberg, 2001), with German being typologically closer to English than to the children's family languages (e.g., Arabic, Kurdish, Persian, Serbo-Croatian, Spanish or Turkish). These findings will be discussed in the light of teacher input, because the children did not only imitate their teacher's pronunciation in terms of accuracy but also with respect to the English variety used.

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New perspectives on teaching pronunciation; metaphonological awareness raising in multilinguals

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The present contribution aims at providing new perspectives on the learning of foreign language pronunciation and bridging the gap between empirical findings and their potential applications for a multilingual classroom. It has become generally acknowledged that multilingual learners develop greater language learning skills, as well as have a broadened phonetic repertoire, a raised level of metalinguistic awareness and perceptual sensitivity, which may serve as additional assets in the process of acquisition of third language phonology (De Angelis 2007, Gut 2010, Wrembel 2015b).

However, research in the area of awareness and noticing in the phonological acquisition of third language has received very limited attention to date; therefore, the paper will present an overview of the related literature and point to potential pedagogical implications (cf. Marx & Mehlhorn 2010, Wrembel & Sypiańska 2014).

The recommendations will stem from the findings of a series of studies (Wrembel 2015a, Wrembel 2015b) investigating various aspects of metaphonological awareness manifested through the participants' self-repair and modifications of pronunciation mistakes in L3, conscious analysis of their oral performance, self-awareness of problems in L3 pronunciation, aspects of cross-linguistic awareness and comments on the process of learning L3 pronunciation. The conducted research involved the application of oral protocols, a complex codification system for a qualitative and quantitative analysis of generated data and a proposal of a composite measure of metaphonological awareness.

A number of pedagogical implications for learning third language speech will be discussed including techniques for raising phonological awareness, acknowledging various factors influencing L3 acquisition, and taking advantage of the potential for positive phonetic cross-linguistic influence in a multilingual classroom.

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The role of markedness in the acquisition of obstruent voicing contrasts of Eastern Armenian and Brazilian Portuguese as foreign languages

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This study compares the acquisition of voicing contrasts by Armenians learning Brazilian Portuguese (BP) with the acquisition of the same contrast by Brazilians learning Eastern Armenian (EA). We investigate the *Markedness Differential Hypothesis* (Eckman 1987), which claims that the relative degree of difficulty corresponds to the degree of markedness: 1. In BP there is [s] and [z] voicing contrast in initial and medial word position and the voicing rule is applied between words; 2. In EA there is [s] and [z] voicing contrast in initial, medial and final word position and there is a non-voicing rule between words. According to the hypothesis, Armenian speakers would not report difficulty producing the BP voicing contrast as it occurs in three positions of EA, whereas BP speakers would show more difficulty at performing the task. The informants performed an experiment in which they had to read words and sentences with the obstruent contrast and other distraction stimuli as well as to describe pictures. After analysing the data using perceptual-auditory and acoustic analysis, we observed that Armenian speakers produced correctly the BP contrast in initial and medial position but kept mistakenly the final contrast of EA in BP words ended with the grapheme *z* and did not apply the voicing rule between words. On the other hand, BP speakers did not produce the final word obstruent voicing contrast of EA and applied BP voicing rule in EA sentences. Markedness plays a role as Brazilians did not produce the contrast in final position but other aspects have to be taken into consideration. Surprisingly orthography seemed to have an influence on the tasks performed by Armenians but not on the ones performed by Brazilians.

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L2 learning and L1 dialectal variation

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A view of Language as a Complex Adaptive System (CAS) (Beckner et al, 2009) emphasizes its emergence by domain-general cognitive human abilities, allowing a dynamic, non-linear, adaptable evolution. One of the crucial characteristics of a CAS is its sensibility to initial conditions, the famous *butterfly effect* (Lorenz, 1972). Thus, the main objective of this study is to analyze the effects of L1 dialectal variation on L2 learning. Brazilian Portuguese (BP) is going through a sound change phenomenon in which alveolar stops /t, d/ are palatalized [tʃ, dʒ] before the high-front vowel [i] (Cristófaro-Silva et al, 2012). A few Brazilian dialects are still on the initial stages of the phenomenon, allowing the research-question: What is the role of L1 dialectal fine phonetic detail in the construction of L2 phonology? The study advocates that the phonetic and phonological levels are actually indistinct (Browman & Goldstein, 1989; Bybee, 2001), recognizing the relevance of fine phonetic detail, often neglected in formal models (Chomsky & Halle, 1968). Therefore, it hypothesizes that L2 learners go through different L2 phonological learning pathways depending on their specific L1 dialect.. It involves Brazilian learners of English from Fortaleza and Mossoró, cities whose L1 realization is described respectively as palatalizing and non-palatalizing BP dialects. The dependent variable is L2 palatalization, whereas the independent variables are L1, gender, L2 proficiency, voicing, stress, word, word frequency, the individuals, tonic syllable, and phonotactic pattern. Data analysis reveals that L1 dialects had a significant influence on BP learners' L2, as Fortaleza informants tend to display higher L2 palatalization levels than their Mossoró peers, thus confirming the main hypothesis. The research indicates the necessity for incorporating fine phonetic detail to Phonological Theory on both L1 and L2 learning/acquisition, as well as the relevance of L1 dialectal variation in L2 learning for Applied Linguistics.

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L2 pronunciation and awareness about L2 phonotactics

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This study set to examine the relationship between L2 pronunciation and awareness about L2 phonotactics. Being aware of the phonotactic constraints of the L2 may be beneficial for L2 pronunciation as suggested by previous research on L2 phonological awareness in the segmental domain (Baker & Trofimovich, 2006; Mora, Rochdi, & Kivistö-de Souza, 2014). Following the connectionist account, the acquisition of L2 phonotactics is assumed to occur mainly unintentionally from the frequency distributions present in L2 input (Ellis, 2002).

Brazilian Portuguese (BP) learners of English (n=71) were tested on their awareness about English phonotactics with a lexical decision task which presented nonword stimuli with legal and illegal initial consonant clusters (eg. "splan" vs. "zblan"). The measure of L2 phonotactic awareness was response time, which was expected to decrease with illegal nonwords due to the fast conclusion of the lexical search resulting from the absence of these clusters in L2 input (Trapman & Kager, 2009). L2 pronunciation was measured with a foreign accent rating task.

The results showed that the L1 BP speakers manifested high sensitivity to L2 phonotactic violations as evidenced by their response time pattern: faster responses were awarded to illegal nonwords than to legal nonwords or to words (F(2,69)=183.93, p<.001, η^2 =.84). Furthermore, the L1 BP speakers did not differ significantly from native English speakers (t[86]=.20, p=.83), corroborating a high level of awareness about L2 phonotactics. Phonotactic awareness and the degree of foreign accent showed a medium strong negative correlation (r=-.46, p<.001) indicating that high phonotactic awareness was related to higher accuracy of L2 pronunciation. Altogether, the results suggest that phonotactics should be taught in the foreign language classroom since increasing learners' awareness about L2 phonotactics might be beneficial for the accuracy of their L2 pronunciation.

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Identification of native/nonnative realization and effect of visual cues on the perception of word-Final /m/ and /n/ by Brazilian EFL learners

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The word-final nasals /m/ and /n/ have different patterns of phonetic realizations across languages, whereas they are distinctively pronounced in English, in Brazilian Portuguese (BP) they are not fully realized. This study investigates the perception of the English word-final nasals /m/ and /n/ by Brazilian learners of English as a foreign language (EFL). More specifically, this study aimed at (1) investigating whether Brazilian EFL learners were able to identify the native-like realization of English word-final nasals; (2) verifying whether visual cues favored the identification of the target consonants, and (3) whether there was an effect of the preceding vowel on the identification of /m/ and /n/.

Two perception tests were used: (1) the Native-like versus Nonnative-like Identification Test, which contrasted CVC words produced with both English and BP phonetic /m/ and /n/ realizations, and (2) the Three-condition Identification Test, which contrasted the presence and/or absence of visual cues in the identification of /m/ and /n/ through three types of stimuli presentation— *Audio/Video*, *Video only*, and *Auditory only*. The effect of preceding vowels on the identification of the target consonants was controlled through the use of the six words *Tim-tin, gem-gen,* and *cam-can*. Two groups took the two perception tests: ten Americans, whose data were used as a reference for comparison, and the experimental group of forty-two BP intermediate EFL learners.

The results indicated that (1) Brazilian listeners were able to identify English nasals' realization when there was contrast between the realizations; (2) whereas *Audio/Video* presentation favored the identification of the target nasals, *Audio only* presentation disfavored it; and (3) there was vowel effect on the identification of both nasals and in both tests, although such effect had different patterns for either consonants or tests. Those results may contribute to the discussion of the role of visual cues and the phonological context in the perception of nonnative sounds or contrasts when learning a FL.

Length of Residence in a Foreign Country and L1 Attrition: Data on the Production of Brazilian Portuguese Voiceless Plosives by Southern Brazilian Immigrants in London

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The study of L1 attrition has witnessed some development since the 1980s; however, there are still few studies on Brazilian Portuguese (BP) and on Brazilian immigrants in L2-dominant communities. Thus, adopting a view of language as a Complex, Adaptive System (CAS) (Beckner et al., 2009), this study investigated the production of BP voiceless plosives by Southern Brazilian immigrants in London. Using a cross-sectional design, this study explored the production of voiceless plosives by thirty-two participants, aged 18-40: Brazilian immigrants that had been living in London for differing lengths of time (age of arrival in UK above 18 years), monolingual Standard Southern British English (SSBE) controls, and monolingual BP controls. BP target sounds /p/, /t/ and /k/ were presented in the carrier sentence *Eu diria _____*. SSBE targets were presented in the sentence *I would say_____*. Targets were elicited in word-initial position, and were randomly recorded three times by the participants. The results showed that speakers with a length of residence (LOR) shorter than four years do not differ from the Brazilian controls (p>.05). Immigrants with a LOR between four and seven years yielded different VOT values from those produced by the controls, presenting higher mean values (p<.001). Finally, immigrants that had been residing in London between eight and eleven years presented the highest VOT values (p<.001). These findings provide evidence for first language attrition faced by short-lag VOT speakers immersed in long-lag VOT L2-dominant communities, as well as for the effect of LOR, as values tend to increase through time. These data confirm, as predicted by a view of language as a CAS, that the L1 system is not rigid and might change during the life span. Our results suggest that language depends on a variety of agents and is also adaptive, being subject to constant change.

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Variation in second language phonology: Competition between underlying representations

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Phonological variation is a common feature in L2 acquisition, generally involving alternation between accurate and inaccurate output forms. Why should this be so? Variation is usually attributed to the grammar, either to a shift from one categorical grammar to another (Bickerton, 1971), or else to a system that generates variable output via variable rules (Cedergren & Sankoff, 1974) or floating/overlapping constraints (Reynolds, 1994; Boersma, 1998). We propose, however, that L2 variation may be situated in the lexicon, taking the form of competition between dual phonological representations for single lexical items, either of which can be accessed at the moment of speaking. These competing representations arise in the course of acquisition as learners struggle with novel L2 segments and prosodic configurations, initially constructing an inaccurate representation that conforms to the L1 phonological system, then developing a revised (accurate) form later on. Importantly, learners do not actually overwrite the original phonological representation; the initial representations continue to be present alongside the novel forms. Hence, at the moment of selection, the speaker can potentially access either form as a base for surface output, the result being phonological variation. Our proposal is demonstrated with reference to the variable production by Brazilian Portuguese (BP) ESL learners of word-final consonants such as /p/ in "mop" as either target-like mo[p] or as inaccurate mo[pi] (Cardoso, 2007; John & Cardoso, to appear). Though considered epenthetic, the added vowel is present in lexical entries (Cantoni & Cristófaro Silva, 2008); indeed BP listeners often hear an illusory vowel after final consonants (Cardoso, 2011). The adaptation of illicit forms thus occurs in the lexicon itself. Eventually, however, BP learners also develop accurate underlying representations, at which point these compete with the original representations for selection. In sum, competition between underlying representations underlies surface variation in the realization of final consonants.

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The dynamics of phonological representations in second language learning

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This special session intends to discuss the nature of phonological representations in second language learning. Formal approaches to phonology suggest that generalizations over the language apply productively whenever conditions are met (Chomsky and Halle, 1968; McCarthy and Prince, 1993). Phonological representations, in general, abstract away from the variation which exist in actual pronunciations. However, there seems to be a paradoxical situation where real pronunciations with their wide range of variation are the source of generalizations, but when generalizations are met then variation is discarded and phonological representations will be discrete. In other words, if variation is crucial to promote generalizations why is it withdrawn from linguistic representation? Recent proposals which attempt to overcome the problems imposed on formal models are given by emergentist and dynamic approaches to language (cf. Vihman (2014) for first language acquisition; Bybee (2010) for language change and Ellis (1998) for second language learning). One of the main claims of these proposals is that representations are multimodal and dynamic so that variability is a core property of linguistic representations.

This special session will address the role of variability in second language learning by focusing on the nature of phonological representations. Some issues to be addressed are: 1) the relationship between perception and production; 2) the role of the lexicon in shaping phonological representations; 3) how phonetic detail impacts phonological representations and 4) evidence from experimental and corpora studies to second language learning.

A set of six papers will provide the basis for the discussion. Time will be allocated to a general debate towards the end of the session. The languages to be examined are Armenian, Brazilian Portuguese, English and French and all papers report on experimental work as source of evidence to phonological representations. Researchers come from universities in Brazil, Canada and Spain. Some of the papers will argue for a somewhat formal approach to language and others will defend a dynamic model perspective. As a result, we expect to promote a debate that may contribute towards the nature of phonological representations in second language learning.

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Learning to perceive novel phonetic contrasts: The role of verbal fluency and phonological short-term memory

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Previous research has shown that learners differ widely in the success with which they learn to perceive novel phonetic contrasts. Similarly, they differ widely in various aspects of executive functioning. The relationship between the two, however, has yet remained unclear. We investigate this relationship by training listeners to perceive novel, difficult to distinguish phoneme contrasts and assessing their performance in relation to two components of executive function, namely: verbal fluency (including both phonetic and semantic fluency), and phonological short-term memory.

70 native speakers of Dutch participated in a series of training and test sessions, during which they were trained to perceive the Korean three-way lenis-fortis-aspirated contrasts /p-p*-ph/, /t-t*-th/, and /k-k*-kh/, which are difficult for them to distinguish. Discrimination and identification tests were used to assess their performance during five (pre- and post-training) test moments on three separate days with one-week intervals. Further, in a verbal fluency test, participants had to name as many words as possible in one minute from a semantic category (namely animals) for semantic fluency, and from a phonetic category (namely starting with an /m/) for phonetic fluency. A nonword-repetition task was used to measure phonological short-term memory.

Results showed that there were strong individual differences in the success with which participants learned to perceive the novel phoneme contrasts, as well as in the scores on the executive functions tests. The relation between the scores on the phoneme perception tests and the tests of executive functioning will be discussed, addressing the questions whether verbal fluency and phonological short-term memory are correlated with phoneme perception at particular stages of learning (pre-, between, or post-training), and with particular test types (discrimination versus identification). This study thus aims to elucidate how executive functioning, in particular verbal fluency and phonological short-term memory, affect the acquisition of novel phoneme contrasts.

Individual Differences in Executive Function and Phonological Processing: Implications for L2 Speech Acquisition. Introduction.

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In recent years, we have seen a rapidly growing amount of research on individual differences in phonological processing and on the learner skills that might be at the source of these differences, including cognitive abilities. Across studies, we find evidence that phonological processing (encompassing both production and perception) is impacted by executive functions such as working memory, inhibitory control, and attention control. In general, the mechanism assumed to underlie these relationships is that a more efficient executive control facilitates phonological processing by freeing resources or reducing interference, which in turn might facilitate phonological acquisition. However, studies differ widely in the presence or strength of these relationships and generalizations are difficult to make, and the specific mechanisms that underlie the relationships are not well understood and might as well extend beyond the domain of executive functioning. The goal of this special session is to further our knowledge of the complex interactions underlying the relationships between executive function and phonological processing. This session hopes to encourage fruitful discussion about the specific and joint contribution of individual differences in executive function and other individual and contextual factors to L2 speech learning and seeks to motivate further research of its implications for pedagogy and current models of language processing and acquisition.

Individual differences in perceptual assimilation, phonological equivalence, and L2 production

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It has been previously shown that L1 speakers of Mandarin (with a two-way stop contrast) who are learning Korean (with a three-way stop contrast) implement the word-initial Korean stop contrast using different strategies (Holliday, 2015). To the extent that L2 segmental production is driven by perceptual targets (Flege, 1995), and that L2 learners' perception of speech sounds is shaped by phonological experience (Best & Tyler, 2007), we expect different production strategies of word-initial Korean stops to reflect individual differences in perception as well.

Word-initial Korean lax stops are produced with long-lag VOT and a low f0, and contrast with Korean aspirated (long-lag VOT/high f0) and tense (short-lag VOT/high f0) stops. In this study, Korean lax stop productions from 11 Mandarin speakers were acoustically analyzed and compared with their performance on two other tasks: a perceptual assimilation task in which Korean stops were auditorily classified as Mandarin stop categories, and a transcription task in which orthographically presented Korean words were transcribed in Mandarin.

Five subjects consistently transcribed Korean lax stops as Mandarin aspirated stops, two subjects transcribed them as consistently unaspirated, and four subjects transcribed them inconsistently. These results generally agreed with their perceptual assimilation behavior: those who transcribed them as aspirated were more likely to assimilate them to a Mandarin aspirated category, and those who transcribed them as unaspirated were more likely to assimilate them that way. Then, the correlation between the percentage of lax stops assimilated to an unaspirated category and the mean normalized distance between the VOT of each subject's lax and tense stop productions was assessed using Kendall's tau coefficient. The correlation was weak ($\tau = -0.147$), and non-significant ($p = .532$). These preliminary results suggest that the mapping between L2 perceptual and production targets may differ widely across individual L2 learners.

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How and why learning to produce non-native sounds affects native production

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L2 learning can affect native phonetic production, with drift of native sounds either towards (Chang, 2013) or away (Fowler et al., 2008) from similar non-native ones. Here, we test whether short phonetic production training affects native production, and whether aspects of individual differences in native production can explain the amount of such drift.

Twenty monolingual native French speakers were trained to produce two novel vowels: the Danish /ɔ/ and the Russian /i/. On each trial, participants repeated the target vowel and received immediate visual feedback showing the location, in F1/F2 space, of their production along with that of the target vowel. Each vowel was repeated 600 times over 3 days. The acoustic position and compactness (i.e., inverse of variability) of the non-native vowels and of the acoustically closest respective French /o/ and /ø/, /y/, /i/ were assessed before and after training.

Training improved the production accuracy and compactness of non-native vowels on average by 19% and 38%, respectively. After training, there was a drift in the position of the French /ø/ and a trend for such a drift for the French /y/ vowel toward the Russian /i/, but no effect on the French /i/. For the French /ø/, the amount of drift was related to pre-training individual compactness of this vowel. The position of the French /o/ did not change overall relative to the Danish /ɔ/, however, training-related changes in F1/F2 between the two vowels were correlated. Training did not change the native vowel compactness. Results show that L1 categories of novice learners drift towards newly learnt non-native ones even after very short lab training, and that speakers with more robust native category representations are less susceptible to such L2 influences. Thus, even native phonetic production is dynamic and susceptible to modifications, but more research is needed on the circumstances and individual differences underlying them.

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Individual differences in executive function and phonological processing: Implications for L2 speech acquisition.

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It is well established that people differ considerably in their ability to learn new languages, especially in the area of phonological processing. Recent research investigating individual differences in phonological processing suggest that factors other than well-studied predictors of success in L2 speech learning, such as age of onset of L2 learning or input quality and quantity, may be at the source of these differences, including cognitive abilities. In general, the mechanism assumed to underlie the relationship between executive functioning and phonological learning is that a more efficient executive control facilitates phonological processing by freeing resources or reducing interference (Lev-Ari & Peperkamp, 2013; Darcy, et al. 2015), which in turn might facilitate phonological acquisition. However, studies differ widely in the presence or strength of these relationships perhaps due to the variety of tasks and populations studied. Generalizations are difficult to make, and the specific mechanisms that underlie the relationships are not well understood.

Understanding the link between executive function and phonological processing is crucial from both a pedagogical and theoretical perspective. For example, an aptitude-by-treatment interaction approach can be made more effective in instruction and assessment by matching the design of tasks to learners' individual differences in executive function. From a theoretical perspective, it is important for models of language processing and language acquisition to understand what makes certain learners talented at acquiring L2 speech and thus provide an account of phonological processing and L2 speech learning that is inclusive of individual variability.

The goal of this special session is to further our knowledge of the complex interactions underlying the relationships between executive function and phonological processing. In particular, the focus of the empirical contributions to this session target under-explored areas of individual differences and phonological processing, such as the role of individual differences in native production on phonetic drift in production training (Kartushina, Hervais-Adelman, Frauenfelder, & Golestani), the impact of individual differences in perception on production (Holliday), and the role of cognitive abilities such as verbal fluency and phonological short-term memory (Broersma, Choi, & Dediu), attention (Safronova & Mora) and executive functions (Reiterer) on L2 learners' speech perception and production skills. A discussion paper following the presentation of the empirical studies (Trofimovich) will discuss the implications of research on individual differences for L2 speech learning theories and L2 pronunciation teaching.

This session hopes to encourage fruitful discussion about the specific and joint contribution of individual differences in executive function and other individual and contextual factors to L2 speech learning and seeks to motivate further research of its implications for pedagogy and current models of language processing and acquisition. The session will include a final 20-minute general discussion.

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Individual differences in oral language skills (pronunciation aptitude) and the relationship to cognitive factors and executive functions

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This paper provides an overview of 4 studies with similar designs. Individuals vary strongly in their cognitive and linguistic abilities (Reiterer et al., 2011), but it is less clear to what extent linguistic and cognitive abilities correlate, share similar grounds.

We conducted several studies focusing on language aptitude for oral speech imitation (imitating unknown sentences in Hindi), alongside with collateral "general cognitive or executive" factors: non-verbal IQ, verbal IQ, auditory working memory (WM), executive functions, and reading speed. Hypothesis: general cognitive abilities only partly correlate with oral phonetic-linguistic abilities. Study one investigated 138 German subjects involving Hindi imitation, nonverbal/verbal IQ, Simon task (executive functions) and reading speed (Reiterer et al., 2011; Hu et al. 2013; Dogil and Reiterer, 2009). Second study, 41 German natives relating speech imitation to singing ability and auditory WM (Christiner and Reiterer, 2013, 2015). Third study focused on sex differences in speech imitation and collaterally tested 64 Germans on non-verbal / verbal IQ measures (Wucherer and Reiterer, 2016). Last study investigated 30 Iranians' speech imitation abilities and auditory WM (Ghafoorian and Reiterer, 2016).

Results: In all studies (N= 273) we found strong and significant correlations between auditory WM and speech imitation ability (r from 0.3-0.8, p<.05). No other cognitive or executive functions correlated with the speech imitation, not even the "hottest candidate" of reading speed, which could be termed an "oral flexibility" measure. Neither non-verbal, verbal IQ, nor executive functions yielded any significant correlations in all of the sub-studies. This leads to the tentative conclusion that a shared "processing mode" or sensory channel might influence individual differences: the bigger the distance between processing channel (i.e. auditory-motor domain for speech imitation and visuo-abstract domain for non-verbal), the less the cognitive and linguistic abilities are related. However, this does not explain the uncorrelated nature of speech imitation and reading speed capacity, since they might share the same output channel, like in singing and speech imitation, two highly related skills.

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Individual differences in second language speech learning: Implications for theory and practice

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Adult second language (L2) learning, and the acquisition of L2 speech perception and production in particular, is generally associated with great inter-individual variation. As a result, much of recent empirical work, which includes research featured in this colloquium, has focused on documenting and explaining individual differences in a variety of cognitive, experiential, and social factors which give rise to variability in adult L2 users' speech perception and production performance. In this presentation, I will critically review recent empirical and theoretical advances in understanding the role of individual differences in L2 speech learning, drawing on several theoretical views, including cognitive processing perspectives, dynamic systems theory, and social-educational frameworks. I will argue that individual differences are not just a source of "noise" in L2 speech learning but rather are integral elements of learning, and that a viable theory of L2 speech learning should centre on and account for inter-individual variation. I will conclude by providing suggestions for further research into individual differences in L2 speech learning and by discussing implications of empirical research on individual differences for pronunciation teaching.

New Sounds

Aarhus 2016

Eqpvtkdwvgf 'Qtcn'cpf 'Rquvgt 'Rtgugpvcvkqpu''

(in alphabetical order)

Identification of stress, quantity and tonal word accent in Swedish

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In addition to 9 vowel and 18 consonant phonemes, Swedish has three prosodic phonemic contrasts: word stress, quantity and tonal word accent. The word stress contrast, as in ˈarmen 'the arm' - arˈmen 'the army', is mainly signaled by syllable duration, while the quantity contrast is realized mainly by duration of vowel and the following consonant, as in *vila* 'rest' and *villa* 'villa', (see Thorén, 2008). Whereas, the tonal word accent, as in ´anden 'the duck' - `anden 'the spirit' is signaled with different tonal patterns. When making curriculums for second language learners, it is helpful to know which phonetic or phonological features are more or less crucial for the intelligibility of speech. Regarding this pedagogical point, Abelin & Thorén, (2015a & b) examined the relative importance of correct realization of word stress compared to correct tonal word accent. They found that misplaced word stress caused many more non-identifications and larger loss than mispronounced tonal word accent.

The present study seeks to extend the findings of the previous studies, by adding the perceptual weight of the quantity contrast. It thus aims to create a ranking list for the perceptual weights of all three Swedish prosodic phonemic contrasts.

A lexical decision experiment was performed, where 20 native Swedish listeners were exposed to 50 intact words representing combinations of trochaic, iambic, accent 1, accent 2 as well as /V:C/ and /VC:/ categories. The test words were 10 originally trochaic words pronounced with iambic stress patterns, 10 original accent 1 words pronounced with accent 2 and 10 trochaic /V:C/ words pronounced as /VC:/. 60 nonsense words with the same combinations of phonologic categories served as distractors. The participants were instructed to judge as quickly as possible whether or not the words they heard were real words. The number of yes/no answers and non-responses (answers that exceeded the reaction time limit) were counted and reaction times were measured.

The results show that participants tended to judge words as non-real to a higher degree when pronounced with distorted quantity than when pronounced with distorted word accent. The frequency of non-responses and non-word decisions for distorted word stress was slightly lower than for distorted quantity but still much higher than for distorted word accent. This seems to indicate that distorted quantity is more detrimental to word identification than distortions of both word stress and tonal word accent. We suggest that both word stress and quantity should be given high priority when teaching Swedish pronunciation.

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Perception of non-native accent in relation to intelligibility and attitude

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The perception of speakers with a non-native accent in a communicative situation brings up several aspects: is the speaker intelligible or pleasant to listen to, and what attitudes do the listeners get towards the speaker (cf. Boyd, Abelin & Dorriots, 1999)? Additionally we address the question of whether intelligibility is facilitated when the listener has the same L1 as the non-native speaker.

We performed listener tests of recordings of 10 adult Somali speakers learning Swedish as their L2. The stimuli consisted of 8 read sentences per speaker. 20 L1 Swedish speakers and 20 L1 Somali speakers listened to the 8 stimulus sentences once. They were asked to rate each speaker, using Likert-like scales concerning: degree of foreign accent, intelligibility, pleasantness, and emotion.

The judgments were correlated with auditory analyses of phoneme realization and word stress, and acoustic analyses of vowel/consonant duration (cf. Zetterholm, 2014).

The hypotheses were that listeners with the same L1 accent would rate speakers lower on degree of foreign accent and higher on intelligibility than the Swedish listeners would. This is in accordance with studies of Munro & Derwing (1995), Munro (2008) who discussed how e.g. L1 background and L2 accent contribute to the intelligibility of non-native speech and a study by Mora & Ludwig (2015) who demonstrated how L2-English was faster to process for L2-listeners compared to L1-listeners. We also predicted that a larger amount of phonemic errors and louder speech (cf. Abelin & Boyd, 2000) would yield less positive classifications of degree of foreign accent and emotions.

Preliminary results show that there is a difference between L1 and L2 listeners both for accent rate and intelligibility. There is also a correlation between judged degree of accent and the listeners' attitude.

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Non-nativelike voice onset time: bilingualism effects *vs.* age of onset effects

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Recent critical period research suggests *near-native* rather than *nativelike* L2 ultimate attainment (UA) to be the *maximal* outcome of adult L2 learning, and (contrary to common belief) the *typical* outcome of child L2 acquisition, indicating age of onset (AO) effects (and potentially maturational constraints) on both post- and prepubescent L2 acquisition (e.g., Abrahamsson & Hyltenstam 2009). However, along certain lines of thinking within SLA (e.g., Birdsong & Gertken 2013; Cook 2015; Ortega 2010), the documented (albeit subtle) differences between native and near-native UA are not to be seen as evidence of AO effects, but rather of the unavoidable consequence of bilingualism. The implication has been that monolingual and bilingual proficiency must not be compared, and that the standard comparison group in SLA studies should be native, simultaneous bilinguals. Along the same lines, it has been suggested that the total loss of the original L1 is what makes it possible for internationally adopted children to successfully acquire the language of the new environment, implying that monolingualism serves as a guarantee for nativelike UA (Pallier et al. 2003; Ventureyra 2004).

In order to test these theoretical claims, we compared the UA of four learner groups (adults at the time of testing; *n* = 20 per group): monolingual L1 learners of Swedish (AO: 0 yrs); simultaneous bilingual learners of Swedish/Spanish (AO: 0 yrs); monolingual L2 learners of Swedish (adoptees from Spanish-speaking countries; AO: 3–8 yrs); and successive bilingual learners of Swedish (immigrants from Spanish-speaking countries; AO: 3–8 yrs). This design enabled comparisons to be made between and across early/delayed language exposure and mono-/bilingual learning. Following the principles and procedures of our previous studies, the data was elicited through a large test battery, covering a wide range of linguistic levels (phonetics, morphosyntax, lexis), modes (production, perception, oral and written language), and phenomena (articulation, categorical perception, grammatical intuition, grammatical/semantic inferencing, formulaic language etc.).

Data on the production and categorical perception of voice onset time (VOT) will be presented. Unlike with grammatical and lexical UA, which was determined primarily by the participants' AO but not at all (or only marginally) by their status as monolinguals or bilinguals, the VOT data suggests a mixture of AO effects and bilingualism effects, and variably so for production *vs.* perception as well as for different places of articulation. Theoretical and methodological implications from the study will be suggested.

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The relationship between L2 speech perception and L2 word learning

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Previous studies suggest that discrimination and acquisition of second language (L2) vowels depends upon the relative size of the L2 vowel inventory and native (L1) inventory, such that having a smaller native (L1) vowel inventory impedes L2 vowel perception, and vice versa (Bundgaard-Nielsen, Best, & Tyler, 2011; Escudero & Williams, 2012; Iverson & Evans, 2007, 2009). In contrast, the L2LP model posits that L2 vowel discrimination and acquisition are predicted by L1/L2 acoustic relationships, and that L2 perceptual abilities translate to L2 word learning abilities (Escudero, 2005, 2015). That is, L2 words containing contrasts that are either difficult or easy for L2 learners to perceive and acquire should likewise be more difficultly or easily learned, respectively. To test these claims, we compared XAB discrimination of five Dutch vowel contrasts and learning of L2 minimal pair words containing the same contrasts between populations whose L1 contains fewer (Peruvian Spanish: PS) and more (Australian English: AusE) vowels than Dutch. If vowel inventory size best explains L2 perception, AusE listeners should outperform PS listeners on both tasks. If acoustic distances between contrasts better explain performance, both listener groups should have comparable difficulties. While there was a main effect of contrast, (XAB: $p = <.001$; Word Learning: $p = <.001$), language background did not affect performance in either task. There was an interaction of language background and contrast in only the XAB task ($p = .002$), with marginally higher accuracy for PS listeners in /ɪ-i/ ($p = .071$), and AusE participants in /i-y/ ($p = .085$). Word pairs containing perceptually difficult vowel contrasts were also difficult to discriminate, while minimal pairs containing perceptually easy contrasts were better discriminated. Difficulty rankings (from most to least difficult) were comparable across both tasks (XAB: (1) /ɪ-i/~/a-ɑ/~/ɪ-ʏ/~/y-ʏ/ >> (2) /i-y/; Word Learning: (1) /ɪ-i/~/a-ɑ/~/ɪ-ʏ/~/y-ʏ/ >> (2) /i-y/). These results suggest that rather than vowel inventory size, L1/L2 acoustic relationships better predict L2 perception performance, and that L2 vowel perception may influence L2 word learning patterns.

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Does frequency matter? An exploratory study of first exposure to Urdu

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Making sense of the speech stream is a challenge for learners confronted with naturalistic input at initial contact. Learners have to identify sound strings as words as well as map meaning to these strings. Little research has been conducted on how adult L2 learners approach this challenge. First exposure studies examine how adult learners process novel stimuli in an unfamiliar language. Emerging findings suggest that learners go beyond their L1 perceptual filters and point to sensitivity to the phonotactic and other information that provides cues for speech stream segmentation (Carroll, 2004, 2013; Gullberg et al., 2010; 2012; Shoemaker and Rast 2013).

We report on a replication of Gullberg et al.'s work on Dutch speakers' first exposure to Chinese Mandarin in our small-scale study of English native speakers' first exposure to Urdu, an Indo-Aryan language spoken in Pakistan, India and some other countries (Grimes and Grimes 2000). With a phonemic inventory of about half as many vowels and twice as many consonants, syllable-timed Urdu also differs from stress-timed English in its pronunciation of corresponding phonemes and range of allowed consonant clusters in onset and coda positions. Thirty-five undergraduates watched a 120-clause, four-minute-long weather report twice during a week Controlled variables included item frequency, presence of English loanwords and use of visual highlights such as gestures and icons. Participants were then tested on their ability to segment Urdu items from speech stream and sensitivity to Urdu and Arabic. Finally, participants' ability to map meanings to lexical items was studied.

Performance was best on loanwords; participants confirmed 87% of the time that words had been heard in the weather report. The second task revealed nascent sensitivity to Urdu where participants correctly identified Arabic words as not being Urdu over 65% of the time. There appear to be no trend for the effects of gestures and only a sub-group of multilinguals showed a correlation between a word's frequency and its recognition. Results corroborate other studies' findings: adults deploy learning mechanisms n mapping acoustic information to identify words in the speech stream.

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Effects of perceptual training on the identification and production of word-initial voiceless stops by Argentinean learners of English

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In the acquisition of an L2 contrast, learners might need to focus on some acoustic cues that do not play a relevant role in their L1 (Schwartzhaupt et al., 2015). Perceptual training tasks (cf. Rato, 2013) may prove efficient in helping learners pay attention to these cues. In this study, we investigate the role of perceptual training in the identification and production of word-initial stops in English by 24 Argentinean learners. Participants were divided in three groups: (i) a control group; (ii) an experimental group, which participated in three training sessions (40 min. each); (iii) another experimental group, which, besides participating in the training sessions, was informed about the L2 aspect to be focused on.

The stimuli in the training sessions consisted of data produced by six speakers of American English, and exhibited two different VOT patterns: Positive VOT and (Manipulated) Zero VOT. This latter pattern was built on Praat (Boersma & Weenink, 2013) and consisted of cutting off the aspiration of initial voiceless stops, so that they could present a VOT pattern that resembled that of a voiced stop, while still carrying all other acoustic cues that characterize voiceless stops. With this hybrid pattern, we trained learners to identify these consonants as voiced, by concentrating on VOT as their main acoustic cue.

All participants took (i) a pre-test; (ii) a post-test (three days after the last training session); and (iii) a delayed post-test (one month later). Our results show an increase in the identification of Zero VOT as a voiced consonant in the post-test, and this increase was maintained in the delayed post-test in both experimental groups. As for the production data, no significant differences in VOT length were found in any of the groups, although learners who had been told to focus on aspiration showed higher VOT scores. These results open new avenues for investigations on the role of instruction combined with training approaches.

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Mispronunciation of singleton and geminate stops by non-native speakers of Japanese

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Previous studies have shown that durations of stop closure and its anteroposterior segments are the acoustic features that distinguish singleton and geminate stops in Japanese (e.g., Amano & Hirata, 2010, 2015; Hirata & Amano, 2012; Idemaru & Guion-Anderson, 2010). Non-native Japanese speakers often mispronounce these two stops, supposedly because they cannot correctly produce the durations of a stop closure and its anteroposterior segments. However, how durations of the closure and segments in their mispronunciation differ from those of correct pronunciation by native Japanese speakers continues to be unclear. Based on this background, this study investigated durations of stop closure and its anteroposterior segments in speech errors by non-native Japanese speakers. Thirty minimal pairs of Japanese words with singleton and geminate stops pronounced by 10 native and 40 non-native Japanese speakers (10 each of Korean, Taiwanese, Thai, and Vietnamese) were analyzed. Non-native Japanese speakers' mispronunciations were identified on the basis of native Japanese speakers' production boundary between singleton and geminate stops that was obtained through a discriminant analysis with variables of durations of a stop closure and its anteroposterior segments. It was revealed that singleton stops are frequently mispronounced as geminate stops, but that geminate stops are pronounced with low error, excluding Thai speakers. It was also revealed that when non-native speakers mispronounce a singleton stop as a geminate stop, stop closure is longer, whereas its previous segment is shorter than in native speakers' correct pronunciation. Meanwhile, when non-native speakers mispronounce a geminate stop as a singleton stop, stop closure is shorter whereas its following segment is longer than in native speakers' correct pronunciation. These findings indicate anisotropic aspects both in mispronunciation direction and durational composition in speech segments in non-native speakers of Japanese.

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Not all heritage speakers are alike: the acoustic correlates of the Spanish tap-trill contrast vary as a function of language dominance

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Spanish has a voiced alveolar tap [ɾ] and a voiced alveolar trill [r] that contrast in intervocalic position whereas American English only has a voiced alveolar approximant [ɹ]. The Spanish tap is produced with a single rapid contact of the tip of the tongue against the alveolar ridge, whereas the trill is typically considered to be accurate when it is produced with two or more brief occlusions between the tongue apex and the alveolar ridge (Hualde, 2005). A Spanish speaker is necessarily going to have to maintain the Spanish tap-trill contrast in intervocalic position to adequately communicate the contrasts signaled by the difference between these two sounds. The Spanish tap and trill contrast has been shown, however, to be an especially challenging contrast to acquire as both a L1 and L2: they are the last sounds to be acquired by L1 Spanish children (Carballo & Mendoza, 2000) and they are also acquired late by L2 learners, requiring relatively high levels of proficiency in the L2 (Face, 2006).

The present study examines the production of the Spanish tap-trill contrast (/ɾ/-/r/) of 40 heritage Spanish speakers and 20 late L2 learners of Spanish from Northern California who participated in a reading-aloud task. The classification of participants as Spanish-dominant or English-dominant was determined by their responses to the Bilingual Language Profile (BLP) questionnaire (Birdsong, Gertken, & Amengual, 2012). The acoustic analyses examined the number of occlusions and overall duration in the production of phonemic trills, while the phonetic variants of the phonemic tap were based on the degree of apical constriction. Results indicate that many speakers produce intervocalic phonemic trills with a non-canonical single apical occlusion maintaining the rhotic phonological contrasts largely by means of segmental duration, and this is especially true for L2 learners and heritage Spanish speakers who are most English-dominant on a language dominance continuum. These data confirm that heritage speakers are a heterogeneous group that varies greatly as a result of language dominance, and that English-dominant heritage speakers and L2 learners are most likely to exhibit a modified system to maintain the rhotic phonological contrast. Additionally, it provides further evidence that it is necessary to consider the proficiency, age of acquisition, language dominance, and other biographical non-linguistic variables that are particular to the experiences of these speakers in order to better understand the phonological/phonetic systems of heritage speakers.

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Bilingual language mode and language dominance effects in the lateral consonant production of heritage and L2 Spanish speakers

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This study aims to bridge the divide between the heritage language and L2 literatures with regard to the investigation of Spanish-English bilinguals' phonetic and phonological knowledge of /l/ in English and Spanish. Spanish /l/ is typically described as "clear", in that it is perceived as more consonantal in quality, whereas American English /l/ is characterized as being "dark", and perceived as more vowel-like in quality (Barlow, 2014; Whitley, 2002). These laterals manifest acoustically via differing resonant frequencies: clear /l/ has a high F2 value and a large difference between F2 and F1 whereas dark /l/ is associated with lower F2 values and a smaller F2-F1 difference (Barlow, 2014).

Forty Spanish heritage and twenty L2 Spanish speakers participated in a reading-aloud task to examine their production of laterals in Spanish and English. Each participant produced 320 laterals in word-initial (e.g., Spanish *leche* "milk", English *lemon*) and word-final position (Spanish *mil* "thousand", English *wheel*) in three different sessions to elicit monolingual and bilingual modes (i.e., level of activation of each language of the bilingual individual): a Spanish session, English session, and a mixed (bilingual) Spanish/English session. The laterals were segmented in Praat (Boersma, 2001) using synchronized waveform and spectrographic displays, and formant measurements were calculated with the Burg algorithm (LPC) from a 25 ms spectral window at the midpoint of the lateral consonant. The results show that language dominance strongly predicts these bilinguals' production of Spanish and English laterals (i.e., as either a clear or dark lateral). The acoustic analyses also reveal phonetic convergence as a result of language mode, with laterals in Spanish and English being produced acoustically more similar in bilingual mode. In the bilingual session Spanish-dominant and English-dominant heritage speakers produced laterals in both languages that displayed intermediate F2 values in comparison to their productions in the monolingual sessions. This study provides evidence of language dominance effects on the acoustic realization of laterals in Spanish and English, and demonstrates the impact of language mode on the phonetic abilities of these early and late bilinguals. These findings add to our understanding of the sources of cross-language phonological influence in heritage and L2 pronunciation by investigating a heterogeneous and understudied bilingual population.

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Phonology at the interface: Late insertion & spell out in L2 morphophonology

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Currently, the state of L2 morphophonology is like shopping in a department store. We might find Stratal OT phonology in Aisle 1, a derivational lexicon in Aisle 3, and Phase-Based Syntax in Aisle 2; the components are epistemologically incompatible.

I present an internally consistent model guided by Representational Realism. Archibald (2013) explored the phonetics/phonology interface. Archibald (2016) probes the phonology/syntax interface. Here, I discuss the phonology/morphology interface guided by the tenets of Distributed Morphology (Embick 2010). For Halle and Marantz (1993), functional morphemes are bundles of features (e.g., [past]) in the syntax which, via Vocabulary Insertion (VI), are spelled out phonologically. There is competition for allomorph selection but, crucially, no competition between complex objects (as in OT).

A local, serial phonology (Newell, 2015), combined with DM accounts for L2 morphophonology (Archibald & Libben, in press). It also captures aspects of processing in the bilingual lexicon (Dijkstra et al. (1999). Pylkännen et al. (2006) showed that senses of a polyseme share a morphological root, which has implications for the bilingual lexicon. While lexical roots are usually viewed as not in competition, bilingual VI is language specific and would be licensed by language tags (contra Sharwood Smith & Truscott, 2014). So, what I call *interlingual allomorphs* like √*dog* and √*chien* would compete for insertion. As Alexiadou et al. (2015) show, DM accounts for language mixing where an L2 root is inserted into a L1 grammatical skeleton and marked with an L1 inflectional marker. Parsimony , as well as priming studies of translation equivalents (Nakayama et al., 2013) suggests the same principles govern lexical roots. A reanalysis of L2 Swedish phonological data from Abrahamsson (2003) show the advantages of this model.

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Vulnerability in discriminating non-native prosodic contrasts to increased task demands

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Under situations with distracting information, speech perception becomes more difficult due to increased demands on cognitive load (e.g. Luce et al., 1983; Rabbitt, 1966), and this has been shown to be even truer in an L2 (Antoniou et al., 2013; Cutler et al., 2007; Sonu et al., 2013). The current study examines how vulnerable perception of L2 prosody is to increased demands on cognitive load. Discrimination ability of non-native prosodic (consonant length and pitch) contrasts was tested with three groups of listeners (German learners of Japanese, German non-learners and Japanese natives) under increased memory load (e.g. Baddeley and Wilson, 2002) through a longer inter-stimulus interval (ISI) (2500ms vs. 300ms) and attention control (e.g. Isaacs and Trofimovich, 2011) through the addition of a task-irrelevant distracting prosodic dimension (non-target distracting pitch to target segmental length contrasts and vice versa). While consonant length contrasts do not exist in German, and thus are completely novel to German participants, pitch contrasts do exist in German at the post-lexical and paralinguistic levels, but not at the lexical level like in Japanese, resulting in two kinds of "non-nativeness".

Results from the discrimination of consonant length contrasts showed very good discrimination in all groups when task demands were lowest as listeners could make use of the acoustic correlates of the contrasts. With increased task demands, only non-native listeners' discrimination abilities decreased: non-learners were strongly affected by both ISI and pitch while learners only by pitch. Learners established novel L2 phonological representations; however, the ability to use these representations was applied only under favorable listening conditions without distracting prosodic information. Results from the discrimination of pitch contrasts showed generally higher discrimination ability for Japanese participants compared to German participants, regardless of ISI or task-irrelevant segmental length structures. Only when an L2 prosodic contrast was completely novel did L2 discrimination ability become vulnerable to increased task demands.

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Assessing L2 speech development in study abroad and listener effects on L2 FA perception

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Research has assessed phonological development in second language (L2) speech production mostly in naturalistic contexts of long-term immersion with immigrant populations and using normally native listeners' foreign accent (FA) ratings. However, studies analyzing to what extent pronunciation accuracy and degree of FA as perceived by native and non-native listeners may change through short-term immersion, such as study abroad (SA), are scarce and have produced mixed results (Díaz-Campos, 2004; Højen, 2003).

The main aim of the present study is to assess the impact of a three-month SA on L2 learners' speech production, as SA is characterized by rich and varied contact opportunities with native speakers which are presumably conducive to gains in speech production. The study also explores native vs non-native listeners' perception of foreign accent (FA) as a function of their phonological short-term memory (PSTM).

Speech samples were collected from a group of 23 undergraduate learners of English as a Foreign Language (EFL) before (pre-test) and after (post-test) SA. Two types of measures were used to assess the learners' speech production: a) error rate scores (phonemic insertions, deletions, and substitutions, stress misplacement); b) FA ratings from a group of native English listeners (NLs) and another group of non-native listeners (NNLs) sharing the EFL learners' linguistic profile. Listeners' PSTM was assessed by means of a serial nonword recognition task (Isaacs & Trofimovich, 2011).

Results indicated a significant improvement in error rate scores [$t(22)=2.135$, $p=.044$], and seemed to point towards a slight, although non-significant improvement in FA ratings, which were nevertheless strongly correlated with the error rate scores ($r>.7$, $p=<.05$). Analyses suggested a relationship between PSTM and NNLs' perception of FA changes ($r=.507**$), but no relationship between PSTM and NLs' perception of FA changes was found. These findings are in line with the inconclusive and mixed results often reported for pronunciation improvement in short-term SA contexts, which seems to be linked to a complex interplay of variables such as length of stay, listener factors concerning the processing of L2 speech, or the type of measures used to assess of L2 phonological competence.

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Phonological Acquisition in L2 Learners' Segmental production and Learning Context Effects

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Most research assessing second language (L2) phonology has been conducted in naturalistic immersion contexts and has explored the effects of learners' age and L2 exposure on their phonological development (Flege, Bohn & Jang, 1997; Munro & Derwing, 1995). However, research addressing the impact of other learning contexts, such as Formal Instruction (FI) or a short Study Abroad (SA) period, on specific aspects of phonological development in learners' speech production is comparatively scarce (e.g. Díaz-Campos, 2004).

The present study thus has a twofold objective. First, it explores possible differential effects of FI and SA on learners' speech production. Secondly, it explores whether different patterns of development arise across FI and SA as a function of differences in learners' L2 phonological onset level. Participants are a group of university learners of English as a foreign language (EFL) in Barcelona (n=25). They were recorded performing a reading aloud task before (T1) and after (T2) an 80-hour FI period, and following a 3-month SA program (T3). Baseline data were collected from a group of English native speakers (n=21). Acoustic measures were obtained for voice onset time (VOT) in voiceless plosives and for vowel duration and quality in the English minimal pairs /iː-ɪ/ and /ʌ-æ/.

Analyses failed to indicate significant improvement during either FI or SA. However, different patterns of development seemed to arise between High-onset (HO) and Low-onset (LO) learners, as LO learners obtained significantly more FI gains in some vowel measures than HO learners, whereas HO learners obtained significantly more SA gains in VOT than LO learners. These results seem to point to the importance of taking into account learners' onset level in order to assess the type of gains that may be expected from different learning contexts, as LO learners may benefit more from FI, whereas HO learners may benefit more from SA.

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The child in adult L2 speech

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While literature has focused on L1 and L2 acquisition differences, similarities between child and adult-L2 developmental speech have also highlighted (Flege & Davidian, 1984; Major, 2001, Hansen Edwards, 2015). The present study aims to shed light on similarity of phonological processes in segment production between adult L2 and child speech *in development*. The L2-English and L2-Greek speech data of 40 adults at different proficiency levels is compared with a bilingual Greek-English child's speech in development from age 2;7 to 4;0. There are 20 L2-English L1-Greek speakers and 20 L2-Greek speakers, 10 L1-English, 5 L1-Albanian and 5 L1-Georgian. One-hour interviews with each L2-speaker and daily interaction with the child facilitated digital recordings of the participants' speech; subsequent data transcription in IPA was validated with acoustic analysis (Praat: Boersma & Weenink, 2015). Results indicate that known processes in child typical developmental speech are evidenced in the L2 data in terms of substitutions, assimilations, phonetic variability, prosodic effects, non-isomorphic processes, co-occurrence of advanced and frozen forms, etc. Further similarity was found with normative patterns per language in the bilingual child's speech; processes predominant in the child early on prevail at beginner/intermediate L2-proficiency levels, e.g. *metathesis*: Child 'solve'→[sɒvl], L2-English 'wild'→[waɪdl]; *consonant harmony*: Child /ɣavjise/→[vavise], L2-Greek /ɾoði/→[vovi]; *vocalization of syllabic lateral*: Child 'apple'→[æpɔ], L2-English 'bottle'→bo[te]; *word onset prominence*: L2-English '[ɹ]iver' but 'ab[ɾ]upt'. *Rule overgeneralization*: L2-English 'down'→[dæʊn], 'so shy'→[ʃəʊ ʃaɪ] and *frozen forms*: L2-Greek /ɣ/→[k], /st/→[s] persist in advanced speakers. Age of segment acquisition in L1 relates to the speed of acquisition in L2 and to the persistence of transfer: marked L1-Greek allophones delay in L2-Greek with matching substitutions and L1 sounds acquired earlier transfer the longer. The systematicity observed between L2 adult speech at different proficiency levels and child developmental speech may serve as a guide for investigating the development of L2 speech longitudinally.

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Speech perception in transition: The role of selective attention to features

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This paper examines transition in English vowel perception by advanced Polish learners of English. It is hypothesized that L2 speech perception is not only governed by similarity or dissimilarity to L1 speech sound categories, as postulated by two prevailing models in the field (Flege 1995, Best 1995, Best and Tyler 2007), but that a vital role is also played by selective attention to features used in L1 (cf. McAllister et al. 2002), even in a different context as argued by Bohn and Best (2012) and Pajak and Levy (2014). It is further hypothesized here that already an individual familiar feature increases the likelihood of accurate perception of an L2 sound, but a familiar feature cluster increases the likelihood of accurate perception of an L2 sound exponentially.

The stimuli included 11 English vowels in nonce words, in bilabial, alveolar and velar contexts. Subjects, 20 Polish first year English majors, were examined in the beginning of the academic year (cf. Cebrian 2009). Their perception of English vowels was tracked on the basis of three tasks: a categorial ABX discrimination task, an identification task with goodness ranking of English vowels in terms of Polish vowels and a task rating (dis-)similarity of pairs of English vowels.

The results showed decreases in goodness rankings of English vowels in terms of Polish vowels and greater perceived dissimilarity of pairs of English vowels, to a large extent consistent with the hypothesis that features familiar from L1 are re-employed in L2 perception and can be ordered in the hierarchy of features including the tongue height and backness, lip rounding and tenseness. The proposed analysis, enriching the existing models with the role of phonetic features and their clusters, is intended to increase the probability with which speech perception can be predicted.

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Assessing the "stress deafness" in oral comprehension of Spanish by French advanced learners

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The role of prosody in oral comprehension is still a subject of debate (Cutler, 2012). This presentation is concerned with primary stress processing in Spanish by advanced French learners. In Spanish, lexical stress is free, distinctive and encoded at the lexical level, whereas in French it is fixed, not-distinctive and post-lexical. These differences may contribute to a persistent "stress deafness" even in advanced L2 learners (Dupoux, Peperkamp, & Sebastián-Gallés, 2001; Dupoux, Sebastián-Gallés, Navarrete, & Peperkamp, 2008; *a contrario* Astésano, Bertrand, Espesser, & Nguyen, 2012; Muñoz García, 2010). Furthermore, it has been reported that stress deafness depends on task (Dupoux & al. 2008). Indeed, advanced learners perform significantly better in tasks related to lower-level processing as opposed to tasks implying higher level processing. This result has been found especially in stress detection and lexical decision tasks, but stress effect on oral comprehension remains largely unexplored. Hence, the aim of this paper is to examine lexical stress processing at different levels of complexity by taking into account both its lexical and morphological value.

20 French speakers with an advanced Spanish level (C1-C2 of the CEFL) and 20 native Spanish speakers took part in the study. They were asked to assess the grammatical and semantic acceptability of items at three complexity levels: isolated words, sentences and short texts, in the hypothesis that the rising complexity of the task will affect their performance. Errors in the stimuli could relate either to segmental (vocalic shift inducing lexico-semantic or morphological incoherence) or stress pattern (inducing morphological incoherence). The effect of L1, type of error and complexity was analysed by means of linear mixed-effects regression models.

The results revealed poorer performance of L2 learners in comparison to native listeners across all tasks, in particular in stress error detection. Both groups obtained significantly better scores in a) vowel errors as opposed to stress errors, b) isolated words as opposed to utterances or texts, and c) the initial position as opposed to the intermediate position. Moreover, native listeners detected vowel incoherence more accurately when it was a grammatical error as opposed to a lexical error, while no such difference was observed for L2 listeners. Finally, in French listeners stress error sensitivity tends to increase when an oxytone is replaced by a paroxytone, while the opposite is observed in native Spanish group.

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Rock or lock? The acquisition of L2 English in a gamified online system: Focus on onset /r/ and /l/

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Gamification is the use of video-game elements in non video-game systems to motivate users to engage in certain activities (Hamari et al., 2014). As such, it can be an effective way to leverage computers' innate persuasive capabilities to motivate students to practice speaking and pronunciation features in a foreign language. In the context of L2 phonological acquisition, a gamified environment can advance students' understanding of marked features, especially when explicit information and opportunities for output are included. Metaphonological awareness increases L2 intelligibility and comprehensibility (Venkatagri & Levis, 2007), so, in this way, it is possible that certain elements of game-playing have the capacity to help EFL learners become motivated to practice pronunciation, even when it involves the strenuous task of acquiring explicit knowledge of marked segments such as English /r/ (rock) and /l/ (lock) by Japanese speakers.

In the present study, eleven Japanese EFL students used a gamified pronunciation course containing graphics, levels, points, badges, and leaderboards (a typical gamified environment) for two weeks. To gain a full understanding of the impact that gamification can have on metaphonological awareness in the foreign language context, a mixed-methods approach for data collection and analysis was adopted. It included pre- and posttests (using spontaneous and controlled aural elicitation tasks), pronunciation anxiety surveys, user logs, a posttest interview, and course video/audio recordings of learners' interactions.

The results indicate that participants were able to show phonological gains in untrained /r/-/l/ items on the posttests. Additionally, we observed a significant correlation between pronunciation anxiety and the acquisition of onset /l/ and /r/. Based on these results, we will highlight the theoretical and pedagogical implications of our findings regarding gamified learning environments and L2 pronunciation.

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Perceptual L2 vowel categories in L1 Spanish speakers: What late L2 speakers (do not) learn

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Little has been said about the nature of L2 perceptual categories when they are mapped onto the same L1 category and speakers have no additional perceptual cues to learn. Aspects addressed are the creation of L2 *phonetic categories* and the effects of age of learning and equivalence classification blockage (Flege 1995), along with cue weighting (Escudero 2004), but can L2 speakers acquire proper categories, with defined native-like boundaries?

We tested discrimination of L2 vowel categories that are within the same L1 category by advanced vs. beginner late learners of English with Spanish as L1. Three 7-step continua were created: between /a/ (F1=935, F2=1548 Hz) and /ɑ/ (F1=964, F2=1296 Hz); between /a/ and /ʌ/ (F1=814, F2=1684 Hz), and between /ɑ/ and /ʌ/. Three groups (Spanish L1 with low English proficiency, Spanish L1 with high proficiency -IELTS 6.5 or above-, and a third control group of English L1) were asked to discriminate in an AX test between one of the continuum tokens and its endpoints, with a 1s ISI. (N=30). Learning of perceptual contrast is expected, although not in a native-like manner.

Results showed that no English L2 speakers showed above-chance performance along the first two continua, but the third continuum presented different patterns: while native speakers of English reached ceiling between endpoints, advanced speakers only reached 72%, followed by beginners with 38%. These findings show that a) despite the considerable difference in Hz, mappings of two contrasting L2 sounds onto the same L1 category make distinction difficult for L2 speakers, regardless of experience level; and b) that late L2 speakers create perceptual representations of L2 sounds that are not categorical, but of which they are aware at an above chance level.

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The phonological status of gemination in Italian speakers of L2 English

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This study aims to show that Italian speakers of English as a Second Language (ESLers) produce an orthographically-motivated phonological contrast that does not exist in the target language (standard British English).

Double consonant letters represent a long consonant in Italian (*fato-fatto*, [ˈfato]-[ˈfatːo], Bertinetto & Loporcaro, 2005), but not in English (*finish-Finnish*). Previous research by the authors (Bassetti, 2016) has shown that Italian ESLers produce longer closure durations in plosives spelled with a double than with a single consonant letter (e.g. a longer [t] in *kitty* than in *city*). The present study demonstrates that such alternation has to be considered as phonological gemination in these ESLers' language systems.

Participants were Italian speakers of English as a Second Language and English native controls (both n = 30). Materials consisted of 18 false minimal pairs in English containing a single or double consonant letter (C-words vs. CC-words, e.g. *finish-Finnish*). In a Reading Aloud Task, participants produced each target word three times within a carrier phrase.

Results show a statistically significant difference in duration between C-words and CC-words in English false minimal pairs in the Italian ESLers' production. Additionally, in some speakers this phonological contrast extends to phonotactic contexts in which gemination is not possible in L1 Italian. No statistically significant differences were found in the production of English native controls.

We argue that this opposition has to be regarded as phonological in Italian ESLers' language systems. These results have implications for models of L2 phonological development and for recent developments in research on orthographic effects on L2 phonology (e.g., Hayes-Harb, Bassetti & Escudero, 2014).

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Accent and comprehensibility in L2 French: Effects of task and listener experience

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Research in second language (L2) speech learning has revealed a relationship between linguistic dimensions of L2 speech and the constructs of L2 accent (nativeness) and comprehensibility (ease of understanding). Specifically, previous studies have demonstrated that in L2 English, accent is associated with fluency and phonology (segments and prosody) while comprehensibility also encompasses grammar, lexis, and discourse (e.g., Munro & Derwing, 1995; Trofimovich & Isaacs, 2012). However, it remains unclear whether linguistic correlates of accent and comprehensibility differ for L2s other than English.

The present study examined linguistic dimensions of accent and comprehensibility for 40 Spanish speakers of L2 French, completing picture narrative and interview tasks. Short recordings were assessed by 20 native French listeners (10 judges with basic knowledge of, and 10 with no experience with, L2 Spanish). 1000-point sliding scales were used to evaluate accent and comprehensibility, as well as nine linguistic variables targeting pronunciation, fluency, lexis, grammar, and discourse.

To uncover the patterning of linguistic dimensions, principal component analyses were conducted, followed by correlations, which revealed that similar to prior research, L2 French accent was associated with pronunciation and fluency (vowel/consonant errors, intonation, speech rate) whereas L2 French comprehensibility was additionally linked to lexis, grammar, and discourse (lexical richness/accuracy, grammar accuracy/complexity, discourse richness). However, accent and comprehensibility were more dissociated in the picture narrative than in the interview task, supporting task-based effects for L2 English ratings (Crowther et al., 2015). Unlike listeners unfamiliar with Spanish, listeners who had experience with Spanish were able to distinguish three comprehensibility dimensions in L2 French, namely, speech quality (pronunciation and fluency), speech complexity (discourse, lexis, and grammar), and speech accuracy (grammar and lexis), thus suggesting additional effects of listener background. Findings will be discussed in relation to constructs of accent and comprehensibility that apply to different speakers and listeners.

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Sibilant variation and indexing "gayness" in L2 English speaking French and German men

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Previous work has shown /s/ variation to be a robust correlate indexing sexual orientation and non-normative masculinity in both production and perception. Much of this works' focus is on English (e.g., Levon 2006; Campbell-Kibler 2011), though it has also been seen in Danish (Pharao, et al. 2014), Spanish (Mack 2010), and Hungarian (Rácz & Schepácz 2013). This previous research relies on data from monolingual speakers, leaving open the question of how bilingual speakers index their gay identity in their native language (L1) compared to their non-native language (L2).

Drawing on speech data from French and German English-speaking gay and straight men, the current study explores variation of /s/ in speakers' L1 and L2 English as a potentially socially conditioned marker of gayness in French and German. Data was collected in France and Germany from gay and straight English-speaking French and German men (n=19; age 21-30). The data was auto-aligned using the FAVE alignment suite (Rosenfelder et al. 2011) and a Praat script extracted all measures of the /s/ tokens. English proficiency was assessed by native English speakers utilising a methodology adapted from Sorace & Filliaci (2006).

Results show that, overall, gay speakers of this study produce /s/ with a higher centre of gravity, higher spectral peak, and more negative spectral skew in both the L1 and the L2. These results are consistent with previous research showing sibilant variation as a marker associated with a gay speech style in monolingual speech. However, there are clear phonetic differences between the L1 and L2 for these speakers which show no obvious patterns, even when taking into account sexual orientation, regional variation in France/Germany, or English proficiency. This lack of consistent patterning in the /s/ variation of these speakers may indicate that the differences between the L1 & L2 productions are not due to systemic language differences nor can they be explained by L1 transfer. Rather, these results point towards a wide range of individual variation, which may be partially attributed to this early evidence that sibilance is a socially conditioned feature for indexing gayness present for both L1 French and German speakers. Furthermore, these results show preliminary evidence of sibilance as a cross-linguistically salient index of gay identity.

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New sounds or old sounds? International adoptees' relearning of birth language phonology

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When international adoptees are re-exposed to the sounds of their birth language, after months or even decades of non-exposure to the language, are they hearing "New Sounds" (Flege, 1995) or old sounds? Children who are adopted into a country where another language is spoken commonly stop using their birth language abruptly soon after adoption (Snedeker, Geren, & Shafto, 2007). Within a few years or even months, they seem to forget their birth language entirely, even if they once spoke and understood it well (e.g., Pallier et al., 2003). In the present paper we investigated whether international adoptees truly forget their birth language, or whether traces of the 'forgotten' birth language, in particular its phonology, remain and can be retrieved with re-exposure.

Study 1 investigated birth language attrition in progress, assessing Mandarin and Cantonese Chinese adopted children in the Netherlands and a control group of Dutch children with no prior experience with Chinese. They were trained and tested on perception and production of Mandarin or Cantonese Chinese affricate and tone contrasts which were typical "New Sounds" and hence difficult for native Dutch listeners/speakers. Results show that at the pretest, the adopted children did not outperform the Dutch control children. After re-exposure, however, adoptees did outperformed Dutch controls both in perception and production.

Study 2 investigated Korean adoptees several decades after adoption, and Dutch control participants. They were trained and tested on Korean lenis/fortis/aspirated contrasts which are again typical "New Sounds" for Dutch language users. Whereas at the pretest the Korean adoptees did not outperform the Dutch control participants, after several training sessions they did, both in perception and in production.

Both studies thus provide evidence that international adoptees do retain memories of their birth language phonology and that this aids them in relearning the sounds later in life.

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Stop production and perception by Kriol-speaking children

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Australian Kriol is often characterized as having extreme levels of variation in phonemic inventories and the pronunciation of lexical items, both within and between speakers. Such variation raise the questions of wether Kriol-speaking children develop unstable phonological and phonetic categories, and whether they have 'flexible' word representations, likely suggestive of ongoing language change. To answer these questions, we conducted a production task, and a mispronunciation detection task with 13 Kriol-speaking children (7 female; age 4;8-7;0; M=6;0) from Beswick, NT, Australia. In the production task, we elicited repetitions of 24 depictable Kriol nouns containing initial and medial /p b t d k g/. From these recordings, we extracted 1400 VOT measurements and 449 constriction duration (CD) measurements. The results show that the children maintained VOT distinctions word initially and word-medially for /p b/, /t d/, or /k g/, as well as a CD contrast, consistent with that of adult Kriol. In the mispronunciation detection task, we presented participants with the same 24 items as in the production task, paired with the target word recorded by a female Kriol speaker. Each item was presented with the correctly pronounced target and 2-4 mispronounced forms (N = 99). Each mispronunciation was a single phoneme mispronunciation in the form of a manner change (/taɪga/ 'tiger' to /saɪga/); voicing (/daɪga/); place of articulation (/kaɪga/); manner+voice (/taɪsa/), or vowel (/toɪga/). The results show that children overwhelmingly reject mispronunciations by the age of 5;7, and that their ability to reject mispronunciations increases with age. Notably, however, the acceptance rate for correctly produced targets does not improve with age. Together, the results suggests that—despite the variability in the input—Kriol-speaking children acquire an invariant phonological system and lexicon before the age of 4;6; and can make explicit judgements about the correctness Kriol lexical items, on the level of fine phonetic detail.

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Japanese phonotactics influence perception of English consonants by Japanese learners of English

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The present paper demonstrates that the phonotactic properties of Japanese influence perception of English consonants by Japanese learners of English. We first extend PAM-L2 (PAM-L2; Best & Tyler, 2007) to account for the effects of differences in native and non-native phonotactics on non-native and cross-language segmental perception, and test our predictions in two perceptual experiments with near-monolingual Japanese learners of English as a second language (L2). Japanese learners of English provide an excellent population to study with respect to the role of phonotactics in L2 segmental perception because Japanese maintains co-occurrence restrictions whereby consonants and vowels are limited in how they combine in /CV/ sequences. The stimuli for these experiments are 8 /VCV/ strings, five that adhere to Japanese co-occurrence restrictions, and three that do not. In Experiment 1, Japanese listeners participate in a categorisation and goodness-of-fit rating task which involves mapping both phonotactically legal and illegal /VCV/ strings into Japanese categories. In this experiment, participants categorised strings as expected, assimilating phonotactically illegal strings to their predicted, perceptually nearest categories. Experiment 2 uses the same tokens across five AXB discrimination tests; two that test the discriminability of pairs of English /VCV/ strings that are phonotactically legal in Japanese and three that test the discriminability of pairs of English /VCV/ strings, when one string adheres to Japanese phonotactics and the other violates Japanese phonotactics. Our results show that Japanese listeners are more accurate and have faster response times when discriminating between legal strings than between legal and illegal strings and suggest that Japanese phonotactics influence listeners to repair consonants in illegal /VCV/ strings to their nearest legal /VCV/ counterpart. This is an important finding with clear theoretical implications given that most contemporary models of non-native and cross-language speech perception, like the Perceptual Assimilation Model (PAM), predict and account for the varying degrees of success that learners have with non-native phonetic and phonological contrasts but offer no framework or predictions for the ways in which native phonotactics may play a role in non-native segmental perception.

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Dutch vowel production accuracy by adult Spanish learners: A comparison between acoustic measurements and crowdsourced native transcriptions

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Research has shown that adult learners have difficulties in acquiring the phonology of a second language (L2) and that the native language (L1) influences the acquisition of L2 phones (Flege, 1995). In our current line of research we focus on Dutch L2 vowel production accuracy by adult Spanish learners.

Previous research on Dutch L2 vowels produced by adult Spanish learners revealed that the durational and spectral properties of the learner vowel productions differed considerably from the native Dutch vowel realizations, and that the Spanish vowels seemed to exert an attractor effect on most Dutch vowels (Burgos et al., 2014, submitted). The findings of a further investigation, in which the same Dutch vowels were transcribed by Dutch lay listeners through crowdsourcing, revealed that the Dutch vowels spoken by Spanish learners were often transcribed differently from their canonical form, and confirmed the attractor effect of the Spanish vowels (Burgos et al., 2015).

In this paper we report on a study in which the results of two different approaches aimed at investigating Dutch L2 vowel production accuracy by adult Spanish learners are compared, i.e., an objective approach based on acoustic analyses and a subjective approach based on native transcriptions by Dutch lay listeners. This comparison contributes to answering the question whether Dutch listeners are capable of perceiving deviant L2 vowel realizations of which we know (by means of objective measurements) are not produced in a native-like fashion, and to understanding which dimensions or features are important for Dutch lay listeners' perception, as attested from their transcriptions.

The results reveal that the outcomes of the acoustic measurements are in line with the findings of the native transcriptions, and confirm the attractor effect of the Spanish vowels, although an interesting disparity concerning duration was found as well. Possible implications of these findings are discussed and directions for future research are suggested.

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L1 Tone attrition among bilinguals in an L2 speaking environment

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Late bilinguals who continue to use their native language while using an L2 every day and/or residing in the L2 community have been shown to exhibit changes in their L1. The majority of the research on changes in L1 use and possible L1 attrition has focussed on the lexicon, morphology and syntax (Schimid, 2002), but in recent years, attention has moved to phonology. Tonal attrition has received the least attention.

In Mandarin, tone is used to differentiate lexical items or to express morphological functions. There are four tones in Mandarin: the level first tone (T1), the rising second tone (T2), the falling-rising third tone (T3), and the falling fourth tone (T4). Among these, the tone considered to be the most complex is T3. Tone sandhi also applies to T3 where for two adjacent T3s, the first T3 is realized as T2 (Y.-H. Lin, 2007) .T2 and T4 show tone variations with different tones followed. In trisyllabic sequences, the middle T2 changes to T1 if the first syllable is T1 or T2 and the final syllable is a random tone from four tones.

Several studies over the past decade of Mandarin bilinguals have revealed attrition of tone by L1 Hakka Chinese speakers living in a Mandarin-speaking area (Yeh, 2011). Little is known, however, about what happens when a tone language speaker moves to a non-tone language environment.

The present study addresses whether there are changes in tone production and perception by Mandarin speakers living in a non-tone language speaking environment (the UK) for varying lengths of time. The study compares 50 Mandarin-English late bilinguals who had been living in the UK from three months to more than five years with Mandarin monolinguals (only with minimal English exposure at school) living in mainland China. Their perception and production of four tones at word and sentence level were tested by a listening comprehension task, an interview task, and a story-telling task for both formal and more casual speech. A questionnaire collected data on speakers' use of and contact with both languages.

The data were analysed acoustically using Praat (version 6.0.17) speech analysis software (Boersma & Weenink, 2016), and statistical measurement revealed that late bilinguals who had lived in the L2 environment for over five years showed signs of attrition on T3, tending to omit the raising part in production, and the first T3 in tone sandhi. The bilinguals' four tones showed a tendency to merge, rendering them less distinctive than the control group's tone production. Age of arrival, amount and type of L2 exposure and of L1 contact showed correlations with tone attrition. Moreover, some patterns mimic tone acquisition(Li & Thompson, 1977; W. C. J. Lin, 1985) indicating that markedness plays a role in both acquisition and attrition.

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Developmental sequences in L2 phonology:
The acquisition of syllable structure in a miniature phonological system

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We test three competing claims for the effectiveness of instruction on linguistic items that follow a developmental sequence (DS). The items selected were /s/ plus consonant onset clusters (sC henceforth; e.g., /st/ in stop) and stop codas (codas; e.g., /p/ in stop), assumed to be acquired in the following orders:

sC: /sl/ > /sn/ > /st/ (Carlisle, 2006)
Codas: /t, d/ > /p, b/ > /k, g/ (Lombardi, 2001)

The Projection Model of Markedness (Zobl, 1985) predicts that an instructional focus on advanced/marked structures leads to the learning of easier/unmarked structures. The Teachability Hypothesis (Pienemann, 2005), in contrast, predicts that instruction must respect learners' "natural order" of acquisition, proceeding from easy to difficult. The All Approach (Shirai, 1997) advocates for exposure to all items that comprise a given DS. Varying degrees of support for all three positions have been found in studies of morphosyntax, but to our knowledge, no single study has contrasted all three claims, and none has investigated DS acquisition from a phonological perspective.

To test these hypotheses, 118 native speakers of Brazilian Portuguese (lacking sC and codas) practiced perceiving and producing sC and coda forms in an artificial language (Taki) created for the study, in three one-hour class lessons. Participants were randomly assigned to one of three experimental groups corresponding to the hypotheses above, counterbalanced across phonological item and type of exposure. Two production tasks (repetition and reading aloud) and a perception task measured learning in a pre/post/delayed-posttest design.

Repeated measures ANOVAs for both structures under the three exposure conditions indicate that, for sC, instructional focus on the most marked /st/ leads to the learning of unmarked structures, thus supporting the Projection Model of Markedness. For codas, however, the instructional effects were more complex, suggesting that the competing claims for teaching may vary as a function of phonological structure.

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Effects of two perceptual training methods on the perception of L2 consonants and vowels

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High variability phonetic training (HVPT) has been found to improve perception of trained L2 sounds [1, 2, 3, 4]. This study compared the effect of two HVPT methods on specifically trained sounds and on implicitly exposed but untrained sounds. The training regimes aimed at improving the perception of English stops and vowels (/i/-/ɪ/, /æ/-/ʌ/, /ɜː/) by Spanish/Catalan bilingual learners of English. Thus this study investigated (a) whether training can improve the perception of trained as well as untrained segments, (b) whether improvement generalizes to novel stimuli and talkers, (c) if improvement is retained over time and (d) which training method (Identification (ID) or Discrimination (DIS)) is more effective. 100 bilingual Catalan/Spanish learners of English were divided into four experimental groups and a control group and were tested on their identification of English sounds presented in CVC non-words before and after a five-week training period, and two months later. The trained groups differed either in terms of training method (ID, DIS) or focus of training (consonants, vowels), resulting in four different groups. Crucially, all four groups were trained with the same set of CVC non-words (i.e. *zat, zut, zad, zud*), exposing learners to trained contrasts within trials and to untrained sounds across trials. All experimental groups significantly outperformed the controls in their identification of trained sounds, confirming the efficacy of both phonetic training methodologies (in line with [1]). However, ID outperformed DIS on trained vowel perception, and only DIS trainees showed significant improvement of the untrained sounds. Interestingly, generalization and retention results patterned differently for vowels and consonants, ID having a greater effect for vowels and DIS for stops. Globally these findings suggest that while both methods are effective for training L2 perception, ID and DIS may promote generalization and retention of gains for vowels and for consonants to different degrees.

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Asymmetric lexical access and crosslinguistic perceptual similarity: An eye-tracking study

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L2 speakers access both L1 and L2 lexicons when processing L2 speech [1]. L2 speakers may also show within-L2 competition when processing words that are perceptually confusable for them [2,3,4]. This evidence comes from eye-tracking studies in which participants follow instructions to click on a depicted target word, presented alongside a phonological competitor and two distractors. Using this methodology, [2] found that Dutch learners of English, who tend to confuse English /ɛ/ and /æ/, upon hearing the initial sounds in *panda,* fixated on both *panda* and *pencil*, but only on *pencil* with target word *pencil* (see also [3]). The asymmetry is argued to reflect the degree of similarity between L2 and L1 sounds, the closest L2 sound being the dominant category. The goals of this study are thus to (a) examine if Catalan learners of English (*n*=30) display asymmetric mapping with L1-L2 single-category assimilations, (b) evaluate if asymmetry is determined by the perceptual closeness between L1 and L2 sounds, and (c) explore crosslinguistic similarity through online processing of interlingual competitors. The target sounds examined are English /i/-/ɪ/ and /æ/-/ʌ/, with respect to Catalan (/i/, /a/). Two eye-tracking experiments were designed following the methodology in [2,3,4]. The first experiment, investigating within-L2 competition, tested if L2 learners show an asymmetry when presented with critical trials containing two members of a confusable pair (e.g., *sheep-ships, hut-hats*). Control trials contained no phonological competitor, or included overlapping but non-confusable words. The second experiment evaluated between-language competition: competitors in this case involved interlingual homophones, e.g., English *pillow*, Catalan *pila* ("battery"). The same 30 participants also performed a perceptual assimilation task to assess the degree of perceived similarity between L1 and L2 vowels.[1] If perceptual similarity is related to asymmetric lexical access, cases of category-goodness difference assimilation may explain the emergence of a dominant lexical category.

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1. Data are being analysed at the time of writing this abstract.

Intelligibility, nativeness, and identifiability of heritage Mandarin speakers

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In previous work examining heritage language (HL) phonology, HL speakers have often patterned differently from native (L1) speakers and late-onset second language (L2) learners with respect to overall accent and segmentals (Tees & Werker, 1984; Au et al., 2002; Knightly et al., 2003; Oh et al., 2010; Lukyanchenko & Gor, 2011; Chang et al., 2011; Lee-Ellis, 2012). The current study extended this line of inquiry to suprasegmentals, comparing the perceptual properties of lexical tones produced by HL, L1, and L2 speakers of Mandarin living in the US.

In accordance with the segmental literature and the few findings on HL tone (Yang, 2015), we hypothesized that HL speakers' tones would pattern in between L1 and L2 speakers' in terms of intelligibility and nativeness (perceived goodness). We also hypothesized that, due to their unique linguistic experience, HL speakers would sound more ambiguous in terms of demographic background than L1 and L2 speakers. These hypotheses were tested by having native Mandarin listeners (1) identify and rate the nativeness of the tones produced in read speech (including a variety of phonological contexts) by HL, L1, and L2 Mandarin speakers, and (2) classify each talker as native Chinese, Chinese American (born and raised in the US), or (non-Chinese) American.

Results differed according to context. In terms of intelligibility, HL tones resembled L2 tones in monosyllabic contexts, but L1 tones in multisyllabic contexts. Across contexts, HL tones fell in between L1 and L2 tones in perceived goodness. HL speakers were also the most difficult group to classify demographically. Taken together, these results converge with recent findings on HL tone perception (Tsukada et al., 2015) in suggesting that, with respect to tone, early HL experience can—but does not necessarily—result in a phonological advantage over L2 learners. Further, they add support to the view that HL speakers are language users distinct from both L1 and L2 speakers.

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Effects of linguistic experience on the perception of non-native tonal contrasts

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Cross-language studies on lexical tone perception have generally found that speakers of non-tonal languages exhibit different weightings of the perceptual dimension of tone from native tone-language speakers, and thereby poorer performance in tone perception tasks. In comparison, research investigating whether speakers of a tone language have advantages over non-tonal speakers in the perception of tones from another language has yielded conflicting findings. In addition to tone inventories of different complexities under study, different controls of speaker variability and speaker normalization effects may also have rendered the cross-study results incomparable. Since the contour tones are characterized by the interaction of F0 direction and height, the level tones (high, mid, low) were chosen because they contrast only in F0 height, which renders the cross-linguistic perception results easier to interpret. The stimuli, following Lee et al.'s (2011; 2014) experimental paradigm, were constructed and presented in ways that avoid listeners' familiarity with an individual speaker. The stimuli were: 1) produced by a large number of speakers; 2) specifically arranged in blocks that were balanced across gender and used each speaker no more than once; and 3) presented in isolation such that no external F0 information was available to listeners. The results of an identification task showed that both the Cantonese and Mandarin groups had significantly higher overall identification accuracy than the English group. That is, experience with a tone language was found to facilitate the perception of non-native tones. Identification accuracy varied across speaker gender and tone height: While all groups had the highest accuracy in identifying tones that were acoustically more distinct (i.e., high tones produced by females and low tones produced by males), only the Cantonese group was able to identify all types of stimuli above chance. The Mandarin group identified high tones produced by males at chance level, while the English group identified high tones produced by males and low tones produced by females at chance level. Group similarities and differences are further discussed in terms of general auditory perception and native language phonological influences.

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The discrimination of Mandarin vs. Minnan tones by French vs. Taiwanese Mandarin-Minnan bilinguals

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Previous studies show that non-tonal language listeners poorly discriminate tone contrasts, for example, those of Mandarin (Gandour, 1983). Their performance presumably reflects a non-linguistic, psychophysical level of perception (Hallé et al., 2004; Wang et al., 2001), possibly modulated by language-specific routines. Documented difficulties are between tone T2 (mid-rising) and T3 (dipping-rising), and, at least for English listeners, between T1 (high-level) and T4 (high-falling) (Broselow et al., 1987). The difficulty found with T2-T3 may be artificial since the relevant studies used citation or prepausal forms of T3 (i.e., the dipping-rising form of T3 which is indeed similar to mid-rising T2, unlike the low-falling form of T3 found everywhere else). In contrast, tonal-language listeners must perceive tones linguistically and, presumably, very well. In the present study, we revisit these assumptions.

We tested naïve French listeners on their discrimination of the four Mandarin tones (we used low-falling, not dipping-rising T3), as well as the seven tones of the Minnan Chinese spoken in Taiwan. We tested Mandarin-Minnan bilingual Taiwanese listeners, as a control group, on the same contrasts. On all contrasts, Taiwanese listeners outperformed French listener, who distinguished best level vs. falling contours of different heights (e.g., Mandarin T1-T3). The French performance, however, was not easily explained by auditory-acoustic distances: for example, they discriminated poorly Mandarin T2-T4, which have opposite, and steep slopes. Taiwanese listeners performed near ceiling on Mandarin but rather poorly on two Minnan tone contrasts that essentially involve pitch height on otherwise level contours. We conclude that (1) French listeners' perception of tones, which is presumably non-linguistic, is nevertheless not solely based on auditory-acoustic characteristics, and (2) Taiwanese Mandarin-Minnan bilinguals seem to ignore tone height, presumably relying more heavily on contour shape.

We argue that our nonnative listeners' data lend less easily to an auditory-acoustic than an articulatory account, in the sense that listeners are more sensitive to the laryngeal maneuvers underlying tone production than to the acoustics of the surfacing F0 contour. A similar account may explain the difficulties encountered by Taiwanese Mandarin-Minnan bilingual listeners.

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Auditory or audio-visual feedback in EFL intonation training?

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This paper addresses the question of whether visual pitch traces are processed in any way that influences production of L2 intonation. We used an auditory-only group to control the possibility that any improvement in pitch variation may be due to increased auditory (and subsequent articulatory) practice rather than (or as well as) visual feedback (cf. Demenko et al, 2009; Zhou et al, 2012; Hardison 2013; etc.). We also tapped into a less explored factor--the degree to which learners understand the syntactic, semantic and pragmatic functions of intonation in the L2 (Mennen and de Leeuw 2014).

We explored whether Chinese learners of English can improve their performance on the comprehension and production of nuclear accents (nuclear tones) and phrasing-related intonational contrasts, modelled after Atoye (2005) and Cruz-Ferreira (1987). 60 Chinese learners were mapped into three homogenous groups—20 treated with 3-week long intonation instruction and audio-visual practice; 20 control with the same period of instruction and auditory-only practice; and 20 control without training. All learners plus ten native speakers were assessed with a pre-, post- and delayed post-test design.

Results showed that Chinese learners were less capable of comprehending the intonational contrasts than native speakers (p<0.001; Wilks' Λ = .308; partial $\eta2$ = .692), particularly of accentuation (p<0.001; partial $\eta2$ = .325) and phrasing (p<0.001; partial $\eta2$ = .663); while tonal contrasts were comprehended in a similar way of native speakers' (p<0.648; partial $\eta2$ = .005). Repeated measures revealed that no improvement on the comprehension task for the control group, while the auditory control and experimental audio-visual groups both showed improvement on accentuation, phrasing and tone. However, no significant difference was found between the auditory and the audio-visual groups (p<0.417). Production data are currently being analysed, while data from the delayed post-test has still been collecting.

The results suggest that, in intonation training, visual feedback may not add much to the benefit of auditory training, especially when coupled with training on the discourse and linguistic functions of intonation. This has practical implications for informing L2 classroom practice and for evaluating the limits of the technology for improving pronunciation.

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Effects of language experience on attended acoustic cues in perceptual learning: A preliminary study in Southern Min by Mandarin learners

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This study investigates the role of directed attention and L1 phonetic categories in learning novel speech sounds. A pilot experiment was carried out with monolingual Mandarin speakers teaching the Southern Min consonants /b, p, p^h, ɕ, tɕ, $tɕ^h$/ and tones (22, 33, 55, 24, 41) as targets. An AXB discrimination test with 240 minimal pairs involving six pairs of consonants and ten pairs of tones was conducted before and after training. Twenty learners were divided into two groups during two sessions of identification training with 240 tokens produced by four other talkers. One group was directed to attend to the consonants of the training stimuli and the other to attend to the tones. Because the accuracy of the pre-training test was already high in both consonant and tone discriminations, no effect of attending group was found in the improvement of the post-training test [$F(1,18)=0.896$, $p=0.356$]. However, the identification results in the second training session were improved from the first one in both consonant [$t(9)=4.810$, $p=0.001$] and tone [$t(9)=4.233$, $p=0.002$].

Examining the most common discrimination errors for the consonants, the /b/-/p/ contrast was the most difficult. For the tones, the 22-33, 33-55 and 22-55 discriminations were the most difficult. We attribute this to the lack of /b/ and only one level tone (55) in Mandarin. Future work will involve more consonant training and testing of /g, k, k^h/ in Southern Min and also native English speakers as subjects. English has the same aspiration types as in Mandarin but no tones. This will allow us to further examine the findings in Guion and Pederson (2007) that Mandarin speakers are sensitive to both F0 height and F0 slope whereas English speakers to only F0 height as well as to see how well the English aspiration discrimination maps onto the Southern Min stimuli.

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Production of word-initial stops by simultaneous Greek-English bilingual children

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This study investigates the nature of the phonological system(s) developed by simultaneous bilingual children. According to previous literature, parallel exposure to two phonetic systems can lead to the development of (i) a single intermediate system, (ii) two independent native-like systems, (iii) two fully differentiated systems with cross-linguistic influence by the one or both languages (Magloire & Green 1999; Lee & Iverson 2012; Flege 1991). One tool used for examining bilinguals' phonetic system(s) is Voice Onset Time (VOT). VOT is language specific, e.g. voiced stops in Greek and Spanish have negative VOT; in English and German they have positive VOT of short duration. Voiceless stops in Greek and Spanish use short lag voicing; English and German use long lag voicing.

In our study we investigate the Greek-English language pair for which there has been limited research (Beach et al. 2001; Antoniou et al. 2010). Bilingual children, aged 8-12 were recorded reading CVCV words in carrier phrases (2700 words in total). The specific age group of bilinguals for this language pair has not been investigated before. Our subjects grew up and lived in Greece, where they attended English-medium schools. This context allowed for daily exposure and use of both languages which has been reported to affect VOT and facilitate the attainment of native-like voicing contrasts and VOT values (Flege et al. 1997, Sancier & Fowler 1997). The VOT and closure duration of word-initial (/p,t,k,b,d,g/) were measured using PRAAT. Statistical results on voiced stops show cross-linguistic, bi-directional influence while results on voiceless stops provide evidence of monolingual-like values in Greek. In English, there is presence of long-lag VOT values which are somewhat shorter than results reported in previous literature. Overall, the paper shows cross-linguistic influence based on data from a less studied language pair, new age group and a novel context.

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Quantity language speakers desensitize to duration after four minutes of distributional training

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Exposure to statistical distributions of sounds affects listeners' perceptual sensitivity to non-native contrasts. Listeners trained with a bimodal distribution usually outperform listeners trained with a unimodal distribution in their discrimination of the newly trained sound contrast (Maye & Gerken, 2000; Escudero et al., 2011; Ong et al., 2015). In one study (Goudbeek et al., 2008) American English listeners learned a new duration-based contrast more readily than Spanish listeners, which was attributed to the presence versus absence of the durational cue in the two languages. This is rather surprising given the over-reliance on duration in Spanish second-language learners of e.g. English (Escudero & Boersma, 2004), and could have been confounded by differences in vowel inventories and different degrees of similarity between the trained and native vowels.

Our study compared distributional training of duration in quantity and non-quantity languages with similar vowel systems: Greek and Czech. Both languages distinguish 5 vowel qualities, which occur as short and long in Czech but not in Greek. 25 Czech and 21 Greek monolinguals were each divided into two groups: one was trained with a bimodal distribution, the other with a unimodal distribution between [ɑ] and [ɑː] (a non-native quality in both languages). During training, participants listened passively to sounds drawn from the distribution (bimodal/unimodal). Before and after training, participants performed same-different discrimination of [ɑ]-tokens with durations ranging from 132 ms to 207 ms (sampled into 11 steps). The proportion of different responses to each pair spanning approximately 15ms (~ JND for duration) was taken as the measure of perceptual discriminability.

A repeated-measures ANOVA revealed an interaction of language, training-distribution and test-type (p = .039). Discriminability improved at post-test in all groups except in unimodally exposed Czechs. The results are interpreted in light of recent models of distributional training (Wanrooij et al., 2015). They are taken to reflect a decrease in sensitivity to duration in the unimodally exposed Czechs. It appears that the presence of length in L1 facilitates (un)learning of non-native duration-based contrasts.

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Time course of Chinese and Korean listeners' use of stress in English word recognition

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This research examines (standard Mandarin) Chinese and (Seoul) Korean listeners' use of segmental and suprasegmental cues to stress in English word recognition. In English, both segmental (vowel reduction) and suprasegmental (fundamental frequency, duration, intensity) information signal stress and constrain lexical access [1,2]. In addition to having lexical tones, Chinese has full-full and full-reduced words that differ in stress placement (1), with both segmental and suprasegmental cues signaling stress [3,4]. By contrast, Seoul Korean does not have lexical tones or word-level stress [5,6]. Lin et al. [7] showed that Korean listeners were less accurate than Chinese listeners in using stress to recognize English words/non-word. The present study examines the *time course* with which these listeners use segmental and suprasegmental cues to English stress.

Intermediate-to-advanced Chinese- and Korean-speaking late second-language learners of English and native English listeners completed a visual-world eye-tracking experiment. In each trial, participants saw a target (*parrot*), one of two competitors (stress match: *parish*; stress mismatch: *parade*), and two unrelated distracters, and they heard the target embedded in the carrier sentence *Click on_____*. The experiment included a vowel-reduction condition, where segmental and suprasegmental information distinguished the first syllable of the target and competitor (*parrot-parade*), and a no-vowel-reduction condition, where only suprasegmental information distinguished the first syllable of the target and competitor (*mystic-mistake*). Words were presented orthographically and controlled for length and frequency. Competitors were also controlled for the orthography of the first syllable.

Growth-curve analyses on the results of 30 English listeners indicate that fixations in the stress-match condition were lower and had a steeper U-shape than fixations in the stress mismatch condition, with this effect being larger in the vowel-reduction condition than in the no-vowel-reduction condition. This suggests that English listeners make greater use of stress in the presence than in the absence of vowel reduction. Data collection from Chinese- and Korean-speaking second-language learners of English is underway.

(1) a. Full-full: *dongxi* 'west and east'
    b. Full-reduced: *dongxi* 'stuff'

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Heritage Dutch interdental fricative production

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This study adds to research about heritage speakers' phonology by examining how heritage Dutch speakers' English L2 [θ] and [ð] production differs from both 'typical' L2 speakers and native English speakers. Dutch has no [θ] or [ð] in its phonology, and research has shown that even highly proficient speakers often substitute these sounds in English (Wester, Gilbers, & Lowie, 2007; Schmid, Gilbers, & Nota, 2014), but little is known about learners who acquire English in a naturalistic context. Studies on immigrant Dutch populations have focused on Dutch attrition, rather than the acquisition of English. The township of Norwich, Ontario provides an opportunity to study the English of Dutch immigrants and heritage speakers, as 9.2% of the population reports Dutch as their mother tongue (StatsCan, 2012). 'Identity' has been shown to affect target language production patterns (Hoffman & Walker, 2010), and as Dutch heritage speakers living in Norwich strongly identify themselves with their heritage culture, they lend themselves well to this research. The study focuses on these Dutch-speaking groups to answer the following question: How do heritage speakers of Dutch differ from monolingual English speakers and Dutch L1 speakers in their realization of [θ] and [ð]?

In addition to a language proficiency and cultural identification questionnaire, each participant was recorded during a picture description task and a reading task. Results show that both English monolinguals and Dutch Heritage language speakers produce [θ] and [ð] at the same rate - in an average of 80% of tokens. However, they produce the remaining 20% differently. The Dutch Heritage group's allophones of [θ] and [ð] are largely stops like the phonemes produced by the late-learning Dutch immigrant group. This pattern may be a marker of ethnic identity, or be a case of L1 transfer. This study adds to the growing body of literature about both Heritage languages and Dutch L2 English. It sheds light on Heritage Dutch speakers' English production patterns and their differences from both native Dutch and native English speakers.

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Asymmetry in the production and perception of English phonemes by Spanish-Catalan Speakers

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The relationship between production and perception has drawn attention due to the link existing between both skills. However, the influence of one onto the other in L2 acquisition is still controversial. Several studies suggest that non-accurate perception of a segment can explain its non-accurate production (Rochet, 1995; Flege, 1993; Flege et al., 1999). Nevertheless, some other studies have found that speakers could produce a segment accurately even if its perception is not very accurate (Goto, 1971; Sheldon & Strange, 1982; Flege et al., 1997). The purpose of this paper is to further analyse the relationship between production and perception of L2 phonemes.

This paper specifically deals with the production and perception of the English voiced alveolar stop /d/ and the voiced interdental fricative /ð/ in absolute initial and in intervocalic position by bilingual speakers of Spanish and Catalan. These two English phonemes were chosen because they are context-conditioned allophones in Catalan and Spanish (i.e. /d/ is realised as a dental stop in absolute initial position but as a dental approximant intervocalically) but separate phonemes in English.

The production of English words with the two target phonemes in both absolute initial and intervocalic position by 20 native Spanish-Catalan speakers was recorded. These data were auditorily analysed by two phonetically trained native English speakers. The participants also took an identification test, in which they had to identify the absolute initial or intervocalic segment in nonsense sound combinations in order to avoid frequency effects.

Asymmetry was found between perception and production. The accuracy in identification is constant across phonemes and positions, whereas the production of these L2 phonemes shows a clear L1 transfer pattern. Our results show both that: 1) the accurate perception of a given phoneme in a specific position is a requirement for its accurate production, and 2) the production of a segment can be very accurate even if its perception is not.

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Production of English consonant clusters in onset position by Spanish-Catalan speakers

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Acquisition of L2 consonant clusters has proven difficult for L1 speakers of languages with simpler onset syllable structures, such as for Spanish learners of English or Swedish (Carlisle, 1994; Abrahamsson, 1999). Previous studies have focused on the contexts which favour epenthesis and the different strategies which are used to accommodate L2 complex consonant clusters in onset position to their L1's phonotactics, which only allows for simpler or different onsets. Overall, the general strategies used by L2 learners are epenthesis and consonant deletion (Weinberger, 1994), which provide evidence for the Syllable Structure Transfer Hypothesis (Broselow, 1988). This paper examines the strategies preferred by 20 teenage bilingual speakers of Spanish and Catalan who learn English as a foreign language in high school. Their production of consonant clusters in the onset will be acoustically analysed in order to provide a detailed description of their speech.

Participants were asked to produce monosyllabic words which are frequent in L2 classrooms with initial /s+STOP/ in isolation both in a picture naming task and in a reading task in which target words were mixed with distractors. All words were to be uttered in isolation in order to avoid resyllabification effects. Their production helps us find whether there are any facilitatory task effects due to availability of spelling. Besides, the production of onset consonant clusters is analysed in terms of accuracy, accounting both for epenthesis or consonant deletion and any other strategy followed by the participants to accommodate the complex initial clusters to their L1 phonotactics. Overall, vowel epenthesis is the mostly used strategy. In the case of vowel epenthesis, a spectral analysis of the emerging vowel is provided, and its formant structure lets us know whether they rely more on their L1 Spanish or L1 Catalan phonological system when speaking their L2, given that typically epenthetic vowels in Catalan are centralised whereas those in Spanish are mid front (i.e. /e/ like).

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Identity and adolescence as factors in L2 phonological acquisition

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Self-identification can play a critical role in the attainment of L2 phonological systems (Isabelli-Garcia 2006; Lybeck 2002). This is especially pertinent for adolescents. They are an age group in a constant state of constructing a linguistic identity, rendering them more prone to the adoption of innovative variants (Eckert 1989). To address this, the current work examines adolescent speech in the often-fraught *banlieue*, suburbs, of Paris, France. Rife with socioeconomic disparity, the *banlieue* have become infamous as hotbeds where the working-class manifests against police brutality and social disempowerment. Immigration to this area has resulted in an influx of new languages and many works have evaluated the L2 French vernaculars that have emerged (Lepoutre 1997; Conein & Gadet 1998; Fagyal 2010). Yet immigrant populations in the area are far from uniform: those of North African origin experience more stigmatization, and less cultural assimilation, than those from Western or sub-Saharan Africa (Mahmood 2015).

This study analyzes the highly-proficient speech of (*N*=11) French high school students, aged 16-18, from the *banlieue*. Sociolinguistic interviews were conducted in French with participants speaking in dyads. The French speech of three student groups was juxtaposed: L1 Semitic language speakers, L1 Bantu speakers, and monolingual French speakers (control group). Phonetic measurements, including duration of word-initial plosives and F2 and F3 of front, round vowels, were taken. T-tests show significant differences in word-initial bilabial plosive duration between L1 Bantu students and monolingual French speakers. This suggests that a documented sociolinguistic marker of North African French, the affrication and increased duration of word-initial alveolar plosives, has been adopted, and modified, in the French of L1 Bantu speakers. The sociolinguistic basis for this innovative variant is clear; I argue that it is the phonemic status of prenasalized stops in the Bantu languages that served as the phonological impetus. However, results from vocalic analyses suggest that L1 Semitic language speakers differentiate their vowels from their monolingual French peers more than L1 Bantu speakers. This is interpreted to mean that integration into the host society is a determining factor in the acquisition of L2 phonological systems. So while French immigration has resulted in an exponential growth of multiculturalism, not all incoming immigrant groups elect to adopt the standard French variety. This is demonstrated by those most prone to innovation: adolescents.

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Effect of multilingualism on processing of indexical and linguistic differences in speech sounds: A neurophysiological study

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Recent behavioural studies suggests that native and non-native adults (Kriengwatana et al., 2014) and infants (Escudero et al., 2014) employ separate mechanisms to cope with speaker versus accent variation in vowels: a mechanism that is intrinsic for speaker and gender, and learned for accent. However, neurophysiological studies (Dadwani et al., 2015; Chladkova et al., 2015) suggest these processes are the same pre-attentively for monolinguals (Australian English: AusE), bilinguals (AusE + heritage language) and Dutch listeners for whom the stimuli are native.

Multilingualism may effect sensitivity to variability in speakers versus accents, possibly due to the extensive exposure multilinguals have to various accents and languages (see detailed review of effects of exposure in Cristia et al., 2012) or depending on the first/second/third language acoustic relationships (Escudero, 2005; 2015). We assessed Indian multilinguals' (AusE + two heritage languages) pre-attentive sensitivity to variation in vowels (stimuli and procedure as in Dadwani et al., 2015). Participants completed an EEG oddball paradigm comprising frequent (standard) and infrequent (deviant) auditory stimuli. The standard stimulus was a natural vowel /ɪ/ produced by a female North Holland Dutch speaker. The four deviants differed from the standard in speaker, gender, accent (East Flanders Dutch), or vowel category (/ɛ/).

We compared the monolinguals and bilinguals from Dadwani et al., (2015) to the multilinguals and found a main effect of language group ($p = .009$). Monolinguals were more sensitive to all changes than bilinguals and multilinguals. We also found a main effect of deviant type ($p = .001$): Listeners were more sensitive to a change in gender. The individual group analysis confirmed significant main effect of deviant type for each group; monolinguals ($p = .048$), bilinguals ($p = .003$) and multilinguals ($p = .048$). Monolinguals and bilinguals were more sensitive to a gender change than to a change in speaker or vowel, whereas multilinguals' sensitivity to a gender change was larger than to an accent or vowel change. Interestingly, multilinguals seemed to have less sensitivity to an accent change than monolinguals and bilinguals. These results suggests that multilinguals adapt to at least accent variation differently from monolinguals and bilinguals.

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Co-articulatory strategies: Production of sibilant sequences in French as L1 and L2

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This study focuses on coarticulatory strategies that can be realized by three Italian learners of French-L2 and by two French native speakers in order to produce sibilant heterosyllabic clusters. In Italian, these sequences are phonotactically marked [1] and different strategies (e.g., schwa insertion) can be realized to cope with them, while in French they are unmarked and place assimilations may occur [2].

The aim of this study is to observe, within Articulatory Phonology [3]: 1) which articulatory strategies Italian learners of French realize to repair non-native sequences; 2) how their production differs from that of native speakers; and 3) if and to which extent speech rate changes and intervening prosodic boundary interfere with articulatory strategies.

The production of V1(/a/)C1#C2V2(/i/) sequences in French L1/L2 (where C1/C2=/s,z,ʃ,ʒ/; n. of repetitions=7) was observed across prosodic boundaries of different strength (phonological/intonational phrase boundary) and at different speech rates (normal/fast) because both factors can affect coarticulation. Acoustic and articulatory data were collected simultaneously (AG500) and they were analyzed auditorily, acoustically and articulatorily. The following measurements were calculated: 1) Centre of Gravity on the entire frication noise (acoustic level); 2a) Closing duration for each fricative gesture; 2b) Absolute timing between C2 and C1 target; and 2c) Relative phasing that is the ratio between C2-to-C1 interval and the duration of [a]-[i] articulation (articulatory level).

The auditory and acoustic analyses revealed that vowel insertion is the usual strategy for Italian learners across both prosodic conditions and rates. Only one speaker realized place assimilations (at fast rate and in the no-boundary condition). French speakers usually inserted a schwa-vowel only at normal rate, while they realize place assimilations in fast speech. Place assimilations were auditorily detectable and acoustically characterized by a (spectral) change from an alveolar to a postalveolar fricative.

Finally, different articulatory strategies seem to be at play. For Italian learners, schwa insertion seems to result from a gestural mistiming due to their attempt to produce non-native clusters [4], while for French speakers it rather seems an articulatory consequence of the tongue passing through a schwa-like configuration influenced by normal speech rate and strong-prosodic boundary.

As for place assimilations, French speakers realize a blending of C1-C2 modifying the timing and displacement of each gesture and, thus, the intergestural timing. The only one Italian learner who shows some cases of place assimilation realize them through a gestural hiding, since the tongue tip alveolar gesture is hidden by the prolongation of the postalveolar lip protrusion.

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"Blue" is a disyllabic word: Perceptual epenthesis in the mental lexicon of second language learners

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This study examines how second-language (L2) learners mentally store words. Lexical encoding of challenging L2 phonemic distinctions has been repeatedly shown to be difficult (e.g. Dupoux et al., 2008), but little is known about phonotactic restrictions, which create perceptual illusions in perception (Dupoux et al., 1999; Kabak & Idsardi, 2007). For instance, if L1 prohibits /dn/ clusters, the difference between two items such as /edna/ and /eduna/ evades listeners–likely a result of a perceptual repair process (/u/-epenthesis). This could have consequences for lexical encoding. Word-initial obstruent-liquid clusters are very common in English (e.g. "blue") but prohibited in Korean. Korean listeners perceptually repair illicit word-initial consonant sequences with an epenthetic vowel [ɯ] or [ʊ]. Thus they might perceive "blue" as "b[ʊ]lue" (Kabak, 2003), and, at least initially, also encode it lexically as a disyllabic word. We examine whether Korean learners of English store such English words with spurious vowels, as a result of perceptual epenthesis. If perceptual epenthesis is lexically encoded, we predict that Korean listeners will accept non-words containing epenthetic vowels ("b[ʊ]lue") as real English words more often than English listeners, because decisions about real-word-status presuppose a successful word recognition involving a match between incoming signal and stored word forms.

Two groups (L1 English: N = 21; L1 Korean, advanced learners of English: N = 18) completed a speeded auditory lexical decision task and a background/word-familiarity questionnaire. Stimuli consisted of 30 common English words containing onset clusters (*blue, play*), which were modified to create 30 pairs of non-words: test items containing [ʊ], which is the Korean epenthetic vowel for onset clusters ("b[ʊ]lue"), and control items containing [ɪ] ("b[ɪ]lue"), resulting in 60 recorded non-words. The control vowel [ɪ] was used in order to verify that the effect is based on epenthetic vowels in lexical representations, and not due to learners simply responding "yes" to items that contain any inserted vowel. An additional 120 word and non-word distractors were included.

Both groups accurately accepted the real words, and rejected the control [ɪ]-non-words. For test [ʊ]-non-words, error rate was higher for Korean listeners than for L1 English listeners. The group*condition interaction was significant ($F(2,72) = 5.137$, $p = .008$).

Korean listeners indeed appear to encode epenthetic [ʊ]-vowels in lexical representations for English words, in this case adding an extra syllable to words such as "blue". Phonotactic and syllable structure restrictions can create pervasive lexical encoding issues for learners, underlining the challenging nature of L2 word learning.

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Vowel duration as a cue to consonant voicing in Russian-English bilinguals

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Preceding vowel duration is an important correlate of voicing in English and is relied on extensively by listeners in making perceptual decisions (e.g., Warren & Marslen-Wilson). In Russian, vowel duration plays a modest role, especially in obligatorily devoiced word-final obstruents (Dmitrieva et al., 2010). Hence, monolingual speakers of Russian pay little attention to vowel duration in deciding consonant voicing (Kharlamov 2015). The hypothesis addressed in the present study is that Russian-English bilinguals, unlike monolingual Russian listeners, would rely on vowel duration when listening to English and Russian speech.

The hypothesis was tested in a forced binary-choice voicing identification experiment. Four words produced by a native speaker of American English, *mug*, *muck*, *muggy*, and *mucky*, were manipulated to vary orthogonally in vowel duration (six equal increments) and voicing duration (six increments). The same manipulation was applied to four Russian words, *mag* 'magician', *mak* 'poppy', *magi* 'magicians', and *maki* 'poppies', produced by a native speaker of Russian. Thirty-four speakers of English, thirty-four speakers of Russian, and twenty-four mostly Russian-dominant bilinguals have been tested to date.

The results indicate that the monolingual Russian group relied on vowel duration significantly less that the other two groups of participants in deciding consonant voicing. In particular, in the word-final environment, Russian-English bilinguals gave more weight to the vowel duration cue than Russian monolinguals, *when listening to Russian words*. This finding suggests that the bilingual experience of these listeners affected their perception of Russian speech.

There was also a difference among the groups of participants in terms of reliance on voicing duration. The monolingual English group relied on voicing duration less strongly than Russian monolingual or bilingual participants, although the difference was less pronounced when bilinguals were tested in English.

Thus, monolingual Russian speakers appear to rely on voicing more in comparison to other groups of listeners, while monolingual English speakers tend to rely on vowel duration more than other participants. Bilingual listeners weigh the two cues more equally than either monolingual Russians or monolingual English speakers when deciding consonant voicing.

These results suggest that bilingual speakers may transfer not only pronunciation but also listening patterns between languages and highlight the importance of understanding the triggers and potential benefits of such perceptual transfers. The difference between monolingual and bilingual Russian speakers was particularly conspicuous in the bilinguals' reliance on vowel duration in word-final position. Research in production has shown that vowel duration differences are virtually absent in monolingual Russian but emerge in the speech of Russian-English bilinguals (Dmitrieva et al., 2010). Thus, bilingual perceptual patterns may be optimized for the perception of bilingual but not monolingual speech.

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Does perceptual training modify production in L2?

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The aim of the study was to investigate whether auditory training modifies pronunciation in L2. Research suggests that some transfer of perceptual learning to production might be possible (Bradlow et al., 1997; Hazan et al., 2005). The experiment was motivated by the hypothesis that foreign accent in L2 speech has perceptual bases and that perception and production domains are inextricably linked (Liberman and Mattingly, 1985; Flege, 1995).

The participants were adult native speakers of Polish acquiring English. The study compared the pretest and post-test perception and production performance of subjects in the experimental and the control group. The experiment focused on final obstruent (de)voicing. Pretest and post-test included minimal pair identification using natural tokens and a sentence reading task. The experimental group completed four sessions of auditory training utilizing acoustically manipulated tokens in two tasks: minimal pair identification and AX discrimination. Subjects' productions were recorded and acoustically analyzed to obtain measurements of preceding vowel duration, closure duration, voicing during closure and consonant duration. Additional calculations included V/C ratio and the percent of closure which was voiced. Binary logistic regression analysis was performed for within and between-group comparisons of pretest and post-test perception accuracy. For within-group comparisons of pretest and post-test production paired-samples t-test was used. Independent samples t-test was used for between-group comparisons.

Overall, the effects of the training were more visible in the production domain. In perception none of the pre-test/post-test comparisons reached significance due to a strong ceiling effect. The control group's production did not change in any way from pretest to post-test. Production in the experimental group changed significantly in three of the six mentioned parameters. The results demonstrated that auditory training using acoustic manipulations can influence pronunciation. The study was meant to underscore the importance of perceptual training as a component of L2 phonetic training courses.

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Study abroad vs. individual differences in phonological working memory in development of native-like accent

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The impact of study abroad (SA) on development of native-like accent is known to be highly variable, depending largely on individual differences among learners with respect to 'learning context' factors, such as motivation or % L2 use (Churchill & DuFon, 2006). We investigate here the contribution of individual differences in cognitive abilities – specifically, phonological working memory (PWM) – to the development of native-like accent, in a small-scale 'apparent time' study of L1 English speaking university students of L2 German, before and after a period spent in a German speaking country. The goal was to determine whether individual differences in PWM, known to influence L2 phonological acquisition (Darcy et al 2015), interact with – or outweigh – other factors affecting pronunciation gain from SA.

Twelve L1 English-speaking full-time university students of L2 German read 'Nordwind und Sonne' (Kohler, 1990; cf. Hu et al 2013); six (2F/4M) were yet to undertake SA, six (4F/2M) had undertaken 4-11 months SA. The recordings were rated for nativelike-ness by eight L1 German-speaking listeners on a 10 point scale (Payne & Whitney 2013) and ratings correlated against i) learning context factors collected via a questionnaire (e.g. age at learning onset, motivation, number of months of SA, self-reported percentage L2 use during SA) and ii) results of a Non-Word Repetition task (NWR, Gupta 2003) as a measure of PWM. Mean accent ratings across pre-/post-SA groups were almost identical, and only weak correlation was found between accent ratings and any of the learning context factors. In contrast there was strong positive correlation (r=.85) between native-like accent-rating and NWR score across all participants, and only a marginal difference in the strength of this correlation between pre-/post-SA groups. We explore the implications for pedagogy, alongside results of ongoing analysis to measure fluency and acoustic features of selected target phonemes (cf. Knouse, 2012) for each participant.

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Is accent represented in the learners' lexicon?

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Previous research on speech intelligibility has shown that foreign-accented speech is as intelligible as native speech for non-native speakers of the same first language background. It has been argued that this is due to shared knowledge about the phonetics of the first language (Bent & Bradlow, 2003). Alternatively or additionally, it could be due to accented forms stored in the learners' mental lexicon that resulted from incorrect perception and non-native input including accented own productions. If this were the case, accented words may be not only more *intelligible* but also more *acceptable* as a good/correct token to non-native than native listeners. Therefore this study investigated how native speakers of German rate German-accented English words and compared this to native English listeners' ratings.

Twenty-four German learners of English were recorded uttering a randomized list of English minimal word pairs. Word pairs contained difficult sound contrasts in which only one token was close to the sound pattern of German: voiceless (familiar) vs. voiced (unfamiliar) word-final obstruents and the vowel contrast /ɛ/-/æ/ (familiar-unfamiliar). Acoustic analyses showed that learners produced familiar sounds similarly to native English speakers but differentiated the unfamiliar sounds less and inconsistently.

In a subsequent perception experiment we tested whether German learners of English and English native speakers rate the goodness of pronunciation as better for words with familiar vs. unfamiliar sounds. While this was true for native listeners, German learners rated both types of words as equally good. This suggests that the Germans' lexical representations of the word pairs are not yet differentiated and may contain German-accented characteristics, especially for words with unfamiliar sounds. German listeners with more English experience, however, showed a pattern closer to the native English one. This indicates that over time lexical representations develop and become less German-accented. Accented representations could thus contribute to foreign-accented production.

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The singleton-geminate contrast in Italian heritage speakers

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Phonology is an understudied domain in heritage speakers (HSs). The few existing studies show that HSs sound different from monolinguals, while having advantages over late L2 learners. Furthermore, although HSs tend to be perceived as non-native in their heritage language, they are within the range of native speakers with regard to specific phenomena, such as Voice Onset Time (e.g. Oh *et al*. 2003; Au *et al*. 2002).

The present study investigates consonant gemination in the Italian spoken by early German-Italian bilinguals. In Italian, geminates have longer duration than singletons, and vowels preceding geminates are shorter than those preceding singletons (Picket *et al*. 1999, Rochet & Rochet, 1995). This contrast is meaning distinguishing, resulting in minimal pairs such as *fato* [fa:to] 'fate' and *fatto* [fat:o] 'done'. In German, consonant gemination does not exist, but vowels preceding double consonants in writing are shorter than those preceding single written consonants. For instance, the /t/ in *Foto* 'picture' is as long as the one in *Motto* 'motto', but the preceding vowels differ in duration (cf. Braunschweiler, 1997).

In this study we ask whether HSs fail to produce the Italian consonant contrast due to massive exposure to the dominant language. We collected naturalistic speech samples from 12 adult Italian-German bilingual speakers. They all had been exposed to both languages from birth, but half of them grew up in Germany, while the other half grew up in Italy. We extracted 597 geminates and 257 singletons and measured their duration as well as that of the preceding vowels. The results show that, across the two groups, geminates were longer than singletons, and vowels preceding geminates were shorter than those preceding singletons. In fact, the differences in both consonant and vowel duration were larger in the HSs than in the Italian-dominant speakers. We discuss these results in terms of overshooting target contrasts, individual variation as well as early vs. late acquired phonological properties.

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A sociophonetic investigation of FACE and GOAT production and Scottish identity construction in Slovak immigrants in Edinburgh, Scotland

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Recent studies have found that second language learners' experiences may significantly influence their identities and motivation towards integrating into their host countries [1, 3, 6]. These results contrast with established norms; some studies [2, 5] found little evidence of second-language learners' successful integration. This study compared linguistic and language attitude data between three groups of female speakers: long-term Slovak immigrants (N=20), Edinburgh local and native-born English speakers (N=8), and fluent learners of RP English living in Slovakia (N=5). Preliminary results of my study suggested that motivation and positive attitudes towards integration are linked with accent acquisition and target identities. Participants' language backgrounds as well as their place of residence had a combined effect on pronunciation patterns: immigrants' pronunciation patterns were distinct from their local Edinburgh peers and English-speaking Slovaks in Slovakia [4]. FACE and GOAT vowel data from three production tasks were used to examine pronunciation patterns across all three groups. Rates of monophthongal pronunciation were calculated via Euclidean distances between F1, F2 vowel onsets and glides. Native Scottish participants produced significantly more monophthongal realisations overall than their Slovak peers, and both groups tended toward increasingly diphthongal realisations with non-spontaneous speech. The word list task appeared to elicit significantly different directions for all three language groups, resulting in more monophthongal realisations for the Scottish natives but more diphthongal for both Slovak groups. Language attitudes and cultural identity data were also collected through three tasks. Attitude analyses suggest that long-term immigrants form blended identities that reflect values from both home and local cultures, but remain distinct from both. Results also suggest that immigrants found Scottish and Slovak-accented RP varieties most attractive, although all groups evaluated the RP accent highest in linguistic quality. Continued residence in a region appears to have a significant effect on immigrants' awareness of local language varieties.

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Discrimination and assimilation of Brazilian Portuguese vowels by Australian English and Iberian Spanish monolinguals

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Models of speech perception such as Flege's Speech Learning Model (SLM, Flege, 1995) Best's Perceptual Assimilation Model (PAM, Best, 1994), its extension to L2 acquisition (PAM-L2, Best & Tyler, 2007) and the Second Language Linguistic Perception model (L2LP, Escudero, 2005; van Leussen & Escudero, 2015) claim that the phonetic and/or acoustic similarity between the native and target language is predictive of L2 discrimination patterns. In particular, the L2LP model posits that detailed acoustic comparisons, using the participants' own native productions and the target language vowel acoustics data, better predicts perceptual assimilation patterns and discrimination accuracy. In the present study we conducted detailed acoustic comparisons, using our participants' own native production data and tested whether acoustic similarity between the native and target language vowels is predictive of Australian English (AusE) and Iberian Spanish (IS) listeners' perceptual assimilation patterns and discrimination accuracy for Brazilian Portuguese vowels.

Twenty AusE and twenty IS monolingual speakers, aged between 18-30, participated in the present study. For our acoustic analyses, we first recorded the participants' own native vowel productions in the fVf (AusE) and fVfo (IS) context. Participants then completed an auditory 2 alternate forced-choice task in the XAB format, followed by a non-native categorisation task. Results indicate that individual listeners' non-native categorisation and discrimination patterns were largely consistent with predictions based on acoustic similarity between their own native vowel productions and the target BP vowels. AusE participants were not at an advantage and both groups found the same BP contrasts perceptually easy or difficult to discriminate. Interestingly, in our examination of the relationship between the degree of acoustic similarity and non-native categorisation (or perceptual overlap) at an individual level, it seems that some speakers show a stronger effect of acoustic overlap, while others show a stronger effect of perceptual overlap on discrimination difficulty. Finally, our findings at an individual level support the L2LP model claims that for the most reliable predictions of L2 perception, acoustic similarity should be based on data collected from the same listeners intended for testing.

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Age-related differences in second-language learning? A comparison of high and low variability perceptual training for the acquisition of English /i/-/ɪ/ by Spanish adults and children.

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It is well-established that adult second-language learners benefit from High Variability Phonetic Training (HVPT; e.g., Logan et al., 1991). However, such training likely demands a significant amount of phonological awareness and attentional resources which may present difficulties for young children. Indeed, although children have been shown to improve more than adults after training (Giannakopoulou et al., 2013), HVPT appears to benefit older rather than younger children, suggesting that the ability to use HVPT might improve with age even though plasticity for speech likely declines (Shinohara & Iverson, 2013). The present study further investigates the potential benefits of high (i.e., HVPT) vs. low variability training for perception of the English /i/-/ɪ/ contrast in children aged 9-12yrs. Additionally, the study investigates whether or not learning in the perceptual domain transfers to production and if this is affected by training paradigm (i.e., HVPT vs. LVPT).

Sixty-three native monolingual Spanish participants (44 children, 19 adults for comparison) completed 5 sessions of high (HVPT) or low variability (LVPT; single talker) training. All had learned or were learning English at school but none had experience of living in a native English-speaking country. Training was a 2-AFC minimal pair, picture identification task (e.g., *ship-sheep*) with feedback. To assess potential improvement, participants completed a category discrimination task (words and non-words, new talkers) and a word repetition task before and after training. All subjects improved across training sessions, but LVPT-children improved more than HVPT-children. Children, but not adults improved in word-based category discrimination, and only children in the HVPT condition improved in non-word discrimination. Conversely, LVPT but not HVPT-children improved in their production of the /i/-/ɪ/ contrast. Likewise, there was a tendency for adults in the LVPT but not HVPT condition to improve in their production. Overall, the results suggest that children, unlike adults, may derive some benefit from training on an isolated contrast (see also Nishi & Kewley-Port, 2007). Additionally, although variability is crucial for the generalization of perceptual learning, LVPT appears to be more beneficial for the acquisition of new articulatory targets.

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Shhh! A study comparing the production of whispered segments by Dutch L2 speakers of English and native L1 speakers.

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In this paper we present the results of our study on whispered speech in L1 and L2. We compare production strategies used by native Dutch and English speakers to distinguish between phonated and whispered voiced/voiceless final-obstruents of English words. In English, voiced final-obstruents are distinguished from voiceless final-obstruents by both the primary cue of voicing and secondary acoustic cues like preceding vowel length. Yet, in Dutch speech the primary cue of the voicing distinction between underlying voiced and voiceless final-obstruents is neutralized, as voiced final-obstruents are realized voiceless due to *final devoicing* (Ernestus & Baayen, 2003; Jongman et al., 1992). The question is to what extent native Dutch speakers make use of secondary cues of the voicing distinction in English. To investigate this, we used whispered speech, since voicing is impossible in whispered speech and only secondary cues can be used to create the voicing distinction (Raphael, 1971; Sharf, 1964).

To compare how native Dutch versus native English speakers distinguish between voiced and voiceless final obstruents in whispered English speech, we devised an experiment to test the production of final-obstruent voicing in phonated and whispered speech. Participants included twenty native Dutch speakers with a "normal" exposure to English and eight native English speakers. Using English stimuli consisting of minimal pairs which differed only by the voicing specification of the final-obstruent (e.g. *beat* vs *bead*), we analysed recordings of both groups. Results indicate that, whereas native English speakers use the secondary cue in both phonated and whispered speech, Dutch L2 speakers of English do not as no significant vowel length difference was found between words with voiced and words with voiceless final-obstruents in either phonated or whispered speech. This seems to indicate that native Dutch speakers do not make use of secondary cues of the voicing distinction in English.

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Accent Imitation on the L1 as a task to improve L2 pronunciation

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This paper presents and discusses the outcome of a focus-on-form mimicking task that makes use of learners' imitation skills to promote L2 pronunciation development. Learners listened to and imitated an L2 accent on their L1 in order to raise their awareness of cross-language differences in laryngeal timing, and to indirectly provide L2 articulatory practice while avoiding the output constraints imposed by insufficient L2 knowledge.

Accent mimicking tasks have been previously used to assess the formation of L2 sound categories (Flege & Hammond, 1982) and learners' awareness of non-distinctive phonetic differences between L1 and L2 sounds (Mora, Rochdi & Kivistö, 2014), but they have not been tested experimentally as training tasks in the development of L2 pronunciation.

Three groups of adult L1-Spanish learners of L2-English took part. An experimental group (EG-1, n=16) participated in four 40-minute training sessions on the imitation of English-accented Spanish. They mimicked speech materials targeting oral stops elicited from 6 L1-English talkers (3 male, 3 female): a set of 48 isolated words and 24 sentences were mimicked individually. In pairs they then engaged in a pre-prepared dialogue and a short spontaneous conversation (2 min) in English-accented Spanish. Another experimental group (EG-2, n=16) did the same training as EG-1 but used English speech materials from the same L1-English talkers. A group of untrained learners doing regular EFL class activities (CG, n=15) were used as control. All participants were pre- and post-tested on the perception (identification task based on VOT continua) and production (picture naming and delayed sentence repetition tasks) of English oral stops, and the perception of cross-language differences between Spanish and English oral stops (rated dissimilarity task).

EG-1 learners increased their awareness of the VOT differences between Spanish and English stops to a greater extent than EG-2 learners, and also perceived and produced English stops more accurately at post-test. The use of accent imitation tasks in L2 pronunciation development will be discussed.

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The background languages' interplay on lexicon and phonology in L3 learning

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Many studies on third language learning (L3) address the question about the role of transfer and which factors that have an impact on this. (e.g., Cabrelli Amaro, Flynn & Rothman 2012). It seems that both the first (L1) and the second language (L2) can act as a source for transfer but the question is if one of the languages have a more prominent role at a specific linguistic level. According to the L2 status factor (e.g. Bardel & Falk 2012) the L2 is predicted to be the transfer source for syntax and phonology whereas lexical transfer is likely to come from both the L1 and the L2. The data used for the present study consist of five recordings with two learners ('he' and 'she') of Swedish as L3 (L1 German, L2 English). The learners' semi-guided spontaneous speech was recorded during a period of four months. It is obvious that at the lexical level both the L1 and the L2 serve as transfer sources to almost the same extent and in the same form (i.e. adapted and non-adapted lexical items), cf.:

He: 'du måste *staya* här'   target-word 'stanna'

             you have to stay here

She: '*und* står där'   target-word 'och'

             and stands there.

However, as for phonology and pronunciation, preliminary results show that L1 is a strong transfer source, especially concerning the consonants. Acoustic analyses show that the voiced final consonants are produced as their voiceless counterpart in words like 'fredag' (Friday) when /g/ is pronunced as /k/ as in their L1. The plosive/t/ is pronunced as a German alveolar consonant instead of a Swedish dental /t/ and the use of a uvular trill /ʀ/ is German-like. Given the analyses of these recordings the different transfer sources, the L2 status factor and the relation between L1, L2 and L3 will be discussed.

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Perceptual assimilation and discrimination of L2 Australian-English vowels by Egyptian-Arabic learners varying in L2 experience

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This study investigated the perceptual assimilation and discrimination of second-language (L2) Australian-English (AusE) vowels by Egyptian-Arabic (EA) learners in an immersion setting. Thirty-eight EA learners of AusE were tested on their perceptual assimilation and discrimination of nine AusE vowel contrasts (/ʊ-ɔ/, /ɪ-e/, /ɪə-iː/, /æɪ-ɑe/, /əʉ-ʉː/, /oː-ʉː/, /oː-əʉ/, /æ-ɐ/, /eː-ɜː/). An AXB discrimination task was completed for each of the contrasts, where participants indicated whether the second of three tokens belonged to the same category as the first or last token. Participants also categorised and rated the goodness-of-fit of the AusE vowels to their L1 vowel categories, and then they attempted the task again using L2 AusE vowel categories to allow inferences to be made about L2 category formation. Participants differed substantially on factors known to affect L2 category formation (e.g., age of acquisition, length of residence), so assimilation types were determined separately for each individual. In line with the Perceptual Assimilation Model (Best, 1995), discrimination accuracy was higher, on average, for contrasts assimilated as two-category or uncategorized-categorized assimilations, as compared to single-category assimilations. Based on the individual assimilations, there were instances where contrasting phones were single-category assimilations when using L1 category labels but uncategorized-categorized or two-category assimilations when using L2 labels. In those cases, discrimination accuracy was correspondingly high, suggesting that the learners had established a new L2 category for one or both vowels in the contrast. There were also many instances where individuals assimilated the contrasts as uncategorized-categorized or uncategorized-uncategorized in both languages. Using those contrasts as a baseline, future research will track L2 category formation longitudinally over a 12 month period.

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Neural correlates of auditory feedback processing during speech production

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An important aspect of L2 speech learning is the interaction between speech production and perception. One way to study this interaction is to provide speakers with altered auditory feedback to investigate how unexpected auditory feedback affects subsequent speech production. Although it is generally well established that speakers on average compensate for auditory feedback perturbations, even when unaware of the manipulation, the neural correlates of responses to perturbed auditory feedback are not well understood.

In the present study, we provided speakers with auditory feedback that was intermittently pitch-shifted, while we measured the speaker's neural activity using magnetoencephalography (MEG). Participants were instructed to vocalize the Dutch vowel /e/ while they tried to match the pitch of a short tone. During vocalization, participants received auditory feedback through headphones. In half of the trials, the pitch in the feedback signal was shifted by -25 cents, starting at a jittered delay after speech onset and lasting for 500ms. Trials with perturbed feedback and control trials (with normal feedback) were in random order. Post-experiment questionnaires showed that none of the participants was aware of the pitch manipulation.

Behaviorally, the results show that participants on average compensated for the auditory feedback by shifting the pitch of their speech in the opposite (upward) direction. This suggests that even though participants were not aware of the pitch shift, they automatically compensate for the unexpected feedback signal. The MEG results show a right-lateralized response to both onset and offset of the pitch perturbation during speaking. We suggest this response relates to detection of the mismatch between the predicted and perceived feedback signals, which could subsequently drive behavioral adjustments. These results are in line with recent models of speech motor control and provide further insights into the neural correlates of speech production and speech feedback processing.

A morpho-phonetic account of word final cluster realization in English L2 by advanced Spanish Speakers

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Misproductions of L2 English word-final consonant clusters have been argued to be phonetically and/or morphologically conditioned (Eckman, 2004; Hansen, 2004; Campos, 2009). Much of this research has addressed the production of the past morpheme [-(e)d] and revealed that learning experience plays a positive role as more advanced learners exhibit fewer mispronunciations than beginner learners (Gallardo del Puerto and Friedman, 2013; Goad and White, 2006).

The present study aims at investigating the degree of phonetic vs. morphological condition in Spanish speakers' productions of L2 English complex codas resulting from the addition of [-(e)d] and [-(e)s] morphemes. 62 tertiary experienced language learners in three groups (upper-intermediate, advanced, and lower-advanced) were compared before and after an on-line 4-week intervention phase on verb-tense practice which also included tutorials on the pronunciation of both English morphemes. Participants performed a delayed read-aloud task with 16 sentences which included homophonic monosyllable words containing complex codas both in inflected and root forms (e.g: *fined*, *find*).

Preliminary auditory analyses coded by one native speaker revealed a rather low incidence of errors overall (5%). We found no statistical differences between the realization of clusters in inflected forms vs. root forms but discovered a positive correlation between the two variables, indicating that those learners who mispronounced the clusters in the root forms did so in the inflected forms. We also found a group effect in the production of [-(e)d], as the higher the English level of the learner group the lower the rate of error incidence. Finally, no treatment effect was found.

Results adjoin the literature that shows a positive effect of learning experience in the acquisition of L2 syllable structure. They also indicate that advanced learners' mispronunciations of clusters in inflected words are phonetically-conditioned, supporting the Prosodic Transfer Hypothesis (Goad & White, 2006), according to which L1 phonological constraints limit the production of inflectional morphology. A qualitative account of errors will be discussed as well as possible reasons for the lack of treatment effect.

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Effects of phonetic training on second-language vowel discrimination: Does musical ability matter?

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Recent studies have revealed some evidence of a relationship between musical ability and second language (L2) proficiency. Slevc & Miyake (2006) reported a relationship between musical ability and predicted perceptive and productive phonology. Alexander et al. (2005) also provided some evidence for a connection between musical ability and L2 speech perception. However, given that pitch is a shared acoustic feature of music and lexical tone perception, the link between the musical ability and general learning of L2 sounds is still unclear.

The current study extends existing research by investigating the relation between ultimate attainment in L2 vowel learning and musical ability. A total of 40 Azerbaijanian (AZ) learners of Standard Southern British English (SSBE) participated in the pre/post-tests. Thirty participants received phonetic training and 10 served as control subjects. A forced-choice discrimination test with 11 L2 vowel contrasts was used in the pre/post-tests. Trainings consisted of five sessions, which included categorical discrimination tasks using natural stimuli produced by six different native speakers. The participants' musical ability was evaluated through three subtests of the Wing Measures of Musical Talents (Wing, 1968). The overall score for the musical ability was calculated by summating the scores of the three subtests.

Discrimination of the L2 vowel contrasts significantly improved after phonetic training. Inter-individual differences were observed in the level of phonetic attainments. Correlation analysis between the overall score of the musical ability and the ultimate attainment in L2 vowel learning revealed no significant relationship. General musical ability may not be an important factor in the general learning of L2 vowel discrimination.

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Language Transfer vs. Language Talent? Individual differences and aptitude in L2 phonology of Persian-speaking learners of English

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Up to now, only few studies in the phonology of English of Persian native speakers have been performed. In the present study, we compared different individual cognitive factors which result in ESL Iranian English pronunciation such as cognitive ability and short-term memory (Working Memory and LLAMA D), language aptitude tests, such as MLAT III, IV and V [Carroll 1960], LLAMA D test [Paul Meara] and a working memory test (Tewes 1994). These measures were then correlated to English pronunciation and phonetic measurements (vowel length measurement) of Persian ESL learners. The sample comprised 30 Iranians with L1 Farsi and academic education with chronological age from 20 to 40 (mean age 26.08) and age of onset of learning from 2-16 (mean age 11.03). Results for three learner groups defined by language proficiency, confirmed previous findings of Critical Period Hypothesis regarding the significance of age of onset of acquisition in ultimate L2 attainment and the contribution of cognitive factors, language aptitude and multilingualism in L2 phonological processing. The observed relationships indicated that individuals with a higher L2 aptitude, better cognitive ability and shorter schwa duration were rated higher on English pronunciation by English native speakers.

We observed significant correlations between English pronunciation scores and these factors: schwa length pronunciation (r = -0.8), MLAT III (r = 0.8) and working memory (r = 0.78). Schwa length pronunciation also correlated highly with number of languages (r = -.74) and the age of onset of acquisition (r=.41). Our cross-linguistic results suggest that phonological native-like L2 achievement in ESL adult learners is possible in that individuals with higher L2 aptitude and working memory capacity can overcome the transfer of L1 phonological categories in L2 processing.

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The role of language experience on perceiving a new vowel inventory

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This study evaluates vowel confusability in French by English (L2) and bilingual English-Spanish (L2/3) learners, with the intent to examine the effect of language experience on listeners' perception of the vowel system of their L2 or 3. The task is modeled on an experiment with native speakers (Hall and Hume, 2013). We are interested in exploring the possible effects of an additional L1 on the perception of French vowels.

The test stimuli consisted of French nonce words of the form [aCVCa] recorded by a phonetically-trained native speaker. The consonants were distinct voiced stops either [b], [d], or [g]; the middle vowel, which was the target, was either one of the fourteen French vowels or absent completely. Participants consist of thirteen L2 listeners and nineteen L2/3 listeners, all intermediate French learners. For each of the 252 tokens, listeners clicked one of fourteen model French words written in plain text on the screen. If they heard no vowel, they were to click on "XX". In training, participants heard all model French words, and were given a block of twenty test stimuli. Responses were compiled into separate confusion matrices (one for L2 and one for L2/3).

Results indicate that the groups share the same tendencies to confuse the mid-front vowels, and like native speakers, are almost at ceiling at perceiving the vowel [i], but both groups of late learners did more poorly than the native speackers In terms of accuracy, however, there appears to be no difference between L2 and L2/ 3 learners. In order to compare the results between both matrices Cohen's Kappa Statistic (Landis & Koch, 1977) was obtained. The monolinguals (k=.45) had slightly higher accuracy than the monolinguals (k=.43); however, the results were almost identical. One noticeable difference was that L2/3 learners tended to perceive the absence of a vowel with [a] (20% of the time), which occurs much less frequently native speakers or in L2 learners. The absence of any noticeable trends in the data may lend support to the idea that learners who grew up bilingual may employ the same cognitive processes in learning and perceiving a new vowel inventory as those who grew up monolingual.

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Native accents are equally well learned with production and listening training

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Foreign-accented speech may initially slow down comprehension, but native (L1) listeners can adapt to it through exposure (e.g., Clarke & Garrett, 2004). Likewise, a native, regional accent is processed more easily if listeners are familiar with it than if it is new to them (e.g., Adank et al., 2009). After regular exposure to a new accent, L1 speakers even modify their own productions towards properties of the new accent (Evans & Iverson, 2007). These production adjustments probably result from frequent accent listening, but vice versa, shifted productions may affect accent comprehension, too. Second language learners' comprehension of an accent, for example, benefits more from having produced the accent in comparison to just having listened to it (Grohe & Weber, in press). In which way L1 participants benefit from producing versus listening to an unfamiliar L1-accent, is tested in the present eye-tracking study with a training-test paradigm.

Seventy-two L1 German participants first either produced or listened to single German words that had their initial voiced stop devoiced, e.g. /b/ became /p/, or they had no accent exposure. In the subsequent printed word eye-tracking task, they saw a target (*BALKEN* – 'beam') and listened to the accented version of it (*Palken*). Alongside with the target, a competitor (*PALME* – 'palm tree') and two distractors were printed on a screen. Target words were either taken from the exposure phase (old), or they were new. The proportion of target fixations (see Figure 1) was significantly higher for the listening ($p<.002$) and the production training group ($p<.03$) than the control group, with no difference between the two training groups; nor between old and new items. Our results suggest that in their L1, participants learn an accent equally well by listening and production. Moreover, generalization of the learned patterns to new words indicates relatively fast abstraction processes.
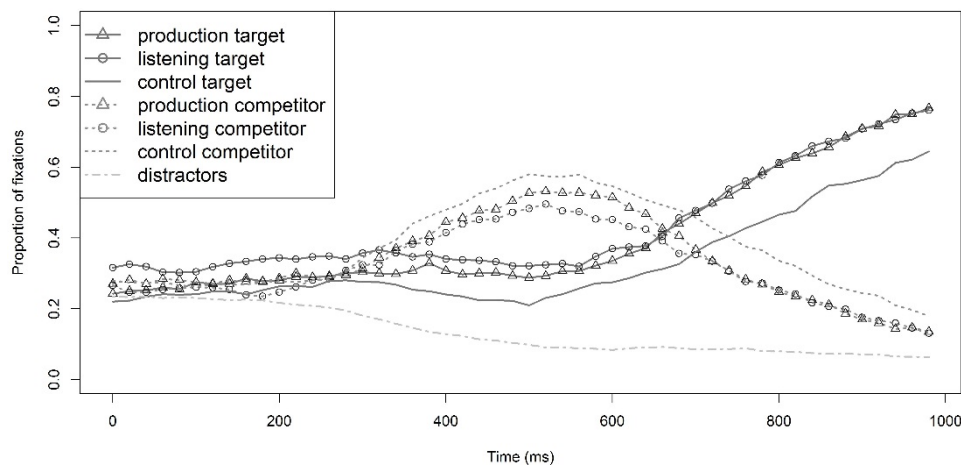

Figure 1. Proportions of target (*BALKEN*) and competitor (*PALME*) fixations.

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Utilizing electropalatography to train palatalized versus unpalatalized consonant productions by native speakers of American English learning Russian

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The distinction between unpalatalized and palatalized consonants is a central feature of the Russian consonantal system. For example, the words for 'mother' (/mat^j/) and 'checkmate' (/mat/) are differentiated by their final consonant: palatalized /t^j/ for 'mother' and unpalatalized /t/ for 'checkmate'. Acoustic analysis has shown that Russian palatalized consonants are phonetically distinguished from their unpalatalized counterparts by two main acoustic cues: the formant transitions of adjacent vowels and characteristics of the consonant release bursts (Bolanos 2013; Kochetov 2006). Previous research has shown that English-speaking learners of Russian, even those who have reached advanced levels of speaking proficiency, commonly have not acquired this contrast (Diehm 1998, Hacking 2011, Hacking, Smith, Nissen & Allen 2016). The present study utilized electropalatography (EPG) training to test whether a six-week intervention could help 10 students enrolled in a college upper division Russian phonetics and phonology class achieve more native-like productions of the palatalization contrast. Subjects were fitted with pseudo-palate devices and completed training sessions targeting four consonants: /s/, /s^j/, /t/, and /t^j/. The 10 subjects were recorded before and after training producing words containing the trained segments as well as words containing eight additional untrained segments: /n/, /n^j/, /r/, /r^j/, /l/, /l^j/, /p/ and /p^j/. On average, the Russian learners showed a statistically-significant increase from pre- to post-training in the second formant frequency of vowels preceding palatalized consonants, thus enhancing their contrast between palatalized versus unpalatalized consonants. Because the training was part of a course curriuclum (and consistent with a majority of EPG training studies, e.g., McAuliffe & Cornwell, 2008), no control group was included. We also examined whether the observed acoustic changes by the individual L2 speakers resulted in contrasts perceivable to native Russian listeners, who participated in a forced-choice word identification task that included all 1200 pre-training and post-training recordings. Relationships between the acoustic findings and the listening task will be discussed.

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Contextual effect in second language perception and production of lexical tones

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A robust contextual effect has been observed in native perception and production of lexical tones (Lin & Wang, 1985; Moore & Jongman, 1997; Shen, 1990; Shih, 1988; Xu, 1994, 1997). However, such an effect has been less systematically investigated in non-native speech (Bent, 2005; Chen, 1997). The current study examines English-speaking learners' perception and production of Mandarin tones (T1: high-level; T2: rising; T3: low/dipping; T4: falling) with varying preceding and following tones. Fifteen intermediate-level learners performed a tone identification task and a list-reading task. The stimuli were disyllabic non-words encompassing all 16 possible tone combinations. The learners' productions were evaluated by five Mandarin speakers. The results reveal that the learners' accuracy rates and error patterns varied in the initial and final position as well as in different tonal environments. For example, when the adjacent tone was T1, the learners often misidentified T3 as T4 in the initial position but as T2 in the final position. In the reading task, on the other hand, the learners frequently produced T3 as T2 in both prosodic positions, whereas the T2→T3 error was much more common in the initial position. The learners' relative accuracy of the four tones also differed in perception and production. It was most clearly manifested in T3 when the adjacent tone was T1. Specifically, in the initial position, the learners' production of T3 was more accurate than their perception, while in the final position their perception led production. These findings suggest that the prosodic position and surrounding tones both have a significant effect on the learners' performance with L2 tones, and that the effect differs in perception and production.

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Pronunciation skills of English-speaking children in a Japanese two-way immersion program

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Several studies examined the acquisition of second language (L2) speech by children in one-way immersion programs and showed that though they were successful in producing L2 sounds similar to those of their native language (e.g., voice onset time of [p, t, k]), they did not reach the target-like phonological norm (e.g., Harada, 2006; Netelenbos, Li, & Rosen, 2015; Rallo Fabra, & Jacob, 2015). On the other hand, in the past decade non-European language two-way immersion education has grown in popularity in the United States. In such programs with a balanced number of students from each target language group enrolled in a class, they are expected to get more exposed to L2 than in one-way immersion programs.

However, no research has been done on pronunciation skills of children in two-way immersion programs. This study investigated to what extent children developed their pronunciation skills in a two-way immersion program, specifically focusing on their accent, intelligibility, and comprehensibility. Ten students (5 English-dominant and 5 Japanese-dominant children) each from two grades in a Japanese English two-way immersion program in the US participated in a five-to-seven minute oral proficiency interview. A few native speakers of Japanese were asked to rate each student's interview on accent, intelligibility and comprehensibility, using a Likert scale of 1 to 6. Results showed that though the children in both grades had their speech rated as foreign-accented, their scores on intelligibility and comprehensibility were higher. In addition, we will discuss some differences in pronunciation skills between English-dominant and Japanese-dominant students.

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L2 Spanish effects on the production of L3 Portuguese voiced stops

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A persistent question in the study of third language (L3) acquisition is how it interacts with the learner's previously acquired linguistic systems, and how these patterns of interaction may vary as a consequence of the phonetic similarity between target phones in each language, speaker proficiency, and the success of acquisition of certain sounds in the L2 or L3. In this presentation, we will discuss the results of an experiment addressing the first and third questions, specifically by examining how the presence of an allophonic lenition pattern in learners' L2 (Spanish) influences their production of similar phonemes in an L3 (Portuguese). We also expand on previous research on whether the first (L1) or second language (L2) is the primary influence on the evolving L3 system [e.g., 1].

12 subjects (6 L1 English/L2 Portuguese and 6 L1 English/L2 Spanish/L3 Portuguese) were recorded reading word lists in their known languages, each containing 60 target sentences with at least one word-medial /b/, /d/ or /g/. Acoustic measurements for each segment were used to calculate two relative intensity measurements commonly used to quantify voiced stop lenition (C/V Intensity Difference and C/V Intensity Ratio) [2].

The results of this experiment provide strong evidence that the lenition pattern acquired by L2 Spanish/L3 Portuguese speakers in their L2 influences their production of voiced stops in their L3 despite the greater phonetic similarity between English and Portuguese intervocalic voiced stops, demonstrating what has been termed an *L2 status effect* [3]. A statistical analysis using Linear Mixed Effects Models shows that unlike the L2 Portuguese speakers in this study, the L3 Portuguese speakers produced voiced stops with higher relative intensity measurements in Portuguese than in English, and with values extremely similar to those observed in Spanish. This supports the hypothesis that the L2 occupies a privileged position as a source of influence in L3 acquisition, even for allophonic contrast, like Spanish voiced stop lenition, that are acquired relatively late by adult L2 learners.

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Comparing the differential contribution of L1 fluency, L1-L2 cross-linguistic influences, and L2 proficiency in predicting L2 fluency over time across two different tasks

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This study examined to what extent there are differences between task types in how much L1 fluency, L1-L2 pairing, and proficiency can predict L2 fluency over time. Research investigating the relationship between L1 and L2 fluency (De Jong et al., 2015; Derwing et al., 2009) has suggested that L2 fluency is a combination of L1 speaking style, cross-linguistic influences, and L2 processing. Task type can also influence L2 fluency: Prèfontaine and Kormos (2015) found that learners' articulation rate and average pauses differed across different types of narrative tasks, but pause frequency and phonation-time ratio did not. Nevertheless, much of the previous literature has elicited oral speech via narratives, and thus less is known about spontaneous speech.

The current study investigated the L2 fluency of English learners of Spanish (n=24) and French (n=25) across two task types, a narrative and a semi-structured interview, before and after five months residing abroad. Nine measurements of fluency were coded in Praat (Boersma & Weenink, 2015) and CLAN (MacWhinney, 2000) including those for speed (e.g., mean syllable duration), breakdown (e.g., filled pauses), and repair fluency (e.g., repetitions). Comparable L1 data were collected. L2 proficiency was assessed via an elicited imitation test (Ortega, 2000). Multiple regressions were conducted with L2 fluency as dependent variable and L1 fluency, L1-L2 pairing, and proficiency as independent variables. Results from the narratives indicated that L1 fluency, L1-L2 pairing, and proficiency differentially contributed to explaining L2 fluency behavior prior to and during immersion. The analysis of the interview data is still in progress; however, once completed will allow for a comparison across tasks to determine whether the differential contribution holds for semi-structured interviews. Findings demonstrate that factors influencing L2 fluency behavior are dynamic, and as such, L2 models of speech production should be equipped to explain these shifts.

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The relationships between phonetic compliance and oral production skills in English for French L1 EFL learners

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Phonetic compliance is defined as the intrinsic speaker-specific ability to appropriately mobilize perception and production processes in order to produce unfamiliar speech sounds. As such, it is a necessary but not sufficient condition for the acquisition of the phonetics and phonology of a foreign language (Delvaux et al., 2014). This paper investigates the relationships between phonetic compliance and oral production skills in English by EFL learners. If the former is one of the determinants of the latter, one may hypothesize a positive correlation between associated indicators in the performances of English L2 learners.

Thirty French L1 English L2 learners, whose language level in English was assessed as B2, participated in the experiment. Task 1 consisted of a reading of "The north wind and the sun". All oral reading productions were assessed twice by 3 experienced EFL teachers using a 10-point Likert scale to answer 5 questions (on overall performance in oral production and specific oral skills regarding: prosody, schwa productions, overal phonetic accuracy and stress realization). Based on these assessments, 12 participants (the 6 best and the 6 poorest) were selected to perform Task 2. Task 2 consisted in 10 repetitions of the French oral vowels, as well as 6 repetitions of 94 synthesized vowel-like stimuli spanning the whole vocalic space. Formant values manually measured in the middle of the repetitions were used to compute three indices of phonetic compliance (following Delvaux et al., 2014).

Results showed that: (i) task 1 exhibited a good discriminative power between L2 learners and resulted in assessments which showed excellent intra-judge and good inter-judge correlations; (ii) task 2 revealed meaningful individual profiles in phonetic compliance based on both the consistency and the complementarity of the information provided by the three indices; (iii) the correlations between performances in tasks 1 and 2 were poor. We will discuss at the conference two (possibly concomitant) interpretations for this latter result: either oral skills in the dominant foreign language are only loosely correlated with the overall ability of the L2 learners to reproduce unfamiliar speech sounds, or our indicators of oral skills (and/or phonetic compliance) need refinement to allow for such correlations to emerge.

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Discrimination of non-native length contrasts by Mandarin listeners

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Japanese is one of the few languages where geminates can be preceded and followed by both long and short vowels. This might affect the discrimination of geminates from singletons by non-native speakers of Japanese. In the current study, perception of Japanese singletons and geminates by native Mandarin listeners was examined. As Mandarin does not use length contrastively (Flege et al., 1997; Lin, 2001), it was predicted that native Mandarin listeners would have difficulty in discriminating the Japanese singletons and geminates.

Ten native Mandarin speakers participated in the experiment. The stimuli consisted of six disyllabic pseudo-words with word-medial singletons and geminates that were preceded and followed by short or long vowels (/pata/, /pa:ta/, /patta/, /pa:ta:/, /patta:/ and /pa:tta/), produced by a native Japanese female speaker. The participants were asked to complete an AX discrimination task with 168 trials ((15 different + 6 same pairs) × 8 AX combinations), resulting in a total of 1680 trials (168 trials × 10 listeners). The data were analysed using A'.
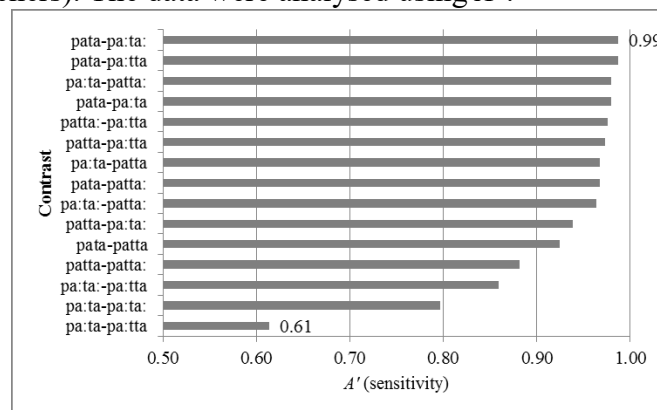

Figure1: A' scores of the AX discrimination task

The results indicate that Mandarin listeners performed near ceiling in most of the pairs (e.g., in /pata/-/pa:ta:/, /pata/-/pa:tta/). However, they performed poorly in discriminating the /pa:ta/-/pa:tta/ pair (0.61). Looking closely at the types of pairs with highest and lowest scores (0.99 and 0.61), we found that pairs that differed in both vowel and consonant length (e.g., /pa:ta/-/patta:/) were discriminated more accurately than pairs that only differed in consonant length (/pa:ta/-/pa:tta/). This suggests that Mandarin listeners are more sensitive to the vowel length than consonant length. Previous studies have shown that although Mandarin does not have any vowel length contrast, Mandarin listeners can easily discriminate English short and long vowels (Bohn, 1995). Our study raises questions about the universality of consonantal and vocalic length contrasts and their role in non-native speech perception.

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The never-ending 'critical period': Bilingual dominance depends on the age of learning both for early and late bilinguals

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According to various formulations of the critical period hypothesis (CPH), age of second-language learning (AOL) does not influence degree of second-language (L2) learning or native language (L1) retention in late bilinguals (Bylund, 2009; Johnson & Newport, 1989). In other words, the CPH predicts that AOL does not correlate with the extent to which late bilinguals become L2 dominant because of L2 learning and L1 attrition. This is because late bilinguals already passed the critical period for language learning and attrition at the onset of L2 learning.

Here, we examined L1 vs. L2 speaking rates in early and late bilinguals in order to shed new light on age effects on L2 acquisition and L1 attrition. We examined L2/L1 speaking rate ratios as a function of AOL because speaking rate is a central aspect of fluency and may serve as a proxy for overall proficiency in bilinguals' two languages (Segalowitz, 2010), and because Flege, MacKay, and Piske (2002) proposed ratio of speaking rates in the L1 and L2 as a good language dominance index.

The participants were 20 early (AOL = 2–10 years) and 20 late (AOL = 17–36 years) Spanish-English bilinguals who were all highly experienced. They produced six English and six Spanish sentences that were measured for speaking rate (seconds per syllable). Subsequently, the L2/L1dominance metric was derived by dividing the English by the Spanish duration values.

The dominance metric correlated significantly with AOL in both early (r =. 56) and late bilinguals (r = .51), indicating that AOL influenced the extent to which the bilinguals became L2 dominant irrespective of whether L2 learning began before or after the puberty. This result seems incompatible with critical period accounts of L2 learning and L1 attrition, but points to ever-stronger L1 entrenchment and/or cognitive aging as important factors that make L2 acquisition ever-harder also in adulthood.

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Three studies, one goal – different methods for non-native contrast training

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Training of novel phonetic features is a common theme in second language learning research. Traditionally, training has included feedback and focused on perceptual methods, most often identification (e.g., Tremblay et a. 1998) or discrimination (e.g., Atienza and Cantero, 2001) training, using either synthetic (e.g., McCandliss et al. 2002) or natural (e.g., Hazan et al. 2005) stimuli. The three separate studies presented here, however, utilised less common training procedures: production training or passive auditory training using synthetic stimuli. The aim of all three designs was to examine the effectiveness of short training schemes.

Different contrasts were trained in each of the three studies: either voicing, duration or vowel quality. Vowel or word stimuli were used in the training, and no feedback was given. Subjects were either children or young adults, and all studies took 2─3 consecutive days. The studies employed two different methods: The voicing and duration studies used listen-and-repeat training, while the vowel quality study employed intensive distributional listening training. In the voicing and duration studies a small number of stimuli was presented in four short sessions, whereas the vowel quality study used a large number of stimuli and two long sessions. All three studies conducted baseline and endpoint measurements using behavioural discrimination tasks and psychophysiological Mismatch Negativity (MMN) recordings with an oddball paradigm.

Preliminary results of the studies suggest training related changes, visible both behaviourally and psychophysiologically. Significant learning effects were observed in MMN and nearly all behavioural tests in the voicing study. Two of the projects, the duration and vowel quality studies, are ongoing and already exhibiting progress similar to the voicing study. Taken together, these results all suggest that different methods of short term training can result in learning effects for various types of contrasts.

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The acquisition of English /h/: Input Frequency and perceptual salience in a corpus study

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While L1 French speakers are able to produce English /h/ and have a demonstrated ability to perceive it in the input (Mah et al., 2007; Mielke, 2002), they often make errors of deletion, e.g., _igh (high) and _elp (help), that persist well after mastering other English phonemes. /h/-deletion is corroborated by the systematic deletion of /h/ in English loanwords to French (Paradis & LaCharité, 2001). This is problematic for accounts of L2 phonological acquisition that assume that errors are a result of incorrectly mapping L2 input to an L1 perceptual or categorical correlate (e.g., Flege, 1995; Best & Tyler, 2007), as these learners do not substitute /h/ with another phone. How can we account for the difficulty that learners' have lexicalizing phones that are reliably perceived in the input? Factors such as input frequency (e.g., Trofimovich et al., 2007) and perceptual salience (Goldschneider & DeKeyser, 2001) may hold the key, given the variable production of /h/ by native speakers of English.

The present study aims to quantify and qualify /h/ in English native speaker input, to identify how these contribute to the late acquisition of this phoneme by Francophones. A corpus of student-directed teacher talk was compiled to determine the type of input to which learners are exposed in an L2 language environment. Results indicate that in teacher speech, /h/ most commonly occurs with function words (which triggers its deletion in non-phrase-initial contexts) and when it does occur, its perceptibility is often blurred by neighboring sounds. We propose that the difficulty acquiring this segment is therefore, at least in part, due to its low frequency and opaqueness (low perceptual salience) in speech directed to L2 learners. These findings will be discussed in terms of their contribution to SLA research and L2 pedagogy.

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The effect of non-native production training in different age groups

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The focus of these three studies was to see how the same phonetic training affects the production of a non-native vowel in different age groups. The trained vowel pair was difficult according to second language learning models (Best & Strange, 1992; Flege, 1987) as the target vowel was acoustically and articulatorily close to the native vowel, but not phonologically relevant in the native language. Earlier studies have shown that production can be altered by perceptual training (Bradlow, Pisoni, Akahane-Yamada, & Tohkura, 1997) and auditory feedback (Perkell, 2012).

Here we present three separate studies with different monolingual age groups: children (7-11 years), adults (18-32 years) and seniors (62-73 years). The studies included four production tests and four listen-and-repeat training sessions on two consecutive days. The stimuli were semisynthetic pseudowords /tʉ:ti/ as the non-native target word and /ty:ti/ as the non-target. The main acoustic difference was on the first vowel F2 value. We analysed the two lowest formants and their standard deviations from the steady-state phase of the first vowel.

The results showed that children changed their productions towards the target vowel after three training sessions as shown by the change of the F2 values. The adults could produce the two words according to the model already in the first session. However, the standard deviation of the F2 values started to decrease after the first training indicating that the subjects produced the target with less hesitation. The seniors changed their production of the target vowel F2 values after only one training session. To conclude, all groups benefitted from training. The production modifications in children may be the result of high motor plasticity while the changes in senior productions could be related more with knowledge, whether explicit or implicit, of the acoustic-articulation relationship. However, adult learners seem to benefit both from actual plasticity and linguistic knowledge.

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The ICE-IPAC project: Testing the protocol on Norwegian and French Learners of English

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Different learner corpora of English exist already which typically tend to focus on various aspects of the grammar, vocabulary, and written forms, although there also exist learner corpora in interphonology, see e.g. the *Asian English Speech Corpus Project, AESOP* (Kondo, 2012), and other projects which focus on prosody in L2 English, e.g. the *LeaP Corpus* (Gut, 2009).

English interphonology has hitherto been studied fairly extensively, but still, many questions merit attention: What is the role of input in contexts where different varieties of English are spoken? Do interphonological phenomena surface in a similar fashion and to the same extent in situations of EFL (English as a Foreign Language) vs. ESL (English as a Second Language)?

ICE-IPAC is a project on English interphonology aiming at describing variation in learner production in both EFL and ESL contexts. It was inspired by two well-established corpus projects, namely IPFC (*Interphonologie du Français Contemporain* (Detey et al., in press), which focuses on learners of French as a foreign language, and PAC (*Phonologie de l'Anglais Contemporain*; Durand & Przewozny, 2012), which focuses on variation in contemporary L1 English.

A pilot study was conducted using the words lists of the PAC protocol. Two female Norwegian learners (NW1 and NW2) from Tromsø, and two female French learners (FR1 and FR2) from Lyon were recorded.

The phonological phenomena observed in their production will be compared with future recordings of a larger number of Norwegian- and French-speaking learners, and of speakers of other languages in foreign and second language contexts.

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Native and non-native listeners' speech comprehension performance under adverse listening conditions

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There is an abundance of literature on the effects of clear speech and intelligibility (e.g. Bradlow & Bent, 2002; Bradlow et al., 2003). However, intelligibility may not always concord with speech comprehensibility (Hustad & Beukelman, 2002). Comprehension assesses a listener's ability to construe the meaning of an acoustic signal in order to be able to answer questions about its contents while intelligibility indicates the extent to which a listener can precisely retrieve the acoustic signal (Hustad, 2008). It is notable that previous comprehensibility studies that were administered to ask listeners for sentence-level information (Hustad & Beukelman, 2002) or narrative-level information (Hustad, 2008) were presented to native listeners. No research has been done on which clear speech properties (e.g. expanded vowel space) produce a clear speech benefit at word level for L2 learners for speech produced in naturalistic settings.

This study explored whether expanded vowel space in target word items from a Diapix task were more comprehensible for both L1 British English speakers and early and late L2 British English learners in quiet and in noise. Sixteen British English listeners, 16 native Mandarin Chinese listeners as early learners of L2 and 16 native Mandarin Chinese listeners as late learners of L2 rated hyperarticulated samples versus non-hyperarticulated samples for comprehension under four listening conditions of varying white noise level (quiet or SNR levels of +16dB, +12dB or +8dB). from (3x2x4 mixed design). Mean ratings showed all three groups found hyperarticulated speech samples easier to understand than non-hyperarticulated speech at all listening conditions. Results are discussed in terms of other findings (Uther et al., 2012) that suggest that hyperarticulation may generally improve speech processing for all language groups.

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Effects of phonotactic constraints on vowel perception

by L2 speakers of English

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The purpose of this study was to investigate epenthesis by L2 speakers when they are given illegal consonant clusters in their L1 and development of L2 speech perception. In Experiment 1 (ABX task), vowel perception following voiced fricative and stop consonants was tested for native Japanese speakers with high proficiency of English (JH), native Japanese speakers with low proficiency (JL), and native English speakers, and the results showed that there was no significant difference between groups. In Experiment 2 (ABX task), it was examined whether JL and JH discriminate can the stimuli with $V_1C_1C_2V_2$ structure from those with $V_1C_1UC_2V_2$ structure, and it was found that the accuracy inidentifying the vowel was higher for JH. In Experiment 3 (a forced-choice task), ES, JH and JL identified non-words when given both the sound files with illegal phonotactics in Japanese and legal ones (/u/ vowel being pronounced between the consonants). There were significant differences in the percentage to identify the non-words among the three groups: ES showed almost perfect performance and the accuracy in identifying the simuli was significantly higher for JH than JL. Although it was reported that L2 speakers perceive an illusionary vowel in illegal phonotactics in their L1 (Dupoux, et al 1999), they also did not perceive a vowel inserted between consonants in certain contexts. Thus, they are not able to discriminate illegal consonant clusters in their L1 from legal syllable structures under certain conditions. However, their perception of illegal consonant clusters develops and approximates native English speakers as their L2 proficiency improves. This study provided evidence supporting the one-step model of speech perception proposed by Dupoux et al. (2011) and SLM (Flege, 1986) regarding development of L2 speech perception at the syllable level.

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Intonation in declarative sentences in Finnish-speakers' spontaneous Finland-Swedish

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As oral skills assessment is becoming more and more common, the different pronunciation features to be involved in the assessment have to be chosen carefully. Research combining L2-pronunciation and oral skills assessment has, however, been widely neglected (Kang 2013). There is also only a little research on Finnish-speakers' pronunciation in Finland-Swedish as L2 (Kautonen, Kuronen & Ullakonoja submitted) despite the fact that Swedish is an official national language in Finland along with Finnish, and many Finnish-speakers learn the Finland-Swedish variety at school. Knowledge on Finnish-speakers' pronunciation of Finland-Swedish is therefore of great value for language teaching and assessment in Finland. Because of the phonetic similarities between Finnish and Finland-Swedish (e.g. Kuronen & Leinonen 2010), L2-speakers' differences from native speakers may often be scarce on the segmental level, whereas the greatest differences between speakers can be expected to occur in prosody.

In this study, I examine Finnish-speakers' (n=7) intonation in declarative sentences in Finland-Swedish spontaneous speech by measuring f0 acoustically. Data come from the National Certificates of Language Proficiency intermediate level (B1-B2 in CEFR; Council of Europe 2001) tests (www.jyu.fi/yki). The aim of this study is to compare speakers by examining the pitch contours used (e.g. falling, rising), f0 peaks and range in declarative sentences, and contrasting them with the pitch contours of native Finland-Swedish speakers.

The results indicate that Finnish-speakers' declarative intonation in Finland-Swedish on CEFR-levels B1-B2 shows some individual variation, but resembles the native speaker model to a considerable extent. The results are important because they provide new information not only on Finnish-speakers' learning of Finland-Swedish pronunciation, but also on Finland-Swedish intonation in general, which has, thus far, only been marginally studied (e.g. Huhtamäki 2015, Vihanta et al. 1990). In addition to implications for educational purposes, the results imply that variation in intonation should be considered when assessing oral language skills.

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Intra- and inter-gestural coordination in L2 speech production by Japanese learners of English

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The influence of native language (L1) on second language (L2) production has been widely examined particularly with vowels and consonants, yet remarkably fewer studies have addressed how L1 suprasegmental properties affect L2 production. In the current project, we investigated intra- and inter-gestural timing of English production by Japanese learners of English. Compared to English, Japanese is characterized by a simpler syllabic structure and no vowel reduction. These prosodic differences may explain problems that native Japanese talkers have in producing L2 English speech timing including changes in duration based on stress placement or vowel reduction (i.e., intra-gestural timing) and based on syllable structure (i.e., inter-gestural timing). Forty English sentences produced by ten native Japanese and ten native Australian English talkers were recorded, and the duration and variability of consonant and vowel intervals (n=20,249) were examined. The results showed that the mean durations of both consonant and vowel intervals were longer, and that overall durational variability was found to be significantly smaller in the L2 production compared to the native English production. We also conducted further analyses to examine speech timing on consonant cluster production (n=6,963), showing the differences in the gestural coordination between the native and non-native talkers. For instance, unlike the native English production, the second consonant in consonant clusters were significantly shorter than the consonants not in clusters among the L2 productions, possibly compensating for the difficulty in producing non-native consonant clusters. These findings suggest that non-native speech timing is characterized by not only the intra-gestural timing as shown in the findings of phoneme durations, but also by the inter-gestural timing, i.e., how we coordinate phonemes.

Do German learners of English sound bored when speaking English? A study on the influence of pitch range on perception of "boredness"

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Research has found that German speakers employ a narrower pitch range than British English (BrE) speakers (Mennen, Schaeffler and Docherty, 2012). Such differences can impact on how speakers are perceived, as pitch range is found to independently contribute to a class of character types (Ladd, Silverman, Tolkmitt, Bergmann and Scherer, 1985; Patterson, 2000). There is, for example, strong anecdotal evidence that German speakers are perceived as "bored" by BrE listeners (Eckert & Laver, 1994). As L2 learners often transfer their native pitch range patterns (Mennen, Schaeffler and Dickie, 2014), our question was whether German learners of BrE would be perceived as more bored than native English speakers.

Native BrE listeners rated sentences produced by six female speakers of BrE and six female German learners of BrE on a scale from Bored (1) to Interested (7). In one condition, the sentences were low-pass filtered (LPF) so only prosodic information was perceptible. In a second condition, the LPF sentences were also monotonised (LPF-mono), so only a flat intonation contour was heard. In a third condition, the original sentences were heard.

ANOVAs showed that the German learners were perceived as more bored than native English speakers in the original sentences (L2Eng: 3; NatEng: 5.3). When only prosodic information was available (in the LPF and LPF-mono condition), English speakers were perceived as more bored than in the original sentences, whereas for the L2 learners ratings did not significantly differ across conditions. It appears that L2 learners were already perceived as bored, so the removal of segments and/or the monotonising of intonation had no further effect on perception.

These results confirm anecdotal reports that German speakers are perceived as bored, even when speaking in English. In discussing our results, we highlight the correlation between listener judgements and measures of pitch range, and provide a preliminary account of what learners could improve to make them sound more interested.

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Japanese Phonotactics Influence Perception of English Consonants by Japanese learners of English

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The present paper demonstrates that the phonotactic properties of Japanese influence perception of English consonants by Japanese learners of English. We first extend PAM-L2 (PAM-L2; Best & Tyler, 2007) to account for the effects of differences in native and non-native phonotactics on non-native and cross-language segmental perception, and test our predictions in two perceptual experiments with near-monolingual Japanese learners of English as a second language (L2). Japanese learners of English provide an excellent population to study with respect to the role of phonotactics in L2 segmental perception because Japanese maintains co-occurrence restrictions whereby consonants and vowels are limited in how they combine in /CV/ sequences. The stimuli for these experiments are 8 /VCV/ strings, five that adhere to Japanese co-occurrence restrictions, and three that do not. In Experiment 1, Japanese listeners participate in a categorisation and goodness-of-fit rating task which involves mapping both phonotactically legal and illegal /VCV/ strings into Japanese categories. In this experiment, participants categorised strings as expected, assimilating phonotactically illegal strings to their predicted, perceptually nearest categories. Experiment 2 uses the same tokens across five AXB discrimination tests; two that test the discriminability of pairs of English /VCV/ strings that are phonotactically legal in Japanese and three that test the discriminability of pairs of English /VCV/ strings, when one string adheres to Japanese phonotactics and the other violates Japanese phonotactics. Our results show that Japanese listeners are more accurate and have faster response times when discriminating between legal strings than between legal and illegal strings and suggest that Japanese phonotactics influence listeners to repair consonants in illegal /VCV/ strings to their nearest legal /VCV/ counterpart. This is an important finding with clear theoretical implications given that most contemporary models of non-native and cross-language speech perception, like the Perceptual Assimilation Model (PAM), predict and account for the varying degrees of success that learners have with non-native phonetic and phonological contrasts but offer no framework or predictions for the ways in which native phonotactics may play a role in non-native segmental perception.

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Extreme perceptual instruction improves L2 production but not L2 perception: Evidence from a classroom-based study

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Studies researching the effect of phonetic instruction highlight its positive influence on modifying learners' pronunciation (Macdonald, Yule & Powers, 1994; Derwing, Munro & Wiebe, 1998; Moyer, 1999). Moreover, insights from cognitive phonology imply that the obstacle to acquiring L2 sounds is cognitive rather than physical (Fraser, 2001; 2006). Practice is essential but hearing and repeating an L2 sound is not sufficient – understanding its auditory quality in a way logical for the learners is of crucial importance for enhancing their perceptive skills and phonological awareness thus leading to appropriate concept formation and L2 sound categorisation.

This paper investigates the influence of a perceptual training on the perception and production of English front vowels /iː, ɪ, e, æ/ by Macedonian learners of English (*N=31*). These vowels are frequently mispronounced due to L1 influence: /iː, ɪ/ are similar to Macedonian /i/, whereas /æ/ is a non-existing sound and is misperceived as /e/. The training combined traditional and communicative-cognitive teaching techniques with a focus on raising subjects' awareness. They were exposed to authentic speech (high speaker variability), as well as to critical evaluation of their own English speech. Activities for practicing speech perception were predominant; speech production was neither encouraged nor practiced. The training spanned twelve 45-minute classes across three weeks (total 9h).

To test the effectiveness of such training, a mixed method approach was used: two quantitative analyses of subjects' pre- and post-training perception and production of /iː, ɪ, e, æ/ (3 perception tests, NS ratings of read words and extemporaneous speech), as well as a qualitative analysis of their views on the training (interviews).

Results show indicative but not significant improvement in subjects' perception of /iː, ɪ, e, æ/. Production results indicate significant improvement in the pronunciation of /æ/ but no improvement for /iː, ɪ, e/. Qualitative results reveal a general feeling of raised awareness and concern for one's L2 speech, preference for some techniques such as minimal pair sound discrimination, critical listening and individual corrective feedback. These findings suggest that practice in one modality (perception) may facilitate improvement in another (production) but not for every sound – L2 sounds non-existing in learners' L1 being particularly receptive to this phenomenon. They also imply that enhancing learners' noticing skills facilitates categorical development.

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Vowel inventory size matters: Assessing cue-weighting in L2 vowel perception

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Previous research suggests that speakers of languages with a small vowel inventory may show difficulties in discerning small-scale spectral differences, leading to the over-use of temporal cues. Conversely, speakers of languages with larger vowel inventories could be more sensitive to small-scale spectral differences (Bohn, 1995; Fox, Flege, & Munro, 1995; Frieda & Nozawa, 2007; Hacquard, Walter, & Marantz, 2007; Iverson & Evans, 2007). The present study sought to extend previous research to four L1s differing in the size of their vowel inventory, and to further investigate whether L1 vowel inventory size could be a contributing factor to the use of temporal cues in L2 vowel perception. Seventy-two participants, L1 Danish (n=20), L1 European Portuguese (n=18), L1 Catalan (n=20) and L1 Russian (n=14), and an L1 English control group (n=7), performed a forced-choice /i-ɪ/ identification task containing natural and duration-manipulated stimuli. Between-groups comparisons showed that the L1 groups differed significantly in the identification accuracy for the duration manipulated stimuli (F[3,68]=36.01, p<.001). Posthoc comparisons showed that the L1 Danish participants manifested the most native-like vowel perception, outperforming all other L2 groups (p<.001). The L1 Russian participants identified duration manipulated stimuli to the least accurate degree, differing significantly from the other L2 groups (p<.001), thus showing the highest overreliance on duration cues. Interestingly, the Portuguese and Catalan learners did not significantly differ from each other (p>.05), which may be accounted by their comparable L1 vowel inventory sizes. These findings are in line with the vowel inventories of the languages in question- Danish having the largest vowel inventory (20+), Portuguese and Catalan having a medium sized vowel inventory (8-14) and Russian the smallest (5). The results are discussed in terms of pedagogical implications for L2 vowel learning.

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Perception of English liquid consonants by Japanese speakers: Evidence from mimicry speech

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This study examined Japanese speakers' discrimination of English liquid consonants by examining their mimicry speech in order to investigate their perception of American English pronunciation. It is well known that Japanese speakers have difficulty in differentiating the liquid consonants /l/ and /r/ (Takagi and Mann, 1992), because they are not contrastive in Japanese. Allophonic variations of both /l/ and /r/ occur in Japanese speech. The most common realization is alveolar tap [ɾ], but [l] also occurs in natural speech (Arai, 1999). However, these variants are phonemically recognized as the same phoneme, conventionally transcribed as /r/, in Japanese.

First we analyzed production errors in English by Japanese speakers using a large English learner corpus (J-AESOP). We found that Japanese speakers have more problems with English /l/ than with /r/; they substituted /r/ for /l/ more than /l/ for /r/ (418 versus 124 examples out of 2,142 consonantal errors). Then we collected mimicry speech of (1) Japanese speakers imitating American English accented Japanese and (2) English produced by Japanese mimicking native American Enlish speakers. The liquid pronunciation of their recorded performance was assessed by native English speakers to determine if the liquid sounds were closer to /l/ or to /r/. We found that all Japanese speakers overused [ɹ] and r-colored vowels (i.e. produced with a curled tongue tip), which showed very low F3 when they performed (1) and (2) above. One speaker produced a typical approxomant [ɹ] in all her English performances, and the substitution of /l/ was rare in all subjects' speech.

These results are similar to those of Aoyama et al (2004), and suggest that Japanese speakers can perceive English approximant /r/ and because they could reproduce it in their mimicry performance. Japanese consonants, except for /w/, generally lack lip rounding, whereas the English approximant [ɹ] is produced with lip rounding i.e. acoustically characterized with a low F3 and relatively slow transition of F1 to the following vowel. The English approximant [ɹ] is phonetically very distant from Japanese /r/ (typically [ɾ]) and other consonants. It sounds quite different from any Japanese consonant, and so Japanese speakers may identify it as a new sound category, as suggested by the Speech Learning Model (Flege, 1995). On the other hand, English /l/ may belong to the same category as Japanese /r/, making it difficult to distinguish as a different sound from Japanese /r/. Therefore, Japanese speakers would substitute English /l/ with either Japanese [ɾ] or English approximant [ɹ], because both of these are perceived as /r/ by Japanese speakers.

These results suggest that Japanese speakers can detect English /r/ but not /l/. Therefore pronunciation teaching in language classes should focus more on /l/ than on /r/.

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Phonological subsystems in interaction:
An exploratory study of young multilinguals

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The present study aims to explore the interactions between three vocalic subsystems of multilingual speakers and to investigate the role language status might play in explaining variability across them. Eight 13- and 14-year-old children who grew up in Germany, had learnt English in school for six years, and Polish for one year, participated in this study. They were divided into three subgroups: children of German parents, children with one Polish-speaking and one German-speaking parent and both German and Polish as their home languages, and children with two Polish-speaking parents and Polish as their only home language. The young multilinguals read a word list and performed a delayed repetition task in all their languages, with both tasks containing several tokens of /i, ɪ, u, ʊ, e, æ, ɛ̃, ɔ̃/ (if present in the language). The average F1, F2 and vowel durations of these vowels were analysed in all three languages.

The results showed that the two heritage speaker groups tended to produce a larger durational difference between German /i/ and /ɪ/ than the children of German parents. Moreover, the heritage speaker groups themselves differed in producing length differences in the English as well as the Polish high front vowel contrasts. Regarding vowel quality, the children with two home languages realized German /i/ with a lower F1 and Polish /i/ with a higher F1 than the other two groups. The results demonstrated, in fact, a great degree of individual variability in the production of the tested vowels in all the speakers' languages and pointed at initial conditions, indexed as language status, as one important factor shaping the phonological system of these multilinguals. The findings are interpreted within the framework of the Dynamic Systems Theory (e.g. de Bot 2012).

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Learning about word stress in L2 acquisition

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The *Computer-Assisted Listening and Speaking Tutor* (CALST, cf. Koreman et al., 2013) is a multi-lingual pronunciation training platform for learning new sounds and consonant clusters in the learner's target language (L2). In this talk, the extension of the platform with exercises for word stress will be presented.

Word stress can present a problem for L2 learners, because languages differ in their assignment of word stress: stress can be fixed, variable or lexical (van der Hulst, 2014), while some languages do not have stress at all. It is still quite unclear how L1 stress assignment affects the acquisition of word stress in L2 (e.g. Archibald, 1995).

For this reason, it has not been possible to base the selection of exercises on a contrastive analysis of L1 and L2, as it has been implemented for exercises for individual sounds and for consonant clusters. We therefore decided to reverse our approach: Instead of using contrastive analysis as a principle for selecting word stress exercises, we will use the learners' results to discover the principles behind L2 acquisition of word stress.

We have implemented word stress exercises varying the number and structure of the syllables in the words as well as their morphological complexity. These parameters are known to be typologically important for stress assignment (cf. Goedemans et al., 2015). All results for users with different L1's are logged, so that the errors can be analyzed in terms of the phonological properties of L1 and L2 word stress. In this way, CALST is used as a tool for discovering the *(morpho-)phonological* principles behind the acquisition of L2 word stress.

In addition, the *function* of word stress also appears to play a role (Kijak, 2009), and also the *phonetic exponents* of stress vary across languages (Lehiste, 1970). These issues will have to be addressed later.

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The role of beat gesture perception and production in L2 pronunciation training

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Research has shown that the use of beat gestures (rhythmic hand/arm movements that are typically associated with prominent prosodic positions in speech) has a number of linguistic functions, including aiding in word memorization (So et al., 2012, Igualada et. al, 2015) and discourse comprehension (Krahmer and Swerts, 2007, Biau and Soto-Faraco, 2013). However, little is known about the potential beneficial effects of beat gestures in second language pronunciation learning. The studies presented here explore the effect of beat gesture observation and production on pronunciation improvement in a language with different rhythmic properties than one's own, specifically addressing the notion of accentedness-- the degree to which a speaker sounds nonnative (Derwing and Munro, 1997).

The first study investigated the impact of beat gesture observation on the acquisition of native-like L2 speech patterns. Twenty Catalan speakers watched a training video in which an instructor gave spontaneous responses to English discourse prompts (separated into easy and difficult), either with or without accompanying beat gestures. The results of the comparison between participants' pre-training and post-training speech samples demonstrated that beat gesture training significantly improved their accentedness ratings on the more discourse-demanding items. This supports the role of beat gestures as highlighters of rhythmic information and has implications for pronunciation instruction practices.

The second study aims to extend the findings of the first experiment to gesture production. It has been shown that in the case of iconic gestures, producing them facilitates learning mental tasks more than simply observing them (Goldin-Meadow et al., 2012). This study will investigate whether participants show higher gains in accent improvement if they are instructed to imitate the experimenter and produce beat gestures themselves, rather than only observe them. This study will be conducted using very similar training materials, with a new set of participants, who will be asked to repeat the instructor-produced gestures on half of the training items. Their improvement on these items will be compared to improvement on items for which they only observed the gestures.

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The role of beat gestures and prosodic prominence on second language novel word acquisition

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Recent research has shown that beat gestures are temporally integrated with speech and favor language comprehension and recall in a first language (e.g., So et al., 2012; Igualada et al., 2014). Yet, little is known about whether the beneficial effects of beat gestures are due to the effects of concomitant prosodic prominence (as beat gestures are typically associated with prominent prosodic positions), and whether these effects are also present in L2 language acquisition. This study investigates the effects of prosodic prominence (e.g., focal pitch accent) and visual prominence (e.g., beat gesture) on L2 novel vocabulary acquisition. Ninety-six Catalan-dominant native speakers were asked to learn 16 Russian words that were presented within a sentence under four within subject experimental conditions: Condition 1 - prominence in neither speech nor gesture (baseline condition), Condition 2 - prominence in both speech and gesture (natural beat gestures), Condition 3- prominence in speech but not in gesture, and Condition 4 - prominence in gesture but not in speech. In the baseline condition, the instructor produced the target word with a non-focal L* pitch accent and kept her hands still. In Condition 2, the instructor produced the target word with a focal L+H* pitch accent and a beat gesture. To generate Conditions 3 and 4, the audio recording of the target word in Condition 1 was replaced by the one in Condition 2 and vice versa.

The results of recall and recognition tasks conducted after the training session showed a significant positive effect of visual prominence only when accompanied by prosodic prominence ($F(1,3064) = 4.885$), $p < .05$). Thus, beat gestures produced naturally (that is, accompanied by focal pitch accent in speech) favor second language vocabulary acquisition. These results have implications for second language instruction practices and theories of prosody-gesture integration.

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Spontaneous imitation of English voiceless stops by Seoul Korean-English bilingual speakers

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When speaker-listeners are exposed to an exaggerated primary cue, they spontaneously imitate the enhanced cue; e.g., English speakers imitate extended VOTs of voiceless stops (e.g., Nielsen, 2011). This imitative pattern can be language-specific, such that when exposed to an enhanced non-primary cue, speakers enhance the primary cue for the relevant contrast; e.g., Seoul Korean speakers imitate aspirated stops with an enhanced non-primary cue (longer VOT) by exaggerating the primary cue for phonological aspiration in the language (post-stop *F0*) (Kwon, 2015).

This study investigates spontaneous imitation of bilingual speakers whose two languages differ substantially in terms of the association of phonetic cues with corresponding phonological categories. Specifically, this study examines how the two cues for Seoul Korean aspirated stops – high post-stop *F0* and long VOT – operate when sequential bilinguals of Seoul Korean and English spontaneously imitate English voiceless stops.

19 bilingual speakers, highly proficient in both Korean (L1) and English (L2), participated. Target stimuli were English /t/-initial words that were produced by a native speaker of American English and manipulated to have either extended VOT (Condition 1) or raised post-/t/ *F0* (Condition 2). Participants' own English /t/ productions before and after the exposure were compared. They were not instructed to "imitate" the stimuli.
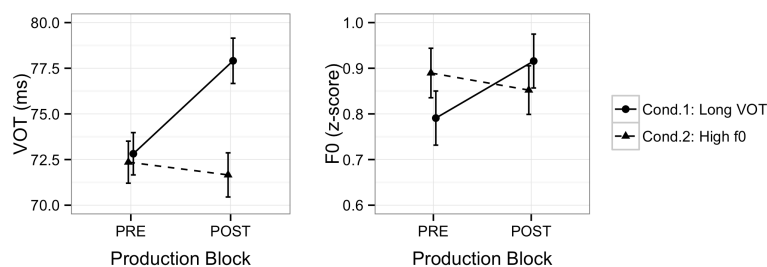

Figure 1. Mean VOT and post-/t/ *F0* of Pre- and Post-Exposure productions. *F0* is presented in z-score to plot male and female speakers together. Error bars represent 95% confidence intervals.

Results: The participants imitated English /t/ with extended VOT not by raising post-/t/ *F0* but by lengthening VOT (Fig.1, Cond.1). *F0*-raised English /t/ did not induce imitative changes in the two acoustic properties measured (Fig.1, Cond.2). These findings suggest that proficient bilingual speakers do not draw on their L1 cue primacy in performing imitation tasks in L2, but adjust the phonetic properties relevant to the L2. Furthermore, the lack of imitative changes in Condition 2 arguably suggests that even proficient bilinguals might not use a non-primary cue in the same way as native speakers.

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Degree of bilingualism modulates interaction between L1 and L2 in code-switching

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When code-switching, bilinguals may produce segments of embedded tokens that are more matrix language-like, due to transient phonetic interactions between their first (L1) and second languages (L2). For example, the VOT of English tokens embedded in a Spanish utterance may become more Spanish-like. Such transient phonetic interaction is observed irrespective of whether the matrix language is the speaker's L1 or L2 (Bullock & Toribio, 2009). However, individuals may differ in degree of bilingualism, quantified in terms of proficiency and amount of use in each language, as well as in attitudes towards each language and associated cultures. This variability contributes to the phonetic variability observed across bilingual speakers in both their L1 and L2 productions when one language is predominantly activated (Law & Francis, 2015a, 2015b). We propose that such variability may be even greater when both languages are simultaneously activated. This study thus investigated whether these differences affect the magnitude and direction of cross-language influence in code-switching. Native Cantonese-English bilinguals living in Hong Kong produced naturalistic code-switching from L1 (Cantonese, also their dominant language) to L2 (English, also their non-dominant language) and from L2 to L1 on separate days, as prompted by code-switching of the experimenter (also a native Cantonese-English bilingual) and conversation topics related to the culture and main domains of use of each language. Consistent with the diglossic nature of Hong Kong, participants learned Cantonese (L1) from birth and English (L2) since age 2-3. Given this homogeneity in age- and input-related factors, degree of bilingualism was operationalized as a combination of L2 proficiency, L2 usage and language attitudes as elicited in a detailed questionnaire. Acoustic properties of segmental and suprasegmental speech sounds were measured in both code-switched and matrix language (unilingual) contexts. These included formant frequencies of Cantonese /aɪ/ and English /ɑɪ/, and measures of speech rhythm (pairwise variability index, Low et al., 2000) and tonality (fundamental frequency slope and range). Preliminary analysis suggests that when English tokens are embedded in Cantonese, more highly bilingual speakers show less influence from the segments of the matrix language (Cantonese) on those of the embedded language (English) than do less highly bilingual speakers. However, English tokens produced in a Cantonese context are more syllable-timed and have more tonal pitch qualities than do unilingual English tokens, regardless of degree of bilingualism of speakers. These findings highlight the important role of linguistic and sociolinguistic factors in transient interactions between L1 and L2 in bilinguals, including possible differences between segmental and suprasegmental features, and illustrate the potential for use of phonetic variability as an identity marker.

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Production and perception of English word-level prominence by Korean speakers

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The current study investigates whether cues to higher-level prosody in an L1 can be used native-like in the production and perception of a novel phonological pattern in an L2. Specifically, we ask whether cues to Korean higher-level prosody are consistently utilized by Korean learners of English in the acquisition of lexical stress.

These questions were addressed through an acoustic study (Experiment 1) and a perception study (Experiment 2). In Experiment 1, 10 Korean and 5 English speakers recorded 14 English stress pairs. Duration, intensity, F0, F1, and F2 were measured in each syllable of target words. Results showed that Korean learners were able to use F0—but not intensity or duration—in a native-like way, and did not reduce vowels in unstressed syllables. In Experiment 2, 12 Korean and 13 English listeners performed a stress-identification task in which spectral cues and one suprasegmental cue were orthogonally manipulated independently in both syllables of the stress pair 'object'. English listeners relied solely on vowel reduction of the first syllable when identifying stress location. Korean learners relied primarily on spectral cues, but also on F0 and intensity. Interestingly, manipulation of suprasegmental cues in the second syllable triggered no perceptual shift in the stress judgment of either listener group.

These findings are consistent with the Cue-Weighting model [1, 2], suggesting that learners' L1 linguistic experience attunes their perceptual attention to specific acoustic cues. However, the perception results also revealed that the learners used a novel L2 cue in L2 perception. This suggests that spectral cues might be more salient than suprasegmental cues: a reduced vowel, unlike suprasegmental cues, may be interpretable without any context, aiding native English speakers and L2 learners alike in the identification of stressed and unstressed syllables.

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The impact of English proficiency and accent differences in estimating English vowel identification based on English-Korean vowel mappings

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The quantitative model proposed by Park and de Jong (2008) estimated Korean listeners' identification of English consonants, especially English stops quite well based on L2-to-L1 and L1-to-L2 mappings. The model's prediction was improved when category goodness ratings were incorporated. Recently, Cho and Lee (2015) showed the model successfully predicted Korean listeners' identification of several English vowels like /u/ and /ʌ/. However, the demarcation of vowel categories challenges categorical perception (Strange et al., 1998). Moreover, vowels such as /æ-ɑ/ (*bat*), /ɜ-ɝ/ (*Burt*), and /ɑ-ɒ/ (*stop*) show accent differences between American and British English. Given that Korean EFL listeners' English proficiency in Cho and Lee was low-intermediate and that few studies have investigated the influence of target-accent differences on L2 listeners' English vowel perception (Escudero & Boersma, 2004), the study explored to what extent the quantitative model estimated Korean listeners' identification of American and British English vowels. The Korean listeners differed with respect to target accents or English proficiency. Specifically, 27 Korean ESL learners mainly exposed to North American English (NAE) (US-listeners), 33 Korean ESL learners intensively exposed to Standard Southern British English (SSBE) after experiencing NAE (UK-listeners), and 32 Korean EFL learners (Korean-listeners) completed English vowel identification and English-to-Korean vowel mapping with goodness ratings. Test words, recorded by 2 native speakers of NAE and SSBE, were composed of 14 *bVt* English words (e.g., *bat, bot*) (112 and 56 tokens in identification and mapping, respectively).

The results revealed that the quantitative model overall predicted SSBE identification (especially characteristic SSBE vowels) better than NAE identification across all the listener groups. However, the predicting power of the quantitative model was similar regardless of the listeners' different levels of English proficiency. This indicates that the listeners less depended on L1 vowel categories when identifying NAE vowels relative to SSBE vowels, thus revealing the impact of L2 listeners' target-accents on perceiving L2 vowels. Further, new L2 vowel category development seems to be an ongoing process, especially for ESL learners (Flege, 1995). The results are of significance since they imply that L2 perceptual models should reflect L2 listeners' target-accent differences.

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Instruction on contrastive focus and improved fluency
for intermediate English learners

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Sentence focus is essential for communication in English, no matter the context (Jenkins, 2002). Focus marks new information in discourse (Halliday, 1967), calls attention to contrasts, and promotes listener comprehension (L. Hahn, 2004). Identification of contrastive focus is learnable (Pennington & Ellis, 2000), and explicit teaching can improve production (M. Hahn, 2002). Levis and Levis (2011) found that advanced learners of English improved production of contrasts after instruction. It is not clear, however, whether instruction improves perception and production for lower level students. It is also not obvious that instruction transfers to speech that does not involve reading aloud, nor whether improvement affects ratings of spoken fluency.

To address these questions, we developed a three-week class to teach contrastive stress (6 sessions at 25 minutes/session). Participants were eleven intermediate students in an Intensive English Program at a Midwestern US university. They received individual and group practice on contrastive stress in reading aloud, picture descriptions and other comparisons that elicited contrasts naturally, cognitively oriented instruction and homework. A control group (n=3) received no instruction.

Following the class, 25 native listeners rated subjects' free speech productions (oral descriptions of pictures with one obvious difference). Pretest and posttest descriptions were played in random order for naïve listeners who rated them for fluency following the procedures described in Derwing, Munro and Thomson (2008). Results show that experimental participants' fluency significantly improved after the instruction on contrastive stress while the control participants' fluency did not. This improvement in fluency appeared to be a result of both improved prosody and their greater comfort with producing grammatical frames that allowed them to express the contrasts. The results suggest that combining pronunciation practice with instruction on formulaic language may lead to greater automaticity in speech even after relatively modest amounts of instruction.

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The effect of experience with linguistics and other languages on non-native perception

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Researchers often examine non-native perception in order to determine which sounds will be difficult for L2 learners. Studies occasionally control for participants' knowledge of other languages, but they have not taken into account whether training in linguistics affects participants' performance in perception tasks (e.g., Harnsberger, 2000; Rose, 2012; Strange, Bohn, Nishi, & Trent, 2005). The current study investigates how experience with other languages and linguistics may change the perception of German vowels. Participants were native English speakers with no experience learning German. They were assigned to four groups: "Naïve" (students with no linguistics training), "Hisp" (students in an introductory Hispanic linguistics course), or "Phono" (students enrolled in phonetics/phonology courses). Phono participants were grouped further according to their experience with learning a language with front-rounded vowels ("Phono+"), or lack thereof ("Phono-"). None of the other groups had exposure to languages with front-rounded vowels. Participants completed a perceptual assimilation task and a free classification task with monosyllabic non-words containing 14 German vowels in alveolar and velar context. In the perceptual assimilation task learners categorized the stimuli according to English categories, and in the free classification task learners made groups according to which stimuli contained similar-sounding vowels.

In the perceptual assimilation results, compared to the Naïve group, the Hisp group was slightly more consistent in their selection of English vowel mappings. The Phono- group and especially the Phono+ group were more consistent for almost all mappings compared to both other groups and had English /o/ as a modal response for German /o/ instead of English /ɑ/ (as chosen by the Hisp and Naïve groups). Consonantal context did have an effect on a number of vowel mappings, but the effect was similar across groups. Free classification results suggest that German vowels were more perceptually distinct for both Phono groups as compared to the Naïve and Hisp groups. The Phono groups primarily used roundedness, F1, and duration to group vowels, while duration played a more minor role for the Hisp group and in particular the Naïve group.

Close examination of background variables showed that the Phono+ group had studied more languages in general than the Phono- group, which in turn had studied more languages than the Hisp and Naïve groups. The Hisp and Naïve groups did not differ in the number of languages they had studied. The differences between Hisp and Naïve are therefore not attributable to the number of languages studied, but for the Phono groups, the effects of knowledge of languages and knowledge of linguistics cannot be easily separated. These results show that these two types of experience can affect performance on perception tasks, and researchers should choose their participants carefully when investigating the initial state of L2 phonological acquisition.

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Phonological properties of word-medial consonantal clusters as predictors of the lexicalization of compounds

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There are 3 competing hypotheses of how compounds (*doorbell*) are comprehended. They can be accessed either via their constituents – *door* and *bell* or as a whole word or via both these processes occurring in parallel (Baayen & Schreuder, 2000). The frequency effects in word recognition are considered a very reliable index of how compounds are accessed (Amenta & Crepaldi, 2012). If compounds are initially decomposed, behavioral data (e.g. response latencies) will be modulated by the frequency of individual morphemes. However, if compounds are recognized via full form, no morpheme frequency effects are expected. In the present study we will use frequency effects as indices of lexical access to compounds. We will investigate whether this access is modulated by phonological properties of consonantal clusters across morpheme boundaries. The rationale is the following. Generally, clusters resulting from morphological operations are expected to be phonologically marked (dispreferred according to Net Auditory Distance, cf. Dziubalska-Kołaczyk, 2014) to saliently signal a morphological function. Compounds (if lexicalized) no longer need such signaling. We predict that compounds with unmarked ("non-signaling") clusters are lexicalized and, consequently, accessed via their full form (no morpheme frequency effects expected). In contrast, compounds with marked ("signaling") clusters are not lexicalized so they are accessed via their constituents (morpheme frequency effects expected) (cf. Zydorowicz et al. 2015). This prediction will be tested by looking into frequency effects in response latencies. To this end we will use regression models to analyze native speakers' lexical decision task (LDT) latencies from the English Lexicon Project (Balota et al., 2007). Previous research has shown that non-native speakers may process compounds differently from native speakers and that they are sensitive to orthotactic cues in this processing (Lemhöfer et al. 2011). Thus here, advanced learners of English as L2 will perform an LDT with compounds with phonologically signaling and non-signaling clusters. By analyzing frequency effects in L1 and L2 data we will investigate whether native speakers and L2 learners differ in how they process compounds (via constituents or via full forms). More importantly, we will test whether this processing is modulated by the phonological properties of consonantal clusters in word-medial positions.

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The production and perception of Mandarin focus sentences by American and Korean learners

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As a tonal language, the Mandarin intonation interplays with tones. Yang and Chan (2010), Luo and Lin (2015) have done researches on the acquisition of question intonation by American learners. By designing the perception and production tasks, this project investigates how Americans and Koreans, who are non-tonal speakers, acquire Chinese focus sentences.

18 American students (9F, 9M, M=21.6yr) and 20 Korean students (10F, 10M, M=22.5yr) with intermediate-to-advanced Mandarin level participated the experiments. Being asked specific questions, the subjects were invited to produce focus (initial, middle, final) sentences consisting of 10 syllables with the same tone: high (T1), rising (T2), low (T3) and falling (T4) as used by Liu and Xu' (2005). The perceptual task required the subjects to mark the focus locations of 12 Mandarin sentences. It also used the same sentences recorded by a native speaker with the focus at initial, medial and final. The recordings were done with Cool Edit. The sampling rate is 11025 Hz. The parameters such as frequency, duration and intensity of each syllable in the sentences were extracted by Praat for acoustic analysis.

The perceptual results showed the identification rates of the focus locations are 85% and 91% for Americans and Koreans respectively. With regard to the production, it was found that Max_F0, mean_F0 and the range of the focus sentences by non-native speakers were significantly smaller than those of native speakers. In addition, the non-native speakers were unable to realize the focus properties such as the pitch enlargement of in-focus words and the compression of post-focus words like native speakers. Moreover, the results indicate the learners failed to acquire the duration and intensity features of Chinese focus sentences. The current study supports the conclusion that the ability of non-native learners' perception develops earlier than that of their production (Flege, 1999; Escudero, 2005).

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Audiovisual feedback modulates lexical competition in a second language

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Second language (L2) learners are often troubled by hard-to-distinguish L2 sound contrasts. These difficulties impact lexical processing, since they may trigger spurious lexical competition. However, L2 listeners can make use of additional cues at their disposal (e.g. orthography) to establish lexical contrasts (Escudero, Hayes-Harb & Mitterer, 2008). Visual articulatory information (lip movements) has proven beneficial in categorizing L2 sounds (Navarra & Soto-Faraco, 2007) but its impact on lexical processing remains unclear. In view of this, the present study assessed (i) whether exposure to audiovisual feedback facilitates the establishment of a contrast between novel English words differing in the /ɛ/-/æ/ contrast by native German speakers, and (ii) whether the resulting recognition patterns may mirror the asymmetry found for real English words (Weber & Cutler, 2004).

Forty-one German listeners were trained to associate pairs of novel English words with pictures of novel objects. Critical pairs overlapped phonetically on their first syllable except for the vowels that formed the difficult /ɛ/-/æ/ contrast. Twenty participants were presented with audio-only stimuli while the remaining twenty-one additionally saw videos of the speaker articulating the words. Subsequently all participants performed the same visual-world eye-tracking task where words were presented audio-only and without feedback.

Results showed that for participants in the audio-only group, recognition of words with both target vowels was similar. In contrast, participants exposed to audiovisual stimuli during training exhibited an asymmetric pattern: words with /ɛ/ were recognized faster than words with /æ/. This suggests that exposure to audiovisual feedback helped listeners distinguish the two vowel categories in these newly learned words. Crucially, this pattern mirrored the asymmetry found in the L2 English lexicon and novel words associated to orthographic representations. Visual information hence helps listeners anchor words with sounds that are similar to their L1, thereby reducing lexical competition for part of the lexicon.

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Measurement for *accentedness*, *pause frequency/duration* and *nuclear stress placement* in the EFL classroom

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In the last decades, there has been a considerable movement to bring pronunciation back on stage in the ELT agenda (Derwing & Munro, 2015). Yet many teachers still do not know what to focus on and how to best deal with it (Levis, 2005). A balanced approach for the teaching of L2 pronunciation that integrates controlled with less controlled tasks with a focus on phonological form seems to be the best way to enable learners to communicate successfully (Luchini & García Jurado, 2015; Derwing, Rossiter, Munro, & Ron, 2004). This study reports on an experimental research carried out with 50 Spanish-L1 trainees, divided into 2 groups (A & B). Both groups were presented with a traditional-teacher centered approach based on controlled exercises (repetition, imitation), but group B added a communicative component in which students completed a battery of sequenced tasks with a focus on phonological form. Both groups recorded a speaking test before & after instruction (pre/post-tests) (Luchini, 2004). Task 2 (comparison of 2 pictures, 30 secs.) of this test was used to measure and compare degrees of *accentedness, frequency & duration of pauses* and *nuclear stress placement*. Comparisons were made intra-group as participants revealed performance differences before data collection. Ten English-native-speaker-raters judged the recordings using a 1-9-rating scale to determine the speakers' degree of perceived *accentedness*. Two specialists, using inter-marker reliability, segmented the transcriptions of recordings and identified nuclear stress placement. Another two specialists identified empty pauses longer than 100 ms. Acoustic analysis was done to double-check pause results. For the analysis of *accentedness* multivariate analysis was used. Group B was perceived as having developed an L2 accent closer to that of the native speaker model. *Nuclear placement* scores showed that group B was more accurate with the location of this stress than group A. Group B also obtained lower scores than group A for pause frequency & duration. Overall, learners exposed to the treatment that integrated the communicative component obtained better results in all 3 parameters analyzed than the other group. Based on these findings, some pedagogical implications for the teaching of L2 pronunciation in ELT contexts will be discussed.

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The role of accentedness and variety recognition in ESL students' attitudes towards Arabic and Chinese-accented English in Montreal

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Despite the position of English as the global lingua franca, there are still persistent negative attitudes towards nonnative accents in English held by native and nonnative speakers of English (Lindemann, 2005; Timmis, 2002). The purpose of this study was to investigate the role of perceived level of accentedness and accent recognition in forming attitudes towards Arabic and Chinese accented English. We designed a study using a combination of the matched and verbal guise techniques in which the participants were asked to rate Arabic and Chinese accents in English with different levels of influence from L1 on different traits. We included the recognition question to address Preston's (1989) concerns about potential misidentifications of speech varieties that might lead to misinterpretation of the data. As McKenzie (2008) points out, misidentifications of language varieties may become a confounding variable which can turn data interpretation into a very difficult task. McKenzie (2008) believes that a variety recognition question is particularly pertinent in eliciting attitudes held by non-native speakers who might be less familiar with and have more difficulty in identifying certain L2 varieties. In the light of previous research (Beinhoff, 2013), we expected the more recognizably Chinese or Arabic accents to receive lower ratings. This hypothesis was partially supported by the numerical data. The country-specific recognition rate was relatively low; however, the participants had a relatively high rate of identifying the nonnativeness of each sample. These findings suggest that the native/nonnative dichotomy may be of higher importance in forming attitudes towards varieties of English than the actual country of origin.

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Acquiring the timing of plosives: VOT and gemination in Italian EFL speakers

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This study aims at comparing two timing phenomena in productions of Italian speakers of L2 English, namely gemination and voice onset time (VOT). Although both phenomena pertain to timing, they pose different challenges to Italian EFL learners: VOT plays a role in both L1 and L2 but with different mappings between phonological category and VOT realization; gemination only exists in their L1, but can occur in L2 English via spelling interference. Previous studies (Bassetti, 2016) found that Italian EFL speakers produce longer closure durations in English for words spelled with double than single consonant letters, and produce shorter VOTs for voiceless plosives than native English speakers.

This study analyses the relationship and the order of acquisition of these two timing phenomena in Italians' realisations of L2 English voiceless plosives. Speakers were 30 Italian EFL learners and 30 English native controls. Stimuli were 3 English word pairs (one for each plosive /p/ /t/ /k/) with a C-CC target within similar stress patterns and vowel context (e.g. *propose-oppose* [prəˈpʰəʊz - əˈpʰəʊz]) plus 3 matching Italian word pairs to be used as a baseline (e.g. *propose-oppose* [proˈpːoze - oˈpːɔze]). The target plosive directly preceded stress, a context where English native speakers produce a long VOT. Participants performed two Reading Aloud tasks, first in English and then in Italian. The 30 English native controls only performed the English task. Stimuli were presented in different orders with foils, and were produced three times in a carrier sentence.

The acoustic analysis confirms that L2 learners tend to produce shorter VOTs and longer closures for CC words, compared with the English controls. A few learners seem to have adjusted their VOT but still produce gemination, while others show the opposite pattern. Despite a great amount of variability, results seem to shed light on the patterns and order of acquisition of these two timing phenomena.

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Acquisition of suprasegmentals in advanced L2 French:
Pitch accent placement and alignment in semi-spontaneous sentences

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This study examines how advanced speakers (AS) of French (L1 English) acquire the phonetics and phonology of French accentuation through pitch accent (PA) placement and alignment respectively. In French statements, non-final accentual phrases are marked with a PA on the final syllable (Jun and Fougeron, 2002; Delais-Roussarie et al., 2015) and display a rising F0 peak aligned with the end of that syllable (Welby and Lovoenbruck, 2009). PAs in English differ phonologically and phonetically – they are realized at the word level with alignment towards the syllable onset (Coughlin and Tremblay, 2011). This study seeks to determine how accurately AS can place the PA and simultaneously realize its alignment in French statements. Although the L2 acquisition of suprasegmentals remains relatively understudied, previous research suggests that the phonological aspects of prosody can be acquired, whereas the phonetic component poses greater difficulty (Mennen, 1998; Trofimovich and Baker, 2006; Huang and Jun, 2011). Researchers have therefore proposed the existence of an acquisitional hierarchy for suprasegmentals (Trofimovich and Baker, 2006; Colantoni, Marasco, Steele and Sunara, 2012). However, since most of these studies use formally elicited sentences, this study also aims to determine whether the same patterns characterize more spontaneous speech. 13 AS and 5 French native speaker controls (NS) were asked to describe pictures using specific target words. It was predicted that the AS would fail to simultaneously realize both the phonological and phonetic aspects of French PAs, and produce more errors with alignment (i.e., phonetic component) than accent position (i.e., phonological component). Preliminary results show that, overall, this prediction was upheld. While the AS succeeded in placing and simultaneously aligning PAs qualitatively in some instances, they were not able to do so at the same frequency as NS. These results support previous claims that there is a hierarchy in the acquisition of suprasegmentals persisting in experienced speakers' semi-spontaneous speech.

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L2 Spanish speakers' perception and production of utterance initial intonation cues in Y/N questions and statements

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English speakers acquiring Spanish must learn that in their L2, intonation patterns distinguish Y/N questions from statements. As opposed to English, Spanish signals a Y/N question from the beginning of the utterance by using a higher initial boundary tone and a higher pre-nuclear peak with respect to its comparable statement. (*English*: Pierrehumbert, 1980; Bartels, 1999; *Spanish*: Sosa, 1999; Hualde, 2005).

Three research questions guide this project: 1) Can advanced L2 Spanish listeners detect intonational phonetic differences not present in the equivalent structures of their L1? 2) Can advanced L2 speakers produce these phonetic differences? 3) Does a more accurate perception of these intonation elements predict a more accurate production in L2 speakers?

Ten advanced L1 English-L2 Spanish speakers participated in this study. The perception task was a timed-response task where participants heard increments of either a Y/N question or a statement in Spanish and were asked whether they heard a question or a statement at each increment. In the production task, participants were presented with scenarios that elicited either a Y/N question or a statement.

Overall, participants successfully identified utterance type at all increments in perception. However, reaction times after the first increment were noticeably longer than at the others. In production, only five of the ten participants showed a clear height difference in pre-nuclear peaks: Y/N question peaks were noticeably higher than their statement counterparts. The other participants showed no difference between Y/N questions and statements in the initial portion of the utterance.

These preliminary findings suggest that L2 speakers are able to detect intonational cues not present in their L1 but they cannot necessarily reproduce them. It seems that accurate perception is a pre-requisite for accurate production in L2 intonation. These findings inform the relationship between perception and production of L2 intonation, a largely understudied area.

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Perception of interrogative sentence modality by Japanese students of Spanish

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Previous studies (Takasawa, Kimura, Sensui, Toyomaru, & Atria, 2012; Sensui, 2015) have proved that it is difficult for Japanese students of Spanish to distinguish between intonation and stress, both while speaking and listening, which can often lead to incorrect identification of sentence modality. This study focuses on recognition of interrogative intonation from the view point of phonetic perception and is aimed at investigating problems faced by Japanese students of ELE (Spanish as a foreign language) due to the expression of interrogative modality with different pitch patterns and lexical stresses in the intonation nucleus. To make sure that modality is only perceived through prosodic features, we have used an identification perception test with synthesized stimuli without lexical and semantic content obtained from natural emissions in two varieties of Spanish (northern – Madrid, and southern – the Canary Islands) characterized by rise and rise-fall pitch patterns, respectively. In this corpus we alternated words to obtain the three stress types of Spanish (oxitone, paroxytone and proparoxytone) in the nucleus of the phrases, while the verb and the subject always remains paroxytone, like in *La guitarra se toca con paciencia* (Dorta, Martín Gómez, & Díaz, 2015). In order to control the results of the test, we have also used synthesized declarative stimuli with falling end. The stimuli perception by Japanese students will determine if they identify both Spanish interrogative patterns as equal knowing that, in Japanese, rising end is used to mark interrogative mode along with particle *ka* and that in colloquial style can be found questions without this particle, only keeping the rising pitch pattern. We part from the hypothesis that the listeners will recognize the northern interrogative modality better than the southern one since it is generally taught as a standard, and, at the same time, than the falling intonation at the end of the southern interrogative patterns will be recognized as a declarative modality marker.

The results indicate that the rise-fall (peaking) interrogative pattern (H* L%) in the southern variation of Spanish is confused with the falling pitch marker (L* L%) of the declarative modality in 80% of cases. It proves that when teaching Spanish to Japanese students, special attention needs to be paid to explaining the relations between intonation, modality and stress in southern variations of Spanish spoken by many millions of people, in order for the students to avoid serious comprehension and speaking mistakes.

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Tracking bilingual activation in the processing of Spanish stress

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In any linguistic context, the two languages of bilingual listeners are active and interact, such that lexical representations in both languages are activated by the spoken input with which they are compatible [1]. For example, in a visual-world eye-tracking experiment in English, upon hearing beans, English-Spanish bilinguals showed similar competition from the *beetle* and *mustache* (in Spanish, *bigote*) pictures, suggesting they activated both languages despite the task being in English [2]. Whereas words that overlap segmentally in the two languages compete for activation, it remains unclear whether suprasegmental information further modulates this cross-language competition.

This study investigates the effect of stress placement on the processing of English-Spanish cognates by native Spanish speakers with some knowledge of English (in Spain) and intermediate-to-advanced English-speaking second-language learners of Spanish (in the US) using a visual-world eye-tracking experiment in Spanish. In each trial, participants saw a target (*asado*), one of two competitors (stress match: *asados*; stress mismatch: *asador*), and two unrelated distracters, and they hear the target word. Importantly, the experiment included a non-cognate condition (*asado-asados-asador*) and a cognate condition, where the stress pattern of the stress-mismatch competitor was a Spanish-English cognate (*inventor*), in which the English-stress pattern matched that of the Spanish target (*invento*). Words were presented orthographically and controlled for length and frequency. Competitors were controlled for the orthography of the first two syllables. Second-language proficiency and vocabulary, and inhibitory control were measured.

Preliminary results: Growth-curve analyses on competitor fixations reveal cognate-status and stress-mismatch effects for native Spanish speakers (Figure 1), and they reveal cognate-status and stress-mismatch effects, and an interaction between the two for Spanish learners (Figure 2). This suggests that both groups use stress as a cue for word recognition, and the English stress pattern affects the processing of Spanish words. The analysis of individual differences is underway.

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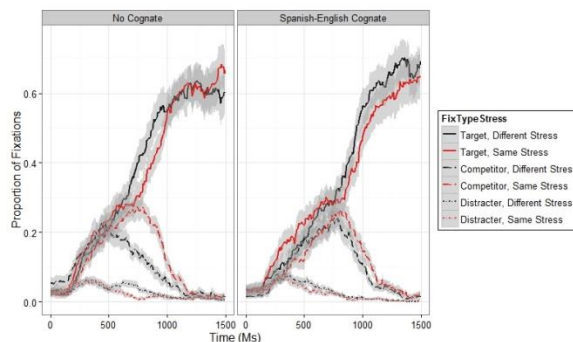
Figure:

Figure 2. English-Speaking L2 Learners' Proportions of Fixations

Speech learning across generations: The production of stop consonants by Bangladeshi heritage children and adults.

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A large body of research has investigated naturalistic L2 speech learning in first-generation migrants (e.g., Bohn & Munro, 2007; Colantoni et al., 2015). Much less is known, however, about how their speech patterns relate to those of subsequent generations born in the host country (but see McCarthy et al., 2013).

The present study aims to contribute to this latter line of inquiry by investigating the production of Sylheti and English stops by two sets of Bangladeshi-heritage families from Cardiff (N=31). The first consists of first-generation female immigrants from the Sylhet area of Bangladesh and their British-born children, the second of second-generation British-born female heritage speakers of Sylheti and their (3rd generation) children.

All participants were recorded producing words with word-initial stops in Sylheti and English, using picture prompts. The Sylheti dataset comprised 12 stop categories, including retroflexes and dentals, and voiced aspirated categories; the English one six, i.e. /p b t d k g/. The data were analysed auditorily and acoustically.

The results revealed non-native productions of English stops by the first-generation migrants, but largely target-like patterns by the remaining sets of participants. The Sylheti stops exhibited incremental changes across successive generations of speakers, with the third-generation children's productions showing the greatest influence from English. While some of the patterns may be developmental in nature, the two sets of age-matched children showed systematic differences, indicating that input-related factors are at least equally important.

These findings have important implications for the maintenance, transmission and long-term survival of heritage languages, and show that investigations need to go beyond second-generation speakers, in particular in communities that do not see a steady influx of new migrants.

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Age of onset of bilingualism and length of exposure in the perception & production of Spanish consonantal contrasts

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To what extent do age of onset of bilingualism and length of exposure to an L2 affect our perception and production of native contrasts? We seek to answer this question by comparing the perception and production of Spanish voiced and voiceless stops by two groups of bilinguals, who acquired Spanish from birth but differed in their age of onset of acquisition (AOA) of English. Early bilinguals were exposed to English before the age of 6 and received formal education in English, while late bilinguals were exposed to English after puberty and were educated in Spanish.

A total of 31 participants took part on the study: 13 early bilinguals (mean AOA, 6; mean length of residence, 19), 9 late bilinguals (mean AOA, 26; mean LOR, 15) and 9 recent arrivals serving as a control group. The participants resided in El Paso, Texas. Specifically, we explored the perception and production of Spanish voiced and voiceless stops/approximants in word-initial ([b]ata vs. [p]ata ("robe" vs. "foot")) and medial (su[β]e vs. su[p]e ("go up" vs. "I knew")) positions. The perception study consisted on an AX discrimination task including 43 minimal pairs using real words. For the production study, subjects read real words (n=112) in a carrier phrase "Digo ___ para tí" ('I say __ for you'). In both tasks, the stimuli were controlled for place of articulation of the consonant, following vowel and stress. For the analysis of the production data, the acoustic parameters considered were percentage voicing, voice onset time (VOT), relative intensity and relative duration.

The results of the discrimination test show that early bilinguals have the highest frequency of errors (10.26%), followed by late bilinguals (9.14%) and controls (6.89%), with significant differences between the early bilinguals and controls ($\chi2$ (2, n=3222) = 8.302, p = .004). Production results revealed that early bilinguals have a significantly lower percentage of voicing (29%) in approximants in medial position compared controls (43%), with late bilinguals somewhere in the middle (H(2) = 11.4, p = .003). For voiced stops in word initial position (preceded by the word 'digo'), differences were found in manner of articulation: significantly less approximant realizations in early bilinguals (50%), followed by late bilinguals (74%) and Controls (77%) ($\chi2$ (2, n=775) = 52.03, p < .001). In addition, approximants produced by early bilinguals had the lowest relative intensity (i.e. more constricted articulation). These results suggest that an earlier onset of L2 acquisition, which in the case of earlier bilinguals was coupled with reduced frequency of Spanish use, and their higher English proficiency, increases the chances of L1 shifts away from the native norm.

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Standing nose to nose: an acoustic analysis of L2 French nasal vowel production

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This study acoustically analyzes the speech of ten female, American students of first-year French in order to assess their acquisition of the three nasal vowels (i.e. /ɛ̃,ɑ̃,ɔ̃/) of Northern Metropolitan French (NMF). Degree of acquisition is determined by comparing their nasal vowels (V_N) against those of their linguistic models: a native NMF speaker whose speech appears in the learners' pedagogical materials and the learners' instructor, herself an advanced L2 speaker (not the author).

Data come from two reading tasks: a one-page text and 60 words delivered in a carrier phrase, all of which is accessible to participants' level. As both oral and nasal gestures can contribute to producing nasal-like sounds (Carignan, Shosted, Fu, Liang, & Sutton, 2015), an analysis of oral and nasal cues (Carignan et al., 2015; Chen, 1997; Maeda, 1993) is used to evaluate the learners' V_N production. The learners' vowel produciton is compared against that of their linguistic models. Specifically, normalized (Thomas & Kendall, 2015) formants are used to chart V_N within the vowel space—not to compare against oral vowels, but against other V_N—and spectral peaks are measured in Praat (Boersma & Weenink, 2014) to estimate state of velopharyngeal opening (VPO), a gesture characteristic of nasal segments.

Analyses indicate that many students produce little distinguishable difference between all three targeted V_N, though some begin to produce predictably distinct segments, which begin to approach the production of the advanced L2 speaker in both mapping of V_N in the vowel space and in VPO. Future articulographic work might provide specific insights into physical differences and similarities in the articulation and production of nasality.

Different aspects of pronunciation can improve as students are made aware of their production and progress (Kennedy & Trofimovich, 2010; Moore, 1997; Sardegna & McGregor, in-progress). The ability to get a visual and quantitative acoustic representation of V_N production could provide language learners and instructors with a toolset to identify concrete ways to improve (e.g. change in place of articulation) and track progress in V_N production. Additionally, tracking acquisition in progress might give greater insight into the process of nasal acquisition.

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L1 and L2 lexical stress realisation in Sylheti-English bilinguals

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Within multilingual cities, such as London, there are large communities of individuals who acquire their first (L1) and second language (L2) in diverse environments. The aim of the current study was to examine the influence of language background and language use patterns on L1 and L2 lexical stress realisation in Sylheti-English bilinguals from the London Bengali community. In English, a primary acoustic cue of lexical stress realisation is a higher pitch in the stressed syllable in relation to the neighbouring unstressed syllables (Reetz & Jongman, 2009). Although very little is known about Sylheti, it has been suggested that the opposite holds true (see Reetz & Jongman, 2009; Hayes & Lahiri, 1991).

Twenty-seven bilinguals took part in the study: (1) late bilinguals (n=11; mean AoA=21); (2) early bilinguals (n=9; mean AoA=6), (3) second-generation bilinguals (n=6). Additionally, 12 monolinguals were recorded. Disyllabic Sylheti and English words with penultimate syllable stress were elicited using a picture naming task. An acoustic analysis of pitch was conducted (Mennen, Mayr & Morris, 2015). Results indicated that the Sylheti monolinguals realised lexical stress in the penultimate syllable of the target word by means of a lower pitch than in the ultimate syllable whilst in the English monolinguals, the opposite was the case. The late bilinguals realised Sylheti and English stress by means of a slight rise from the penultimate syllable, approximating the Sylheti-like stress pattern in both English and Sylheti. In contrast, the second-generation bilinguals realised Sylheti and English stress by means of a fall in pitch, approximating the English stress pattern in both English and Sylheti. Interestingly, the early bilinguals displayed a distinct pattern for English and Sylheti, in the direction of each monolingual group. These findings have implications for our understanding of how language background influences L1 and L2 prosody in diverse multilingual environments.

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How L1 speech sounds are learnt: The implications for teaching L2 pronunciation

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The leading model for how students learn the production of L2 speech sounds is self-supervised auditory matching (SSAM). This supposes that students develop perceptual representations of L2 sounds that they use to guide their production, in a 'matching-to-target' process. Thus in both the Imitative-Intuitive and Analytic-Linguistic approaches (Celce-Murcia et al. 2010), the teaching of speech sound production in the classroom starts with listening exercises.

In L2 acquisition, Flege (2005) describes how SSAM is one of the bases for the Speech Learning Model: "As in L1 development, production is guided by perceptual representations stored in long-term memory." As this quote illustrates, the belief in SSAM as the natural mechanism for learning L2 speech sound production is partly the result of an assumption that children learn L1 speech sound production this way. However, while some scholars have indeed asserted that L1 production is guided by auditory representations (e.g. Fry 1968, Kuhl 2000), their assertions were beliefs and not evidence-based.

There is currently a debate within Child Phonology about how young children learn L1 speech sound production. Messum & Howard (2015) have presented the case for an alternative to SSAM. They describe a Mirrored Equivalence (ME) mechanism based on the well-documented phenomenon of caregivers reformulating infant vocal output within imitative interactions. Here it is the adult doing the 'imitation' while the child only has to make a deduction of equivalence.

For L2, there is no evidence that SSAM is the mechanism by which speech sound production is best learnt (and no empirical record of success to justify its use). Further, in his Silent Way approach, Gattegno operationalised an ME paradigm for the L2 classroom and the absence of a model for students to copy demonstrated that SSAM is not necessary for speech sound learning. I will examine these theoretical issues and their implications for teaching.

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The production of Modern Greek sibilants by Bulgarian learners – an acoustic study

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The present acoustic study investigated the production of Modern Greek /s/ and /z/ by beginner Bulgarian learners before and after pronunciation training.

The sibilant inventory of Standard Modern Greek comprises alveolar /s/ and /z/ and spectrally they are found to be between English /s/ and /ʃ/, and /z/ and /ʒ/, respectively (Panagopoulos 1991). Contemporary Standard Bulgarian has all four phonemes /s ʃ z ʒ/. In such inventories the alveolar and palatoalveolar sibilants are peripheral on the spectral mean dimension unlike inventories with one sibilant, which is fairly central on the spectral mean scale (Boersma & Hamann 2008).

The attainment of target /s/ and /z/ by the Bulgarian learner requires modification of the existing sibilant categories and their corresponding articulatory gestures acquired with the L1. Following the Speech Learning Model (Flege 1995, 2002) category assimilation is very likely to occur for similar L1 and L2 sounds. In this case the learner is expected to establish merged L1-L2 categories.

Seven native Bulgarian female learners of Modern Greek (M_{AGE} 19.2) were recorded two times: prior to pronunciation instruction (T1) and after 15 pronunciation training sessions (T2). In addition, five native Modern Greek female speakers (M_{AGE} 27.4) served as a control group.

The elicitation protocol comprised real words embedded in carrier sentences. The target sounds were recorded in initial and medial position in stressed and unstressed syllables with all five Greek vowels /i e a o u/. Six repetitions were recorded and five of them analysed. The spectral mean frequencies were used for the acoustic analysis as a reliable indicator in distinguishing between anterior and posterior articulation of alveolar sibilants.

Both T1 and T2 learners' productions were compared to the productions of the control group to examine the approximation of the target norms. The spectral mean values produced at T1 and T2 were compared to investigate phonetic learning.

The results indicated that merged L1-L2 categories were created, as predicted by the SLM. The statistical analyses showed that mergers' spectral mean frequencies were significantly lower at T2 but remained significantly higher than the target norms.

The results suggest that the SLM, which was developed for highly proficient bilinguals, might also be applicable in the case of beginner learners studying the target language in formal settings.

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Seventeen-month-old infants exposed to more than one language do not identify familiar words where monolinguals succeed

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Monolingual Australian English (AusE)-learning 19-month-olds identified familiar words in an unfamiliar Jamaican accent (JaME), but 15-month-olds did not, despite identifying words in their native accent, though vocabulary size predicted JaME identification (Mulak, et al., 2013). Increased phonetic variability inherent to exposure to more than one language may enable earlier recognition of accented words. Alternatively, bilinguals may be delayed because exposure to more phonetic contrasts may heighten phonetic sensitivity (see Byers-Heinlein & Fennell, 2014), or they may not have a sufficient English vocabulary as their vocabulary is split between languages.

We tested 17-month-old AusE monolinguals' (N=16) and AusE+ heritage language bilinguals' (N=21) identification of familiar words in a familiar/native vs unfamiliar accent. Participants viewed images of two familiar objects while an audio recording produced by an AusE (familiar/native accent) or JaME (unfamiliar accent) speaker named one object.

A 2 (accent) x 2 (mono/bilingual) ANOVA comparing percent fixation to the target (named) image (Figure) revealed an accent effect (p=.015) and an accent*language group interaction (p=.047). Only monolinguals' target fixation in AusE was above chance (p=.005). Monolinguals' expressive vocabulary predicted target looking in JaME (p=.010), while bilinguals' English vocabulary did not correlate in either accent. However, bilinguals' target looking correlated with AusE and heritage language comprehension and production parental ratings. AusE production positively correlated and heritage language production negatively correlated with AusE target fixation (Table), suggesting bilinguals' performance may relate to expressive proficiency.

Thus, children exposed to more than one language from birth seem delayed in word identification in their familiar accent relative to monolinguals, with performance tied to proficiency in both languages. Ongoing research tests 19-month-old bilinguals to inform whether general linguistic or vocabulary-dependent factors account for bilinguals' development in this task.
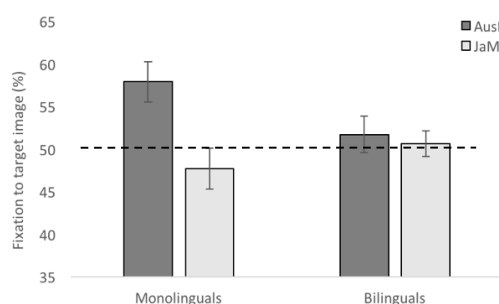
Predictor	B	t	p
AusE production	0.14	4.20	.004
Heritage language production	-0.15	-3.90	.006
AusE comprehension	-0.13	-3.91	.006
Heritage language comprehension	0.15	4.19	.004

Note. Percent exposure to AusE was not entered. R^2 = 0.42.

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Bilingual and L2 learners' cross-situational learning of minimal pair words

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In cross-situational word learning (XSWL) listeners infer word-object pairings by tracking auditory word and visual referent co-occurrences across trials. Adults learn novel words in XSWL (e.g., Fitneva & Christiansen, 2011), and can simultaneously encode fine phonological detail, successfully learning minimal pairs (Escudero, Mulak, & Vlach, 2015).

Bilingualism and L2 learning may affect XSWL of phonologically similar words, possibly depending on the native language (L1) of the listener and proficiency in each language (see L2LP model: Escudero, 2005, 2009). Bilinguals may outperform L2 learners in the L2 due to reduced influence of the L1 and/or greater proficiency in the L2.

We tested XSWL in 11 Mandarin L2 learners of English, and 12 Mandarin-English bilinguals (stimulus words and procedure as in Escudero et al., 2015). Listeners were tested on eight words produced in different prosodic affects in Australian English (monolinguals and L2 learners) or American English (bilinguals). Words formed non-minimal pairs (nonMPs: e.g., BON-DEET), consonant MPs (consMPs: BON-PON), or vowel MPs (vowelMPs: DEET- DIT).

We compared L2 learners to 11 Australian English monolinguals from Escudero et al. (2015) in a mixed-effects model with pair type (nonMP, consMP, vowelMP) and language background (monolingual, L2 learner) as fixed effects. Monolinguals outperformed L2 learners (p=.010), and their accuracy exceeded chance in each pair context (all ps<.01), while L2 learners' performance never exceeded chance (ps>.13). Mixed-effects modeling of bilinguals revealed no effect of pair type (p = .925), with accuracy exceeding chance for each pair type (ps < .003).

While Mandarin L2 learners of English did not learn MPs, bilinguals and monolinguals did. L2 learners' failure may be because they treated prosodic information as tonal information, impairing XSWL, whereas bilinguals, as native speakers of both English and Mandarin, could perceive the English stimuli in parallel with monolinguals. Ongoing research investigates whether cross-accent acoustic differences influence performance.
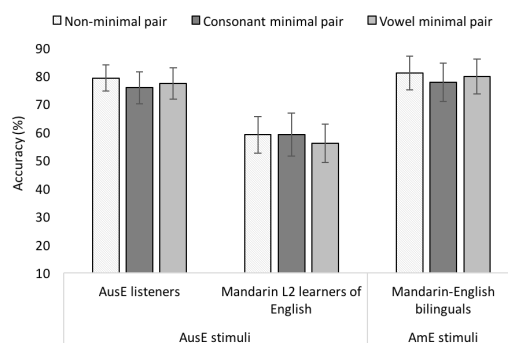
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How native and non-native listeners process schwa reduction in French: A combined eye-tracking and EEG study

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Words are often reduced (e.g., the English word /jɛʃeɪ/ for /jɛstədeɪ/ *yesterday*). Native listeners generally understand reduced forms effortlessly. Non-native listeners of a language, in contrast, can have problems understanding reduced forms. The question is to which extent highly proficient learners suffer from reduction, and which mechanisms may be responsible for their problems.

We investigated these questions in a combined EEG and eye-tracking experiment with French native and Dutch non-native listeners of French, We focused on schwa reduction in the first syllable of French nouns (e.g., /rkɛ̃/ *for* /rəkɛ̃/ *requin* 'shark'). Schwa-reduced and unreduced nouns were presented in the middle of sentences and were not predictable from the preceding context.

Participants were asked to listen carefully to the spoken sentences, and to look at the screen. During the presentation of the spoken sentence, participants saw a display of four line drawings. Each display consisted of a depiction of the target word (e.g., *requin*), a phonological competitor (e.g., *rideau* /rido/ 'curtain'), and two neutral distractors (e.g., *voiture* /vwatyr/ 'car' and *fleur /flœr/* 'flower'). Eye movements and EEG were recorded simultaneously throughout the experiment.

The EEG data show a more negative N400 for reduced than for full forms in the non-natives but not in the natives. The eye tracking data reveal that the non-natives considered competitors more seriously and for a longer stretch of time than the natives. Interestingly, when the non-natives heard a reduced target, it was mainly the phonological competitors that were interfering with the identification of the target word, whereas when hearing a full form, both phonological competitor and neutral targets were being fixated. Taken together, the data suggest that highly proficient learners suffer more from reduction than natives do. They have more problems in accessing representations of reduced words and seriously consider other lexical candidates during lexical search.

Longitudinal acquisition of prosodic phenomena in L2 English

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Although prosodic accuracy is essential for intelligible L2 speech, few studies have documented longitudinal prosodic acquisition in adults (Ordin & Polanskaya, 2014). The goal of this exploratory study was to gain insight into prosodic learning trajectories for English L2 speakers from two native language backgrounds with different prosodic characteristics. We present an analysis of temporal and intonational aspects of ESL speech over 10 years, with a focus on 1) how much timing and intonation improve in relation to native-speaker productions; 2) how the prosodic properties of the native language affect L2 prosodic acquisition; and 3) how well prosodic measures of L2 utterances correspond to listeners' speech ratings. English sentence productions from 10 Mandarin (syllable-timed, tone language) and 8 Russian (stress-timed, non-tonal language) immigrants were elicited soon after their arrival in Canada, one year later, and at 10 years. These were compared with native English productions of the same sentences. Segmentations (word and phone level) were obtained through forced alignment based on HMM-models implemented in HTK and trained on the TIMIT database. After hand-correction, interval metrics, including %V and VARCOV, were computed (White & Mattys, 2007). F0 contours were extracted using PRAAT autocorrelation (10 ms step). Contours were inspected and subjected to Fujisaki model based decomposition, yielding continuous smooth log F0 contours. These model contours are superpositions of slowly-changing phrase contours, and faster-changing accent contours associated with pitch accents.

With respect to 1), both L2 groups diverged from native English at the outset of the study, with more native-like productions at 10 years, particularly in the Mandarin speakers' VARCOV. In most speakers, mean F0 fell over time. Females, in particular, initially produced fairly monotone speech with pitch accents having a relatively narrow span, but F0 gestures later became more native-like. However, pitch accent frequency remained higher than in the English controls, suggesting that more words were emphasized. For 2), while the Russian speakers may have initially benefited from sharing L1 rhythmic properties with English, data did not support a long-term advantage. For 3), some measured dimensions correlated significantly with listener ratings of comprehensibility and fluency.

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English speakers' Japanese pitch accent: "Snapshot" of dynamic system

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In second language acquisition research there is growing awareness that an L2 is a 'dynamic' system that is individual to the learner (de Bot, Lowie & Verspoor, 2007). However, in L2 phonology, findings are generally reported as group means, giving the misleading impression of "average behaviour which belies […] important inter-learner differences" (Munro & Derwing, 2015, p. 31). This paper, which investigates the second language acquisition of Japanese pitch accent by English-speaking learners, responds to the need for individual learner data by analysing learners' pitch accent systems.

Previous research into English speakers' acquisition of Japanese pitch accent has taken three approaches: the first investigates learners' perception of Japanese pitch accent (e.g. Goss, 2015); the second investigates learners' realisation, in production, of the Japanese pitch accent patterns (e.g. Sakamoto, 2010). The third, less well-researched approach, investigates learners' spontaneous production of real words, i.e. those encoded in long-term memory. Individual variation in accuracy has been reported in the perception and realisation studies, but it is not clear how individual differences manifest in the production of real words.

In this study, two groups of English-speaking learners of Japanese (less experienced n=13; more experienced n=8) read aloud 180 Japanese words, and Japanese phoneticians (n=3) identified the accent type of each word that they produced. The novel approach was taken of having learners read aloud words in three contexts – *ame* 'rain', *ame da* 'it's rain', and *ame ga furu* 'rain falls' – to understand how stable the learners' accent types are, as pitch is lexical in Japanese but not English.

The findings show considerable individual variation in the proportion of each accent type, and in the variation of accent type with word length, lexical class and context. Although not a longitudinal study, each learner's accent system can be seen as a snapshot of a dynamic system, and gives striking confirmation of how misleading it can be to report group means to represent "average behaviour". Interestingly, there was little variation between learners in the match with Standard Japanese, unlike in the perception/realisation studies. I argue that this is due to two things: pitch not being lexical in English, and the low functional load of pitch accent in Japanese.

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A longitudinal approach to the perception-production link

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A wealth of research has been concerned with the relationship between speech perception and speech production in a second language (L2). For some individuals, perception leads production, whereas for others the opposite appears to be true (Sheldon & Strange, 1982; Zampini, 1998). Recent inquiry into the topic even suggests that the two domains may dissociate in the initial phases of phonological SLA (Hanulíková, Dediu, Fang, Bašnaková, & Huettig, 2012). However, despite sustained interest in the topic, most studies have examined the link in pre-post(-delayed) designs. This is problematic since development in the two domains may not be simultaneous. Rather, perception may predict production in an asynchronous or delayed fashion. The present study examined the relationship between English speakers' ability to perceive and produce L2 Spanish stops over time to gain insight into the variable nature of the perception-production link over time.

Twenty-six English-speaking learners of L2 Spanish participated five times over a calendar-year, completing an identification task and two production measures, picture description and sentence reading. Perception was operationalized as d', a measure of an individual's sensitivity to a contrast which takes into account response bias, and production as voice onset time (VOT). To establish comparable perception and production measures, the approximately 4,000 tokens that learners produced over the course of the study were recoded into /b/ and /p/ labels by employing a VOT boundary of 10 ms of voicing lead (-10 ms). Stops whose VOT was below the boundary were coded as /b/ and stops whose VOT was above the boundary as /p/. A d' production measure was then computed by taking into account learners' productions and the intended target (i.e., /b/ or /p/). The d' production measure is therefore comparable to native speaker judgments of stop consonant identity (i.e., native speakers' ability to identify learners' productions as voiced or voiceless) insofar as it reflects learners' ability to produce a targetlike VOT contrast in the L2.

A range of configurations emerged, including individuals capable of producing the L2 VOT contrast in a targetlike manner but who nonetheless had difficulty perceiving it. Cross-lagged correlations and mixed-effects models were fit to the data including d' as a time-varying predictor of production. Results indicate that the nature of the link itself may vary across individuals. As a result, it may be more fruitful to evaluate factors that predict different types of relationships, examining whether certain neurocognitive and experiential variables favor production over perception or vice versa.

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Developmental patterns in the L2 acquisition of the Spanish tap and trill: A longitudinal study

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Research on the Spanish tap and trill has demonstrated that second language (L2) learners tend to produce taps at moderate levels of accuracy by the intermediate to advanced proficiency level, but only produce accurate trills at the most advanced stages of learning (Face, 2006; Kissling, 2013; Reeder, 1998). However, this strand of research has focused on the intervocalic context. Consequently, less is known about learners' production in onsets and codas and in contact with other consonants (e.g., #_, _#, _.C). Likewise, most studies have been cross-sectional, or have examined learners' production over a shorter period of time (but see Major, 1986). The present study adopts a longitudinal approach to the production of taps and trills across a range of environments, tracking learners' realizations over time.

Twenty-six English-speaking learners enrolled in an introductory Spanish course at the time of recruitment participated, completing five sessions over a year-long period spanning two semesters of college-level Spanish coursework. At each data session, they completed a picture description and reading task. On the former, they received pictures representing a subject, a verb, and an object or location, combining them to create a simple sentence in Spanish. Approximately 7,000 sound files were extracted and analyzed using Praat software. On the basis of the acoustic and auditory properties of the sound, rhotics were coded into the following *a priori* realization categories: tap, trill, Spanish approximant, assibilated, English approximant, and rhoticized vowel. Additional categories emerged over the course of analysis, including the insertion of epenthetic vowels particularly in word-initial position. Preliminary results will focus on amount and type of variability in the realization of L2 segments over time, examining static and fluid patterns of development as a function of time, phonological environment, and task.

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On the role of orthography in L2 sound acquisition:
The case of Polish L2 German learners

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In recent years, there has been growing interest in whether L2 sound acquisition is influenced by orthographic input (e.g., Bassetti et al., 2015; Escudero et al., 2008; Hayes-Harb et al., 2010). In this paper, we report on a production experiment with 18 Polish German-as-a-Foreign-Language (GFL) learners (and 20 German natives as control). We tested whether the (explicit) orthographic marking of German vowels affects L2 productions of German vowel length. Furthermore, vowel quality was analyzed separately in order to complement the duration data. In contrast to Polish, German vowel duration and tenseness are contrastive (e.g., [be:tən] "to pray" versus [bɛtən] "beds"), hence, the acquisition of the German vocalic system has long been identified as one of the most prominent problems for Polish L2 German learners (e.g., Hentschel, 1986). The study set out to test whether orthographic marking (for example in the form of German lengthening *h*; see Nimz, 2011) could aid learners in building more accurate L2 phonological representations.

The data for the six German vowels /a: e: o: a ɛ ɔ/ were collected by means of a picture-naming task. Half of the items were explicitly marked for their vowel length in the L1 spelling (i.e. long vowels were marked by lengthening *h*, e.g., *Sahne* [za:nə] "cream", and short vowels were marked by double consonant letters, e.g., *Sonne* [zɔnə] "sun"). No orthographic input was available during the task. Over 2500 vowel productions were acoustically analysed for vowel length and vowel quality. While there were not significant effects of orthographic marking on vowel length, the analysis of F1 and F2 showed significant formant movements for German /e:/ as produced by Polish GFL learners ([ɛe]). Since these movements were only found for /e:/, this finding cannot be explained by the idea that monophthongs have a natural tendency to be replaced by diphthongs when they are high, tense, and long (Hentschel, 1986).

Instead, we explain this finding with a combination of orthographic and perceptual interferences, as German /e:/ is perceptually very different from a Polish spelling pronunciation of <e> (i.e. /ɛ/), unlike, for example, /o:/. We conclude that the *L1* orthographic system plays an important role in L2 sound acquisition. At the same time, our duration data suggest that learners do not make use of length information provided by the *L2* orthographic system.

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A study of F0 and duration cues in the production and perception of Mandarin T2 and T3 by Korean and Chinese dialect speakers

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SLA studies on the production and perception of Mandarin tones show that L2 learners weigh acoustic cues differently from native speakers (i.e. Gandour, 2006). Since former researches mainly focus on non-tonal learners, this study investigates how different dialect speakers and Korean learners weight F0 height and duration cues in producing and perceiving Mandarin T2 and T3, and examines how leaners' pre-existing tonal systems interact with L2 tones.

58 subjects (M=22.9yr) participated the project, including 4 Mandarin speakers (2M, 2F), 10 Wu dialect speakers (5M, 5F), 12 Hebei dialect speakers (6M, 6F), 8 South Min dialect speakers (4M, 4F), 8 Cantonese speakers (4M, 4F), and 8 advanced Korean learners (4M, 4F). According to Rong (2012), 12 frequently-used Chinese words were recorded by subjects in production task and by native speakers as stimuli in perceptual test. Synthesized T2-T3 continua was utilized for identification and discrimination experiments. The offset of target syllables ranged from 9st to 19st with 1 semitone difference, and 3 sets of syllabic duration (110ms, 140ms, 170ms) were designed to detect the duration effects.

F0, duration, identification and discrimination rates were measured by praat and E-prime. Results showed that (1) For production, different F0 and duration error patterns were concluded across groups. The error of turning point time correlated with that of F0 height (r2=0.85, p=0.009). An early turning point oftentimes co-occurred with larger F0 height for T3, and vice versa for T2. (2) All groups used F0 height as perceptual cue, only South Min and Korean groups depended on duration cue in perceiving T2 and T3. (3) Regression results indicated significant correlation between production and perception in F0 height for all groups except for HK and Korea. Finally, tonal assimilation patterns were drawn according to L1 tonal systems under the framework of PAM (Best, 1993) and SLM (Flege, 1995).

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Local errors and letter-to-sound correspondences: Top priorities in pronunciation teaching of learners of different L1

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The primary aim of the study is to provide evidence for the existence of local errors, which Szpyra-Kozłowska (2015: 93) defines as "idiosyncratic mispronunciations of individual words in which, apart from global errors, there are other phonological and phonetic deviations from the original, due to various interference factors," e.g. pronouncing *foreign* as [foˈrejn]. Our intention is to examine what types of errors, whether avoidable (encompassing spelling cues), 'either-or' or unavoidable ('graphophonemic exceptions'), as classified in Porzuczek (2015), are the most frequent in the production and recognition of Sobkowiak's (1996) *Words Commonly Mispronounced* (henceforth WCM). Our tertiary aim is to check what categories, i.e. rules concerning letter-to-sound relations turn out as weakest in the subjects' performance and what patterns should be explicitly discussed in the phonetic course.

The analysis is done on the basis of a questionnaire and recording based study on 230 international (Polish, Ukrainian, Kazakh, Turkish and Tajik) students' production and recognition of a sample of 60 items from a list of WCM.

A reasonable number of Polish pronunciation specialists (Sobkowiak, 1996; Szpyra-Kozłowska and Stasiak, 2010; Szpyra-Kozłowska 2013, 2015; Porzuczek, 2015; Waniek-Klimczak, 2015; Zając, 2015) emphasises the need to draw learners' attention to phonetically difficult words, unpredictable spelling-to-sound correspondences or words with a difficult stress pattern etc. It is frequently argued that the use of such phonologically deviant representations of words hinders successful communication far more than other phonetic errors.

We have empirically confirmed the existence of local errors in the production and recognition of WCM by students of various nationalities. We have also managed to select the precise spelling-to-sound patterns and other phonotactic rules, which need to be addressed at the phonetic course. The result of the study lets us conclude that Sobkowiak's list of phonetically difficult words is useful for foreign learners of different mother tongues because they all appear to err in these lexical items.

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The Effects of Prenasal Raising/Tensing of American English /æ/ on the perception of American English vowels by native Japanese listeners

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In many dialects of American English, /æ/ before a nasal consonant is said to be raised and/or tensed. This study attempts to investigate the effects of this allophonic variation on the perception of American English vowels by native Japanese listeners. Flege's SLM postulates that phones of L1 and L2 are related in position-sensitive allophonic level, and it is possible that /æ/ in prenasal position is labeled as an instance of a different Japanese vowel category. 32 native speakers of Japanese participated as listeners. They heard /i, ɪ, eɪ, ɛ, æ, ɑ, ʌ/ uttered in /bVC/, /kVC/, /bVN/ and /kVN/ frames (/C/ is either /b/, /d/ or /g/. /N/ is either /m/, /n/ or /ŋ/.), and identified the vowel they heard in each consonantal context. They were told that the final would be /b/, /d/ or /g/ in bVC/ and /kVC/ contexts, and /m/, /n/ or /ŋ/ in /bVN/ and /kVN/ contexts, but that their job was to identify the vowel and disregard the final consonant. A series of repeated-measures ANOVAS revealed that overall vowels are less accurately identified in prenasal context, but the identification accuracy of all the vowels was reduced equally. For instance, /ɑ/ was identified better in /bVn/ and /kVn/ contexts than /bVC/ and /kVC/ contexts respectively. It was /æ/ that reduced identification accuracy before a nasal context than before a stop consonant more significantly than the other vowels (p<.001). Moreover, /æ/ was less accurately identified before /ŋ/ than before /m/ or /n/. /æ/ is usually transcribed as Japanese low vowel /a/, and is often identified as a poor exemplar of Japanese /a/ (Strange et al. 1998, Frieda & Nozawa 2007. Less accurate identification of /æ/ can be attributed to the raising of /æ/ before a nasal consonant which makes the vowel sound distant from Japanese /a/.

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Perception and production of L2 European Portuguese consonant sounds by native Cantonese speakers

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Several studies have shown that difficulties in the production of certain non-native sounds often derive from inaccurate perception (Flege, 1995; Munro & Bohn, 2007). One of the factors behind such perceptual biases is the interference of the phonological system of the learner's L1 (Strange, 1995). Bearing in mind that, contrary to European Portuguese (EP), voicing is not a distinctive feature in Cantonese, this study aimed at identifying L2 consonantal segments inaccurately produced in word-initial position by native Cantonese speakers, learners of EP-L2, and assessing degree of cross-language perceptual similarity. A perceptual assimilation task (PAT – Cebrian, Mora & Aliaga-Garcia, 2010) was carried out by 11 Macanese participants, who heard 128 CV stimuli of EP and identified the initial consonant sound according to L1 categories, rating degree of goodness-of-fit on a 7-point scale. To assess segment production accuracy, 30 EP native speakers heard 128 CVto stimuli produced by the Macanese participants, identified the initial sound and also performed degree of goodness-of-fit ratings. Interpreted within the framework of the *Perceptual Assimilation Model-L2* (PAM-L2 – Best & Tyler, 2007), the PAT results show that, at an early stage of learning, 12 of the 16 targeted EP sounds might pose perceptual difficulties (/p/, /t/, /k/, /b/, /d/, /g/, /f/, /ʃ/, /v/, /z/, /ʒ/, /R/). Results of the production test disclose difficulties with 14 EP sounds (/p/, /t/, /k/, /b/, /d/, /g/, /f/, /s/, /ʃ/, /v/, /z/, /ʒ/, /l/, /R/). Overall, the results suggest that, except for /s/ and /l/, data provided by a PAT, when analyzed in the light of the PAM-L2, might reliably be used to anticipate oral production inaccuracies.

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The relationship between perception and production in the acquisition of Japanese vowel length contrast by native English speakers

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According to the Speech Learning Model (SLM), most inaccurate production has perceptual basis (Flege, 1995). In Japanese, vowel length makes a phonemic difference as in /obasan/ "aunt" and /abaasan/ "grandmother," and the feature of length plays an important role in Japanese phonology. Oguma (2002) reported that even advanced learners had difficulty in pronouncing long-vowel words accurately. The acquisition of the length contrast is one of the most challenging areas for learners of Japanese Previous studies on the acquisition of Japanese vowel length contrast did not report clear relationship between perception and production (e.g. Toda, 2003). The current study examines the relationship between foreign accent and categorical perception of Japanese vowel length contrast.

The utterances of 30 native English speakers learning Japanese were evaluated by native Japanese speakers with a 5-point scale. The learners were asked to read Japanese words out loud at a natural speed, both in isolation and in a carrier sentence, [Kore wa ___ desu] "This is ___". Native Japanese speakers evaluated the utterances focusing on whether the duration of short/long vowel was appropriate to the Japanese word. The learners also participated in the perception experiment where vowel duration continuums were used as stimuli. The materials of the stimuli were four minimal pairs (i.e., eight words) differing in vowel length at word-initial position or word-final position. Categorical perception of each learner was evaluated here with three parameters: category boundary, sharpness, and amplitude (Kato et al., 2004). Category boundary was estimated as 50% cross-over point of response rate on the logistic function. Sharpness was an index indicating sensitiveness to the change of duration over category boundary. Amplitude was an index indicating the stability of listeners' identification to the extreme stimuli.

The results of experiments showed that the production score correlated with sharpness and amplitude, while the production score did not correlate with category boundary. The results indicated that sharpness and amplitude seem to relate to pronunciation accuracy. However it seems that even if the category boundary is much shorter or longer than that of native Japanese speakers, learners are able to pronounce short and long vowels accurately. Learners' categorical perception might not fully correspond to learners' pronunciation accuracy. Shown by some of the learners whose categorical perception resemble native Japanese speakers had strong foreign accent.

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Predictability of L2 phonetic learning by exolingual Czech learners of French

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The Speech Learning Model - SLM (Flege, 2007) and the Perceptual Assimilation Model - PAM (Best and Tylor, 2007) deal with the learnability of second language (L2) vowels and consonants by late, mostly indolingual (immigrant), learners. The models base their predictions on an inter-language phonetic comparison of the learner's first language (L1) and L2. Paillereau (in press) showed that Czech monolingual listeners assimilate the French /ɛ/ - /e/ to the Czech /ɛ/ - /ɪ/; /o/ - /ɔ/ to /u/ - /o/, respectively, and /œ/ to /ɛ/. The vowel /ø/ is assimilated to different Czech categories. Formant measurements are predominantly in accordance with perceptual data. Using PAM, French e/ɛ and o/ɔ, falling into a *two-category assimilation,* should be discriminated well, and ø/œ, representing either a *category goodness difference* or an *uncategorized-categorized pair,* should be discriminated with more or less difficulty. Following SLM, /ɛ/ - *highly similar* in most contexts, and /ø/ - *new* in some contexts, could be mastered authentically, whereas *similar* vowels /e, o, ɔ, œ/ could not.

We aim to test to what extent these predictions apply to exolingual learners. How do Czech proficient learners of French actually perceive and realize French mid vowels /e, ɛ, o, ɔ, ø, œ/? Can their phonetic learning be predicted by either of these models? Czech vowel inventory consists of /iː, ɪ, ɛː, ɛ, aː, a, uː, u, oː, o/.

The perceptual abilities of 10 Czech learners (M age = 25.7) were examined in two ways: 1) an identification test of isolated mid-vowels (8 repetitions), and 2) a discrimination oddity task with 61 sequences of four monosyllables containing mid-vowels, e.g. /pop tɔt kok RoR/. Global results show that Czech learners largely confuse French mid-vowels, although the identification score for isolated /ø/ and /œ/ is higher (84% and 74%, respectively) than that for the other mid-vowels.

Learners' production abilities were examined in two ways: 1) A formant analysis of vowels uttered 10 times in isolation and in nonce words CVCVCVC (C = /p, t, k/), embedded in carrier sentences. F-patterns were compared to the norm (= 10 French non-southern women, M age = 28.5). 2) A perceptual verification by 10 non-southern French listeners was executed in an identification test. The results show that learners realize vowels within each pair with approximately the same F-pattern, except for ø/œ in isolation. Against expectation, /e/ is not realized within the Czech /ɪ/, to which it is phonetically similar, but within /ɛ/. Isolated /ɛ/ and /ø/ are identified mostly "correctly", whereas other vowels are confused with their counterparts.

SLM can partially account for the limits of phonetic learning of French by Czechs, whereas PAM cannot. Nevertheless, Flege's model is not completely adapted to our learners who had learnt French in Czech schools from textbooks, either. We suggest that predictions relating to L2 phonetic learning for exolingual learners should consider not only the influence of their L1, but also the influence of spelling.

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Developing a difficulty hierarchy of Spanish sounds for L2 Spanish speakers

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Explanations of relative difficulty in L2 speech normally do not explicitly include a role for complex articulatory movements and focus on markedness [1] or the perceptual categorization of sounds [2, 3]. An explanatorily and predictively adequate L2 speech theory must include a model of production difficulty, yet our understanding of what is articulatorily easy/difficult is limited. While research on phonetic constraints has revealed that articulations involving frication [4], trilling [5, 6], and posterior places of articulation [7] are complex, the combinations of complex articulatory gestures that result in the greatest difficulty for L2 learners is understudied. The goal here is to adapt a method used in the speech sciences to establish empirically a hierarchy of difficulty of sounds for L2 speakers.

10 L1 Spanish and 10 advanced L1 English-L2 Spanish speakers residing in Madrid repeated nonce VCV sequences as rapidly as possible for seven seconds. Five Spanish segments absent from English ([β, ɣ, χ, ɲ, r]) were produced in two contexts ([eCa], [aCe]). [m, t] (present in both languages) were also included as a baseline, as stops were predicted to be the least difficult [8]. In contrast, [r, χ] were expected to be the most difficult, given the precise aerodynamic conditions required for their production. Productions were analyzed acoustically (place and manner of articulation, voicing), and speed and accuracy rates (correct vs. incorrect) were calculated; segments with slower and lower accuracy rates were analyzed as the most difficult.

The following hierarchies were observed: L1 [m, t, β] > [ɣ, ɲ, r, χ]; L2 [m] > [t, β] > [ɣ, ɲ] > [r] > [χ]. Results, consistent with findings on coarticulatory resistance [4, 6], and phonetic constraints [5, 7, 8], indicate that for L1 English-L2 Spanish speakers, trilling and frication in the posterior part of the vocal tract are particularly challenging even for advanced speakers.

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The L2 perception and production of English sentence types: Intonation, syntax and pragmatics

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Studies have revealed that advanced L2 speakers experience greater difficulty using intonational cues in their target pragmatic contexts than in controlled speech [1]. However, research has focused on structures where intonation was the only cue (e.g., English broad vs. corrective focus) rather than on structures involving syntactic and prosodic cues (e.g., English sentence types). To fill this gap, we investigated the acquisition of three English sentence types: statements (S) (e.g., *John ate a pancake*), absolute yes-no questions (AQ) (e.g., *Did John eat a pancake?*), and declarative questions (DQ) (e.g., *John ate a pancake?*) by L1 Spanish-L2 English speakers. In addition to intonational cues distinguishing sentence types, English learners must acquire the syntactic and pragmatic distinction between AQs and DQs. Seven L1 English and seven advanced L1 Spanish-L2 English speakers completed two production (repetition of decontextualized sentences vs. production of a contextually appropriate sentence) and three perception tasks (forced-choice identification of utterances ranging from low-pass filtered to contextually appropriate options) involving increasing levels of access to contextual meaning. Error rates were calculated and the pitch change and slope were measured for the first pitch accent (PA) and the final nuclear contour.

Overall, the L2 speakers distinguished between statements and questions with native-like accuracy, but demonstrated difficulty distinguishing between AQs and DQs, incorrectly preferring AQs where DQs were expected (Perception error rate: L1: 6%; L2: 29%; Production error rate: L1: 5%; L2: 83%). Contextual effects were detected in the realization of PAs and nuclear contours, with smaller pitch excursions in contextualized than decontextualized production tasks; crosslinguistic influence was observed in the realization of the first PA of AQs and DQs, but differences with controls were not significant. These results support the claim that crosslinguistic influence is greatest in contextualized tasks [1, 4], and reveal that even advanced learners experience difficulty acquiring the English sentence types.

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Bilingualisms and phonetic compliance

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Certain types of bilingualism could facilitate the acquisition of a third language (Cenoz, 2003; Sanz, 2000) and more specifically, may improve phonetic learning, at least for certain foreign phonetic contrasts (Antoniou et *al.*, 2015). This advantage in foreign language learning could be due to specific experience with two phonemic systems as well as to cognitive advantages generally associated to bilingualism, such as increased executive functioning (Barak & Bialystok, 2011) and/or greater functional awareness of language (Rutgers & Evans, 2015), likely to have an impact on speech perception and production skills. Following this, it may be assumed that some bilinguals could demonstrate enhanced phonetic compliance – the inherent ability to produce speech sounds unusual in their native language(s) (Delvaux et *al.*, 2014) – in comparison to monolinguals, or at least that this ability woud develop differently in bilingual and monolingual speakers.

In order to assess phonetic compliance in bilingual and monolingual adults, we collected data from four Dutch-French Belgian bilingual participants that were subsequently compared to the data of four monolingual participants gathered from a previous study (Delvaux et *al.*, 2014). The data collection paradigm was based on 10 repetitions of French and Dutch vowels and 6 reproductions of 94 synthesized vowel-like stimuli distributed accross the entire vocalic space. Formants values were automatically measured in the middle of productions and manually verified. Following Delvaux et *al.* (2014), three indices were computed to : (i) assess the distance betwen the stimuli and the corresponding productions, (ii) take account of the structure of each individual's native phonological system(s), (iii) assess the participants' degree of phonetic control.

Results revealed no significant difference between monolinguals and bilinguals but still, proved interesting. Indeed, the ranking of bilingual participants differed across the three indices, suggesting more diversified profiles than among monolingual participants. Actually, the productions' distributions over the vocalic space demonstrated differences in performances among bilinguals, that were captured by the indices. In conclusion, these results confirm the multidimensionality and complexity of phonetic compliance, particularly in bilingual speakers, and emphasize the interest of a multi-componential approach in assessing phonetic compliance, as well as the need for further refinements of the theoretical underlying reflection.

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The acquisition and generalization of novel boundary locations: Vowel height adaptation in Greek listeners

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Not only during second- or cross-language perception do listeners encounter "new sounds". Perceptual adaptability is necessary for processing even non-canonical tokens of one's first-language sound categories (Samuel & Kraljic, 2009). For instance Maye, Aslin, and Tanenhaus (2008) showed that listeners recalibrated L1 vowel categories after exposure to lexical items containing altered realizations of these vowels. We ask whether exposure to vowels with manipulated quality results in adjusted perception of these as well as non-exposed but phonologically related vowels. Such generalization has been attested for consonants (Kraljic & Samuel, 2006) but is inconclusive for vowels.

We recorded a native speaker of Greek (a five-vowel language) reading polysyllabic words or non-words containing /i/ or /e/ (but never /u/ or /o/). Using Praat (Boersma & Weenink, 2015), we lowered the /i/'s, in either the words or the non-words, to an intermediate height between /i/ and /e/ to be presented along with unmanipulated /e/'s to a half of our participants. The other half was exposed to raised /e/'s and unmanipulated /i/'s. Unmanipulated words or non-words only containing /a/ were fillers. Fifty-seven Greek listeners completed a lexical decision task with either /i/-lowering or /e/-raising in either words or non-words. In two subsequent separate tasks (order counterbalanced), they categorized isolated vowels from /i/-/e/ and /u/-/o/ continua, created by resynthesizing endpoint productions by the same speaker.

In the lexical decision task, listeners scored 93% correct or higher; data of one participant was excluded from statistical analyses because no /i/-/e/ boundary could be determined in her data. Repeated-measures ANOVA on individual boundary locations from the categorization tasks, computed from logistic regression coefficients, showed an effect of Manipulation Direction (F[1, 52] = 7.2, p = .010), meaning that, as predicted, participants exposed to raised /e/ and unmanipulated /i/ had the high-vowel versus mid-vowel boundaries at lower F1 values than participants exposed to lowered /i/ and unmanipulated /e/. The analysis did not detect an effect of Lexical Status (manipulation in words versus in non-words), which indicates that access to contextual cues such as lexicon or phonotactics is not a prerequisite of perceptual recalibration. Importantly, Manipulation Direction was not found to interact with Continuum (/i/-/e/ versus /u/-/o/), indicating generalization of perceptual adjustment from the manipulated front vowels to the unexposed back vowels of corresponding phonological height.

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Investigating the bilingual advantage in imitation of Sussex English intonation: Evidence from Quebec French-English bilinguals and English monolinguals

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This study aims to explore the bilingual advantage in certain aspects of linguistic processing, specifically phonetic/phonological production. Several studies have underscored the positive effects of bilingualism on both non-linguistic (e.g., Bialystok & Kwan, 2005) and linguistic cognition (e.g., Kaushanskaya and Marian 2009; Kondratenk & Spinu, 2014). Our study examines the learning of intonation patterns in second dialect learners.

29 speakers (17 English monolinguals and 12 French-English bilinguals) from Montreal, QC, were trained to reproduce a novel accent of English, specifically the variety spoken in the Sussex region of England. The experiment included a pre-test, an imitation task and a post-test. Here, we focus on the results of the imitation task. The imitation task consisted of a passive and an active learning phase. In the passive phase, the participants were asked to listen to native Sussex English productions for 5 minutes. In the active phase, they heard the same sentences and were asked to imitate them one by one. To eliminate any doubts with respect to phonemic representation, the sentences to be read out loud were also presented on the screen in orthographic transcription. They produced sentences with distinct intonation patterns, i.e. declaratives, yes-no questions, and tag questions.

The preliminary results are based on 270 intonation contours. We manually examined and extracted the contours using the Praat software for acoustic analysis and assigned them similarity scores by dividing each sentence contour into 4 equal-sized regions and comparing each of these with the contours of native pronunciation. We used general pitch patterns (flat, falling, rising) as well as pitch excursions such as rises and falls in order to determine similarity and computed a final score for each sentence. A one-way between subjects ANOVA was conducted to compare the effect of language status (bilingual and monolingual groups) and intonation pattern (declarative, yes-no question, tag question) on similarity scores. Preliminary results show a significant main effect of language status ($F(1, 72) = 19.2$, $p < 0.05$), with bilinguals (mean similarity score = 77%) having outperformed monolinguals (mean similarity score = 58%). Post hoc tests using the Bonferroni correction revealed the existence of significant differences among the three intonation patterns examined, with the mean similarity score for Yes-No Questions being significantly higher as compared to Tag Questions.

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When 'politician' becomes 'policía' and 'border' becomes 'brother': Effects of orthography and cognate status on Spanish-Catalan EFL learners' pronunciation

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Learning a foreign language (FL) in an educational setting implies a series of limitations relative to learning a second language (L2) in a naturalistic setting. FL learners receive limited auditory input but considerable written input. Unlike Spanish and Catalan, which are transparent languages with a very close connection between orthography and pronunciation, English is an opaque language with little connection between sound and spelling (Erdener & Burnham, 2005). This cross-linguistic difference, often triggers non-target like pronunciation by these learners.

In the present study, we investigate whether the opaque nature of English is indeed a barrier for Spanish-Catalan bilinguals learning English (see Escudero, 2015 for a review). A group of intermediate EFL adolescent learners were recorded producing a corpus of cognate and non-cognate words in two different conditions: a reading aloud task and a delayed repetition task. In the reading aloud task, the target words were presented as visual prompts in a carrier phrase. In the delayed repetition, words were presented aurally and participants repeated them after a 2-second delay followed by and audio prompt. The words were phonetically transcribed using PHON (Rose & MacWhitney, 2015).

As predicted, task condition had a significant effect on pronunciation. Participants produced more non-target-like cognate words when these were presented in the visual form. These "accented" pronunciations often included addition of epenthetic "e", lack of vowel reduction and violation of English syllabicity rules. These results suggest that attention to spelling might interfere with the waylearners process of the phonological forms of words (Trofimovich & McDonough, 2011).

As for non-cognate words, no significant effects of task condition were found. We speculate that errors in non-cognates such as the substitution of 'brother' for 'border' or 'water' for 'weather' were due to lexical frequency. Interestingly, in the delayed repetition, some participants produced non-words if these were not in their lexicons, suggesting that pronunciation learning might work on a word-by-word basis.

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The effect of foreign accent on listeners differing in L1

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Foreign accent (FA) can affect intelligibility, and variations in FA effects have been ascribed to both speaker and listener differences (Bent & Bradlow 2003, Imai et al. 2005, van Wijngaarden et al. 2002). Some studies suggest an intelligibility benefit for listeners sharing a speaker's L1 (Bent & Bradlow, 2003) whereas others report that a mismatch in the L1 may be detrimental (Stibbard & Lee, 2006).

In the present study we explore segmental accent effects on distinct listener populations using Spanishaccented English consonants. One listener group had an L1 matching the speaker's L1 (Spanish, N=21); a second group (English, N=9) had an L1 matching that of the target sounds; a third group (Czech, N=33) was mismatched in the L1 of the talker and the targets. The study also evaluated three techniques designed to isolate segmental FA cues: code-switching, cross-linguistic splicing, and cross-linguistic text-to-speech synthesis. Words were presented blocked by segment isolation technique and randomised by accent (native vs. non-native). Participants identified each word (intelligibility task) before rating it for degree of FA. All segment isolation techniques were able to convey segmental FA but synthesis from text was less efficient than the others; code-switching and splicing were not significantly different.

All listeners were able to detect FA while Czech listeners rated it more harshly than Spanish listeners. Foreign-accented stimuli resulted in lower intelligibility than native-accented words for all listeners. However, Spanish listeners had the smallest intelligibility reduction from FA, indicating a matched advantage, although they still found native accent more intelligible (Stibbard & Lee 2006). Czech listeners had the largest intelligibility reduction from foreign-accented stimuli, and thus a strong mismatched detriment (Stibbard & Lee 2006; Pinet et al. 2011). Our results confirm that the relationship between listeners' and speakers' phonological representations has a decisive influence on speech intelligibility.

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TipTopTalk!: A game to improve the perception and production of L2 sounds

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Swain's (1985) Comprehensible Output Hypothesis considers that input alone may not be enough for second/foreign language (L2) learners to acquire new language forms. The Hypothesis claims that producing an L2 will facilitate L2 learning due to the mental processes related with language production. Thus, learners will more likely notice discrepancies and gaps between linguistic aspects of their native language (L1) and those of their L2 when *producing* language than when only *perceiving* language.

Taking Swain's Hypothesis into account, in this talk we will present a Computer Assisted Pronunciation Training designed for non-native speakers of Chinese, English, German, Portuguese (Brazilian and European) and Spanish. The game makes use of automatic speech recognition (ASR) and text-to-speech systems available in Android smartphones and tablets to (i) present learners with the target sounds by means of synthesized stimuli; (ii) test learner's discrimination of specific L2 sounds that are likely to cause intelligibility problems through exercises containing minimal pairs; and (ii) allow learners to record their speech and compare their production to that of the L2. The game provides users with immediate feedback in both perception and production exercises. In the latter exercises, when the recognizer is unable to identify an ideal or close-to-ideal response, the user can retry the answer up to five times. The main disadvantage of ASR pronunciation training is erroneous feedback, i.e., possibility of false alarms and false accepts (Neri et al., 2006).

In order to encourage users' engagement and desire to keep playing the game, each correct answer entitles users to collect points so as to reach a given game status. Moreover, different language-dependent leaderboards can be displayed at the end of each round. The advantages in using a gamification design strategy are (i) the increase of learners' engagement, and (ii) the possibility of individualized and comprehensive feedback while keeping users active and comfortable to progress at their own pace in an anxiety-free context.

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The role of video-based interaction in the longitudinal development of second language oral ability: An experimental study

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Over the past 40 years, researchers have extensively examined how adult second language (L2) learners can improve their morphosyntactic performance through interaction with native speakers in various settings (e.g., face-to-face, classroom, and video-mediated), leaving a gap in research on the effects of interaction on other linguistic domains of speech production (for review, see Mackey, 2012).

The current study investigated the role of video-based interaction in the longitudinal development of L2 speech. Specifically, the study examined how such interaction effects, if any, can differ according to learners' proficiency levels (the amount of conversation experience), linguistic domains (overall impressions, pronunciation and fluency), and characteristics of L2 interaction (the number of errors, corrective feedback and repair).

A total of 20 Japanese English-as-a-Foreign-Language learners were divided into two groups ($n = 10$ for Experienced and Inexperienced, respetively) based on the amount of experience abroad and general proficiency test scores. During the nine-week treatment over one academic semester, the participating students engaged in weekly, one-hour conversation exchanges with native speakers in the US via video-conferencing tools. The spontaneous production of the participants was elicited via a picture description task at the beginning and end of the project. Subsequently, the data was submitted to global (comprehensibility), segmental (consonant and vowel accuracy), prosodic (adequate and varied intonation) and temporal (optimal speech rate) analyses.

First, the analysis of video interaction data revealed that the participants in the inexperienced learner group made more pronunciation errors, received more corrective feedback from native speaking interlocutors, and had more opportunities to work on improving various pronunciation errors during the interactional treatment, compared to those in the experienced group. Second, the analysis of the pre-post speech data yielded significant gains in comprehensibility and fluency among the inexperienced learner group; and pronunciation among the experienced learner group.

The findings support the idea that the acquisitional value of interaction could be a multifaceted phenomenon. A semester-long interaction activity may help inexperienced L2 learners to develop certain aspects of linguistic competence that are often associated with early phase of L2 speech learning (comprehensibility, fluency). In contrast, an interactional experience of this kind may be beneficial especially for advanced learners to attain refined pronunciation accuracy that often develops at the later stage of L2 speech learning. The quality of interaction (feedback/repair moves) could be related to the learning process of inexperienced L2 learners rather than experienced L2 learners.

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The connection between perception and production: Training both modalities in strict isolation

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Language and cognition scientists have been interested in the relationship between perception and production for decades. One route to understanding their interconnectedness is to train one modality and test for effects in the other. Using this model, a meta-analysis by Sakai and Moorman (2013) showed that perception-only training of second language sounds leads to moderate gains in production, with the effect mediated by manner of articulation. Perception seems to influence production, but can production influence perception?

In a normal communicative setting, language learners listen to speech at the same time as they produce it. Because the co-occurrence of listening and speaking is intuitive, most pronunciation trainings provide participants with auditory samples to be analyzed or imitated. However, a study cannot claim that production training leads to perception gains if dense and repeated exposure to auditory stimuli might be the actual cause of alterations in the perceptual modality.

In the present study, approximately sixty native speakers of Spanish were randomly divided into one control and three experimental groups. The first experimental group received production-only training on English /i/ and /ɪ/ with absolutely no other-produced aural input. The second experimental group underwent the same production training, but wore noise-cancelling headphones and listened to white noise, which blocked all air- and bone-conducted sound from their own voices. In the strictest sense, this group did not hear any iteration of the target sounds. A third experimental group underwent perception-only training and was never prompted to produce the target sounds. All participants underwent a battery of perception (identification and discrimination) and production (elicited production, passage reading, and picture description) tasks in pre- and posttest sessions. Results show that both production-only training and perception-only training can positively influence the alternate modality. This study is the first of its kind, and results have the potential to impact both pedagogy and the field of cognition.

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Can perceptual training improve production of L2 phones? The final report of a meta-analytic review spanning 25 years of perception training research

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In 1988, Flege began publishing a series of articles that later developed into the Speech Learning Model of second language (L2) learning (e.g., Flege, 1988, 1995, 2003). Two postulates of this model are that native language phonemic inventories can be altered to include new L2 sounds, and that accurate perception of L2 sounds must be achieved before accurate production can occur. In the ensuing 25 years, numerous researchers have attempted to empirically test these claims, with keen interest in the connection between the perception and production modalities.

The current study employed meta-analytic procedures to summarize findings from experiments that tested the effectiveness of perception-only training on production outcomes, published from 1988 to 2013. A pool of 18 primary studies passed all inclusion and exclusion criteria, and data were extracted from independent experimental groups to calculate 21 effect sizes for perception outcomes and 24 effect sizes for production outcomes after perception-only training. Results indicated that strictly controlled perception training led to medium-sized improvements in perception (mean=0.97, SD=1.03) and small improvements in production (mean=0.58, SD=0.47). Effects in the production mode were mediated by the manner of articulation of the target phoneme: Obstruents showed the largest effects while vowels and sonorants showed the smallest. There was no significant correlation found between perception gains and production gains.

This meta-analysis offers a comprehensive view of 25 years of perception training studies that test for production gains. Results indicate that the perception and production modalities are in fact connected, in so much as training in the perceptual mode can induce positive change in the productive mode as well.

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On the (a)symmetry of FR-ANG-lais pronunciation feedback: A comparative analysis of corrective feedback provided by English-speaking and French-speaking participants during language tandem conversations

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Our French-English tandem interaction corpus (Horgues & Scheuer, 2015a) offers a new perspective on how L2 learners receive and use corrective feedback (CF) – especially pronunciation feedback – and also on how native speaking tandem participants, who are not professional language teachers, might serve as efficient CF providers. We video-recorded 21 French-English tandem pairs, each consisting of a native French and a native English student. The tandems were recorded in two sessions, separated by 3 months, each time performing collaborative reading and semi-spontaneous tasks (story-telling and debating) in both languages. The corpus is therefore well-suited for a comparative analysis of French and English NSs' strategies on CF in general, and pronunciation feedback in particular. Our methodology derives from the typology established in previous research into CF in the context of L2 classroom teaching (Lyster & Ranta, 1997; Sheen, 2006; Lyster, Sato & Sato, 2013), which we have adapted to the characteristics of peer-to-peer interactions.

We have previously reported on the CF provided by the native English participants (Horgues & Scheuer, 2015b), where, pronunciation-wise, the NSs predominantly recast segmental errors (66%), vowels being the prime target. In the present paper we proceed to a comparative study of the participants' corrective behaviour by examining the French portion of the data. Our main research questions are: Do French and English NSs target the same language areas while providing CF? Do they resort to the same corrective strategies (recast, clarification requests, explicit comments)? Do they display the same preferences as to the types of pronunciation errors triggering CF?

The analysis of the data from session 1 shows that French NSs provide over twice as much CF as their Anglophone counterparts (201 vs 93 corrective instances) and that they predominantly correct vocabulary and morphosyntax (42% and 22%, with a further 13.5% involving a combination of the two), with pronunciation being most rarely targeted (12%). English NSs even more strongly favour vocabulary (61%), with 'pure' morphosyntactic corrections ranking the lowest (12%). Recast remains by far the prevalent corrective strategy, employed in over 80% CF instances in the English and the French sections of the corpus alike. The pronunciation errors targeted by the French CF providers are almost exclusively segmental. While some of the above dissimilarities are inevitably due to structural differences between English and French, profound sociolinguistic and sociocultural factors may have to be invoked to explain other asymmetries.

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The phonetic realization of German laterals in initial word position by Bosnian migrants living in Vienna

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The present study deals with the influence of language contact on the German lateral productions of Bosnian migrants living in Vienna and is part of a larger study on the phonetics of language acquisition and attrition.

Bosnian has two lateral phonemes, a palatalized and an alveolar/velarized one (see Maric 2005). Standard Austrian German (SAG) features only one alveolar lateral phoneme (see Moosmüller et al., 2015). In the Viennes dialect (Vd) however, the alveolar lateral has a velarized allophone, which is negatively evaluated and therefore sometimes avoided especially by female dialect speakers.

Phonetic processes observable after the acquisition of a stable L2 knowledge will be analyzed with respect to the hypothesis of Cross Language Influence (formulated by Sharwood-Smith 1983) and further contact phenomena (see e.g. Riehl 2004, Birdsong 2006). Moreover, it will be analyzed, whether there are speaker- or group-specific characteristics in the production of the laterals, due to the sex of a speaker (see Labov 1990) or different attachments and belongings within the new environment, describing the speaker's identity construction (see for example Wodak and Krzyzanowski 2007).

At the NS 2016 I will present first results of a current, not yet completed production study of German laterals in the salient word initial position, carried out with 18 speakers (three women and three men of each language variety: Bosnian, SAG and Vd). Read sentences and spontaneous speech (semi-structured biographical interviews) were recorded. Formants (F1-F3) and duration of the laterals and their phonetic surrounding are measured and statistically analyzed.

First results confirm, that there are no velarized laterals in SAG. In the Vd, velarized laterals can occur in initial position and are mainly produced by men, especially in back vowel contexts. All of the Bosnian speakers produce velarized laterals in word initial position, whereas Bosnian women tend to realize more velarized laterals than men.

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The pronunciation of voiced Italian obstruents by Swiss German learners

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Swiss German dialects lack voiced obstruents, but nevertheless distinguish two types of homorganic *fortis* and *lenis* stops and fricatives, duration being the main acoustic correlate. There are only *fortis* affricates, and the feature fortis vs. lenis is neutralised whenever two obstruents follow each other (Fleischer & Schmid 2006). By contrast, Italian is known to be a 'true voice language', thus displaying negative VOT values for voiced stops; moreover, the feature [±voice] is quite pervasive in the obstruent inventory, e.g. for alveolar and postalveolar affricates (Bertinetto & Loporcaro 2005).

On the basis of this contrastive analysis, we hypothesise that Swiss German learners perceive voiced Italian obstruents as equivalent to lenis consonants, thus assimilating the new sounds of the L2 to the most similar consonants of their L1, as suggested by current models of second language speech (Best & Tyler 2007, Flege 1995). We furthermore hypothesise that the devoicing will be stronger in affricates (given the structural gap in the L1) and in clusters consisting of two obstruents. We assume that learners achieve the voicing of the target obstruents more easily in some phonotactic consonants (e.g. intervocalically) than in others, according to considerations of linguistic markedness (Eckman 2008).

These hypotheses were borne out by an acoustic analysis of a corpus gathered from 10 high school students, who read 19 sentences containing /b d g v z dz dʒ/ in 6 different phonotactic contexts. From 644 tokens we computed the locally unvoiced frames, using the 'Voice report' function in *Praat* (Boersma & Weenink 2015). Results show that 47% of the tokens were (at least partially) devoiced, with some differences among the speakers. There was a clear effect of the factors 'consonant' and 'context' (Kruskal-Wallis $p<0.001$): according to our predictions, affricates were more strongly devoiced, and stops were more devoiced after /z/, revealing an effect of both L1 influence and markedness conditions.

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An ear for accent: Learners' developing concept of L2 dialectal variation

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Previous research on monolinguals shows that an individual's perception and production of dialect varies throughout his or her lifetime and can be affected by factors such as residential exposure and social ties (Clopper and Pisoni, 2004; Evans and Iverson, 2004, 2007; Munro, Derwing, and Flege, 1999). Less is known about how second language learners understand and conceive of dialectal variation, especially classroom learners, whose exposure to L2 dialects is often rather limited. For instance, while some studies have shown that variable input can benefit language learners' perceptual growth (Lively, Logan and Pisoni, 1993; Nishi and Kewley-Port, 2007), the effects of input variability and exposure to L2 dialectal variation on dialect development is largely unknown.

The present study examines the dialect perception of 60 L1 English speakers learning Spanish and their ability to identify the regional dialectal accents of native speakers from 6 different Spanish-speaking regions. Analyses of listeners' response accuracy on a forced-choice identification task revealed that some dialects were easier for learners to identify than others, and participants' performance varied as a result of their prior dialect exposure. An examination of specific contexts of exposure (teachers, social contacts, media, and study abroad) reveals that experience with a native instructor who speaks a dialect correlates with the greatest gains in recognition, although it is unclear whether this is due to amount of exposure, comprehensibility of the input, or learners' familiarity with one key speaker. The evidence that learners benefit from exposure to only one speaker of one dialect when learning about variable L2 sounds is probably due to a lighter cognitive load and learner level. Ultimately, these findings have implications for the field's understanding of learners' ability to distinguish between individual and regional variation, and how the concept of dialect develops in the interlanguage with exposure to regional variation.

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The effect of the L2 competence on the perception of Spanish lexical stress by German speakers

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The *stress deafness* hypothesis postulates that speakers of fixed-stress languages show more difficulties in perceiving stress contrasts in L2 than speakers of free-stress languages. (e.g., Dupoux et al., 1997; Peperkamp & Dupoux, 2002). Thus, speakers of German should not show evidence of *stress deafness* in Spanish, since both are free-stress languages. In a previous study (Schwab & Dellwo, 2016), we showed that, on the one hand, German speakers without knowledge of Spanish were able to perceive Spanish lexical stress to a high degree (76% of correct responses), although not to the same degree as native Spanish listeners (90%), and that, on the other hand, the poorer performance of the non-native listeners was mainly due to the perception of particular accentual contrasts (i.e., proparoxytone and oxytone patterns).

The goal of the present research is to examine to what extent the knowledge of Spanish enables the German-speaking listeners to overcome the difficulties they showed with specific Spanish accentual contrasts. For this, we analyzed the perception of Spanish lexical stress by native German speakers with advanced knowledge of Spanish (4-9 years of Spanish course) and by native Spanish listeners. The participants performed an Odd-One-Out task, in which they had to indicate which stimulus in a sequence of three segmentally identical Spanish stimuli had a different accentual pattern. Results showed that no significant difference was found between the performance of the German-speaking listeners with advanced knowledge of Spanish (89.7%) and the performance of the native listeners (90.8%), although the former were again less sensitive to some accentual contrasts (i.e. proparoxytone and oxytone patterns) than the latter. We can conclude that the knowledge of Spanish facilitates the German speakers' perception of Spanish lexical stress.

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Factors affecting the time needed by French-speaking listeners to discriminate Spanish accentual contrasts

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The goal of the present research is to study the effect of the manipulation of the acoustic parameters involved in the perception of lexical stress. More specifically, we examine the time needed by French-speaking listeners when they have to discriminate Spanish accentual contrasts.

The participants were 10 French-speaking advanced learners of Spanish and 10 French-speaking participants without knowledge of Spanish. They performed an AX discrimination task, in which they heard pairs of Spanish trisyllabic words, and had to indicate whether the position of stress in the two stimuli was the same or different. The stimuli we used were *Base* and *Manipulated* stimuli. The *Base* stimuli (i.e., stimuli with the original stress pattern) were proparoxytone, paroxyone or oxytone. The PP>P *Manipulated* stimuli presented a stress shift from the antepenultimate originally stressed syllable (as in a proparoxytone, PP) to the penultimate syllable (as in a paroxytone, P), while the P>O *Manipulated* stimuli presented a stress shift from the penultimate originally stressed syllable to the final syllable (as in an oxytone, O). In order to be able to examine the role of the three acoustic parameters involved in the perception of lexical stress (f_0, duration and intensity), we used *Manipulated* stimuli which presented the seven possible isolated and combined manipulations of the acoustic parameters. Each pair of stimuli that the participants listened to was composed of a *Manipulated* and a *Base* stimulus. The Same/Different responses (reported in Schwab & Llisterri, 2015) and the reaction times were analyzed by means of mixed-effects models.

The results show that the time needed to perceive an accentual difference mainly depends on whether the acoustic parameters clearly indicate the position of the stress (in PP>P manipulations) and on the accentual pattern (in PP>P and P>O manipulations), but does not depend on the competence in L2.

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Vowel inherent spectral change in the speech of Polish learners of English

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Research on vowels in second language (L2) speech typically concentrates on vowel quality as defined by first and second formant frequencies (F1,F2) in a two-dimensional acoustic space. However, phonetics research has shown that in languages like English with large vowel systems, there is a great deal of acoustic overlap between vowel targets. Vowel inherent spectral change (VISC; e.g. Morrison & Assmann 2013) involving formant trajectories over time rather than static two-dimensional targets, has been shown to be an integral part of the English vowel system. By contrast, in smaller vowel systems such as Polish, there is sufficient 'room' in the two-dimensional space to accommodate the entire inventory, so language users have less need to utilize VISC to differentiate among vowels. These differences open up a research area that for the most part has remained unexplored: acquisition of VISC in L2.

This paper will report on a project investigating the acquisition of VISC by Polish learners of English. We are currently comparing VISC in the speech of Polish users at different levels of proficiency according to three types of acoustic measures: Formant Excursions (acoustic/auditory distance traveled over the course of a vowel or a portion of a vowel), Formant Slopes (direction and rate of of a given vowel formant), and Formant Stability (the proportion of a vowel's duration that falls within a certain distance of the target. Preliminary analysis on the FLEECE vowel revealed significant effects of proficiency for each of these measures for both F1 and F2, while in the case of the TRAP vowel proficiency-based differences were observed in F1 for each measure. By contrast, static measures of formant values are less successful as predictors of English proficiency.

Under the assumption that a diachronic source of VISC may be found in the degree of synchronicity between consonantal and vocalic gestures in speech, we also examine the effects of onset consonant place of articulation on the dynamic properties of vowels. Results suggest that the effects of English proficiency on VISC are concentrated in coronal and dorsal contexts.

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There goes the neighborhood! Avoiding labels in L2 phoneme detection

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Phoneme detection (PD) measures sensitivity to violations of L1 allophonic distribution in terms of reaction time (RT) inhibition (slower: Otake et al., 1996; Weber, 2001) or facilitation (faster: Weber, 2001). Commonly PD relies on target language (TL) orthography or metalinguistic knowledge to label listening targets (e.g., Japanese nasal kana <ん> or <ン>; German <ch>). But TL labels are problematic for L2 research: they denote phonological representations that may clash with L1 representations of those sounds for L2 learners, and interlanguage may posit divergent subphonemic representations. The present PD studies use an adjacent familiar listening target [t] to measure RT shifts due to phonological violations by the phones of interest.

Study A tested L1 Germans using a (C)CV_[t] frame—listening target [t]—to replicate RT facilitation for progressive dorsal fricative assimilation violations (German [ç]~[x]: Weber, 2001). Stimuli included match conditions [ax ɛç], for example [baxt], [bɛçt] and illicit mismatch conditions [ɛx aç], for example [bɛxt], [baçt]. The listening target [t] was detected faster in vowel-fricative mismatch ($M = 345$ ms) versus match ($M = 375$ ms) trials, $t(94) = 2.17$, $p = 0.016$. Group results demonstrated that neighbor-target PD detects the same facilitation shown by Weber (2001) with L1 Germans without requiring reference to orthographic labels for assimilation-governed phones [ç x].

Study B incorporated coda /h/ (illicit in both English and German) alongside the vowel-fricative conditions to independently test sensitivity to a known phonotactic violation for both L1 groups. Second-semester L1 English L2 German adult learners showed inhibition for illicit coda /h/ in a CV[ht] frame (listening target [t]): $t(97) = 1.98$, $p < .001$. Neither group showed facilitation for illicit vowel-fricative mismatches, although fourth-semester L2 German learners showed such a (non-significant) trend. Differences of means by participant between match and mismatch conditions suggest the importance of individual differences for tasks of this type.

Models of L2 phonology acknowledge the importance of position-sensitivity (Best, 1995; Best & Tyler, 2007; Flege, 1995). This is problematic for L2 research when TL labels include multiple phones (e.g., German <ch> represents [ç] and [x]). The present studies demonstrate the utility of adjacent-target PD for L2 studies, because they offer a methodological solution for study of position-dependent phenomena (e.g., allophones, prosodic constraints) that would otherwise rely on TL labels.

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What is the relationship between inhibitory control and L2 oral fluency development? A study on individual differences in a stay abroad context

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While it is generally accepted that the stay abroad (SA) context positively affects language learning, especially in the area of oral fluency, we do not yet have a full picture of the role individual differences (IDs) play in speaking fluency development. Besides well-studied individual factors such as L2 proficiency and L1 background impacting speaking performance, IDs in executive function such as inhibitory control (IC) may also impact L2 speaking performance by allowing L2 learners with stronger IC to better suppress cross-language interference during speech production, thus leading to more fluent L2 speech. This study investigates the relationship between inhibition and L2 oral fluency development for American English learners of Spanish during a 3 month stay abroad. No study to date has investigated the relationship between IC and oral fluency development in the SA context.

Data from 50 participants has been collected; all tasks are conducted at pre-test and post-test. To measure inhibitory control, participants completed a Simon task and a picture decision task (Colomé, 2001); language switching tasks from L1-L2 and L2-L1 provide an online measure of inhibitory control. Fluency measures are obtained from L1 and L2 oral narrative tasks; speed and breakdown fluency are measured through pause frequency and duration, mean length of runs, speech rate and other measures used in the literature. A LEX-ESP test measures vocabulary knowledge. IDs in L2 use and audiovisual input during SA are measured through pre-test, mid-semester and post-test questionnaires. Participants with stronger inhibitory control are expected to show more progress in L2 speaking fluency. Frequency of L2 use is expected to positively correlate with fluency development.

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Putting the accent on learning: Using the Speech Accent Archive in pronunciation research and teaching

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This paper will introduce some ways of using the online Speech Accent Archive (Weinberger 2015) in pronunciation research and teaching. The Speech Accent Archive is an online database of over 2,000 English accent samples from native and non-native speakers of English. For each speaker, there is a recording of a standardized passage and a phonetic transcription of the speaker's reading, accompanied by brief biographical details. By enabling comparisons within and between groups of speakers, the website provides a valuable resource for both research and teaching.

In order to illustrate possible uses of the archive, two specific research questions are addressed in this paper. The first, 'synchronic' question is aimed at characterising the patterns of feature distribution that exist within a particular locale; in particular, the possible existence and significance of implicational patterns is explored. The second, 'diachronic' question is whether pronunciation instruction has any effect on accent feature distribution within a particular sample of learners. To answer this question, recordings of 90 students reading the Speech Accent Archive passage were made before and after a one-semester course in English phonetics and phonology.

The paper will also attempt to illustrate some of the ways in which research and 'theory' can inform 'practice', for example by predicting orders of acquisition or prioritizing features for instruction.

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High variability perceptual training in second language learning of Mandarin consonants

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Mandarin and Korean sound systems contain similar place and manner categories, but differ in how they combine parameters to contrasts consonants such as sibilants. These phonological and phonetic (dis)similarity may present challenges to Korean speakers when learning Mandarin.

This study examined effects of the High Variability Perceptual Training (HVPT) on improving Korean learners' perceptual learning of Mandarin coronal sibilants. We designed identification tasks for inexperienced and advanced adult Korean learners of Mandarin who were recruited for short-term auditory training. In the posttest after training, they all improved significantly in their accurate identification of Mandarin sibilants. Training effects were also confirmed in their satisfactory performance with novel phonetic inputs and in new tasks such as discrimination.

Our findings prove that Korean speakers of varying degrees of proficiency in Mandarin can all benefit from auditory training. The role of task and input modification in second language (L2) acquisition are also confirmed. HVPT helps direct learners' attention to critical L2 cues that are not readily noticeable in naturalistic environments. Moreover, our results reveal that effects of identification training can successfully transfer to discrimination. The two perceptual processes are indeed intricately related. Therefore, tolerance to variations within phonetic categories can be improved through sharpening of the sensitivity to cross-category variations.

Phonetic convergence in Heritage Speaker interactions: More than just the language is at play

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In the field of speech perception and production variability is analyzed as arising from within or between speaker differences, attributable to phonetic context or dialect. Nonetheless, recent research has shown that variability also emerges during conversational interaction, resulting in convergence (or divergence) across speakers, mediated by non-linguistic factors such as gender, race and speaker role (Pardo, 2012). In the present study, we examine phonetic convergence in the speech of a female Spanish Heritage speaker and hypothesize that the degree of phonetic convergence would be modulated by the language of the interaction (Spanish vs. English) and the interlocutor's linguistic background (heritage speaker vs. non-heritage speaker).

The female Spanish heritage speaker completed different versions of a map task on different days, with four different female speakers of the same age and educational level. The four dyads were:

Spanish:
1. Spanish Heritage speaker (a)
2. Spanish speaker from Mexico City

English:
3. Spanish Heritage speaker (b)
4. Midwest American English speaker

Following Pardo (2006), speakers read a word list prior to completing the map task (pre) and then again after its completion (post). Items were counterbalanced across dyads. We measured VOT and vowel F1/F2 formants pre/post for degree of phonetic convergence between the subject and her interlocutors. Subsequently, we took tokens from the pre/post word lists and created AXB trials. Critical trials involved the subject's pre/post repetitions of the same words as A or B and the interlocutor's pre/post production as X. Native Spanish (n=10), Spanish Heritage (n=10) and monolingual English (n=10) listeners judged the tokens for similarity.

Analyses show greatest pre/post phonetic convergence between the participant and the Spanish Heritage speaker in Spanish, also confirmed by AXB listener judgments. Results are discussed in light of how nonlinguistic factors affect phonetic convergence and how these modulate Heritage Spanish speaker phonetic interactions.

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Discrimination of Punjabi liquids by Mandarin listeners: Comparisons to Japanese listeners

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Does exposure to certain phonological contrasts of L1 help discriminate the L2 sounds? The present research examined the discrimination of four Punjabi liquids /ɾ ɽ l ɭ/ and two stops /d ɖ/ by Mandarin Chinese listeners (MC) while comparing the results of Japanese listeners (Jpn) reported in a previous study.

Punjabi has a four-way liquid contrast (/ɾ ɽ l ɭ/) in which both [+/-lateral] (tap/flap vs. lateral) and [+/-apical] (dental vs. retroflex) features are contrastive. Mandarin Chinese has a two-way liquid contrast (/l/-/ɹ/), and a dental vs. post-alveolar (traditionally referred to as "retroflex") contrast for fricatives and affricates, but not for stops (Lin, 2007). Japanese, on the other hand, does not have a contrastive set of liquids. There is only one liquid /ɾ/ that has apical stop realizations as free variants.

Our experiment tested discrimination of six disyllabic pseudo-words with the target Punjabi liquids and stops in word-medial position (/ˈpʰala/, /ˈpʰaɭa/, /ˈpʰaɾa/, /ˈpʰaɽa/, /ˈpʰada/ and /ˈpʰaɖa/), produced by a male native Punjabi speaker. The participants were asked to complete an AX discrimination task with 168 trials ((15 different + 6 same pairs) × 8 AX combinations).
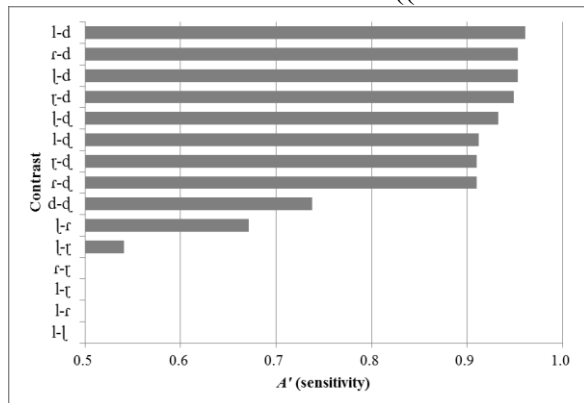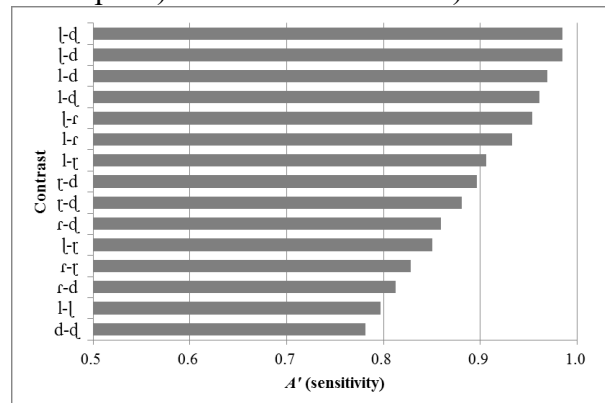

Figure 1: Japanese listeners

Figure 2: Mandarin listeners

The Jpn showed a distinct discrimination pattern: liquid-/d/ contrasts (easy) > liquid-/ɖ/ > /d/-/ɖ/ > liquid-liquid (difficult), while the MC showed a gradual pattern within and between each of the following categories: lateral-stop > liquid-liquid > tap/flap-stop > dental-retroflex.

Overall, the MC showed better discrimination than the Jpn. Both Jpn and MC discriminated the lateral-stop contrasts very well. However, the MC performed better in discriminating the liquid-liquid contrasts, compared to the Jpn. The laterality contrasts in Mandarin Chinese may have contributed to the sensitivity towards the Punjabi liquids. Furthermore, the Jpn showed better performance in /ɾ-d/ discrimination than the MC. This might be due to lack of [ɾ] as an allophone of any liquid in Mandarin Chinese. Usage of apical feature in fricatives and affricates did not help the perception of dental-retroflex contrasts well. The disparity between the roles of these features remains to be explored.

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The influence of coda modification on intelligibility and comprehensibility

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The present research examines the intelligibility and comprehensibility of English word-final consonants produced by Brazilians. More specifically, we investigate how typical productions of Brazilian leaners of English, namely, vocalization of nasal consonants (e.g., 'soon' [sũ]), l-gliding (e.g., 'soul' [sow]), palatalization of alveolar stops (e.g., 'note' [nowtʃ]), vowel paragoge (e.g. 'take' [teiki], and voicing/devoicing of alveolar fricatives (e.g., 'house' [houz]) hinder intelligibility and comprehensibility. Tokens containing these types of coda modification were selected from a corpus containing spoken English utterances produced by Brazilians who performed an image-description task. Eighteen utterances providing little semantic context were used to design an intelligibility test, which was presented to listeners from different L1 backgrounds.

The listeners were asked to (a) perform orthographic transcription of words containing coda modification (intelligibility measure), (b) rate how easy/difficult it was to understand the words (comprehensibility measure), and (c) comment on what made the utterance easy/difficult to understand. The listeners were able to transcribe correctly over 80% of the tokens containing coda modification. When we examined the listeners' performance according to type of coda modification, it is clear that three types of process seem to cause little intelligibility problems: voicing/devoicing of alveolar fricatives, vocalization of nasal consonants, and l-gliding. However, palatalization and vowel paragoge hinder intelligibility more often.

Regarding comprehensibility, the types of coda modification that affected it the most were palatalization, vowel paragoge, and vocalization of nasal coda. The latter was a process that had little effect on the intelligibility rates, but it was pointed out by many listeners as a pronunciation feature that required from them an additional effort to understand what the speakers were saying. Listeners also pointed out that they managed to understand most of the target words because of familiarity with English spoken by Brazilians.

Code-switched and interpreted productions are more foreign-accented: GOOSE fronting in Czech learners' English

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We analyze productions of the GOOSE vowel by 20 advanced Czech learners of English as a Foreign Language (EFL) with the aim to compare effects of long-term, competence interference and short-term, performance interference (Antoniou, Best, Tyler & Kroos, 2011, Piccinini & Arvaniti, 2015, Simonet, 2014) from L1 into L2.

While both in British and American English, /u/ has undergone fronting (Deterding, 1997, Harrington, Kleber, & Reubold, 2008, Henton, 1983, Labov, 2008), the equivalent vowel in Czech is fully back (Skarnitzl & Volín, 2012). One study showed that even EFL learners with limited exposure to authentic input can produce somewhat fronted /u/'s (Wester, Lecumberri & Cooke, 2015). Our goals were (1) to replicate these findings with Czech EFL learners, and (2) to test the effect of L1-to-L2 code-switching and of L1-to-L2 interpreting on the degree of /u/-fronting in Czech learners' speech. We predicted that /u/ produced in a Code-switching condition (learners start an utterance in L1 and switch to L2 to repeat what they heard in L2) and in an Interpreting condition (learners start in L1 and switch to L2 to translate what they heard in L1) would be less front, more L1-Czech-like, than /u/ produced in an English-only condition (learners report in L2 what they heard in L2). In each condition 12 sentences containing CVC words with /u/ (adjacent to at least one coronal), sentence-initially and sentence-finally, were elicited.

To analyze the data, we first submitted the learners' mean F2 of /u/'s from the English-only and Code-switching conditions to a repeated-measures ANOVA with factors Condition (English-only/Code-switching) and Position (initial/final). Importantly, F2 was lower in the Code-switching condition ($p = .03$). Next, after eliminating GOOSE words mistranslated during interpreting also from the English-only and code-switching data, we compared all three conditions. RM ANOVA (Condition-by-Position) showed an effect of Condition, with a post-hoc Tukey showing a lower F2 for Interpreting ($p < .001$).

To summarize, (1) Czech EFL learners showed /u/-fronting, and (2) using Czech immediately before speaking in English reduced this /u/-fronting. Thus, L1 interference temporarily increased due to switching between languages.

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The effect of high variability training of English vowels on Italian adult listeners

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The present study is the first investigation using both identification and discrimination tests to examine the effect of high variability phonetic training (HVPT) on the perception of English vowels /ɑ-ʌ/ by Salento Italian speakers. Recent studies showed that this contrast is very difficult to discriminate for Italians (Escudero et al., 2014; Sisinni et al., 2013).

Previous studies (e.g., Bradlow et al., 1997, Iverson & Evans, 2009) showed that HVPT is successful for improving adult learners' perception of "difficult" L2 sounds. HVPT consists of exposing trainees to a wide range of highly variable natural productions in order to avoid reliance on specific talkers' characteristics.

The experimental group (N=11) performed both an identification and an AX categorial discrimination task before (pretest) and after (posttest) attending a three-week training program (9 sessions). A control group (N =10) participated at the pre/posttest only. The training program consisted of a series of identification tasks and the training stimuli were pseudowords /bVb/, /pVp/, /mVm/ (V = /ɑ/ or /ʌ/) produced by five English speakers. The pre/posttest stimuli were produced by two further talkers and included also /tVt/ and /dVd/, so that the posttest measured generalization to new talkers and both old and new items. Generalization was also assessed for old talkers (used for training) and new items.

The results showed, first, an improvement in the experimental group performances, confirming the positive effect of an HVPT and its generalization (Bradlow, 2008). Specifically, the positive effect was observed for /ʌ/ in the old items produced by the new talkers and in the new items produced by both the old and the new talkers.

Second, the positive effect of an identification training did not extend to vowel discrimination. This suggests that improving L2 vowel identification may not help to detect vowel acoustic differences in a discrimination task.

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The effect of orthography on L2 phonology in Japanese speakers of English

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Recent research shows that the orthographic form of words can affect pronunciation in L2 speakers. Previous research found that Italian speakers of L2 English produce the same consonant or vowel as longer when spelled with double letters than when spelled with single letters (e.g., *kitty* vs. *city, seen* vs. *scene*), probably because double consonant letters represent geminates in Italian and double vowel letters often represent long vowels in English (Bassetti, 2016; Bassetti & Atkinson, 2015).

The present study aimed at replicating these findings with native speakers of a language that has contrastive vowel as well as consonant length, and is written with a different script. We focussed on the production of orthography-induced contrasts between singleton and geminate consonants and short and long vowels in Japanese speakers of English. In the Japanese script kana, geminate consonants are represented with a *sokuon* symbol (はと /hato/ 'dove' vs. はっと /hatto/ 'hat'), and long vowels are represented with a double symbol (の /no/ 'field' vs. のう /noː/ 'brain').

Native speakers of Japanese and native British English controls (both *n* = 12) performed a delayed word repetition task. The targets were nine voiceless plosives and seven vowels (spelled with one or two letters) in orthographic minimal or semi-minimal word pairs, which were produced within a carrier sentence. We predicted that Japanese speakers would produce the same English consonant or vowel as longer if spelled with double than with single letters (a longer [t] in *kitty* than in *city*; a longer [iː] in *seen* than in *scene*). Participants' knowledge of target word spellings was tested using a Spelling to Dictation task.

The acoustic analysis confirmed systematic differences in segment durations for Japanese but not for English participants. The effect was larger for consonants than for vowels. Results have implications for research on orthographic effects on L2 phonology, and for models of L2 phonological development.

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Speech recognition by native and non-native listeners with a competing-talker background: An ERP study

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Everyday listening conditions are far from optimal. Background noise is particularly detrimental for the speech recognition of non-native listeners (e.g., Mayo et al., 1997), and non-native accents can be hard for native listeners to understand under noise (e.g., Bent & Bradlow, 2003; Pinet et al., 2011). Listening in the presence of a competing talker places additional demands on attention and cognitive control, as there are competing information streams in addition to acoustic masking. The present study investigated how the higher cognitive load caused by competing speech affects speech recognition for native English speakers and Korean learners of English when they listen to different accents, as measured using the N400 response of EEG recordings.

The stimuli were English sentences recorded by Korean and Southern British English speakers, which were presented to subjects simultaneously (one speaker in each ear), and in a control condition with a single talker. The sentences varied in the predictability of the final word (e.g., High: Doctors try to cure dangerous diseases; Low: Scientists try hard to stop different diseases; Anomalous: Doctors try to cure dangerous pianos). Subjects pressed a button whenever they heard a semantically anomalous sentence in the target ear (i.e., they were instructed to attend to one of the talkers). The magnitude of the N400 is normally expected to be less for highly predictable sentences than for low and anomalous.

The results demonstrated that the detrimental effect of competing speech was not significantly greater for non-native listeners than for native listeners, as measured by N400. However, there was an interaction between listener and spoken accent, with English speakers having greater context-related N400 differences for the native accent and Korean speakers having similar effects for both accents. This provides neurophysiological evidence for the intelligibility benefit for one's own accent.

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The development of French *liaison* in early L2 acquisition

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French liaison, a phenomenon of external sandhi, involves the production of a latent coda consonant (liaison consonant, LC) in prevocalic contexts for example [z] in *des* [de] + *ânes* [an] → *des ânes* [dezan], (some) donkeys. The segmental content of the liaison consonant is dependent on word1 but produced as the onset of word2: [de.zan]. Consequently, word and syllable boundaries do not align. This misalignment has been argued to constitute potentially different difficulties for L1 children and L2 learners (Wauquier, 2009, Wauquier & Shoemaker, 2013). Moreover, whereas knowledge of written word boundaries appears to help L1 children resolve misalignment errors (Ruvoletto, 2014), the written form is often seen as the source of errors in L2 acquisition. However, previous L2 studies focus on adult learners in a university context. None have looked at the L2 acquisition of liaison in children – a particularly interesting population since they are L2 learners but do not have access to writing. Two questions arise: (1) How does liaison develop in child L2 French? (2) Is child L2 development more similar to that of L1 children or adult L2 learners?

This study addresses these two questions through a longitudinal case study of three Swedish-speaking children learning French through immersion (age of onset: 3;0-3;4). The children were recorded seven times over 18 months (from 14 to 30 months of exposure). Obligatory liaison was elicited through a picture-naming task. Three simultaneous Swedish-French bilinguals and two monolingual French-speaking children serve as controls.

The child L2 productions initially resemble adult L2 acquisition, with a large proportion of LC omissions (e.g. [dean]), but later contain features that have previously only been observed in L1 children, e.g. LC substitutions (e.g. [denan]). This developmental path is interpreted with regards to current models for L1 development of liaison. The study contributes both empirically and theoretically to the understanding of L2 phonological development, more specifically regarding the role of access to writing.

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Acquiring phonological contrast before target-like coarticulation: Evidence from an electropalatography study of L2 English word-final nasals

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Mastering word-final consonants involves the simultaneous acquisition of phonological contrasts and target-language patterns of coarticulation with following segments. To date, research has focused on the former (e.g., Broselow & Xu, 2004). Studies of coarticulation have overwhelmingly investigated voicing assimilation via transcription or acoustic analysis (e.g., Cebrian, 2000; Simon, 2010). Accordingly, with the goal of increasing our understanding of the acquisition of coda consonants, we investigate both the L2 acquisition of place contrasts and coarticulation in English word-final nasals using electropalatography (EPG), which allows for the precise measurement of gradient coarticulation.

Advanced L2 learners (3 each of L1 Japanese, Spanish, and French) and two controls wearing custom-made Reading-style, 62-electrode palates were tested on their L1/L2 production of each language's word-final nasals via a carrier sentence reading task. Japanese, Spanish, and French differ (i) phonologically: whereas French, like English, allows a 3-way syllable-final contrast (/m-n-ɲ/ŋ/), nasal codas are more restricted in Spanish and Japanese (/n/ or /ŋ/ respectively pre-pausally/vocalically; homorganicity with the following consonant elsewhere); and (ii) phonetically: place assimilation with the following consonant is gradient in French and English but categorical in Japanese and Spanish. Thus, French-speaking learners should outperform the other groups.

Based on standard articulatory measurements of the relative location and degree of nasal constriction (Gibbon & Nicolaidis, 1999), the French learners resembled the controls most closely in their maintenance of place contrasts and gradient assimilation patterns. Japanese learners had acquired place contrasts to a great extent; however, their L2 coarticulatory patterns were L1-influenced. Finally, L1 Spanish speakers resembled their Japanese counterparts in the categorical application of cross-word assimilation but differed from both other groups in the alveolar realization of final nasals. In summary, the EPG data demonstrate that, although nasal place contrasts may be acquired, L1 coarticulatory patterns are more resilient and preserved even by advanced L2 speakers.

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L2 Acquisition of the Spanish palatal nasal

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The purpose of this study is to examine whether L1 English/ L2 Spanish learners form a new category for the Spanish palatal nasal /ɲ/. To date, there is only one study on the L2 acquisition of Spanish nasals (Díaz-Campos, 2004, based on impressionistic data). The present study aims to fill this void via cross-sectional analysis of the production of Spanish /ɲ/ by beginner and advanced L1 English/L2 Spanish learners.

While /n/ is part of Spanish and English inventories, /ɲ/, composed of a tautosyllabic palatal nasal+glide element, is not. This English-Spanish disparity presents difficulty for L1 English/L2 Spanish learners (Hammond, 2001), possibly due to a similar English heterosyllabic alveolar nasal+palatal glide sequence [n+j] (e.g., 'canyon' [ˈkʰæn.jn̩]) which contains a shorter nasal segment and following vocalic portion (Martínez-Celdrán & Fernández-Planas, 2007). Herein, we ask: a) Do learners produce distinct segments for /ɲ/ and /n/? b) If so, is learners' [ɲ] Spanish-like (indicative of new target-like category) or similar to English [n+j] (indicative of L1 transfer)?

Seven beginner/eight advanced L1 English/L2 Spanish speakers and 10 L1 Spanish/L2 English controls completed a delayed repetition task in each language. Nonce words were produced in the carrier phrase *Digo X para ti* /'I say X to you' (20 critical items, 20 distractors). English critical items contained an intervocalic [n+j] sequence or [n]. Spanish critical items contained intervocalic [ɲ] or [n]. We measured nasal segment duration, an acoustic index of the [n]~[ɲ]~[n+j] distinction.

Results show that while beginner and advanced learners distinguish [n] and [ɲ] acoustically, their [ɲ] is not native-like. Beginner learners also differentiate between English [n+j] and Spanish [ɲ], whereas Advanced learners' [n+j] production approximates Beginner [ɲ]. We consider the possibility of category merger for the advanced learners and posit that acquisition of this new (similar) segment may consist of novel category formation followed by category merger.

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The role of visuospatial hand gestures in the acquisition of Mandarin Chinese tones

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Previous studies have tested the effects of perceiving hand gestures on L2 learner's vocabulary acquisition (Allen, 1995; Kelly et al., 2009). However, little has been said on the possible effects of hand gestures on the acquisition of prosody, despite the tight relationship between prosody and its visuospatial hand gestures representation (Connell, Cai, & Holler, 2013). Chen (2013) reports better tonal production and a higher frequency of accurate responses by learners of Mandarin Chinese who saw and produced gestures as tone markers than learners following the traditional numeric system of tones. However, this classroom study do not control for many aspects interfering with the effect of gestures nor is it know the respective role of seeing and producing gestures. First, we want to investigate if visualizing a short training with co-speech gestures gives better results than instruction without gestures in the acquisition of Mandarin Chinese tones. Secondly, we ask if imitating the co-speech gestures during the training improves acquisition more than only observing them.

In a first experiment, a first group of participants watches a short training video in Mandarin Chinese where the instructor do not produce any hand movement whereas the second group watches a training with the same instructor producing the emblematic hand movements conveying both the pitch contour and the duration of tones. Both perceptive and productive performances following the training are analysed. The second experiment investigates if participants improve even more their perception and production of tones by themselves producing the gestures during the training. The training material for this study is the same than in the second condition of the first experiment, however, a new participants are selected. Subsequent forced-choice identification task and production ratings are carried out. Our results will permit to tell apart possible improvements in the perception of tones from those in production.

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Bande à Part: The development of a mobile music app for L2 pronunciation

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The design of an L2 language program or class should include fluency development (Celce-Murcia et al., 2010), defined as the learner's ability to make the best use of what is already known in a fast, automatic and intelligible manner. However, fluency development is often neglected in the language classroom "possibly because it does not involve the learning of new language items" (Nation & Newton, 2008, p. 8). In addition, the in-class environment is usually affected by time constraints, which considerably reduces learners' opportunities for practice (Collins & Muñoz, in press).

In this study, we attempt to address these two limitations by proposing Bande à Part, a mobile music application (app). Bande à Part was developed for learners of French as a second language and uses music as a pedagogical tool. The rationale for the use of music for language learning stems from Engh's (2013) call for incorporating music in L2 teaching programs, based on a meta-analysis of its effects on L2 acquisition. Music is naturally repetitive and already a part of many learners' lives and, in addition, it provides interesting content to encourage learners to use it. To ensure the app is theoretically-informed and pedagogically sound, it was developed according to Doughty and Long's (2003) principles for integrating SLA theory and technologically enhanced environments. For example, it has interactive features to promote noticing and consequently phonological awareness. Some examples of input enhancement features include the ability to highlight certain phonological features (e.g., liaison), slow down the speed of singing, choose songs based on a number of options (e.g., vocabulary difficulty, regional variety), and provide subtitles in the target L2 French and/or in the L1 English. We will discuss pedagogical applications as well as future studies that will measure the effectiveness and usability of the app in L2 French acquisition.

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The spirantization of voiced stops in multilingual Polish

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Spirantization in Spanish is a well-documented process of weakening voiced plosives /b,d,g/ to fricatives or approximants after vowels, glides, fricatives and /r/. Acoustic and articulatory data show it as a continuum based on the degree of constriction (Cole et al. 1999; Hualde et al. 2010, Hualde et al. 2011). Spirantization research in the context of second language learners gives evidence of L1 effects on L2 acquisition (Zampini 1993, 1994, 1997; Face and Menke 2009). The aim of the present study is to analyse whether advanced L2 Spanish may trigger spirantization in L1 Polish of multilingual speakers. The assumption is that since "phonetic systems reorganize in response to sounds encountered in an L2 through the addition of new phonetic categories, or through the modification of old ones" (Flege 1995:233), L1 Polish which does not spirantize voiced stops may be modified due to L2 Spanish spirantization. For this purpose advanced Polish learners of Spanish were asked to read words in carrier sentences in Polish and Spanish. Also Spanish and Polish baseline data were recorded. The voiced plosives were inserted in a word-internal, intervocalic context of the low vowel /a/ in an unstressed syllable. A low pass Hann filter was applied to maximise the difference in constriction between stops and approximants (Simonet et al. 2012, Hualde et al. 2010). Three measurements of the relationship of intensity between the consonant and the following vowel were taken: (1) IntDiff=Vmax-Cmin (2) IntRatio= Vmax/Cmin (3) spectral tilt=H2-H1. Pilot study results show that Spanish baseline values have a low intensity difference with a negative spectral tilt, Polish baseline data has twice as high intensity difference with a positive spectral tilt, whereas Polish influenced by Spanish includes approx. 30% negative spectral tilt and 70% positive spectral tilt tokens. Intensity ratio measurements across the groups show statistically significant differences. The results indicate that the influence of Ln on L1 may be observed on more features of language than hitherto surmised.

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Perception of geminates in Japanese by French-speaking learners

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This study investigates the capacities to differentiate geminate/singleton consonants by French-speaking learners of Japanese as a foreign language (FJ). The learners of Japanese without a similar phonological contrast in their native languages have difficulty making this distinction (Sonu et al., 2013, Tsukada et al. 2015).

However, little is known about the case of FJ. In French, neither vowel length nor word-internal geminate obstruent distinction exists (Single Category in PAM-L2: Best & Tylor, 2007). To investigate how much FJ can distinguish geminate/singleton consonants, we conducted an AXB experiment. The stimuli were non-words with CiVj(Ci)CiVj structure where Ci was /k/, /p/, or /s/. Vowels were /i, e, a, o, u/ and the same vowels were inserted in the first and second vowel slots. The stimuli were read by one male and one female native speakers of Tokyo Japanese with two pitch patterns: Low-High and High-Low. The participants included 10 first-year university students in Japanese studies (FJ1), 9 third-year students (FJ3) and 6 native speakers of Japanese (NJ).

The results indicate that FJ1 and FJ3 had an error rate of about 10% in average, while the NJ's error rate was 4% in average. The difference between FJ1 and NJ and between FJ3 and NJ were statistically significant ($X^2(1) = 45.69$, N = 2832, p < .001 between FJ1 and NJ, $X^2(1) = 38.354$, N = 2655, p < .001 between FJ3 and NJ). Both FJ and NJ indicated a higher error rate in the case of fricative /s/ and high vowels /i, u/. However, when the stimuli were read in High-Low pitch, FJ show difficulty differentiating geminate/singleton contrast. These results should be compared in future studies with the case of other presumably SC cases (long vs. short vowels, /h/ vs. /Ø/ by FJ) and with TC cases (geminate/singleton by Italian-speaking learners, for example).

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TipTopTalk!: A game to improve the perception and production of L2 sounds

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Swain's (1985) Comprehensible Output Hypothesis considers that input alone may not be enough for second/foreign language (L2) learners to acquire new language forms. The Hypothesis claims that producing an L2 will facilitate L2 learning due to the mental processes related with language production. Thus, learners will more likely notice discrepancies and gaps between linguistic aspects of their native language (L1) and those of their L2 when *producing* language than when only *perceiving* language.

Taking Swain's Hypothesis into account, in this talk we will present a Computer Assisted Pronunciation Training designed for non-native speakers of Chinese, English, German, Portuguese (Brazilian and European) and Spanish. The game makes use of automatic speech recognition (ASR) and text-to-speech systems available in Android smartphones and tablets to (i) present learners with the target sounds by means of synthesized stimuli; (ii) test learner's discrimination of specific L2 sounds that are likely to cause intelligibility problems through exercises containing minimal pairs; and (ii) allow learners to record their speech and compare their production to that of the L2. The game provides users with immediate feedback in both perception and production exercises. In the latter exercises, when the recognizer is unable to identify an ideal or close-to-ideal response, the user can retry the answer up to five times. The main disadvantage of ASR pronunciation training is erroneous feedback, i.e., possibility of false alarms and false accepts (Neri et al., 2006).

In order to encourage users' engagement and desire to keep playing the game, each correct answer entitles users to collect points so as to reach a given game status. Moreover, different language-dependent leaderboards can be displayed at the end of each round. The advantages in using a gamification design strategy are (i) the increase of learners' engagement, and (ii) the possibility of individualized and comprehensive feedback while keeping users active and comfortable to progress at their own pace in an anxiety-free context.

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Kazoo for improving speech rhythm in L2 Swedish? – A teaching experiment

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This paper presents findings of a teaching experiment, in which we investigated whether using a simple membraphone instrument – the kazoo – can enhance the development of speech rhythm in L2 Swedish. Kazoos have been recommended for teaching prosody, as they offer a speech model which is stripped of the segmental level and can therefore help to focus on prosody (Gilbert 1978). In this experiment, a control group of advanced Finnish learners (n=12) of Swedish received varied pronunciation instruction for twelve 90-minute sessions. The experimental group consisted of similar learners (n=13), and the course was run in an identical manner compared to the control group; the group differed only in that the learners used personal kazoos on the sessions that dealt with prosody. Both the control group and the experimental group were tested before and after the course with read-aloud sentences and story, and free speech tasks.

In the analysis, we focus on prosodic characteristics on the utterance level. The investigated parameters are rhythmic patterns (e.g. syllable duration and manifestation of sentence stress) and intonation contour. These parameters differ in Finnish (Iivonen 2009) and Swedish (Vihanta et al. 1990), and are therefore difficult but important learning goals for Finnish learners of Swedish. To assess learners' development, their productions before and after instruction were compared to identical materials collected from native speakers of Swedish. The results will shed light on whether or not the kazoo is a helpful learning tool for speech rhythm in L2 Swedish. The results can be applied to the teaching of other languages as well. Therefore, putting this often recommended teaching/learning tool to the test will benefit language teaching in a larger scale. In addition, the study has many implications to future research on the possibilities of the kazoo.

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Difference in L1 and L2 speakers' temporal realizations of Swedish stressed syllables

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According to Fant and Kruckenberg (1994) duration is the major perceptual cue for stress in Swedish. The language has a trading temporal relation between the vowel and consonant in stressed syllables (in either form of /V:C/ or /VC:/), and its native speakers pronounce all stressed syllables long, by making clear temporal contrast between stressed and unstressed syllable and realizing quantity category clearly. Realizing this stress feature correctly can be one important condition for L2 speakers of the language to be well understood (Abelin & Thorén, 2015).

The paper examines whether there is difference in the pronunciations of L1 and L2 Swedish speakers, in terms of the duration ratio between the phonologically long segment and the whole word. This measure is suggested here to be relevant for both stress and quantity realization. It was predicted that the minimum value of the ratio would be greater among L1 speakers than L2 speakers, and that L1 speakers would exhibit a greater "upwards" variation than L2 speakers.

We used data from two studies, comprising the recordings of short carrier sentence reading by thirty two Swedish L1 speakers and sixty two L2 speakers from 19 different L1 backgrounds. Most L1 speakers read sentences more than once, in normal, solemn or poetic styles. This was intended to effectively create variation among these speakers. On the other hand, the L2 speakers were divided into two groups: one group read sentences with different markings for long and short vowels, and the other group read a text in which letters for long, stressed vowels and consonants were underlined. For the comparison, we particularly looked at the difference in the pronunciations of two /VC:/ quantity words, *kaffe* [ˈkafːə] 'coffee' and *åtta* [ˈɔtːɐ] 'eight'.

The results confirmed the prediction: the native Swedish speakers have a significantly higher mean value for the subjected duration ratio than non-native speakers, and both minimum and maximum values among L1-speakers are higher than the corresponding values among L2-speakers. This value distribution indicates that L1 Swedish speakers pronounce stressed syllables longer than L2-speakers do. In addition, when comparing the two L2 speaker groups, those who followed markings for phonologically long sounds performed significantly better than the other. Based on these findings, the study suggests that L2 speakers need to be facilitated to learn to pronounce stressed syllables long, for which duration exaggeration of phonologically long segments can be used, raising their awareness of both stress and quantity distinctions.

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The perception of Mandarin lexical tones by native Japanese listeners

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Processing lexical tones is known to be difficult for non-native speakers from various language backgrounds. Because Japanese is a pitch accent language, native speakers of Japanese may be expected to be skilled at processing pitch variations in Mandarin. However, pitch accents in Japanese phonetically differ substantially from lexical tones in Mandarin (Sunaoka et al., 2009) and it may not be easy for Japanese learners to process the four Mandarin lexical tones efficiently.

This study compared perceptual accuracy of six Mandarin tone contrasts (T1-T2, T1-T3, T1-T4, T2-T3, T2-T4, T3-T4) of two groups of Japanese listeners (learners and non-learners) and a control group of native Mandarin listeners (2 males, 7 females) to gain a better understanding of how Mandarin tones are perceived. The first Japanese group (6 males, 8 females) had no experience with Mandarin whereas the second Japanese group (6 males, 4 females) had varying learning experience with Mandarin.

A total of 76 monosyllabic words including the 28 (7 words x 4 tones) test words which were produced by 8 (4 males, 4 females) native Mandarin speakers were presented to the three groups of listeners in random order. The listeners' perceptual accuracy (A') was assessed in a forced-choice categorial discrimination test (Flege et al., 1999; Wayland & Guion, 2003, 2004). The responses were analysed in relation to Mandarin learning experience, phonetic context (initial consonants (/m b d/) and tone bearing vowels (/i a u/)), and speaker gender. The control group was hardly affected by these factors and discriminated all six tone contrasts accurately.

As for the effect of Mandarin learning experience, while both Japanese groups discriminated T2-T3 most poorly, the learner group showed the largest advantage for this and T1-T2 contrasts (0.17). The learner vs non-learner difference was smallest for T3-T4 (0.06). In regard to speaker gender, both Japanese groups perceived the T2-T3 contrast more poorly (0.72 vs 0.82 for learners, 0.52 vs 0.7 for non-learners), and T1-T2 (0.92 vs 0.88 for learners, 0.76 vs 0.7 for non-learners) and T1-T4 (0.94 vs 0.89 for learners, 0.85 vs 0.74 for non-learners) contrasts more successfully, when produced by female speakers. In sum, the learners were less affected than the non-learners by phonetic contexts and speaker gender, suggesting that the former may be in the process of developing robust cognitive representations for non-native tone categories.

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Arabic-French bilinguals' perceptual assimilation and discrimination of consonants that are phonetically similar but differ phonologically in the L1 and L2

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Perceptual Assimilation Model of Second Language Speech Learning (Best & Tyler, 2007) proposes that second-language (L2) speech-sound categories can either be merged with native (L1) categories or established as new L2 categories. Both phonetic and phonological categories can be shared or separate, such that a shared L1/L2 phonological category might incorporate language-specific phonetic variants. Accordingly, Arabic-French bilinguals should establish a shared L1-L2 /r/ category with separate phonetic categories for the Arabic voiced apical trill [r] and the French voiced uvular fricative [ʁ]. However, Arabic also has a voiced uvular fricative, /ɣ/, which is phonetically similar to [ʁ]. Here we investigated whether Arabic-French bilinguals tune in to the phonetic differences between [ɣ] and [ʁ] to overcome this phonetic/phonological mismatch. Arabic-French bilinguals, Arabic speakers with no knowledge of French, and monolingual English speakers completed AXB discrimination and perceptual assimilation tasks on Arabic and French consonants. The critical contrasts were [ɣ]-[ʁ], [ɣ]-[r], and [r]-[ʁ]. The two Arabic groups showed the same perceptual assimilation patterns, with [r] assimilated to /r/, and both [ɣ] and [ʁ] assimilated to /ɣ/. While the Arabic-French bilinguals labeled [ɣ] and [ʁ] predominantly as Arabic /ɣ/, they also selected French "R" around 20% of the time for both consonants. All three consonants were uncategorized for the monolingual English speakers. [ɣ]-[r] and [r]-[ʁ] were discriminated well by both Arabic groups and their discrimination was more accurate than the monolingual English speakers'. For the crucial [ɣ]-[ʁ] contrast, all three participant groups performed at chance level. Thus, Arabic-French bilinguals do not appear to be sensitive to the phonetic differences between Arabic [ɣ] and French [ʁ]. To overcome cross-language phonological mismatch, the bilinguals may need to dynamically alter their phonetic-phonological mappings according to language context. Future research should test whether bilinguals' lexical processing is affected by phonetic context and language mode.

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Production of Norwegian lexical pitch accents
by tonal versus non-tonal language speakers

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The goal of the present study was to investigate to what degree second language (L2) users of Norwegian master the realization of tonal patterns. Based on previous perception studies (Wayland & Guion, 2004; Caldwell-Harris et al., 2015) it was hypothesized that native speakers of a tone language would have an advantage over speakers of a non-tonal language. Evidence from existing production studies, however, is not conclusive (Kaiser, 2011; Tronnier & Zetterholm, 2013). Participants in our study were two groups of four multilingual speakers each, having a tone language (Lingala) and a non-tonal language (Swahili) as their respective dominant languages. Two native speakers of East Norwegian served as a reference. Speech material was selected from longer recordings of conversations. For each speaker, a total of 60 accent phrases (APs) containing East Norwegian words with accent 1 (L*H⁻) and accent 2 (H*LH⁻), respectively, were identified and annotated using Praat (Boersma & Weenink, 2015). Approximately equal numbers of APs comprising words with accent 1 and accent 2 were selected. Instrumental analysis involved measurement of fundamental frequency (f0, expressed in semitones) in vowels carrying phonological labels L and H.

Evaluation of f0 measurements showed evidence contradicting our original expectations. A relatively large amount of Lingala speakers' APs contained tonal patterns in congruence with phonological specifications. Pooled across accent types 1 and 2, this was true for 85 % of their tokens. Swahili speakers showed basically similar performance (81 % as expected). Only the results for this group differed significantly from the native reference with an overall score of 92 %. Inspection of f0 dynamics (L-H and H-L-H) revealed similar values for all three speaker groups, Swahili speakers producing larger dynamics (3.3 semitones) than Lingala and Norwegian subjects (both 2.8 semitones).

The present results revealed that both groups of non-native speakers have high proficiency in the tonal system of East Norwegian. The fact that the Swahili speakers performed equally well as the Lingala speakers indicate that speaking a language with tonal contrasts as one's dominant language is not a decisive factor, at least not at an advanced level of proficiency. On the whole, our findings suggest that multilinguals have advantages in the acquisition of non-native tones.

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L2 rhythm acquisition: The question of learning direction

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Dutch and Spanish are distinguishable from each other based solely on rhythmic cues (Ramus, Dupoux & Mehler, 2003) due to typological contrasts between both languages: Dutch has relatively complex syllable structure and uses extensive final (FL) and accentual lengthening (AL), while Spanish has less complex syllable structure and uses less FL and AL (Prieto et al., 2012; Cambier-Langeveld, 1999). This interplay of factors complicates speech rhythm acquisition by second language (L2) learners (Carter, 2005; Li & Post, 2014; White & Mattys, 2007). To determine whether learning direction affects the aforementioned correlates of speech rhythm, our study compares speech of 10 Dutch learners of Spanish with either low, i.e., A2, or high, i.e., B2, proficiency (Council of Europe, 2001) (DLS- and DLS+) with data by 10 less and more proficient Spanish learners of Dutch (SLD- and SLD+), as well as 10 native (L1) speakers of both languages as control groups. Eckman's (1977, 2008) Markedness Differential Hypothesis (or MDH, used recently in Rasier & Hiligsmann, 2009; Ordin & Polyanskaya, 2015) predicts that Dutch rhythm is more marked, and thus more difficult to acquire than Spanish rhythm (cf. Payne et al., 2012). When comparing FL and AL data collected in an oral reading task similar to the one used in Prieto et al. (2012), DLS are thus expected to advance more towards their target L1 control group than SLD. Following Li & Post (2014), the raw data were converted to lengthening measures as a percentage of the baseline condition (unstressed and non-final syllables) to control for speech-rate differences. A Generalized Linear Mixed Model analysis reveals that for AL the SLD- differ significantly from the L1 Dutch while the proficient SLD+ do not, suggesting they approach target values. However, both DLS groups do not differ from the L1 Spanish, indicating that both are already on target, outperforming the SLD. Regarding FL, both L2 groups do not differ from the L1 Dutch, while the DLS+ do differ significantly from the L1 Spanish, implying that the SLD outperform the DLS in this aspect. Further analyses using rhythm metrics and including speakers up to C1 level will present a more definitive answer as to whether learning direction affects rhythm acquisition.

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Preaspiration in Faroese-accented English

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Faroese is an Insular Scandinavian language with approximately 50,000 native speakers in the Faroe Islands. A striking phonetic feature in the language is the use of preaspiration of voiceless stops /p, t, k/ after short vowels (Helgason 2003, Thráinsson et al. 2004). Exploratory work on Faroese-accented English (í Hjøllum 2011, í Hjøllum & Mees 2012) suggests that preaspiration is transferred into L2 English. In this paper we analyse this transfer in more detail.

Previous research has shown crosslinguistic influence in voice onset time (VOT) systems, but native-like L2 VOT systems can be acquired (e.g., Flege 1991, Flege et al. 1992, Simon 2010). The focus in the literature has predominantly been on the transfer of voicing and post-aspiration of stops; our study on preaspiration adds another, crosslinguistically extremely marked (Silverman 2003) type of VOT system to this research.

We recorded L1 Faroese and L2 English speech from seven secondary school students in two settings: a careful reading task and a more colloquial picture description task. Three recordings were selected for further analysis based on their sound quality. The quality and duration of the aspiration segment in relevant contexts were then measured acoustically using the methodology developed by Nance & Stuart-Smith (2013) for Scottish Gaelic.

The recordings show transfer of preaspiration from Faroese into English for all voiceless stops, but there is remarkable intra- and interspeaker variation in both the L1 and the L2 as well as between the two languages. We attempt to account for this variation with reference to phonetic factors (e.g., vowel quality) and L2 acquisitional factors (e.g., category formation).

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The role of rhythmic training in English as a Foreign Language learners' connected speech comprehension

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In English connected speech, reduction processes affect the phonetic shape of words, especially function words, reducing their intelligibility for non-native listeners. There is a close connection between reduction and speech rhythm: metrically weak syllables reduce more, and may be cued only by subtle phonetic detail that non-native listeners struggle to detect. Despite growing evidence that attention to speech and music is rhythmically guided (e.g. Large 2008) and that speech processing depends on language rhythm (Cutler 2012), little work has tested whether encouraging non-native learners to attend to rhythm might support their comprehension of casual speech. We report an experiment to test whether learners' casual speech comprehension is affected by the rhythmic organisation of speech they are exposed to.

Participants were pre- to upper-intermediate learners of English (EFL), of various L1 backgrounds, resident in Glasgow. The experiment had three phases: pre-test, exposure, post-test. In all phases, learners heard short sentences spoken fast and casually by native speakers of Glasgow English. In the pre- and post-test learners filled in gaps corresponding to the sentences' function words. In the exposure phase, learners listened to sentences produced several times with increasing speech rate. In the high rhythmicity condition, the sentences had regular metrical structure and were elicited through a modified version of the speech cycling procedure (Cummins & Port 1998) in which speakers align the stressed syllables with metronome beats occurring at gradually increasing rates. In the low rhythmicity condition, sentences had an irregular metrical structure and were elicited from the speakers reading a story at different rates.

A mixed-effects logistic regression analysis showed a trend in the expected direction, such that the learners' comprehension of function words improved more if they received high rhythmicity rather than low rhythmicity exposure. This result was consistent with the expectation that rhythmic attending to English speech can improve the learners' comprehension of fast casual speech. Significant effects between the overall performance at the test and the learners' English language proficiency were found. As well as this, significant differences between different types of connected speech phenomena (increasing difficulty: contractions vs no contractions (e.g. *can* vs *can't*), pronouns, prepositions, the verb *to be* (e.g. [*hyz*] vs [*hiz*]), participles (-*ing* vs -*en*), articles, the pronoun *her*) were also found.

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Non-persistent "stress-deafness" in L1 English-speaking advanced learners of L2 Spanish

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Counter to the predictions of Peperkamp et al. (2010) and Rahmani et al. (2015), a form of 'stress-deafness' has been observed in naïve listeners whose L1 has non-predictable stress, including European Portuguese (EP, Correia, Butler, Vigario, & Frota, 2015) and English (Taylor & Hellmuth, 2012), when listeners are confronted with stimuli bearing suprasegmental stress cues only but no unstressed vowel reduction (cf. Cutler, 1986). This study tests whether L1 English-speakers continue to display stress-deafness even after gaining advanced proficiency in Spanish, a language without unstressed vowel reduction, in order to establish whether or not this 'cue-dependent' form of stress-deafness is persistent, in the sense of Dupoux et al. (2007).

Fifteen L1 English-speaking advanced learners of L2 Spanish attempted AX (testing perception, Dupoux et al. 1997) and Sequence Recall (SR, testing phonological encoding, Dupoux et al. 2001) tasks, in response to pseudo-word minimal pairs, with a stress ['nama~na'ma] or phoneme ['maba~'maga] contrast. In a within-subjects design, all participants responded to three sets of stimuli with different stress cues, recorded by a trained phonetician: pseudo-English (pitch, intensity, duration and vowel reduction), pseudo-Spanish (pitch, intensity, duration) or pseudo-Japanese (pitch only). A stress-deafness index (stress contrast score minus phoneme contrast score) partials out individual variation in task ability. As expected, participants are error-free with pseudo-English in AX and SR (0%/0% respectively), and show little sign of stress-deafness with pseudo-Spanish (4%/0%), confirming cue-dependent stress-deafness to be non-persistent; however, they also show much reduced stress-deafness index scores with pseudo-Japanese (16%/15%), compared to naïve listeners (48%/44%, reported in Taylor & Hellmuth 2012).

These findings support models of L2 phonological processing based on inhibition of L1 perception experience (Darcy et al. 2015), rather than acquisition of language-specific perception skills (Correia et al. 2015), since, having learned to perceive and encode suprasegmental cues to stress in Spanish, the participants appear to be able to generalise this skill to a novel language type.

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The good pronunciation learner

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Different studies have shown that factors which lead to a high L2 pronunciation attainment include motivation, orientation towards native pronunciation models, continuous and intensive access to the target language, training of perception and articulation as well as the degree of relationship between L1 and L2 (cf. summary of 25 studies in Wild 2015, 60). On the basis of a mixed-method study conducted with 32 young adult learners (L1: English, level in German: A2-B1 according to the CEFR), variables influencing their acquisition of the German word stress, which especially differs in internationalisms in English and German, were investigated. The research questions were:

1. Which variables influence the acquisition of word stress?
2. Do musical active learners make, on average, less word stress mistakes?

Data collection included questionnaires followed by German performance tests (reading and quasi-spontaneous speech) at four points in time during the first 12 months of the learners' first study year of German language and literature. The questionnaires asked inter alia for musical activities, learning targets, routines of practicing pronunciation as well as self-evaluation of perception and production ability. Each of the tests contained the same 40 words causing regular stress problems for the target group in different contexts.

By the means of Spearman's rank-order and Pearson product-moment correlations as well as chi-square tests, it could be shown that the following factors correlate with a successful acquisition of word stress: attaching value to having a good pronunciation and pronunciation training, positive attitudes towards practicing pronunciation in form of imitation, rhymes, songs, poems and kinaesthetic exercises as well as conducting particular types of exercises (imitation, listening tasks, word stress and sentence intonation exercises) outside the language lessons, recognising own problems with discriminating and producing German word stress as well as playing an instrument and singing. The results make clear that there are at least some variables which can be taken advantage of in pronunciation teaching and learning.

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Disentangling French tongues in a German classroom

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The pronunciation of a foreign language is not an intuitive task to accomplish. It needs correct input (Flege, 2009), training and feedback (Kartushina et al. 2015). Becoming aware of the differences in pronunciation that exist between a learners' mother tongue (L1) and a foreign language (L2) can help learners to improve their pronunciation in the L2 (Wrembel, 2007).

In the following, we present the *Progression and Feedback French Learners Audio Corpus of German Speech* (ProFee-FLACGS) created between September and December 2015 with a volume of approximately 4 h of speech. Participants are 30 first grade French students majoring in German. All participants took an obligatory class in German pronunciation theory. Although not all participants grew up in a monolingual household, they were all French dominant. The 30 participants were split in two groups: while 15 participants got a classic training, 15 other participants got training and some visual input in form of spectrograms. An expected outcome of this experimental setting is a better phonological awareness in the group that got visual input and by this means a quicker or better improvement in German pronunciation. Participants had four obligatory oral assignments to perform across the semester. They recorded themselves and send an audio-file of their production to the teacher.

French learners are famous for their word initial /h/ omissions in foreign languages like English or German (Kamiyama et al., 2011; Zimmerer & Trouvain, 2015). Omitting word initial /h/ is not the only difficulty French learners of German meet, sometimes they also produce word initial /h/ instead of a glottal stop. For instance in one of the reading tasks, the word group *keine Ahnung haben* which should be pronounced /kaɪ̯nəʔaːnʊŋhabən/ was uttered as followed by some of the participants: [kaɪ̯nəhaːnʊŋhabən] or [kaɪ̯nəhaːnʊŋʔabən]. A human expert checks h-initial and V-initial words The Progression and Feedback corpus shows that both the omission of /h/ onsets as well as the replacement of /ʔ/ onsets by /h/ onsets improve over time in both experimental groups.

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The predictors of accentedness ratings in Polish-English bilingual children

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While foreign accentedness (FA) ratings have been used widely in SLA studies conducted on adult language learners (e.g. Piske et al. 2001, Gallardo del Puerto et al. 2007), they have rarely been explored in bilingual children. The aim of our study is to investigate, whether the Polish speech of Polish preschoolers raised bilingually in the UK is perceived as different from that of their monolingual peers matched for age and socioeconomic status, based on FA, intelligibility and acceptability ratings. Further, we explore the socioeconomic and linguistic predictors of the perceived foreign accent.

To this end, speech samples of 32 bilingual Polish-English children (aged 4;9 to 6;11) and 10 monolingual Polish children (controls) were extracted from two tasks: sentence repetition and picture story retelling. Moreover, detailed background information on the bilingual children's language development and amount of input/output was collected. The samples were embedded in an online questionnaire and subjected to ratings performed by adult 55 Polish native raters (in-service and pre-service early education teachers), who evaluated the degree of foreign accent, intelligibility and acceptability on a 7-point Likert scale.

The results demonstrated statistically significant differences between the bilingual and monolingual children on all three rated parameters. Strong correlations were found between both tasks on all measures. Further, interesting patterns of correlations appeared between FA scores and background data, pointing to the quantity of English input as predictors of the perceived FA in L1 Polish. This holistic production assessment was also correlated with the results of a previous study (Marecka et al., 2015) on auditory assessment of cross-linguistic influence (CLI) in the same sample of bilingual children, to identify specific phonetic features contributing to foreign accentedness in their L1. The study is particularly relevant for the context of educational models of bilingual language acquisition. The findings will contribute to the creation of phonological profiles of bilingual children as part of a larger scale project.

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Acoustic feature representing the unnaturalness of Japanese spoken by non-native speakers

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Japanese speech produced by non-native speakers is often perceived as unnatural by Japanese native speakers, even if non-native speakers make no mispronunciations. Naturalness of Japanese speech relates to various acoustic features, such as duration, intensity, and fundamental frequency of speech segments (e.g., Amano et al. 2012; Amino et al. 2011; Kato et al. 2002; Sato 1995). To investigate the causes of this perceived unnaturalness, this study examined acoustic features of relative duration, intensity, and fundamental frequency of a vowel. Fifty-seven non-native speakers (7 of English, and 10 each of French, Korean, Taiwanese, Thai, and Vietnamese) participated in the speech recording. Ten native speakers of Japanese recorded examples of natural speech. The spoken word material comprised 29 Japanese words that were two or three mora long with flat type accents and did not contain special moras such as lengthened vowels, geminate stops, or moraic nasals. Participants pronounced the word material that was embedded in a carrier sentence, /korewa __ dato omoi masu/ ("I suppose that this is __"). Their pronunciations were recorded, and acoustic features of the vowel portions in the word material were analyzed. The analysis revealed that acoustic features differ in relative duration, intensity, and fundamental frequency, depending upon the first language of the non-native speaker. For example, compared to Japanese natives, Thai and Vietnamese speakers exhibited longer relative duration for first and last vowels, French speakers exhibited lower relative intensity for all vowels, and all non-native speakers exhibited higher relative fundamental frequency for first vowels, but lower relative fundamental frequency for last vowels. These results indicate that corresponding to non-native speakers' first language, the unnaturalness relates to different acoustic features in different portions of their Japanese speech, probably because the characteristics of their first language affect their Japanese utterance.

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Perceptual cue weighting of Chinese consonants <t d z c> in L1 and L2 Chinese

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Chinese has two alveolar plosives <t d > (phonetically [t^h t]) and two alveolar affricates <c z> (phonetically [ts^h ts]). The obstruents <t c z> perceptually correspond to a single Danish alveolar consonant <t> (variably realized as [t^s] or [t^h]). This suggests that discriminating Chinese [t^h ts ts^h] would be difficult for Danish learners of Chinese. However, Ne et al (submitted) found that Danish learners were surprisingly good at discriminating the Chinese initials. The present study builds on that and investigates the cue weighting of frication and aspiration in perception of Chinese by Danish learners of different years of study with a control group of native speakers of Mandarin Chinese. The participants were presented with 288 stimuli which were systematically varied for the duration of aspiration and frication in Praat (Boersma & Weenink, 2015). The participants were asked to type the pinyin letter of the consonant they perceived. Results show a significant difference between Danish and Chinese subjects. Within the duration of aspiration of 30ms, frication was positively correlated with the perception of [ts] by Danish speakers but as [ts^h] by the native Chinese speakers. The categorical boundary between [ts^h] and [t^h] appears to depend on frication and is on average 25 ms for Danish speakers but 20 ms for native Chinese speakers. The results also show the Danes perceived more sounds as [t^h] and [ts] at the expense of [t]. However, an analysis on the subset of the data of the Danish subjects shows that years of study do not significantly influence the results. We suggest that more explicit instruction on the phoneme discrimination and natural immersion should be considered to facilitate learners to discriminate the consonants.

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Durational features of /s/+stop consonant clusters produced by bilingual Mandarin-English children and monolingual English children and adults

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The present study aims to investigate the durational features of English word-initial /s/+stop consonant clusters produced by bilingual Mandarin-English children and monolingual English children and adults.

The participants included two groups of 5-to-6-year-old bilingual Mandarin-English children: one with low proficiency in English (Bi-low) and one with high proficiency in English (Bi-high); one group of age-matched English monolingual children; and one group of English monolingual adults. The Bi-low children had resided in the US less than six months and were exposed to English less than two years. The Bi-high children were born in the US but had been raised in a monolingual environment until they enrolled in English kindergarten at around 3 years of age. Each participant was recorded producing a list of English words containing three /s/+stop clusters at initial position each followed by three vowels /a, i, u/. The absolute durations of the clusters and cluster elements of fricative, stop gap, stop burst, and VOT were measured. The proportions of element durations to the overall cluster duration were also calculated.

The results showed that the Bi-high children approximated the English adults in terms of the absolute and proportional durations of the cluster components but the Bi-low children produced significantly shorter durations for the fricatives and longer durations for the stop closures than the Bi-high children and English monolingual adults. In addition, compared to the Bi-low children, the Bi-high and English monolingual children showed more compatible patterns to the adults on the overall cluster duration and the durations of certain components. These findings suggest that the Bi-high children had developed near-native temporal features whereas the Bi-low children organized the cluster components along the time scale in a manner different from the English adults. The difficulty of producing clusters may reside in the poorer ability of beginning English learners of Mandarin-speaking children to make appropriate articulatory transitions. Finally, although English monolingual children showed no differences from the Bi-high children, they differed from the adults on the absolute and proportional durations of stop closures, which provides additional evidence on the development of temporal features in English monolingual children.

Perception of devoiced vowels in German:
A comparison of Japanese and German listeners

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In Tokyo Japanese, vowel devoicing is a common process, which leads to the reduction of high, unstressed vowels (/i/ and /u/) between voiceless consonants. The phonological system and phonetic knowledge of speakers' native language (L1) often interferes with the perception and production of sounds, words, and sentences in foreign languages (e.g. Flege et al., 1994; Best, 1995; Kingston, 2003). Native Japanese speakers learning German show a strong tendency to produce such devoiced vowels in German as well, although German lacks this regular process (Yasuda and Zimmerer, 2013). Our previous study indicated that devoiced vowels may lead to perceptual difficulties. German listeners, who rarely confront devoiced vowels in their native language, seem to refrain from reconstructing the vowel completely, which can also heighten the perception of a foreign accent by German listeners.

The primary objective of this study is to investigate the extent to which this reduction process leads to perception problems by Japanese listeners. The secondary objective of it is to compare the perceptual tendencies of Japanese and German listeners. To this end, a phoneme monitoring experiment was carried out. The items in the experiment were German words produced by German and Japanese speakers, respectively. All words produced by German speakers were voiced versions, whereas those produced by Japanese speakers were either voiced or devoiced. The participants were 10 native Japanese speakers, who had been studying German for about 4 years. The hypothesis was that Japanese listeners who had problems perceiving devoiced vowels would react similarly both to the voiced and to the devoiced versions of the experimental words.

The results of the experiment suggested that the Japanese listeners had no difficulty correctly perceiving both German and Japanese speakers' productions in which vowels were voiced. However, their reaction times were longer for the productions of German speakers than for those of Japanese speakers. Furthermore, the Japanese listeners showed difficulty with the devoiced condition of Japanese speakers, i.e. they seemed unable to distinguish between voiced and devoiced vowels.

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Voicing and devoicing of final stop target in similar German and English word pairs by native speakers of Japanese - A case study of L3 phonological acquisition

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Although German does not exhibit voicing contrast in word-final obstruents, a large number of research studies call into question the possibility of complete neutralization of voicing (Smith et al., 2009). Port and O'Dell (1985) found that the distributions of acoustic parameters for underlying voiced and voiceless stops are significantly different, despite considerable overlapping between the two categories. Smith and Peterson (2012) found that many of the studied subjects of native English learners of L2 German exhibited at least a tendency to devoicing the voiced targets in German relative to their productions of orthographically similar words in English. However, most of the research on neutralization of voicing contrast in German pertains to speakers in L1 or L2 situations, not in L3. In this point, native Japanese speakers first learn English as L2, and then they learn any other language as an L3, e.g. German here.

Given this, the research questions of the present study are as follows:

1. How is voicing and devoicing of word-final stop targets in English produced by native Japanese learners?
2. How are similar word pairs in German produced by native Japanese learner of L3 German?
3. How does cross-linguistic transfer and interference of L2 characteristics get mapped on L3, or those of L3 on L2?

To this end, a production study of German and English words was carried out to compare voicing and devoicing patterns by Japanese speakers. Ten native speakers of Japanese participated in the experiment. They had studied English at least for six years as L2 and were studying German as L3. Results of this production task show that Japanese speakers make voicing contrast in final stop targets completely both in German and English, specifically, in terms of vowel duration preceding voiced and voiceless final consonants and final consonant closure duration. However, the contrast is less great and greater in German than the native speakers of German reported in Smith et al. (2009) show. While Japanese does not have word-final stops (hence voicing contrast), our Japanese subjects correctly produced both voice and voiceless stops

The result of the experiment suggests that the voicing distinction in L3 German should be caused by a transfer from English, which reflects the subjects' acquired phonological knowledge of L2.

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Attended and unattended processing of spectral and duration cues in a non-native language

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This study addressed the processing of spectral and duration cues in a non-native language, when listeners did or did not attend to the auditory stimuli. We used the mismatch negativity (MMN) component of auditory event-related potential (ERP) to index unattended processing. The MMN is elicited as a response to deviant sounds in a sequence of repeating sounds. Importantly, previous studies have shown that MMN amplitude is larger for familiar native-language sounds than for unfamiliar non-native sounds, which has been interpreted to reflect the activation of representations for speech sounds in the brain (Näätänen et al., 1997). The MMN is typically measured when listener's attention is directed elsewhere from the sounds, suggesting that the MMN elicitation does not require focused attention.

Our target language was Finnish that includes /ɑ/ vs. /æ/ contrast and uses duration phonologically to signal vowel length. In contrast, the non-native listeners' native language (Russian) does not include the vowel /æ/, nor uses mere duration phonologically. We presented native speakers of Russian and Finnish with vowel changes from /ɑ/ to /æ/ and vowel length changes from /ɑ:/ to /ɑ/ in tasks where attention was directed to the stimuli or away from them. We hypothesized that in non-native speakers, the processing of vowel duration might be more modulated by attention as compared to the spectral features of the vowels. Preliminary results showed that the MMN responses to duration changes but not those to vowel changes were smaller in the Russians than in the Finns. The results are interpreted to suggest a smaller degree of plasticity in auditory cortex for a new phonetic cue (duration) than for a new set of values of a cue used in the native language (spectral quality). The present ERP findings add to the understanding of how attention affects the processing of phonetic features in the brain, since behavioral methods have difficulty in tapping non-attentive processing, which complicates direct comparisons between attentive and non-attentive processing. The understanding of the interplay of attention and phonetic cues is relevant for the teaching of foreign languages.

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The Articulatory Approach to teaching pronunciation

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Current literature presents approaches to pronunciation teaching as either Imitative-Intuitive or Analytic-Linguistic (AL) (Celce-Murcia et al. 2010; Murphy & Baker 2015). Both approaches use listening to models as the principal starting point for student learning. In the AL approach, this is augmented by complementary exercises and information. However, matching the acoustic model is the basic learning paradigm.

There is a third way, the Articulatory Approach (AA), in which the development of motor skills is considered primary. This was recommended by the phonetician J. C. Catford (e.g. Catford 1988) amongst others. It was implemented for L2 learning by Gattegno in his Silent Way (Gattegno 1962, 1976). In this approach, the teacher coaches the students, guiding them in their experimentation and giving them feedback on their production. Listening to native speaker models plays little or no part because of the danger of students using the models as targets for auditory matching and hence losing contact with their motor activity. In practice, the most effective way of preventing this is for the teacher to refrain from providing a model at all (Gattegno 1985).

 Proponents of the AA argue that other approaches do not give enough importance to developing the new muscular movements necessary to articulate the L2. They further argue that there are aspects of pronunciation that students cannot acquire through listening and for which sustained articulatory coaching is required. For example, the unusual articulatory setting for English (Honikman 1964) and the speech breathing used by English speakers to implement stress accent which is quite different from that used for most other languages (Messum 2008). Students do not start to use either of these after just listening to L1 models. Given the poor results obtained in conventional pronunciation teaching, I will argue that the Articulatory Approach should be re-evaluated.

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Longitudinal studies of post-puberty learners in the public eye

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Longitudinal L2 studies can shed light on rate and route of development and reveal a range of developmental co-occurrences and often reveal non-linear acquisition. Yet they are relatively rare in L2 phonology; e.g. Gut (2009) noted that only 17 of the hundreds of studies over the previous 39 years were longitudinal. Since 2009, a new source of data has emerged: YouTube. While the longitudinal tracking of individual learners is limited to those in the public eye, video clips, typically of interviews, are a rich source of data giving researchers an unprecedented chance to track learners for much longer (sometimes decades) than has been the case in longitudinal work.

The presentation describes new work on the L2 English oral production of French- German- and Spanish-speaking footballers and actors whose YouTube interviews were used to examine, in ten separate case studies, word-initial –h; interdental fricatives; lax vs. tense front vowels; complex onsets and codas and word-final alveolar fricatives. Interviews from the time speakers began to live in the target language country to the present reveal the expected influences on target-like production including continued L1 use, orthographic input, identity and instruction. When examined over decades, speakers' production of target segments is not linear. Moreover, data reveal less common influences. For example, in interviews, Arsène Wenger's interdental fricatives shift from his previous French-based substitutions to /f/ and /v/ while he was Arsenal Football Club manager; in interviews, Antonio Banderas' target-like production of vowels reverts back to Spanish-based vowels during his professional use of Spanish-accented English as the voice of Puss in Boots.

Despite obvious drawbacks - most importantly recording quality that precludes acoustic analysis - YouTube is a valuable source of data for much longer-term examination of issues, testing of hypotheses and exploration of unusual influences on L2 phonology.

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Pitch peak alignment as indicator of phonological development in a second language

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Even though scholars have long held that prosodic features carry the biggest weight in terms of perceived accent and intelligibility, we know surprisingly little about the intonational patterns of second language speakers. With this in mind, this study examined the intonation produced in neutral declarative Spanish utterances among English-speaking learners of Spanish at three proficiency levels (low=17, high=20, very high=18), as determined by an elicited imitation task (Ortega, 2000). The pitch alignment of prenuclear syllables was chosen as the target tonal event, as alignment is known to differ in Spanish and English (late alignment for the former and early for the latter). In addition, groups of monolingual Spanish (n=17) and English (n=17) speakers participated for comparison.

Participants were recorded while completing a storytelling task (quasispontaneous speech), in Spanish for Spanish speakers learners, and in English for English speakers. Location of prenuclear pitch peak alignment was examined in 699 utterances via visual inspection of tonal curves produced by Praat. Scores consisted of the distance from the peak to the left boundary of the accented syllable, measured in milliseconds and normalized for speech rate.

Results put monolingual speakers of English and Spanish at the ends of the alignment spectrum, as expected. Production of second language learners, however, fell between values of monolingual speakers. They progressively approached native-like alignment patterns as proficiency increased. These results support observations that L2 learners and bilingual speakers produce certain tonal events as an intermediate resolution between the two languages (e.g., Mennen, 2004; Simonet, 2011). Also worth noting is that very high proficiency speakers, comprised of instructors of Spanish, behaved as balanced Spanish-English bilinguals (cf. Zárate-Sández, 2015). The discussion addresses implications for intelligibility and proposes that certain continuous prosodic parameters (such as peak alignment) could be linked to phonological development (akin to VOT in the segmental realm).

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Does spelling back up quantity distinction in L2?

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Quantity distinctions of vowels and consonants in stressed syllables seem to be one of the greater difficult prosodic features in second language learning of Swedish (Bannert 1990). The syllable structure in Swedish allows the combination of a long vowel followed by a short consonant (V:C) or a short vowel followed by a long consonant (VC:) or a cluster of consonants (Bruce 2012; Riad 2014). This complementary quantity contrast is shown by single or double consonantal letters in the orthography. Examples of two minimal pairs are: vila/villa (rest/house) [viːla/vɪlːa]; glas/glass (glass/ice-cream) [ɡlɑːs/ɡlasː]. Vowel quantity also has an effect on vowel quality. The hypothesis is that orthography guides the L2-speaker towards correct pronunciation of quantity features in read speech.

The material used for this study contains recorded read speech produced by twelve L2-learners of Swedish with six different L1s using another orthography than the Latin alphabet. This means that, except for the spoken language, they also have to learn a new alphabet and the relation between phoneme and orthography in Swedish. Thus, vowel and consonant duration in the stressed syllable of five minimal pairs was analysed. Duration as well as the ratio was measured in each word. Measurements from L2-speech were compared to measurements of equivalent items in L1-speech.The results indicate that spelling is not helpful since most of the target words were pronounced with the syllable structure VC:, regardless of the speakers L1. As sentence semantics is not always helpful to the listener, incorrect length variation can cause problems in communication. The results raise questions about didactic implications for teaching Swedish as a second language and if/how quantity distinction is presented which shows the relationship between orthography and pronunciation. This will be discussed in the presentation.

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The effects of anticipatory dissimilation in second language Chinese tones

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Tone co-articulation is a cross-linguistically common mechanism whereby a given lexical tone is altered in its phonetic manifestation due to influences from adjacent tones in natural languages. Previous studies have found that 1) carry-over co-articulation effects are more extensive than anticipatory effects, and 2) while carry-over effects are mostly assimilatory, anticipatory effects tend to be of a dissimilatory nature and are most clearly seen on contour tones (Gandour et al. 1992, 1994; Xu, 1994, 1997; others). In Chinese (a tonal language) connected speech, a lexical tone undergoes variations depending on its neighboring tones. However, these variations must keep the essential shape of the lexical tone intact (not change the toneme) such that native ears can identify the tone. The present study aims to determine if second language (L2) Chinese tones are constrained by this 'universal' phonetic mechanism of tone co-articulation and explore its relationship with L2 Chinese tone phonology.

This study looks into the production of two Chinese lexical contour tones: 1) the rising tone, T2; and 2) the falling tone, T4, made by sixty non-native Chinese learners with different L1 backgrounds. In particular, balanced disyllabic words and nonsense sequences containing the test tones produced in carrier sentences were examined. In the L2 Chinese tones, much clearer anticipatory effects were observed than carry-over effects by analyzing the error patterns. Further phonetic measurements for the majority of T2 offsets and T4 onsets, as well as the types of substitutions were used to explore the influence of anticipatory dissimilation effects on the L2 tone phonology. This study presents evidence that anticipatory dissimilation effects are one of the sources of toneme changes in L2 tone productions, thereby playing a role in shaping interlanguage tonal grammars. In addition, this study highlights two asymmetric features of anticipatory dissimilation mechanism in L2 Chinese: 1) only high (H) component tones are sensitive to anticipatory effects; and 2) rising tones are more easily influenced than falling tones.

Research concerning anticipatory co-articulation remains relatively scarce in the literature. This is in part due to the fact that anticipatory co-articulation is very subtle and hard to detect in natural languages. L2 research provides an ideal context for explorations into anticipatory co-articulation mechanisms.

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Assimilation of English /θ/ by L1 Mandarin and Cantonese speakers

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Mandarin Chinese and Cantonese speakers have difficulty learning English /θ/, likely because they both lack native dental fricatives. Although the fricative inventories of Mandarin and Cantonese appear to be similar, speakers of these two languages tend to assimilate the English /θ/ differently. Several studies have acknowledged this variation, but have not provided empirical data or any detailed analysis of this phenomenon. This study carried out an identification test on 20 Mandarin and Cantonese speakers, designed based on Best's Perceptual Assimilation Model, which examined their category identification, assimilation, and production of English /θ/. The results confirmed our initial observations that Mandarin speakers most often assimilate the English /θ/ to Mandarin /s/ (although the Mandarin /f/ is also used), while Cantonese speakers strongly assimilate to Cantonese /f/. The production measurements indicated that this may occur due to acoustic differences between /f/ in Mandarin and Cantonese. That is, the Cantonese /f/ is acoustically similar to the English /θ/, but neither /f/ nor /s/ in Mandarin are strongly similar to English /θ/. The difference in the /f/ sounds may occur because the Mandarin /f/ is produced with a less strong closure. Based on these findings, it can be predicted that Cantonese speakers face a bigger difficulty than Mandarin speakers in acquiring English /θ/, because the higher similarity of Cantonese /f/ should cause more interference under Flege's Speech Learning Model.

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Methods of investigating vowel interferences of French learners of German

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The French and German vowel inventories (Fougeron & Smith, 1999; Kohler, 1999) show many similarities, for instance, both have the front rounded vowels [y, ø, œ]. Contrary to German, French has no vowel length contrast. Although specialized teaching materials for German consider the problem of vowel length/tenseness (e.g. Hirschfeld, 2014; Hirschfeld et al., 2007), it is still unclear how frequently vowel errors occur in L2 speech and which pairs of long/tense and short/lax vowels create the most serious difficulties for French learners of German. We present three methods to analyze the interference processes occurring in read speech of French learners of German (Trouvain et al., 2014). The investigated material covers all monopthongal full vowels from 60 sentences read by 30 beginners and 20 advanced learners as well as 40 native speakers.

First, we analyzed phone confusion matrices of the non-native speech that was hand labeled by German annotators. The lowest scores of correctness were shown for /œ/ (57%), /ʏ/ (63%), and /ɛː/ (68%), with /øː/ , /yː/, and /eː/ as the main substitutions. Second, in a perception study based on the investigated material, German native speakers listened to words belonging to minimal pairs like *Miete* /ˈmiːtə/ - *Mitte* /ˈmɪtə/ ('rent-middle') differing in length/tenseness. Correct identification of native speech was 98%. The results for the learners indicate that, overall, short vowels were identified correctly less often (64%) than long vowels (77%), but with great inter-individual differences. The vowels with the lowest perception score were /ɔ, œ, ʏ/ with wrong identifications of 65% (beginners) and 47% (advanced). Although most problems occur in the beginner group, every second advanced learner shows for short vowels an identification rate lower than chance, which means they were perceived as long by German native listeners. Finally, acoustic measurements of the minimal pair words revealed different strategies: some learners tend to lengthen while others tend to shorten vowels.

The results of these three investigations help to create a more detailed account of the transfer of vowel contrasts, extending prior research on vowel perception (Kingston, 2003; Flege & MacKay, 2004), with orthography as a possible source of interference. Furthermore, the results of the studies can be used to create individualized training and feedback for foreign language learners.

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The use of tones in phonological processing and lexical access by Dutch learners of Mandarin

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The automatic selective perception model (Strange, 2011) proposes that difficulty in L2 speech contrast learning mainly rests on the phonological level, and can be revealed by a cognitively demanding task with complex stimuli. Findings supporting this model showed that L2 learners can discriminate non-native lexical stress contrasts in a simple discrimination task, but showed a persistent stress processing impairment in more demanding tasks (Dupoux et al., 1997; Dupoux et al., 2008).

The present study investigated the phonological processing of another prosodic category - tonal contrasts - by beginner and advanced Dutch learners of Mandarin with native Mandarin listeners as a control group. Two research questions were raised: 1) Can Dutch speakers of Mandarin as a second language learn to process tone phonologically? 2) Are some tonal contrasts more difficult to acquire than others? Two tasks, a sequence-recall and a lexical decision task, were employed, with high memory load and phonetic variability. In the sequence-recall task, tones presented great difficulty to beginner learners, but such difficulty does not constitute a persistent tone "deafness", since the advanced learners showed a significant improvement and approached the performance of Mandarin natives in all tone pairs. For both learner groups and even for native Mandarin listeners, Tone 2-Tone 3 was the most difficult pair. In the lexical decision task, Mandarin word-nonword pairs differing only in tone were tested. Compared to the beginner group, the advanced learners improved significantly in their sensitivity to tones. Tone 2 and Tone 3 were mutually confusable and were most resistant to improvement. This can be attributed to the acoustic similarity of these tones. Advanced learners became more sensitive to Tone 1, a high level tone, than other tones, which is in line with previous findings (Gandour, 1983): compared to tone-language speakers, intonational language speakers are more sensitive to pitch height than pitch direction.

In conclusion, a developmental trajectory in L2 phonological processing of tones was observed for Dutch learners of Mandarin. Different tones were not equally difficult to learners, which can be attributed to acoustic similarity between particular tones and interference from L1 experience.

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Notes

Malaysia Poland Belgium Macedonia
Portugal Spain Denmark
Hong-Kong Sweden Brazil
United Kingdom Taiwan Canada China
Netherlands Germany Czech-Republic Argentina
USA Switzerland Finland Japan Austria
Saudi-Arabia
Singapore Australia Greece France
Italy Norway Korea

Greek Swedish
Polish Slovak English
Norwegian Azerbaijanian Bengali Russian
Chinese Japanese Cantonese
Minnan Catalan Bosnian Finnish
Mandarin Czech Spanish
Arabic Persian Armenian Dutch
French Portuguese
German Faroese Korean
Thai