Article

Field-Testing Code-Switching Constraints: A Report on a Strategic Languages Project

John M. Lipski

Department of Spanish, Italian and Portuguese, The Pennsylvania State University, University Park, PA 16801, USA; jlipski@psu.edu; Tel.: +1-814-865-6583

check for updates

Abstract: The present article provides an overview of ongoing field-based research that deploys a variety of interactive experimental procedures in three strategically chosen bilingual contact environments, whose language dyads facilitate a partial separation of morphosyntactic factors in order to test the extent to which proposed grammatical constraints on intra-sentential code-switching are independent of language-specific factors. For purposes of illustration, the possibility of language switches between subject pronouns and verbs is compared for the three bilingual groups. The first scenario includes Ecuadoran Quichua and Media Lengua (entirely Quichua syntax and system morphology, all lexical roots replaced by Spanish items; both are null-subject languages). The second juxtaposes Spanish and the Afro-Colombian creole language Palenquero; the languages share highly cognate lexicons but differ substantially in grammatical structures (including null subjects in Spanish, only overt subjects in Palenquero). Spanish and Portuguese in north-eastern Argentina along the Brazilian border form the third focus: lexically and grammatically highly cognate languages that are nonetheless kept distinct by speakers (both null-subject languages, albeit with different usage patterns). Results from the three communities reveal a residual resistance against PRONOUN + VERB switches irrespective of the subject-verb configuration, thereby motivating the application of similar techniques to other proposed grammatical constraints.

1. Introduction

From the beginning of linguistic research on intra-sentential language switching—a paradigm initiated in the 1970's and continuing at the present—attention has been directed at the possible existence of grammatical configurations that favour or inhibit changing languages within the confines of a single utterance (cf. the studies in Bullock and Toribio 2009 and the references therein). Among the issues that arise in the study of spontaneous intra-sentential code-switching, two have received considerable attention. The first is the need to disentangle putatively general restrictions from language-specific grammatical structures. Structural differences among languages such as head position, verb raising, null subjects and lexical argument structure often make it difficult to tease apart language-specific from more general patterns, hence the plethora of examples and counter-examples found in code-switching studies.

Equally important is obtaining reliable data on speakers' acceptance and production of specific switching patterns. Corpora of spontaneous speech provide examples of possible and presumably acceptable code-switches but leave open the question of other potential switches not found in the corpora that may or may not occur in naturalistic speech. Acceptability judgments, while providing valuable data on speakers' metalinguistic awareness, frequently become entangled with prescriptivist objections to language mixing and do not always accurately reflect actual usage (e.g., Toribio 2001;

Anderson 2006; Anderson and Toribio 2007; Badiola et al. 2017). A third line of approach—the one exemplified in the present study—involves psycholinguistic techniques that probe bilinguals' code-switching intuitions while sidestepping explicit judgments.

Some psycholinguistic code-switching research relies on written language (e.g., reading-based eye-tracking and sentence-matching techniques) and is therefore inappropriate for non-literate or visually impaired participants or for languages with no written tradition. Other procedures entail low signal-to-noise ratios and require multiple repetitions, often with costly and sometimes non-portable equipment (for example ERP and fMRI experiments). On the other hand, there are more portable techniques that can be deployed with strictly auditory stimuli, in field settings with participants unaccustomed to experimental procedures and including a variety of seldom-studied bilingual environments that can potentially extend the knowledge base on code-switching. "Field psycholinguistic" research of this sort carries its own set of challenges, not the least of which is the inherently noisier data that require a greater number of participants and stimuli and—almost inevitably—more patience and flexibility by all involved (cf. the discussion in Speed et al. 2018). In the balance, extending psycholinguistic code-switching research to field settings with appropriately adapted techniques provides a promising complement to rigorous laboratory-based studies and may provide partial responses to the issues mentioned above.

The present essay provides an overview of ongoing field-based research that deploys a variety of interactive experimental procedures and strategically tailored stimuli in three strategically chosen bilingual contact environments, whose language dyads facilitate a partial separation of lexical and morphosyntactic factors. The first scenario includes Ecuadoran Quichua and Media Lengua (entirely Quichua syntax and system morphology, all lexical roots replaced by Spanish items). The second juxtaposes Spanish and the Afro-Colombian creole language Palenquero; the languages share highly cognate lexicons but differ substantially in grammatical structures. Highly vernacular Spanish and Portuguese in north-eastern Argentina along the Brazilian border form the third focus: lexically and grammatically highly cognate languages that are nonetheless kept distinct by speakers (as evidenced by in situ observation and the language classification and translation tasks conducted by Lipski 2017b). In all three linguistic environments, spontaneous language mixing occurs, at times without the conscious acknowledgment by bilingual speakers. The results have variously been described—by the speakers themselves as well as by outside observers—as code-switching, interference and the emergence of "third" languages but to date there has been no systematic inquiry into the type(s) of language mixing that actually occur. Since much research on possible grammatical conditioning of code-switching is implicitly or explicitly linked to language typology, the three bilingual environments chosen for study are ideally situated to tease out the relative contributions of grammatical structures and lexicons.

Similar experimental techniques have been applied in each of the three environments with the goal of (literally) triangulating the role of grammatical configurations in constraining or facilitating intra-sentential language switching. The results also point to the viability of obtaining reliable data on potential code-switching restrictions in the absence of an active code-switching environment or an extensive tradition of formal language education and metalinguistic commentary.

2. Possible Constraints on PRONOUN + VERB Switches

For purposes of illustration of some of the field-based techniques and the interpretation of the resulting data, a single language-switching configuration is compared across the three bilingual communities: between subject pronoun and verb. From the earliest studies of Spanish-English code-switching, it has been observed that switches between subject pronouns and verbs are almost non-existent and are explicitly rejected by bilingual speakers (e.g., Gumperz 1977, p. 26; Timm 1975,

p. 477), with some exceptions as noted by Koronkiewicz (2014).[1] It is not immediately clear whether such putative constraints are specific to pronouns or apply more generally to functional elements (e.g., Muysken 2000, p. 40), system morphemes (Myers-Scotton 1997) and/or closed-class categories (Azuma and Meier 1997; Doron 1983; Jake 1994; Joshi 1985; Prince and Pintzuk 2000). The fact that pronouns are very rarely borrowed cross-linguistically (e.g., Haugen 1950; van Hout and Muysken 1984; Muysken 2000, p. 74; Nortier and Schatz 1992; Thomason 1999; Thomason and Everett 2005, p. 301) while other closed-class functional items such as conjunctions are more susceptible to borrowing (e.g., Aaron 2004; Karttunen and Lockhart 1976, pp. 35–39; Lastra 1968; Lipski 2005) suggests that pronouns may indeed enjoy a "special" status. A cross-linguistic examination of various existing and potential switch configurations can contribute to the understanding of the role of grammatical categories in favouring or constraining intra-sentential code-switching. In the following sections, code-switching is taken to refer broadly to a left-to-right transition from one language to another within a single utterance. Since the focus is on possible restrictions on the combination SUBJECT PRONOUN (in one language) + VERb (in the other language), a topic that has not been treated uniformly in previous research, a number of different configurations appear in the test materials. These range from the insertion into an otherwise monolingual string of a single word (subject pronoun) from the other language to utterances that transition from one language to the other at some intermediate point.

Not all of the tasks reported in the following sections were specifically designed to highlight this particular grammatical combination and therefore the results—while suggestive—are offered more as a demonstration of cross-linguistic field-based techniques than as a definitive assertion about the status of pronouns.

3. Interactive Techniques with Auditory Code-Switched Stimuli

There are many effective interactive experimental methods that can be applied to code-switching research and in particular to the search for grammatical configurations that favour or inhibit intra-sentential switches. This section briefly surveys some techniques that have provided promising results with auditory stimuli in field settings involving minority languages or dialects and including non-literate and unschooled participants.

3.1. Speeded Language Classification

One versatile and easily programmable technique involves speeded language classification. Frequently used speeded acceptability judgments (e.g., along the lines of Bader and Meng 1999; Felser et al. 2009) are sometimes unreliable for the reasons stated earlier but speeded classification tasks do not elicit judgments. Participants know in advance that they will hear stimuli (presented in unpredictable order) from each language as well as mixed utterances and need only classify the stimuli accordingly. This technique is particularly useful in situations where outside observers' perception of code-switching does not coincide with the speakers' own intuitions. This type of task is easily automated for self-paced portable computer presentation, using any of a variety of experiment-building platforms, with the systematic measurement of reaction time providing an additional dividend. Given the emphasis on vernacular usage in minority speech communities, the author has used this technique exclusively with auditory stimuli, both as extracted from recordings of naturalistic speech and with deliberately manipulated stimuli created with text-to-speech programs. This task could be easily adapted to rapid visual presentation.

3.2. Mixed Translation

Elicited translations always carry the risk of priming but in code-switching research translation tasks can provide collateral data on bilingual participants' intuitive partitioning of their languages.

---

[1]　For example Spanish-English switching can occur with coordinated pronouns, hanging topics, clefting, modification and prosodic stress. This finding echoes the observations of (Gumperz 1977, p. 26).

Participants are asked to translate a randomized group of utterances from both languages into the "other" language (i.e., not the language of the stimulus). The results are particularly interesting when putatively mixed utterances are included without this fact being revealed. Disfluencies such as hesitation, backtracking, or reluctance to translate, as well as explicit comments and requests for clarification reflect participants' explicit awareness of a language switch, while apparently effortless translation suggests that certain sentence elements are consciously or unconsciously overlooked in order to assign a base language from which to translate. For example, Portuguese-Spanish bilinguals in Misiones, Argentina, routinely translated without hesitation, comments, or indications of surprise the mixed sentence (1), a case of congruent lexicalization (Muysken 2000) in which *no puedo* 'I can't' is in Spanish and the remainder in Portuguese. All the translations were in a single language (most frequently into Spanish).[2]

1. *no*　　*puedo*　　||　ficar　hoje　porque　a gente　vai　pr'o Brasil
   NEG　　can.1S　　　　stay　today　because　[we]　　go.3S　to Brazil
   　　　　　　　　　'I can't stay today because we are going to Brazil.'

On the other hand, sentence (2), which changes languages (Spanish to Portuguese) halfway through (alternation in the classification of Muysken 2000) frequently evoked hesitation or explicit questions as to which language the sentence was in.

2. *Cuando*　*ellos*　*hablan*　　||　misturam　as　　línguas
   when　　they　　speak.3S　　　mix.3PL　　ART　languages
   'When they speak, [they] mix languages.'

3.3. Repetition with Concurrent Memory-Loading

Elicited repetition has been used experimentally in the study of bilingual speech—including code-switching—by Azuma and Meier (1997); Clyne (1972), Meijer and Tree (2003); and Treisman (1965), among others. The rationale of such tasks is that "when listeners hear a sentence that exceeds the capacity of their short-term memory, they will pass it through their own grammar before repeating it" (Gullberg et al. 2009, p. 34). In the case of bilingual stimuli, adding memory demands to the repetition potentially increases the cognitive load to the point where more subtle aspects of bilingual competence may be revealed. Previous work, for example, by Miller and Isard (1963); Marslen-Wilson (1985); and the studies reviewed by Vinther (2002), has shown that in sentence repetition tasks, respondents' errors frequently reflect their own grammars, that is, what they WOULD HAVE SAID instead of what was actually said. In the case of code-switching research, repetition with concurrent memory loading can provide insights into preferred and dispreferred switch-types. One method is achieved by presenting a sequence of random numbers followed by a stimulus utterance; participants are asked to retain the digits in memory and following the stimulus utterance, first repeat the numbers and then repeat the stimulus (a version of the technique employed for example, by Dick et al. 2001; McDonald 2006; Waters et al. 2003; also, Gordon et al. 2002). Some participants find this task frustrating, although most make a sincere effort to memorize the numbers. This task can be used with individuals with impaired vision. Repetition of stimuli after being distracted by describing an unrelated video presentation is another useful technique (similar to that used, for example, by Norcliffe and Jaeger 2016). In this task, participants hear a stimulus utterance, then watch a short video clip (with no sound) and are asked to describe it, after which they are asked to repeat the stimulus utterance. In communities where most members watch popular television programs, cartoon clips have proven to be effective stimuli, whereas when working with participants who watch little or no television, documentary clips depicting events in the same communities invoke a comfortable familiarity. All such materials

---

2　In all of the examples the portion of the utterance in the first language is in italics and the point of transition to the other language is indicated by ||.

are readily available on the internet (e.g., YouTube) and can be edited with free software (e.g., VLC Media Player). Depending on the choice of videos, participants often enjoy this task, provided that the experimenter reassures them that occasionally forgetting a stimulus is to be expected. This experiment requires participants with at least average visual acuity. Yet another approach is repetition of a target stimulus after having subsequently heard two or more unrelated distractor sentences (an example in Lipski 2017c). This task is also applicable to participants with impaired vision and can be employed in bilingual communities where number terms are routinely expressed in only one of the languages but this approach yields a higher error rate, for example, repetition of the last utterance heard rather than the first. Ultimately the choice of approaches requires a careful study of the linguistic ecology of the community and the profile of prospective participants.

3.4. Close-Shadowing: Another Form of Cognitive Loading

Close-shadowing is a limiting case of elicited repetition, in which participants repeat stimuli online without waiting for the end of the utterances (Bailly 2002; Marslen-Wilson 1973, 1985; Mitterer and Ernestus 2008). In the case of bilingual stimuli, speech shadowing potentially increases the cognitive load to the point where more subtle aspects of bilingual competence may be revealed, particularly when shadowing code-switched utterances. Although during close-shadowing participants sometimes become so engrossed in the task that they repeat verbatim combinations that they would likely reject upon reflection, repetition of mixed utterances frequently evokes "corrections" in the direction of the respondents' preferred structures, as well as omission of elements implicitly regarded as unacceptable.

The extended passages required for close-shadowing tasks can be generated by text-to-speech programs, particularly if non-occurring language switches are to be part of the experiment. Segments extracted from naturalistic speech or rehearsed elicitation can also provide the required stimuli. Close-shadowing is a stressful exercise for many participants and the researcher needs to be attentive to stress levels and either time out or terminate the task if a participant becomes too uncomfortable. In all cases, the best advice for participants who momentarily lose track of the passage is to wait until the beginning of the next full utterance before continuing. Practice sessions, demonstration by the researcher and frequent breaks between passages will contribute to a successful outcome.

4. Creation of Mixed Stimuli

In code-switching studies involving written stimuli the researcher is free to construct any and all combinations, irrespective of their adherence to observable linguistic behaviour. On the other hand, when contemplating interactive tasks involving putatively mixed auditory stimuli, the issue of creating natural-sounding utterances arises, especially for combinations that may be judged as aberrant or even impossible. In small close-knit speech communities where most residents know one another, unacceptable sentences produced in a recognizable voice may result in unfair criticism of the speaker or unrealistic reactions by participants. The same may be true of utterances extracted from recorded corpora, even if they are electronically modified, since speakers may have produced configurations that are "not supposed" to exist and recognition of this fact by other community members could be a cause for embarrassment or even resentment. This issue can be addressed in two ways, depending on the linguistic ecology of the bilingual communities as well as the research variables themselves. In some instances, it may be possible to train a bilingual confederate to produce a full range of code-switched combinations without disfluencies or other audible indications that might betray the speaker's implicit acceptability judgments. This method is effective if the speaker's voice is not recognized by potential participants. Under limited circumstances, code-switched stimuli could be produced by the researcher but unless the researcher belongs to the same speech community or is capable of producing essentially native-like utterances, participants' responses may be clouded by reactions to "outsider" performance.

An alternative source of code-switched stimuli is synthesized speech, typically by making use of available text-to-speech software based on sampled human voices. Programs for several major

languages are available but although some produce highly realistic utterances, the results are almost always generic in nature, striving for a sociolinguistically neutral version of the language involved without any of the sociophonetic nuances that enable listeners to personally engage with a given variant of their language. When dealing with less common languages or dialects, it may be possible to digitally modify the output of a standard text-to-speech program resulting in very naturalistic utterances. This approach is time-intensive and involves considerable trial and error but when successful provides the researcher with considerable freedom to construct mixed stimuli without requiring a skilled confederate and is inherently more portable (e.g., synthesized stimuli can be created "at home" away from the speech community to be studied and additional collaborators worldwide can be trained in the creation of stimuli).

The following sections describe ongoing field-based research in three bilingual speech communities. The vignettes have been chosen to exemplify some of the previously enumerated techniques and represent a subset of the research protocols that have been utilized in these environments. The online supplementary contains a full list of stimuli for each of the experiments.

5. Quichua and Media Lengua in Ecuador: Identical Morphosyntax, Disjoint Lexicons[3]

In the Andean highlands of South America, Quichua (as the Quechua varieties are known in Ecuador) has been in contact with Spanish for some five centuries and a broad panorama of contact-induced phenomena can be observed. In addition to Spanish-tinged Quichua and Quichua-influenced Spanish, a putative "third language" has been documented for highland Ecuador, referred to as *Media Lengua*, literally 'half-language' but in fact a complete language spoken natively and psycholinguistically distinct from both Spanish and Quichua. Media Lengua consists essentially of Quichua morphosyntax with nearly complete replacement of Quichua lexical roots by their Spanish counterparts (Muysken 1988, p. 409). Media Lengua was first brought to the attention of linguists by Muysken (1979, 1981, 1988, 1997, 2012), based on field research conducted in the 1970's in the province of Cotopaxi; recent studies (Müller 2011; Shappeck 2011) found almost no speakers of this variety and little collective memory of its former presence. In the northern province of Imbabura, Media Lengua is alive and well in the indigenous communities of Angla and Casco Valenzuela, in the *parroquia* 'parish' of San Pablo del Lago in the *cantón* 'county' of Otavalo. In these villages Media Lengua continues to be used (together with Quichua) on a daily basis by most residents, although many of the youngest community members primarily use Spanish (Gómez Rendón 2005, 2008). Media Lengua is also present in the community of Pijal (Stewart 2011, 2013, 2015a, 2015b), located about an hour's walk downhill from the aforementioned communities (see Figure 1). According to oral tradition, Media Lengua in Angla and Casco was brought from Pijal, through marriage and relocation but in Pijal Media Lengua and Quichua are currently spoken only by some adults, as Spanish has become the dominant language in the community.

The Quichua-Media Lengua dyad provides a unique environment in which to probe more deeply into the possibly "special" status of specific categories in the context of intra-sentential code-switching, since the two languages not only share identical phrase structure and syntactic mechanisms (i.e., both linear and structural identity) while having disjoint and non-cognate lexicons but which also employ exactly the SAME (bound) grammatical morphemes but lexically disjoint sets of words for grammatical categories that have previously been implicated in code-switching research (e.g., pronouns, negators and interrogative words). Both Quichua and Media Lengua are also null-subject languages, employing the same verbal inflections that identify subject person and number. It is therefore possible to manipulate combinations of original Quichua and Spanish-derived items in the absence of any morphosyntactic differences between the two languages, in order to determine

---

3　Research in Ecuador was conducted under Penn State IRB #33997. All participants gave informed consent and were compensated for their participation.

if specific grammatical categories resist or enhance left-to-right language transitions in the absence of confounding typological factors. Any residual differential behaviour once other language-specific peculiarities are stripped away will be suggestive of at least some language-independent limitations on intra-sentential language transitions.
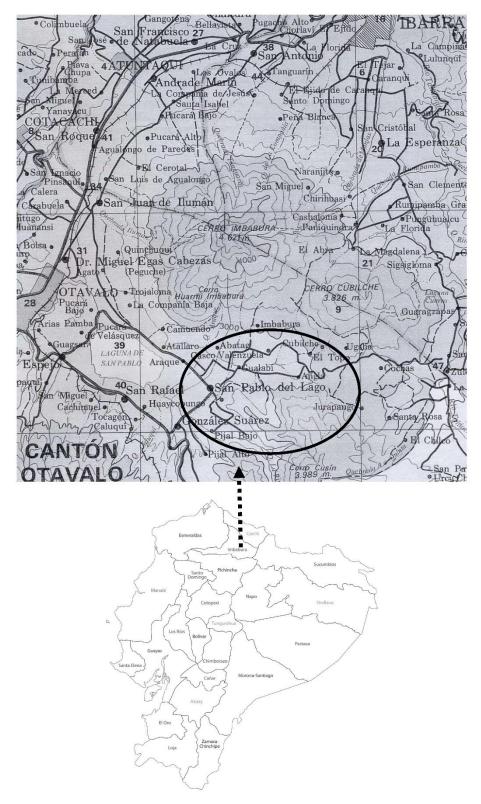

Figure 1. Map: Media Lengua communities in Imbabura province, Ecuador.

Media Lengua is by definition a mixed language and even though it has been demonstrated that Quichua-Media Lengua bilinguals delimit the two languages to a very large degree (Lipski 2017a), the speakers themselves (nearly all rural residents with little or no formal schooling and none with training in Quichua or Media Lengua) often refer to Media Lengua in terms that suggest unprincipled mixing: *chaupi shimi* or *chaupi lengua* 'half a language', *chapushka chapushka* 'all mixed up', and—among some school children—*quichañol*. Given the virtual "all or nothing" nature of Media Lengua (i.e., with no intermediate partially relexified varieties), fluent intra-sentential Quichua-Media Lengua code-switching (especially involving entire constituents) should be readily identifiable.[4] Quichua-Media Lengua bilingualism offers a promising environment for field-testing language mixing in the absence of morphosyntactic discrepancies. The two experiments described below, one essentially metalinguistic (acceptability) and one psycholinguistic (memory-loaded repetition), were designed to probe the viability of intra-sentential switches after specific grammatical categories.

6. Media Lengua-Quichua Experiment #1: Acceptability Task

6.1. Participants

Fifty-one Quichua-Media Lengua bilinguals (age range 18–50+; age M = 32.6, S. D. = 2.4; twenty-nine female and twenty-one male) participated in this task of acceptability judgments (described in detail in Lipski 2016a), in a first attempt to determine the reliability of native speakers' intuitions and explicit awareness of the differences between Quichua and Media Lengua. Twenty-six of the younger participants had received at least one class in Quichua, while none of the older adults had studied Quichua and ten had received no schooling at all. Due to failure to follow instructions, inattentiveness or unfamiliarity with the task, data from twenty participants were rejected based on d-prime scores[5] that suggested responses at or below the level of chance (i.e., less than 50% correct identification of both externally judged acceptable and unacceptable utterances). Of the remaining thirty-one participants (age M = 29.3; S. D. = 4.2), fourteen were male and seventeen were female, nineteen had received at least some classes in Quichua and four had no formal schooling.

6.2. Materials

A group of 113 utterances was recorded in the voices of several female Quichua-Media Lengua bilinguals whose voices covered the same approximate F0 range, including seventeen in Quichua, twenty in Media Lengua and each of the remaining seventy-six contained a single element from the non-base language, including subject pronouns, interrogatives, negators and lexical roots of nouns and verbs. The base language (the language of the lexical roots of all but the single other-language element) was Quichua in thirty-eight mixed stimuli and Media Lengua in the other thirty-eight. Examples are in (3):[6]

---

[4] Stewart (2011, 2015b, p. 228) describes "code-switching" for Pijal Media Lengua but the examples involve frozen combinations such as *a las ocho de la mañana* 'at 8:00 in the morning', also found among Quichua speakers from other regions where Media Lengua is not present.

[5] D-prime scores, a measure of signal-to-noise ratio in experimental data, are based on the rate of correct responses ("hits") minus the rate of false positive responses ("false alarms"). Mathematically this represents the z-transform of the hit rate minus the z-transform of the false alarm rate, calculated on the basis of standard deviation from the mean for each participant's responses.

[6] A reviewer has queried whether mixed examples such as 3g contain more than one transition point. This is not the case; it is the nature of ML that Spanish-derived lexical roots are accompanied by Quichua system morphemes (usually post-positions). These are not language transitions; only when a (possibly affixed) root in one language is immediately followed by a root in the other language is there a transition.

3. a. Quichua stimuli

    uchina   ka-shpa-ka   may-pi-tak   'kausa-rka-ngi?
    small   be-GER-TOP   where-LOC-Q   live.PERF.2S
    'When you were young, where did you live?'
    Gabriel-pak   wasi-pi-mi   kausa-ni
    Gabriel.GEN   house.LOC.AFFIRM   live.1S
    'I live in Gabriel's house.'

    b. Media lengua stimuli

    kichwa-ta   aprindi-ngapa   kiri-ni
    Quichua.ACC   learn.DES   want.1S
    'I want to learn Quichua.'

    c. inki-ta-tak   azi-hu-ngi?
    what.ACC.Q   do.PROG.2S
    'What are you doing?'

    d. Transition to Quichua after Media Lengua subject pronoun
    il-ka || rigsi-wa-n-mi
    he-TOP   know.1S-3S.AFFIRM
    'He knows me.'

    e. Transition to Media Lengua after Quichua subject pronoun
    pay-ka || miu-ta   kunuzi-n-mi
    3s-TOP   me.ACC   know.3s.AFFIRM
    '(S)he knows me.'

    f. Transition to Quichua after Media Lengua interrogative
    inki–ta–tak || tarpu–rka–ngi
    what.ACC.Q   plant.PAST.2SG
    'What did you plant?'

    g. Transition to Media Lengua after Quichua interrogative
    mashna || iho-kuna-ta-tak   tini-ngi
    how many   child.PL.ACC.Q   have-
    'How many children do you have?'

    h. Transition to Quichua after Media Lengua lexical item
    iho–kuna   *bini*–ngichi || puñu–ngapa
    child.PL   come.2PL   sleep–CAUS
    'Children, come to bed.'

    i. Transition to Media Lengua after Quichua lexical item
    wawa–kuna   *shamu*–ngichi || *durmi*–ngapa
    child.PL   come.2PL || sleep–CAUS
    'Children, come to bed.'

6.3. Procedure

The stimuli were presented on a portable computer using a script written for the PEBL experiment-building platform (Mueller and Piper 2014). The stimuli were individually randomized for each participant in a binary forced-choice format. Participants listened over headphones and were

instructed to press the right shift key (covered in green) if the utterance would be possible in their community and the left shift key (covered in red) if the utterance did not seem possible. On-screen icons (coloured dots and thumbs-up and thumbs-down images) provided visual reminders of the choices. It was not revealed that some of the utterances contained mixtures of Quichua and Media Lengua. The program computed the responses and reaction times.

6.4. Results

Participants found 85.3% of all-Quichua utterances and 80.4% of all-Media Lengua utterances acceptable but judged only 21.7% of the mixed utterances to be acceptable. A breakdown by major switch type is found in Table 1. Whereas most of the switches after, e.g., pronouns and interrogatives also occur <u>before</u> a lexical item, in this table and the other calculations, only transitions <u>after</u> a lexical item (and—given the nature of Quichua and ML syntax—simultaneously <u>before</u> another lexical root) were calculated.

Table 1. Results of acceptability judgments: mixed Quichua-Media Lengua stimuli.

Transition After	% Accepted
PRO	10.1%
Interrog.	7.7%
lexical	25.3%

A general linear (logistic regression) mixed-effects model was fitted in R (R Core Team 2014, version 3.3.1) using the lme4 package (Bates et al. 2014); *p*-Values were approximated with the lmerTest (Kuznetsova et al. 2014) and car (Fox and Weisberg 2011) packages. With correct-incorrect as response variable and participant and stimulus as random intercepts, a main effect for switch type was revealed, including a significant difference between switches after subject pronouns and switches after lexical roots of nouns and verbs ($p = 0.001$, $z = 3.264$, estimate 1.1381, std. error 0.3487). A likelihood comparison between the null model (no fixed effects) revealed that the model with switch type as fixed effect accounted for significantly more of the variance: χ^2 (3) = 58.86, $p < 0.0001$.

This initial experiment showed that even in a speech community characterized by highly regionalized vernaculars, little formal education and a lack of previous metalinguistic commentary, not all deviations from observed language configurations are judged equally. As a group, participants rejected a large proportion of mixed Quichua-Media Lengua stimuli, providing a demonstration that Media Lengua is a cohesive language and not a continuum of Quichua-Spanish mixture. Among the mixed stimuli that were accepted, language shifts following pronouns and interrogative words received lower acceptability scores than switches after verbs and nouns, in a bilingual environment in which the two languages share identical morphology and syntax.

7. Media Lengua-Quichua Experiment #2: Memory-Loaded Repetition

7.1. Participants

A previous memory-loaded repetition task involving recollection of random numbers (Lipski 2016a) had yielded inconclusive results in the case of language switches after subject pronouns, due in large measure to the very high standard deviation of the responses. A subsequent task using visual distractors was conducted, targeting the same grammatical categories. Sixty-two native Quichua-Media Lengua bilinguals (ages 18–50+, age M = 31.2, S. D. = 4.1), thirty-nine females and twenty-three males) from the communities of Angla and Casco Valenzuela participated in this experiment. Twenty had received some Quichua classes and six had no formal schooling. Six had participated in the acceptability task of experiment #1, two years previously.

7.2. Materials

Thirty utterances spoken by a female Quichua-Media Lengua speaker were recorded: seven in Quechua, seven in Media Lengua and sixteen mixed Quichua-Media Lengua, each containing a single word from the non-base language as in (1). The utterances (eight with Quichua as base language and eight with Media Lengua as base) were randomized for each participant and presented on a portable computer using a PEBL script. Each stimulus consisted of the target utterance, a seven-second video clip taken from publicly available videos of cultural practices in Imbabura indigenous communities (e.g., planting, cooking, harvesting, collective work brigades), a video clip of an old-fashioned movie ten-second "countdown" and the image of a speaking mouth. All sound was removed from the video clips.

7.3. Procedure

Participants listened to the stimuli through headphones and were given pre-recorded instructions (in Quichua and Media Lengua) to retain them in memory. During the 10-s countdown they were to comment on the video clip in the language of their choosing and then, upon seeing the image of the mouth, repeated the stimulus utterance exactly as heard. Stimuli and responses were recorded digitally. The fact that some of the utterances contained both Quichua and Media Lengua elements was not disclosed.

7.4. Results

Table 2 gives the results for the mixed utterances, including those instances where the stimulus was repeated in the same language(s) as the original as well as switches of the key word to match the language of the rest of the sentence.

Table 2. Results of memory-loaded repetition task: mixed Quichua-Media Lengua stimulus utterances.

Transition after	% Changed to Monolingual	% Unchanged
PRO	45.1%	54.9%
Interrog.	46.8%	53.2%
lexical	10.0%	90.0%

A general linear mixed-effects model with retention as mixed versus substitution to achieve monolingual status as response variable and participant and stimulus as random intercepts revealed a main effect for switches after pronouns ($p < 0.0001$, $z = 10.58$, estimate 2.3475, std. error 0.2218) and interrogative items ($p < 0.0001$; $z = 12.61$, estimate 2.6597, std. error 0.2109) with respect to lexical roots of nouns and verbs taken as the reference level:[7] A likelihood comparison with the null model revealed that the mixed-effects model account for significantly more of the variance: χ^2 (2) = 237.49, $p < 0.0001$.

As with the task in Experiment #1, this repetition task was a novelty for all participants. Only in three instances did participants explicitly comment on hearing and/or correcting mixed stimuli, which suggests that most of the spontaneous corrections were unconscious. The significant difference in rates of conversion of mixed utterances to monolingual strings depending on the nature of the switch boundary provides additional support for the results obtained in the first experiment.

8. Interim Discussion: Quichua-Media Lengua

The experiments conducted among Quichua-Media Lengua bilinguals have provided promising results as regards consistent reactions to varying language-mixing configurations in a speech

---

[7]　Quichua/Media Lengua negation was not included as a variable since the Quichua negator *mana* is frequently shortened to *na* in naturalistic speech, making it almost indistinguishable from Spanish/ML *no*.

community in which intra-sentential language transitions are not a common practice. The fact that Quichua and Media Lengua share identical system morphemes and syntactic structures eliminates an important variable that acts as a confound when studying intra-sentential switching between languages that differ in morphosyntax. The fact that usable results can be obtained from participants with little or no formal schooling and with languages that have no written tradition or history of metalinguistic commentary is encouraging, as research on language mixing is extended to an ever-wider range of languages and sociolinguistic configurations.

9. Spanish and Palenquero: Cognate Lexicons, Distinct Grammars[8]

Another bilingual contact environment that provides an opportunity to isolate both lexicon and morphosyntax involves Spanish together with the Spanish-lexified creole language Palenquero, spoken in the Afro-Colombian village of San Basilio de Palenque and known to its speakers as *lengua (ri Palenge)* '[the] language (of Palenque).' Spanish and Palenquero share many syntactic patterns, including SVO word order, post-nominal adjective placement, head-first subordinate clauses and prepositional phrases (Schwegler 2013a, 2013b; Schwegler and Green 2007 and the references therein). Most of the Palenquero lexicon is cognate with local vernacular Spanish (Cásseres Estrada 2005) but Spanish and Palenquero are in general not mutually intelligible. Among the differences with respect to Spanish, Palenquero is not a null-subject language like Spanish (although having null subjects for expletive and existential constructions). Invariant verb roots combine with pre-verbal tense/mood/aspect particles. There is also no gender or number marking on nouns and modifiers; nominal plural is marked (when essential) by the pre-nominal particle *ma*. In contrast to Spanish, Palenquero has no definite articles, no preverbal object clitics and generally exhibits unbounded clause-final negation instead of Spanish immediately pre-verbal NEG. These morphosyntactic differences often render spoken Palenquero impenetrable to Spanish speakers, although individual words can frequently be recognized and simple utterances can sometimes be deciphered (Magerman 2016).

Palenquero speakers and linguists alike agree that Palenquero and Spanish are distinct languages, not part of a dialectal cline; this is confirmed by psycholinguistic research that demonstrates Palenquero-Spanish bilinguals' ability to consistently distinguish the two languages (Lipski 2015c, 2016b, 2016c). At the same time in contemporary spoken Palenquero apparent Spanish intrusions are not uncommon (e.g., verbs "conjugated" for person and number, pre-verbal object clitics, feminine gender agreement on words cognate with Spanish grammatically feminine items), as are language islands such as *te digo* 'I'm telling you.' These patterns, most of which fall into the congruent lexicalization category (Muysken 2000), have been characterized as code-switching, for example, by de Friedemann and Roselli (1983, p. 185), Schwegler (1998, pp. 242–243; 2001, p. 414; 2011a, p. 449), Schwegler and Morton (2003, pp. 121–123) and Morton (2005, p. 162). On the other hand, research Lipski (2015c, 2016b) suggests that Palenquero speakers themselves do not normally acknowledge code-switching and when presented with code-switched patterns, for example, at clause boundaries (alternation in the classification of Muysken 2000), consistently reject them. Inter-sentential language mixing of this kind is also not a common practice. Even Schwegler and Morton (2003, p. 119) acknowledge that "for Palenqueros there is no such thing as code-mixing: in a speaker's view, any stretch of natural speech is ultimately assignable to a given code (Spanish or creole)," although code-switching is the "result of both conscious and unconscious linguistic behaviour."

10. Palenquero Experiment #1: Acknowledgement of Language Mixing

One of the earliest experiments conducted in Palenque employed speeded acceptability judgments + repetition as an indirect measure of awareness of all types of language mixing that had previously been observed in spontaneous speech as well as probing the reaction to unattested combinations

---

[8]　Research in Palenque was conducted under Penn State IRB #34061. All participants gave informed consent and were compensated for their participation.

(details in Lipski 2015c, 2016b). Presenting Palenquero participants with fragments of previously recorded material in order to obtain their views on possible Palenquero-Spanish mixing proved unreliable, even when the natural voices were slightly modified. Identification of the speakers' voices (in a community where virtually everyone knows everyone else) became a distraction and even though the presented examples had been produced spontaneously by fluent Palenquero speakers, some utterances provoked critical comments that could ultimately have led to embarrassment for the original speakers. The use of synthesized voices provides an alternative way of probing for language judgments, with the additional benefit that unattested combinations can be included for presentation.

10.1. Participants

A total of fifty-six Palenquero-Spanish bilinguals participated, forty-seven adults (age range 25–60; age M = 33.4, S. D. = 3.3); twenty-two females and twenty-five males) and nine older adolescents (18–21, age M = 19.1, S. D. = 1.0); five males, four females). All of the adolescents and three of the younger adults had received at least one Palenquero language class as part of the recent language revitalization program but these classes (typically only one day per week) do not involve explicit instruction, metalinguistic commentary, or corrective feedback (Lipski 2012, 2014; Moñino 2012; Schwegler 2011b) and there is no reason to suggest that these participants are more sensitive to language mixing than speakers who have not received a Palenquero class.

10.2. Materials

One hundred five synthesized utterances were prepared using a Spanish female voice from the Cepstral Swift Talker® text-to-speech program (www.cepstral.com), of which thirty were in "canonical" Palenquero and each of the remaining seventy-five contained a single Spanish-like constituent grafted onto a Palenquero utterance or a Palenquero element grafted onto an otherwise Spanish sentence. The sentences were individually modified with PRAAT software (Boersma and Weenink, 1999–2005) to closely approximate Palenquero segmental and suprasegmental phonotactic patterns. The mixed stimuli included twenty-two instances of transitions of Spanish subject pronouns followed by Palenquero (invariant) verbs and twenty-two utterances with transitions of Palenquero subject pronouns followed by Spanish-like verbs conjugated for person and number. These included utterances with a single language transition (e.g., d) as well as a few instances of a subject pronoun from one language embedded in an utterance from the other language (e.g., c). There were twenty-five mixed utterances whose exogamous element at the point of the transition was a lexical noun or verb root. Examples are in (4). Given the high degree of lexical overlap between Palenquero and Spanish (most items of non-African origin), it is necessary to clarify how the constituents of putatively code-switched stimuli are classified. Several intersecting criteria are relevant in determining language classification. First is grammatical function. Palenquero *mi* 'me' in 4c is nominally homophonous to the Spanish disjunctive pronoun *mí*, but in Spanish this pronoun is only used after prepositions, never as a free-standing direct object as in 4c or indirect object as in 4a and 4f. Similarly, the Spanish stressless possessive *mi* 'my' can only occur pre-nominally, unlike the tonic post-nominal Palenquero possessive equivalent *mi* as in 4e and 4f. Suprasegmental differences also separate the two languages; for example, Palenquero possessives and direct and indirect objects typically carry a high tone (Lipski 2010; Correa 2012), not found in Spanish. The same is true of Palenquero clause-final negation in *nu* (4a), and pronouns following prepositions as in *ku bo* 'with you' in 4b. The grammatical frame in which an item is embedded is another indicator of language status. For example, *kasa* 'house' in 4e is a predicative nominative following the Palenquero copula *hwe*; in such a construction the homophonous Spanish *casa* would require a definite article, non-existent in Palenquero. Similarly, Palenquero *mano* 'hand' is homophonous with its Spanish equivalent, but the word is grammatically feminine in Spanish, requiring the feminine determiner *una* rather than the masculine *un* (the only indefinite determiner in Palenquero). Moreover, Spanish would require the preposition *de* 'of' following *mano*, which does not

occur in Palenquero. Ultimately, all test stimuli were corroborated by a skilled Palenquero consultant, a Palenquero language teacher who has worked extensively with the author.

4.　a.　Palenquero stimuli

ané	kelé	pagá	mi	loke	kotá nu
3PL	want	pay	1S	COMP	cost NEG

'They don't want to pay me what it costs.'

　b.

bo	siribí	pa	hende	salí	ku	bo	nu
2S	serve	for	people	leave	with	you	NEG

'You're not fit to go out with people.'

　c.　Spanish subject pronoun + Palenquero verb

bo	a sabé	ke	*ello*	ta	miná	mi
2S	know	COMP	3PL	PROG	watch	1S

'You know that they are looking at me.'

　d.　Palenquero subject pronoun + Spanish verb

ele	‖	no	conseguía	una	mujer
3S		NEG	obtain-IMP-3S	DET	woman

'He didn't find a wife.'

　e.　Spanish sentence with Palenquero complement

la	*primera*	*casa*	*de*	*material*	‖	hwe	kasa	ma	tatá	mi
DET	first	house	of	material		COP	house	PL	father	1S

'The first (cement block) house here was my parents' house.'

　f.　Palenquero sentence with Spanish verb

voy	‖	andi	kombilesa	mi	nda	mi	un	mano	topocho
go.1S		LOC	friend	1S	give	1S	DET	hand	plantain

'I'm going to a friend's house so that he can give me a bunch of [small] plantains.'

10.3. Procedure

The stimuli were randomized and loaded onto a portable computer and participants listed through headphones. For each stimulus participants were asked to quickly indicate whether the utterance was "good" Palenquero (no definition of acceptability was offered), then repeat the utterance exactly as they had heard it.[9] Stimuli and responses were digitally recorded.

10.4. Results

For the all-Palenquero stimuli, the rate of acceptance was 89%. Of the mixed utterances, those with switches following subject pronouns were rejected at the rate of 58.5% for Spanish pronoun + Palenquero verb and 51.0% for Palenquero pronoun + Spanish conjugated verb; switches following lexical items were rejected at the rate of 42.6%. A general linear mixed-effects model was fitted with acceptance/rejection of the stimulus (construed as acknowledgement of language mixing) as response variable and participant and stimulus as random intercepts. A main effect was found for switches after Spanish subject pronouns ($p < 0.0001$, $z = -4.807$, estimate -1.30892, std. error 0.27227) and after Palenquero subject pronouns ($p < 0.04$, $z = -2.132$, estimate -0.73034, std. error 0.34262) but not for lexical roots of nouns and verbs ($p = 0.87$, $z = 0.164$, estimate 0.04087, std. error 0.24941). With respect to the null model, the model with switch-type as fixed effect accounted for significantly more of the variance: χ^2 (3) = 23.44, $p < 0.0001$.

---

[9]　A partial analysis of the repetition portion is found in Lipski (2015b, 2016b).

This experiment demonstrates that some acceptability judgments can be obtained in this speech community, in which explicit metalinguistic commentaries about language mixing are almost never heard. The fact that rejection rates of SUBJECT PRONOUN + VERB were similar in Spanish >> Palenquero and Palenquero >> Spanish configurations suggests that the link between null subjects and rich verb inflection is not a major determinant of acceptability in this case.

11. Palenquero Experiment #2: Close-Shadowing

A multi-purpose close-shadowing task (details in Lipski 2017c) provided data on Palenquero-Spanish bilinguals' implicit processing of intra-sentential language shifts.

11.1. Participants

Twenty-eight adult Palenquero-Spanish bilinguals (age M = 35.3, S. D. = 4.5) and thirty-nine young Palenquero speakers (ages 18–22; age M = 19.4, S. D. = 1.4) participated in the close-shadowing task (in total thirty-nine male and twenty-eight female).[10] Four of the adults and three of the adolescents had participated in the acceptability task, nearly three years previously.

11.2. Materials

Using female Spanish voices from the text-to-speech programs Cepstral Swift Talker® and ISpeech (www.Ispeech.org) and modified in PRAAT, six paragraph-length stimuli were prepared, each approximately one minute in length and containing nine or ten sentences arranged in a coherent sequence. Several of the sentences were modelled on previously recorded naturalistic interviews. Although nominally in Palenquero, the stimuli sentences contained several Spanish incursions, including twelve with intra-sentential language left-to-right transitions (six Spanish >> Palenquero and six Palenquero >> Spanish), including both one- or two-word substitutions and inter-clausal transitions. In six of the switched sentences the other-language portion occurred after a subject pronoun and in the remaining six switched sentences the transition to the other-language occurred between nouns, verbs and adjectives (i.e., lexical categories), thereby allowing for a preliminary glimpse into the shadowing of stimuli with language transitions. Examples are in (5):

5. Palenquero to Spanish

a.
kuandi	*bo*	ǀǀ	*me*	*da*	*sei*	*mango* ǀǀ	*lo*	*recibo*
when	2S		1S	give	six	mango	3S	receive.1

'When you give me six mangos I'll take them.'

b.
si	*bo*	*a*	*kelé*	*500*	*peso*	ǀǀ	*yo*	*te*	*lo*	*vendo*
if	2S		want	500	peso		1S	2S	3S	sell.1S

'If you want 500 pesos [of cassava], I'll sell it to you.'

Spanish to Palenquero

c.
yo	ǀǀ	*ta*	*trabahá*	*ayá*	*i*	*uto*	*ta*	*trabahá*	*akí*
1S		PROG	work	there	and	other	PROG	work	here

'I am working there and someone else is working here.'

d.
yo	*con*	*la*	*edad*	*que*	*yo*	*tengo*	ǀǀ	*i*	*tan*	*nda*	*bo*	*un*	*ekplikasió*
1S	with	DET	age	COMP	1S	have.1S		1SSS	FUT	give	2S	DET	explanation

'At my age I'll give you an explanation.'

---

10 Although in tasks requiring active production of Palenquero, adult native speakers typically out-perform young L2 speakers, in the aggregate there were no significant differences between adults and young speakers with respect to the abilities required for successful shadowing.

11.3. Procedure

The stimuli were loaded onto a portable computer and participants listened through headphones. Stimuli and responses were digitally recorded on separate channels. Participants were instructed to begin repeating the sentences immediately and closely follow the voice until the end of each block. It was suggested that if they lost track they should pause and wait for the beginning of the following utterance. A brief pause occurred after each block. Before beginning the experiment, participants were given a practice run with a block of stimuli not used in the experiment. The fact that some stimuli contained Spanish elements was not disclosed.

11.4. Results

The experiment was not designed specifically to probe for any special status associated with pronouns or other grammatical categories,[11] but Table 3 shows that even with the increased cognitive demands inherent in the close-shadowing task, intra-sentential switches involving a subject pronoun resulted in spontaneous "correction" to monolingual utterances at a higher rate than stimuli with left-to-right switches involving a noun or verb in the other language.

Table 3. Results of close-shadowing: mixed Palenquero-Spanish stimuli.

Transition after	% "Corrected"
PRO	59.2%
lexical	27.4%

A general linear mixed-effects model with unmodified repetition of the switched utterances versus "correction" of the switched elements to achieve a monolingual string as response variable and with participant and stimulus as random intercepts confirms the pronoun-lexical distinction as a significant ($p < 0.03$) fixed effect: $z = -2.221$; estimate -19.847; std. error 8.936. With respect to the null model, the model with switch-type as fixed effect accounted for more of the variance: χ^2 (1) = 4.933, $p < 0.03$.

Close-shadowing is cognitively challenging and the effort expended to process and repeat speech in real time leaves little room for conscious modification. The fact that subject pronoun + verb combinations were spontaneously modified nearly 60% of the time is consistent with the results of the acceptability task, marking this non-occurring combination as inherently dispreferred.

12. Interim Discussion: Palenquero and Spanish

Palenquero and Spanish share nearly identical lexicons but differ along several grammatical dimensions, including the null-subject (Spanish) versus obligatory overt-subject (Palenquero) distinction. Although Palenqueros do not believe that they engage in intra-sentential code-switching and usually reject alternation-type utterances that change languages at clause boundaries, the experimental tasks reveal a sensitivity to varying language-switched configurations. In particular, switches after subject pronouns—not observed in naturalistic Palenquero speech—stand out as producing higher rates of rejection or spontaneous correction.

13. Spanish and Portuguese in Border Regions: Cognate Grammars and Lexicons[12]

Spanish and Portuguese are sibling Ibero-Romance languages whose degree of mutual intelligibility is considerable especially in contact environments. Both Spanish and Portuguese are

---

[11] The experiment was designed to test primarily for processing of Spanish-like feminine gender agreement and person-number verb agreement in otherwise all-Palenquero utterances (Lipski 2017c) but the richness of the responses provide additional insights into Palenquero-Spanish bilingual processing.

[12] Research in Misiones was conducted under Penn State IRB #40019. All participants gave informed consent. The author was advised by respected community members that offering compensation for participation was not appropriate.

null-subject languages with mostly cognate verbal paradigms, although Brazilians in general tend to use more overt subject pronouns (e.g., Barbosa et al. 2005; Duarte 1993, 2000; Kato 2000). In every Spanish-speaking nation bordering on Brazil there are one or more communities located on the border, nearly always paired off with a corresponding community on the Brazilian side. With the exception of Chui, Brazil/Chuy, Uruguay (Couto 2008), Brazilians in border communities do not speak Spanish but many Spanish speakers use L2 varieties of Portuguese when speaking to Brazilians. Spanish speakers' attempts to speak Portuguese frequently result in unintended "Portuñol" mixtures which—given the high degree of overlapping grammatical and lexical patterns—can result in on-the-fly violations of putative code-switching constraints, for example, after subject pronouns and interrogatives (Lipski 2006, 2008, 2009). It is therefore of interest to determine if fluent Spanish-Portuguese bilinguals differ from L2 speakers as regards intra-sentential language switching, that is, whether the combination of significantly cognate lexicons and substantially overlapping morphosyntax results in a "softening" of restrictions documented for typologically more diverse language pairs.

There are two areas in Latin America where Spanish and Portuguese are in extensive bilingual contact. The first is northern Uruguay, where the "Fronterizo" Portuguese varieties have been documented since the 1960's (Ribeiro de Amaral 2008; Behares 2005; Carvalho 2003a, 2003b, 2004a, 2004b, 2006; Douglas 2004; Elizaincín 1976, 1979, 1992; Elizaincín et al. 1987; Hensey 1972, 1982a, 1982b; Kaufmann 2009; Rona 1965; Waltermire 2006). Currently all speakers of these "Uruguay Portuguese dialects" as they are properly characterized also speak Spanish but the Portuguese varieties—which contain liberal admixtures of Spanish—are sociolinguistically stigmatized by such terms as *rompeidiomas* 'language breakers' and speakers increasingly feel inhibited about speaking a dialect of Portuguese felt to be inferior to the educated Brazilian Portuguese heard on television or when visiting Brazil.

A more propitious environment for studying Spanish-Portuguese bilingualism in the absence of sociolinguistic conformist pressures is found in the province of Misiones in extreme north-eastern Argentina, where vernacular Portuguese is spoken natively in most of the rural areas in the eastern half of the province, which borders on Brazil. Misiones Portuguese bears the mark of rural vernacular Portuguese of the neighbouring Brazilian states and bears little resemblance to urban standardized Portuguese (Lipski 2017b). Despite the fact that most residents of eastern Misiones listen almost exclusively to Brazilian Portuguese media, there is no attempt to emulate prestigious Brazilian varieties, such as is occurring in northern Uruguay and there is no sociolinguistic stigma associated with either local Portuguese varieties or the unschooled Spanish spoken by many rural inhabitants. The greatest concentration of bilingual speakers is found along the Uruguay River separating Argentina and Brazil, between the town of El Soberbio and the town of Santa Rita.

Despite the fact that the speech known locally in Misiones as *brasilero* 'Brazilian' is in fact a highly vernacular offshoot of southern Brazilian Portuguese, residents of Misiones often assert that they speak *Portuñol*, a term frequently reinforced in regionalist literature, newspaper articles and printed and on-line tourist information. Objectively, little morphosyntactic or phonological convergence with local Spanish has been found (Lipski 2011a, 2011b, 2015a, 2017b; also, Daviña 2003; Sturza 2005; Sturza and Fernandes 2009), except in the attempts by some Brazilian-born residents to communicate in imperfectly-acquired Spanish. Most bilingual Misiones natives use both Spanish and Portuguese on a regular basis and the widespread "Portuñol" sentiments and absence of sociolinguistic inhibitions open the door to research on language switching.

In order to test the permeability of putative language transition restrictions among Portuguese-Spanish bilinguals in Misiones, Argentina, three experiments were conducted (some results reported in Lipski 2017b, 2018; the analysis of specific code-switching patterns is presented here for the first time). To properly interpret the following experiments, it should be noted that although Portuguese and Spanish share many cognate homographs, there are systematic phonetic differences in nearly all cases, thus leading to unambiguous transitions between languages.

14. Misiones Experiment #1: Translation

14.1. Participants

Fifty participants (ages 18–45; age M = 22.1, S. D. = 5.5); thirty-one female and nineteen male) from El Soberbio, Colonia Alicia and Pozo Azul and surrounding agricultural zones participated in a rapid translation task. All were raised in primarily Portuguese-speaking households and none had lived in Brazil or had any formal instruction in Portuguese.

14.2. Materials

Ninety utterances were created using various text-to-speech programs with female voices in Latin American Spanish and Brazilian Portuguese and modified phonetically in PRAAT and morphosyntactically to approximate local varieties of Portuguese and Spanish (described in detail in Lipski 2017b). Each utterance was followed by a 500 ms. gap and an audible beep. Thirty utterances were entirely in Spanish, thirty were entirely in Portuguese and thirty contained transitions from one language to the other in various configurations (fifteen Portuguese >> Spanish and fifteen Spanish >> Portuguese, mostly involving a single word but also including two each of transitions at clause boundaries). The stimuli were randomized and presented on a laptop computer. Examples are in (6).

6. Spanish to Portuguese

   a. | *dónde* | ‖ | fica | a | casa | do | prefeito |
      |---------|---|------|-----|------|-----|----------|
      | where | | stay | DET | house | of-DET | mayor |

      'Where is the mayor's house?'

   b. | *ellos* | ‖ | misturam | as | línguas | quando | falam |
      |---------|---|----------|-----|---------|--------|-------|
      | 3PL | | mix.3PL | DET | language.PL | when | speak.3PL |

      'I think that they mix languages when they speak.'

   Portuguese to Spanish

   c. | *ninguem* | ‖ | llegó | para | la | fiesta | de | María |
      |-----------|---|-------|------|-----|--------|-----|-------|
      | no one | | arrive.PERF.3S | for | DET | party | of | Maria |

      'No one arrived for Maria's party.'

   d. | *faz* | *muito* | *tempo* | *que* | ‖ | no | hablo | portugués |
      |-------|---------|---------|-------|---|-----|-------|-----------|
      | make.3S | much | time | COMP | | NEG | speak.1S | Portuguese |

      'I haven't spoken Portuguese for a long time.'

   e. | *en* | *la* | *escuela* | *no* | *podemos* | ‖ | falar | brasileiro | com | os | profesores |
      |------|------|-----------|------|-----------|---|-------|------------|-----|-----|------------|
      | in | DET | school | NEG | able.1PL | | talk | Brazilian | with | DET | teachers |

      'In school we can't speak Portuguese with the teachers.'

14.3. Procedure

Participants listened to the stimuli sequentially through headphones; repetition was not permitted. They were told that they would hear some sentences in Spanish and some in Portuguese and were instructed to rapidly translate from the language of the stimulus into the "other" language upon hearing the beep. It was not revealed that some utterances contained mixtures of Spanish and Portuguese. Respondents were timed out if a response was not initiated within two seconds following the beep. Stimuli and responses were digitally recorded.

14.4. Results

Very few mixed translations resulted from the mixed stimuli and none contained monotonic shifts (beginning in one language and continuing in the other). There was a general tendency to translate

mixed utterances into Spanish, perhaps because the participants were aware of the author's interest in the local variety of Portuguese and were therefore in a "Portuguese" mode (e.g., Grosjean). Table 4 gives sample results for the translation of mixed stimuli, with the transition from one language to the other indicated: after subject pronouns (6b,c), after fronted interrogatives (6a), between modal verbs and infinitives (e.g., examples 1 and 6e) and after lexical items such as nouns and (non-auxiliary or modal) verbs.

Table 4. Results of translation task: mixed Spanish~Portuguese stimulus utterances.

Transition Type	% "Corrected" to Monolingual	% Unchanged
PRO + (8)	97.6%	2.4%
Interrog. + (6)	99.1%	0.9%
modal ‖ infinitive (4)	97.5%	2.5%
lexical (8)	92.9%	7.1%

A general linear mixed-effects model with participant as random intercept, retention of the language transition during translation versus "corrected" translation to a monolingual utterance as response variable and a comparison with the null model showed that including transition type as fixed effect accounted for significantly more of the variance: χ^2 (3) = 21.2; $p < 0.0001$. There was a main effect ($p < 0.04$) for a transition to the other language following subject pronouns compared with transitions after lexical items: $z = -2.092$; estimate -1.5241; std. error 0.7286.

15. Misiones Experiment #2: Language Classification

15.1. Participants

Seventy-one Portuguese-Spanish adult bilinguals (forty female, thirty-one male, ages 18–45; age M = 24.2, S. D. = 4.4) from the communities of El Soberbio, Colonia Alicia, Santa Rita, Alba Posse and surrounding agricultural zones participated in the language classification task (details in Lipski 2017b). None had lived in Brazil, received any schooling in Portuguese, or participated in the previous translation task.

15.2. Materials

Seventy-five utterances were created using various text-to-speech programs with female voices (fifteen in Spanish, fifteen in Portuguese and forty-five containing transitions from one language to the other at various points as in (7)). The mixed stimuli included twenty-three Spanish >> Portuguese and twenty-two Portuguese >> Spanish utterances; two utterances in each group contained switches of constituents larger than a single word.[13]

7.   Spanish to Portuguese

    a.   *cuando*   *nosotros*   ‖   falamos   misturamos   as   línguas
        when   1PL   speak.1PL   mix.1PL   DET   language.PL
        'When we speak we mix the languages.'

   Portuguese to Spanish

    b.   *nós*   ‖   siempre   vendemos   los   productos   en   Além
        1PL   always   sell.1PL   DET   product.PL   in   Além
        'We always sell [our] products in Além.'

---

13   Spanish *cuando* 'when' is cognate with Portuguese *quando* but there are small but real phonetic differences that allow for uncontroversial language identification. Spanish *cuando* is realized as [ku̯an.do] and Portuguese *quando* is approximately [ku̯ã.du]. Similarly phonetic differences separate other close cognates./

15.3. Procedure

The stimuli were loaded onto a portable computer and were presented using a PEBL script. Each participant received the stimuli in randomized order. Participants were instructed to classify each of the stimuli either as all-Portuguese by pressing the left shift key (covered by a red dot), all-Spanish by pressing the right shift key (green dot), or mixed by pressing the space bar (blue dot). Screen icons provided visual reminders of the dots, augmented by images of the Argentine flag, the Brazilian flag and (for mixed utterances) the two flags intertwined. The program recorded responses and reaction times.

15.4. Results

Participants correctly classified all-Spanish (93%) and all-Portuguese (77%) utterances at high rates. The lower score for Portuguese stimuli can be attributed to local residents' belief that they speak "Portuñol." The classification results for mixed stimuli are given in Table 5, where it can be seen that language transitions after pronouns were classified as mixed to a greater extent than transitions after nouns and verbs.[14]

Table 5. Classification experiment; results for mixed stimuli (*N* = 71).

Transition Type	% Classified Mixed
PRO + (10)	82.1%
Interrog. + (8)	58.2%
NEG + (6)	80.6%
modal ‖ infinitive (6)	83.6%
lexical (11)	75.7%

A general linear mixed-effects model with response (correct or incorrect) to the language classification task as the response variable, participant as random intercept,[15] and transition-type as fixed effect revealed a main effect (p < 0.0001) for transitions to the other language following subject pronouns compared with lexical items such as nouns, adjectives, and verbs: z = 4.061; estimate 1.2470; std. error 0.3071. A likelihood comparison between the null model showed that the model with transition-type as fixed effect accounted for more of the variance: χ^2 (5) = 506.48; *p* < 0.0001.

16. Misiones Experiment #3: Memory-Loaded Repetition

16.1. Participants

Sixty-seven adult bilingual participants (ages 21–45, age M = 24.3, S. D. = 4.5) from the towns of El Soberbio, Colonia Alicia, Santa Rita and the surrounding rural areas participated in a memory-loaded repetition experiment (details in Lipski 2018). All had participated in the language-classification task but at a different time.

16.2. Materials

Twenty utterances were created using various Spanish and Portuguese text-to-speech programs with female voices, of which eight replicated local vernacular Portuguese and twelve contained one-word Portuguese-Spanish transitions similar to those in (6) and (7) (six Spanish >> Portuguese and six Portuguese >> Spanish). Each stimulus consisted of a test utterance accompanied by a seven-second

---

14 The lower rate of mixed classification for transitions to the other language following interrogative words can be attributed to the considerable phonetic similarity between the cognate Spanish and Portuguese items.

15 Stimulus was not included as a random intercept since it was already known that distinct switch-types evoking widely varying responses were used. Models that included stimulus as a random intercept showed such a large variance and large eigenvalues as to be essentially uninterpretable.

video clip (without sound), taken from popular and locally available cartoon programs (e.g., Loony Tunes, Batman, Superman, Green Lantern, Flash and Spider Man). Each stimulus began with the target utterance (accompanied by the visual image of a listening ear), followed by a cartoon video clip, a ten-second countdown video and finally the image of a speaking mouth.

16.3. Procedure

The stimuli were presented in randomized order on a portable computer using the PsychoPy experiment-building platform (Peirce 2007) and both stimuli and responses were digitally recorded. Participants were asked to retain the stimulus utterance in memory when it was first presented. During the ten-second countdown after the video clip they were to describe the cartoon as accurately possible in the language of their choice. When the image of the mouth appeared, they were to repeat the stimulus utterance exactly as heard. It was not disclosed that some of the stimuli contained nominal Portuguese-Spanish mixtures.

16.4. Results

All-Portuguese stimuli were repeated without changing language (verbatim or with very small within-language modifications) at the rate of 98.8%. The results for mixed stimuli are given in Table 6.

Table 6. Results of memory-loaded repetition experiment (*N* = 67).

Transition Type	% "Corrected" to Monolingual	% Unchanged
PRO (Sp..) + (4)	75.6%	24.4%
Interrog. (Sp..) + (2)	59.5%	40.5%
modal ‖ infinitive (2)	58.6%	41.4%
lexical (4)	3.6%	95.4%

A general linear mixed-effects model was fitted with speaker and stimulus as random intercepts and retention of language switch versus "correction" to monolingual status as response variable. There was a main effect ($p < 0.006$) for transitions to the other language following subject pronouns compared with language-changes after lexical items ($z = 2.778$; estimate 3.1645; std. error 1.1393). A likelihood comparison between the null model revealed that the model with transition type as fixed effect accounted for more of the variance: χ^2 (2) = 6.06; $p < 0.05$.

17. Interim Discussion: Spanish and Portuguese

Misiones Portuguese-Spanish bilinguals do not normally engage in code-switching, "Portuñol" designations notwithstanding. The three experiments conducted in these speech communities reveal not only the ability to systematically differentiate the two closely related languages but also to exhibit sensitivity to specific language-mixing patterns. Even in the absence of substantial morphosyntactic differences, PRONOUN + VERB transitions stand out as exemplars of less preferred bilingual patterns.

18. General Discussion

The research reported here, conducted at various times and places and including several approaches, demonstrates that interactive studies can be carried out in speech communities characterized by little or no literacy, the use of non-canonical varieties and highly regionalized minority languages and no familiarity with academically-oriented activities. The same studies show that it is possible to obtain replicable reactions to code-switching configurations even in communities where code-switching is not explicitly acknowledged as well as with individuals who do not routinely engage in intra-sentential code-switching.

For purposes of illustration, a single configuration has been highlighted, namely the relative desirability of transitions to the other language between subject pronouns and verbs as compared

to transitions following lexical content items such as verbs and nouns. The data collected in three substantially different bilingual environments partially converge in the case of language transitions between subject pronouns and verbs, with an apparently inhibitory residue remaining even in those instances (e.g., Spanish-Portuguese and Quichua-Media Lengua) in which no collateral morphosyntactic differences might be invoked, and/or where there is substantial lexical and basic phrase-structure overlap (Palenquero-Spanish, Spanish-Portuguese). Given the motley collection of languages and experimental protocols, no firm conclusions as to a "special" status for PRONOUN + VERB language switches are being put forth here but some observations will be offered, expanding on the preliminary thoughts found in Lipski (2016a).

One possible reason for the scarcity of Spanish-English switches between subject pronouns and verbs is related to syntactic structure: overt subjects are obligatory in English, while Spanish is a null-subject language in which overt subjects have been argued to occupy a topicalized position on the left periphery (e.g., Grinstead 2004; Ordóñez 1997; Ordóñez and Treviño 1999). Similar considerations might obtain between Spanish and Palenquero (which also requires overt subjects) but not between Spanish and Portuguese (another null-subject language) or between Quichua and Media Lengua (both null-subject languages).[16] And even in Palenquero, subject pronouns (with the exception of *i* 'I')[17] are "strong" in the sense of Cardinaletti and Starke (1999): they have the semantics of a full noun phrase, can be coordinated and modified, cannot be phonologically reduced, receive word stress and can be prosodically stressed, which is also consistent with a left-periphery location. Jake (1994) classifies overt pronouns in null-subject languages as discourse-thematic (content) morphemes; in this classification combinations of an embedded language pronoun in a matrix language constituent should not be disproportionately disfavored, although the data collected for the present project suggest otherwise. Consequently, the null- versus overt-subject dichotomy, while possibly sufficient in the case of Spanish-English switching, is not a necessary condition for the degraded status of PRONOUN + VERB switches in the languages studied here.

A more promising line of approach focuses on semantic factors, especially the inherently anaphoric nature of pronouns, which are implicitly or explicitly linked to an antecedent. In the experiments conducted as part of the present project, participants generally rejected language switches after subject pronouns at higher rates when processing in classification or acceptability tasks than when called upon to produce such combinations in repetition or shadowing tasks. While a certain amount of such verbatim repetition may be attributed to participants' simply "following instructions" (contrary to the implicit hopes of experimenters who employ such techniques) or to entrenched combinations (e.g., "big words" in the sense of Dąbrowska 2000, 2004), the asymmetry is also suggestive of processing being more efficient when the pronoun-antecedent link and the subject-verb link remain in the same language. Switching languages between semantically linked elements potentially impinges on "robust information transfer" (Jaeger 2013) as well as on the comprehension procedure proposed in Sperber and Wilson (2002, p. 18): "Follow a path of least effort in computing cognitive effects [. . .] Stop when your expectations of relevance are satisfied."

Similar considerations may obtain in the case of switches of interrogative words, which are syntactically and semantically linked to a gap in the same utterance. Cross-linguistic research points to a processing cost for filler-gap dependencies such as those represented by interrogative

---

16   Anecdotally, MacSwan (2000, p. 50) reports that a Catalan-Spanish-Greek trilingual speaker found Catalan-Spanish and Spanish-Catalan switches between subject pronoun and verb to be "relatively well-formed" although similar switches involving Greek were not accepted. All three are null-subject languages, with Spanish and Catalan sharing cognate pronouns. Similarly, in a transcription of Portuguese-Spanish language mixing on the Uruguay-Brazil border, Ribeiro de Amaral (2008, p. 143) gives the sentence ELE *no quiere venirse* [. . .] 'he doesn't want to come', with a switch between the Portuguese pronoun *ele* 'he' and the Spanish-language predicate. The issue of PRONOUN + VERB switches in these language dyads needs to be studied in greater detail.

17   Palenquero at times employs atonic personal pronouns as subject clitics, doubled with free-standing pronouns (Schwegler 1993, 2002), which may indicate that Palenquero overt subjects also occupy a position on the left periphery.

elements (e.g., Aoshima et al. 2004; Felser et al. 2003; Fiebach et al. 2002; Hawkins 1999; Stepanov and Stateva 2015; Sussman and Sedivy 2003, inter alia), which is consistent with the observed disfavoring of language switches between the filler WH-element and the language in which the gap is embedded. The data collected to date are not sufficient to fully explore the possible correlation between semantic and syntactic linkages and intra-sentential code-switching in the case of pronouns and interrogatives but the recurring cross-linguistic tendencies are consistent with factors other than syntactic differences. The techniques outlined in the present study can complement corpus- and observation-based approaches with an eye toward separating quasi-universal from language-specific code-switching configurations.

The preceding sections document the ongoing search for recurring bilingual patterns by expanding the base of languages, speech communities and research methodologies. Experimental data from less commonly-studied languages and dialects, obtained in field settings in communities with scant literacy and written tradition, can help refine and supplement laboratory- and corpus-based findings, which to date represent only a small subset of the world's languages (e.g., Jaeger and Norcliffe 2009; Norcliffe and Jaeger 2016) and largely represent literate, middle-class, Western industrialized societies (Henrich et al. 2010). The projects outlined in the present essay represent an attempt to keep widening the code-switching research perimeter.

References

Aaron, Jessi Elana. 2004. So respetamos una tradición del uno al otro. *So* and *entonces* in New Mexican bilingual discourse. *Spanish in Context* 1: 161–79. [CrossRef]

Anderson, Tyler Kimball. 2006. Spanish-English Bilinguals' Attitudes toward Code-Switching: Proficiency, Grammaticality and Familiarity. Ph.D. dissertation, The Pennsylvania State University, State College, PA, USA, May 19.

Anderson, Tyler Kimball, and Almeida Jacqueline Toribio. 2007. Attitudes towards lexical borrowing and intra-sentential code-switching among Spanish-English bilinguals. *Spanish in Context* 4: 217–40. [CrossRef]

Aoshima, Sachiko, Colin Phillips, and Amy Weinberg. 2004. Processing filler-gap dependencies in a head-final language. *Journal of Memory and Language* 51: 23–54. [CrossRef]

Azuma, Shoji, and Richard P. Meier. 1997. Open class and closed class: Sentence-imitation experiments on intrasential code-switching. *Applied Psycholinguistics* 18: 257–76. [CrossRef]

Bader, Markus, and Michael Meng. 1999. Subject-object ambiguities in German embedded clauses: An across-the-board comparison. *Journal of Psycholinguistic Research* 28: 121–43. [CrossRef]

Badiola, Lucia, Rodrigo Delgado, Ariane Sande, and Sara Stefanich. 2017. Code-switching attitudes and their effects on acceptability judgment tasks. *Linguistic Approaches to Bilingualism* 8: 5–24. [CrossRef]

Bailly, Gérard. 2002. Close shadowing in natural versus synthetic speech. *International Journal of Speech Technology* 6: 11–19. [CrossRef]

Barbosa, Pilar, Mary Kato, and Eugênia Duarte. 2005. Null subjects in European and Brazilian Portuguese. *Journal of Portuguese Linguistics* 4: 11–52. [CrossRef]

Bates, Douglas, Martin Maechler, Ben Bolker, and Steven Walker. 2014. lme4: Linear Mixed-Effects Models Using Eigen and S4. R Package Version 1.1-12. Available online: http://CRAN.R-project.org/package=lme4 (accessed on 11 September 2018).

Behares, Luis Ernesto. 2005. Uruguai/Brasil: Contribuição ao estudo da heterogeneidade lingüístico-cultural da fronteira sul. *Diálogos Possíveis* 2: 29–45.

Bullock, Barbara E., and Almeida Jacqueline Toribio, eds. 2009. *The Cambridge Handbook of Linguistic Code-Switching*. Cambridge: Cambridge University Press.

Cardinaletti, Anna, and Michal Starke. 1999. The typology of structural deficiency: A case study of the three grammatical classes. In *Clitics in the Languages of Europe*. Edited by Henk van Riemsdijk. Berlin: Mouton de Gruyter, pp. 145–234.

Carvalho, Ana Maria. 2003a. Rumo a uma definição do Português Uruguaio. *Revista Internacional de Lingüística Iberoamericana* 1: 125–49.

Carvalho, Ana Maria. 2003b. The sociolinguistic distribution of (lh) in Uruguayan Portuguese: A case of dialect diffusion. In *Linguistic Theory and Language Development in Hispanic Languages*. Edited by Silvina Montrul and Francisco Ordóñez. Somereville: Cascadilla Press, pp. 30–44.

Carvalho, Ana Maria. 2004a. I speak like the guys on TV: Palatalization and the urbanization of Uruguayan Portuguese. *Language Variation and Change* 16: 127–51. [CrossRef]

Carvalho, Ana Maria. 2004b. Diagnóstico sociolingüístico de comunidades escolares fronterizas en el norte de Uruguay. In *Portugués del Uruguay y Educación Bilingüe*. Edited by Brian Nicolás, Claudia Brovetto and Javier Geymonat. Montevideo: Administración Nacional de Educación Pública, pp. 44–96.

Carvalho, Ana Maria. 2006. Políticas lingüísticas de séculos passados nos dias de hoje: O dilema sobre a educação bilíngüe no norte do Uruguai. *Language Problems and Language Planning* 30: 149–71. [CrossRef]

Cásseres Estrada, Solmery. 2005. *Diccionario Lengua afro Palenquero-Español*. Cartagena de Indias: Ediciones Pluma de Mompox.

Clyne, Michael. 1972. Perception of code-switching by bilinguals: An experiment. *ITL: Review of Applied Linguistics* 16: 45–48. [CrossRef]

Correa, José Alejandro. 2012. La entonación del criollo palenquero y del kateyano de San Basilio de Palenque (Colombia). In *Palenque Colombia: Oralidad, Identidad y Resistencia*. Edited by Graciela Maglia and Armin Schwegler. Bogotá: Pontificia Universidad Javeriana, pp. 31–56.

Couto, Hildo. 2008. Chuí/Chuy: Uma comunidade de fala, duas comunidades de língua. In *Español y Portugués: Um (velho) Novo Mundo de Fronteiras e Contatos*, 1st ed. Edited by Jorge Espiga and Adolfo Elizaincín. Pelotas: EDUCAT, pp. 165–208.

Dąbrowska, Ewa. 2000. From formula to scheme: The acquisition of English questions. *Linguistics* 11: 83–102.

Dąbrowska, Ewa. 2004. *Language, Mind and Brain*. Washington, DC: Georgetown University Press.

Daviña, Liliana Silvia. 2003. Fronteras Discursivas en una Región Plurilingüe: Español y Portugués en Misiones. Masters' thesis, Universidad de Buenos Aires, Buenos Aires, Argentina.

de Friedemann, Nina S., and Carlos Patiño Roselli. 1983. *Lengua y Sociedad en el Palenque de San Basilio*. Bogotá: Instituto Caro y Cuervo.

Dick, Frederic, Elizabeth Bates, Beverly Wulfeck, Jennifer Aydelott Utman, Nina Dronkers, and Morton Ann Gernsbacher. 2001. Language deficits, localization and grammar: Evidence for a distributive model of language breakdown in aphasic patients and neurologically intact individuals. *Psychological Review* 108: 759–88. [CrossRef] [PubMed]

Doron, Edit. 1983. On a formal model of code-switching. *Texas Linguistic Forum* 22: 35–59.

Douglas, Kendra Lynne. 2004. Uruguayan Portuguese in Artigas: Tri-Dimensionality of Transitional Local Varieties in Contact with Spanish and Portuguese Standards. Ph.D. dissertation, University of Wisconsin, Madison, WI, USA.

Duarte, Maria Eugênia Lamoglia. 1993. Do pronome nulo ao pronome pleno: A trajetória do sujeito no português do Brasil. In *Português Brasileiro: Uma Viagem Diacrônica. Homenagem a Fernando Tarallo*. Edited by Roberts Ian and Mary Aizawa Kato. Campinas: Editora da UNICAMP, pp. 107–28.

Duarte, Maria Eugênia Lamoglia. 2000. The loss of the 'Avoid Pronoun'principle in Brazilian Portuguese. In *Brazilian Portuguese and the Null Subject Parameter*. Edited by Mary Aizawa Kato and Esmeralda Vailati Negrão. Frankfurt: Vervuert-Iberoamericana, pp. 17–36.

Elizaincín, Adolfo. 1976. The emergence of bilingual dialects on the Brazilian-Uruguayan border. *International Journal of the Sociology of Language* 9: 123–34.

Elizaincín, Adolfo. 1979. *Algunas Precisiones Sobre los Dialectos Portugueses en el Uruguay*. Montevideo: Universidad de la República.

Elizaincín, Adolfo. 1992. *Dialectos en Contacto: Español y Portugués en España y América*. Montevideo: Arca.

Elizaincín, Adolfo, Luis Behares, and Graciela Barrios. 1987. *Nos Falemo Brasilero*. Montevideo: Editorial Amesur.

Felser, Claudia, Harald Clahsen, and Thomas F. Münte. 2003. Storage and integration in the processing of filler-gap dependencies: An ERP study of topicalization and wh-movement in German. *Brain and Language* 87: 345–54. [CrossRef]

Felser, Claudia, Mikako Sato, and Nicholas Bertenshaw. 2009. The on-line application of Binding Principle A in English as a second language. *Bilingualism: Language and Cognition* 12: 485–502. [CrossRef]

Fiebach, Christian J., Matthias Schlesewsky, and Angela D. Friederici. 2002. Separating syntactic memory costs and syntactic integration costs during parsing: The processing of German WH-questions. *Journal of Memory and Language* 47: 250–72. [CrossRef]

Fox, John, and Sanford Weisberg. 2011. *An {R} Companion to Applied Regression*, 2nd ed. Thousand Oaks: Sage. Available online: http://socserv.socsci.mcmaster.ca/jfox/Books/Companion (accessed on 11 September 2018).

Gómez Rendón, Jorge. 2005. La media lengua de Imbabura. In *Encuentros y Conflictos: Bilingüismo y Contacto de Lenguas en el Mundo Andino*. Edited by Olbertz Hella and Pieter Muysken. Frankfurt and Madrid: Vervuert/Iberoamericana, pp. 39–57.

Gómez Rendón, Jorge. 2008. *Mestizaje Lingüístico en los Andes: Génesis y Estructura de una Lengua Mixta*. Quito: Abya-Yala.

Gordon, Peter C., Randall Hendrick, and William H. Levine. 2002. Memory-load interference in syntactic processing. *Psychological Science* 13: 325–430. [CrossRef] [PubMed]

Grinstead, John. 2004. Subjects and interface delay in child Spanish and Catalan. *Language* 80: 40–72. [CrossRef]

Grosjean, François. The Bilingual's Language Modes. In *One Mind, Two Languages: Bilingual Language Processing*. Edited by Janet Nicol. Oxford: Blackwell, pp. 1–25.

Gullberg, Marianne, Peter Indefrey, and Pieter Muysken. 2009. Research techniques for the study of code-switching. In *The Cambridge Handbook of Linguistic Code-Switching*. Edited by Barbara E. Bullock and Almeida Jacqueline Ed Toribio. Cambridge: Cambridge University Press, pp. 21–39.

Gumperz, John J. 1977. The sociolinguistic significance of conversational code-switching. *RELC Journal* 8: 1–34. [CrossRef]

Haugen, Einar. 1950. The analysis of linguistic borrowing. *Language* 26: 210–31. [CrossRef]

Hawkins, John A. 1999. Processing complexity and filler-gap dependencies across grammars. *Language* 75: 244–85. [CrossRef]

Henrich, Joseph, Steven J. Heine, and Ara Norenzayan. 2010. The weirdest people in the world? *Behavioral and Brain Sciences* 33: 61–135. [CrossRef] [PubMed]

Hensey, Fritz. 1972. *The Sociolinguistics of the Brazilian-Portuguese Border.*. La Haya: Mouton.

Hensey, Fritz G. 1982a. Uruguayan *fronterizo*: A linguistic sampler. *Word* 33: 93–198. [CrossRef]

Hensey, Fritz G. 1982b. Spanish, Portuguese and Fronteriço: Languages in contact in northern Uruguay. *International Journal of the Sociology of Language* 34: 9–23.

Jaeger, T. Florian. 2013. Production preferences cannot be understood without reference to communication. *Frontiers in Psychology* 4: 230. [CrossRef] [PubMed]

Jaeger, T. Florian, and Elisabeth J. Norcliffe. 2009. The cross-linguistic study of sentence production. *Language and Linguistics Compass* 3: 866–87. [CrossRef]

Jake, Janice L. 1994. Intrasentential code-switching and pronouns: On the categorical status of functional elements. *Linguistics* 32: 271–98. [CrossRef]

Joshi, Aravind K. 1985. Processing of sentences with intrasentential code switching. In *Natural Language Parsing: Psychological, Computational and Theoretical Perspectives*. Edited by David R. Dowty, Lauri Karttunen and Arnold M. Zwicky. Cambridge: Cambridge University Press, pp. 190–205.

Karttunen, Frances, and James Lockhart. 1976. *Nahuatl in the Middle Years*. Berkeley: University of California Press.

Kato, Mary Aizawa. 2000. The partial pro-drop nature and the restricted versus order in Brazilian Portuguese. In *Brazilian Portuguese and the Null Subject Parameter*. Edited by Mary Aizawa Kato and Esmeralda Vailati Negrão. Frankfurt: Vervuert-Iberoamericana, pp. 207–40.

Kaufmann, Göz. 2009. *Falar espanhol* or *hablar portugués*: Attitudes and linguistic behavior on the Brazilian-Uruguayan and Brazilian-Argentinian borders. *Romanistisches Jahrbuch* 60: 276–317.

Koronkiewicz, Bryan. 2014. Pronoun Categorization: Evidence from Spanish/English Code-Switching. Ph.D. dissertation, University of Illinois at Chicago, Chicago, IL, USA, October 28.

Kuznetsova, Alexandra, Per Bruun Brockhoff, and Rune Haubo Bojesen Christensen. 2014. lmerTest: Tests for Random and Fixed Effects for Linear Mixed Effect Models (lmer Objects of lme4 package). R Package Version 2.0-6. Available online: http://CRAN.R-project.org/package=lmerTest (accessed on 11 September 2018).

Lastra, Yolanda. 1968. *Cochabamba Quechua Syntax*. The Hague: Mouton.

Lipski, John M. 2005. Code-switching or Borrowing? No sé *so* no puedo decir, *you know*. In *Selected Proceedings of the Second Workshop on Spanish Sociolinguistics*. Edited by John Lipski, Sayahi Lotfi and Maurice Westmoreland. Somerville: Cascadilla Press, pp. 1–15.

Lipski, John. 2006. Too close for comfort? the genesis of "portuñol/portunhol". In *Selected Proceedings of the 8th Hispanic Linguistics Symposium*. Edited by Ana Maria Carvalho, Timothy Face and Carol KLEE. Somerville: Cascadilla Press, pp. 1–22.

Lipski, John M. 2008. Searching for the origins of Uruguayan *Fronterizo* dialects: Radical code-mixing as "fluent dysfluency". *Journal of Portuguese Linguistics* 8: 5–46. [CrossRef]

Lipski, John M. 2009. "Fluent dysfluency" as congruent lexicalization: A special case of radical code-mixing. *Journal of Language Contact* 2: 1–39. [CrossRef]

Lipski, John. 2010. Pitch polarity in Palenquero: A possible locus of H tone. In *Linguistic studies in Romance languages*. Edited by Sonia Colina. Amsterdam: John Benjamins, pp. 111–27.

Lipski, John. 2011a. Um caso de contato de fronteira: O sudoeste. In *Os Contatos Linguísticos no Brasil*. Edited by Mello Heliana, Cléo Vilson Altenhofen and Tommaso Raso. Belo Horizonte: Editora UFMG, pp. 349–68.

Lipski, John M. 2011b. Encontros lingüísticos fronteiriços. *Ideação* 13: 83–100. Available online: http://e-revista.unioeste.br/index.php/ideacao/article/viewArticle/6109 (accessed on 11 September 2018).

Lipski, John M. 2012. The "new" Palenquero: Revitalization and re-creolization. In *Varieties of Colombian Spanish*. Edited by Richard J. File-Muriel and Rafael Orozco. Frankfurt and Madrid: Vervuert, pp. 21–41.

Lipski, John M. 2014. La lengua palenquera juvenil: Contacto y conflicto de estructuras gramaticales. *UniverSOS* 11: 191–207.

Lipski, John M. 2015a. Portuguese/portuñol in Misiones, Argentina: Another Fronterizo? In *New Perspectives on Hispanic Contact Linguistics*. Edited by Sandro Sessarego and Melvin González-Rivera. Frankfurt and Madrid: Vervuert/Iberoamericana, pp. 253–81.

Lipski, John M. 2015b. From 'more' to 'less': Spanish, Palenquero (Afro-Colombian creole) and gender agreement. *Language, Cognition and Neuroscience* 30: 1144–55. [CrossRef]

Lipski, John M. 2015c. How many "grammars" per "language"? mapping the psycholinguistic boundaries between Spanish and Palenquero. In *Romance Linguistics 2012: Papers from the 42nd Linguistic Symposium on Romance Languages*. Edited by Jason Smith and Tabea Ihsane. Amsterdam: John Benjamins, pp. 43–60.

Lipski, John M. 2016a. Language switching constraints: More than syntax? Data from Media Lengua. *Bilingualism: Language and Cognition* 20: 722–46. [CrossRef]

Lipski, John M. 2016b. Palenquero and Spanish: A first psycholinguistic exploration. *Journal of Pidgin and Creole Languages* 31: 42–81. [CrossRef]

Lipski, John M. 2016c. Palenquero and Spanish: What's in the mix? In *The Iberian Challenge: Creoles beyond the Plantation Setting*. Edited by Armin Schwegler, John H. McWhorter and Liane Ströbel. Frankfurt & Madrid: Vervuert/Iberoamericana, pp. 153–80.

Lipski, John M. 2017a. Ecuadoran Media Lengua: More than a "half"-language? *International Journal of American Linguistics* 82: 233–62. [CrossRef]

Lipski, John M. 2017b. Portuguese or Portuñol? Language contact in Misiones, Argentina. *Journal of Linguistic Geography* 4: 47–64. [CrossRef]

Lipski, John M. 2017c. Can agreement be suppressed in second-language acquisition? Data from the Palenquero-Spanish interface. *Second Language Research* 34: 309–341. [CrossRef]

Lipski, John M. 2018. La interfaz portugués-castellano en Misiones, Argentina: Zona de prueba para la alternancia de lenguas. *Estudios Filológicos* 60: 169–90. [CrossRef]

MacSwan, Jeff. 2000. The architecture of the bilingual language faculty: Evidence from intrasentential code switching. *Bilingualism: Language and Cognition* 3: 37–54. [CrossRef]

Magerman, Daniel. 2016. Palenque and Its Neighbors: Languages and Attitudes. Ph.D. thesis, Pennsylvania State University, State College, PA, USA.

Marslen-Wilson, William. 1973. Speech Shadowing and Speech Perception. Ph.D. dissertation, Massachusetts Institute of Technology, Cambridge, MA, USA.

Marslen-Wilson, William D. 1985. Speech shadowing and speech comprehension. *Speech Communication* 4: 55–73. [CrossRef]

McDonald, Janet L. 2006. Beyond the critical period: Processing-based explanations for poor grammaticality judgment performance by late second-language learners. *Journal of Memory and Language* 55: 381–491. [CrossRef]

Meijer, Paul J. A., and Jean E. Fox Tree. 2003. Building syntactic structures in speaking: A bilingual exploration. *Experimental Psychology* 50: 184–95. [CrossRef] [PubMed]

Miller, George A., and Stephen Isard. 1963. Some perceptual consequences of linguistic rules. *Journal of Verbal Learning and Verbal Behavior* 2: 217–28. [CrossRef]

Mitterer, Holger, and Mirjam Ernestus. 2008. The link between speech perception and production is phonological and abstract: Evidence from the shadowing task. *Cognition* 109: 168–73. [CrossRef] [PubMed]

Moñino, Yves. 2012. Pasado, presente y futuro de la lengua de Palenque. In *Palenque Colombia: Oralidad, Identidad y Resistencia*. Edited by Maglia Graciela, Armin Schwegler, José Alejandro Correa, Ludmila Ferrari, Aline Helg, Yves Moñino and María Cristina Navarrete. Bogotá: Pontificia Universidad Javeriana, pp. 221–55.

Morton, Thomas Barry. 2005. Sociolinguistic Variation and Language Change in El Palenque de San Basilio (Colombia). Ph.D. dissertation, University of Pennsylvania, Philadelphia, PA, USA.

Mueller, Shane T., and Brian Piper. 2014. The Psychology Experiment Building Language (PEBL) Test Battery. *Journal of Neuroscience Methods* 222: 250–59. [CrossRef] [PubMed]

Müller, Andrea. 2011. La Media Lengua en Comunidades Semi-Rurales del Ecuador: Uso y Significado Social de una Lengua Mixta Bilingüe. Bachelor's thesis, University of Zürich, Zürich, Switzerland.

Muysken, Pieter C. 1979. La mezcla de quechua y castellano: El caso de la "media lengua" en el Ecuadopr. *Lexis* 3: 41–56.

Muysken, Pieter C. 1981. Halfway between Quechua and Spanish: The case for relexification. In *Theoretical Orientations in Creole Studies*. Edited by Albert Valdman and Arnold R. Highfield. New York: Academic Press, pp. 52–78.

Muysken, Pieter. 1988. Media Lengua and linguistic theory. *Canadian Journal of Linguistics* 33: 409–22. [CrossRef]

Muysken, Pieter. 1997. Media Lengua. In *Contact Languages: A Wider Perspective*. Edited by Sarah Grey Thomason. Amsterdam and Philadelphia: John Benjamins, pp. 365–426.

Muysken, Pieter. 2000. *Bilingual Speech: A Typology of Code-Mixing*. Cambridge: Cambridge University Press.

Muysken, Pieter. 2012. Bilingual and multilingual language use: Knowledge, comprehension and production. In *The Handbook of Bilingualism and Multilingualism*, 2nd ed. Edited by William C. Ritchie and Tej K. Bhatia. New York: Blackwell, pp. 193–215.

Myers-Scotton, Carol. 1997. *Dueling Languages: Grammatical Structure in Codeswitching*, 2nd ed. Oxford and New York: Oxford University Press.

Norcliffe, Elisabeth, and T. Florian Jaeger. 2016. Predicting head-marking variability in Yucatec Maya relative clause production. *Language and Cognition* 8: 167–205. [CrossRef]

Nortier, Jacomine, and Henriette Schatz. 1992. From one-word switch to loan: A comparison between five language pairs. *Multilingua* 11: 173–94. [CrossRef]

Ordóñez, Francisco. 1997. Word Order and Clause Structure in Spanish and Other Romance Languages. Ph.D. dissertation, CUNY, New York, NY, USA.

Ordóñez, Francisco, and Esthela Treviño. 1999. Left dislocated subjects and the pro-drop parameter: A case study of Spanish. *Lingua* 107: 39–68. [CrossRef]

Peirce, Jonathan W. 2007. PsychoPy—Psychophysics software in Python. *Journal of Neuroscience Methods* 162: 8–13. [CrossRef] [PubMed]

Prince, Elle F., and Susan Pintzuk. 2000. Bilingual code-switching and the open/closed class distinction. *University of Pennsylvania Working Papers in Linguistics (PWPL)* 6: 237–57. First Published in 1983.

Ribeiro de Amaral, Tatiana. 2008. Una Comunidad de Habla, dos Comunidades de Lengua: La Alternancia de Códigos Como Signo de Identidad en la Frontera Brasileño-Uruguaya. Ph.D. dissertation, Universidad Autónoma de Madrid, Madrid, Spain, September.

Rona, José Pedro. 1965. *El Dialecto "Fronterizo" del Norte del Uruguay*. Montevideo: Adolfo Linardi.

Schwegler, Armin. 1993. Subject pronouns and person/number in Palenquero. In *Atlantic Meets Pacific: A Global View of Pidginization and Creolization*. Edited by Francis Byrne and John Holm. Amsterdam and Philadelphia: John Benjamins, pp. 145–61.

Schwegler, Armin. 1998. El palenquero. In *América Negra: Panorámica Actual de los Estudios Lingüísticos Sobre Variedades Hispanas, Portuguesas y Criollas*. Edited by Matthias Perl and Armin Schwegler. Frankfurt and Madrid: Vervuert Iberoamericana, pp. 219–91.

Schwegler, Armin. 2001. The myth of decreolization: The anomalous case of Palenquero. In *Degrees of Restructuring in Creole Languages*. Edited by Ingrid Neumann-Holzschuh and Edgar Werner Schneider. Amsterdam and Philadelphia: John Benjamins, pp. 409–36.

Schwegler, Armin. 2002. On the (African) origins of Palenquero subject pronouns. *Diachronica* 19: 273–332. [CrossRef]

Schwegler, Armin. 2011a. Palenque: Colombia: Multilingualism in an extraordinary social and historical context. In *The Handbook of Hispanic Sociolinguistics*. Edited by Manuel Díaz-Campos. Malden: Blackwell/Wiley, pp. 446–72.

Schwegler, Armin. 2011b. On the extraordinary revival of a creole: Palenquero (Colombia). In *Endangered Languages—Voices and Images*. Edited by Marleen Haboud and Nicholas Ostler. Bath: Foundation for Endangered Languages, pp. 153–65.

Schwegler, Armin. 2013a. Palenquero. In *The Atlas and Survey of Pidgin and Creole Language Structures, vol. II: Portuguese-Based, Spanish-Based and French-Based Languages*. Edited by Susanne Maria Michaelis, Philippe Maurer, Martin Haspelmath and Magnus Huber. Oxford: Oxford University Press, pp. 182–92.

Schwegler, Armin. 2013b. Palenquero structure data set. In *The Atlas of Pidgin and Creole Language Structures Online*. Edited by Susanne Michaelis, Philippe Maurer, Martin Haspelmath and Magnus Huber. Munich: Max Planck Digital Library, chp. 28. Available online: http://apics-online.info/contributions/48 (accessed on 11 September 2018).

Schwegler, Armin, and Kate Green. 2007. Palenquero (creole Spanish). In *Comparative Creole Syntax: Parallel Outlines of 18 Creole Grammars*. Edited by John Holm and Peter L. Patrick. London: Battlebridge, pp. 273–306.

Schwegler, Armin, and Thomas Morton. 2003. Vernacular Spanish in a microcosm: *Kateyano* in El Palenque de San Basilio (Colombia). *Revista Internacional de Lingüística Iberoamericana* 1: 97–159.

Shappeck, Marco. 2011. Quichua-Spanish language contact in Salcedo, Ecuador: Revisiting Media Lengua syncretic language practices. Ph.D. dissertation, University of Illinois Urbana-Champaign, Champaign, IL, USA.

Speed, Laura, Ewelina Wnuk, and Asifa Majid. 2018. Studying psycholinguistics out of the lab. In *Research Methods in Psycholinguistics and the Neurobiology of Language: A Practical Guide*. Edited by Annette M.B. de Groot and Peter Hagoort. New York: Wiley-Blackwell, pp. 190–207.

Sperber, Dan, and Deirdre Wilson. 2002. Pragmatics, modularity and mind-reading. *Mind and Language* 17: 3–23. [CrossRef]

Stepanov, Artur, and Penka Stateva. 2015. Cross-linguistic evidence for memory storage costs in filler-gap dependencies with wh-adjuncts. *Frontiers in Psychology* 6: 1301. [CrossRef] [PubMed]

Stewart, Jesse. 2011. A Brief Descriptive Grammar of Pijal Media Lengua and an Acoustic Vowel Space Analysis of Pijal Media Lengua and Imbabura Quichua. Master's thesis, University of Manitoba, Winnipeg, MB, Canada.

Stewart, Jesse. 2013. *Cuentos y Tradiciones de Pijal: Relatos en Media Lengua*. North Charleston: CreateSpace.

Stewart, Jesse. 2015a. Production and Perception of Stop Consonants in Spanish, Quichua and Media Lengua. Ph.D. dissertation, University of Manitoba, Winnipeg, MB, Canada.

Stewart, Jesse. 2015b. Intonation patterns in Pijal Media Lengua. *Journal of Language Contact* 8: 223–62. [CrossRef]

Sturza, Eliana Rosa. 2005. Línguas de fronteira: O desconhecido território das práticas lingüísticas nas fronteiras. *Ciência e Cultura* 57: 47–50.

Sturza, Eliana, and Ivani C. Fernandes. 2009. A fronteira como novo espaço de representação do espanhol no Brasil. *Revista Signo & Seña* 20: 209–27.

Sussman, Rachel Shirley, and Julie Sedivy. 2003. The time-course of processing syntactic dependencies: Evidence from eye movements. *Language and Cognitive Processes* 18: 143–63. [CrossRef]

Thomason, Sarah G. 1999. Speakers' choices in language change. *Studies in the Language Sciences* 29: 19–43.

Thomason, Sarah G., and Daniel L. Everett. 2005. Pronoun borrowing. In *Proceedings of the Twenty-Seventh Annual Meeting of the Berkeley Linguistics Society*. Edited by Charles Chang, Michael J. Houser, Yuni Kim, David Mortensen, Mischa Park-Doob and Maziar Toosarvandani. Berkeley: UC Linguistics Department, vol. 27, pp. 301–15.

Timm, Lenora A. 1975. Spanish-English code-switching: El porque y how not to. *Romance Philology* 28: 473–82.

Toribio, Jacqueline Almeida. 2001. Accessing bilingual code-switching competence. *International Journal of Bilingualism* 5: 403–36. [CrossRef]

Treisman, Anne M. 1965. The effects of redundancy and familiarity on translating and repeating back a foreign and a native language. *British Journal of Psychology* 56: 369–79. [CrossRef]

van Hout, Roeland, and Pieter C. Muysken. 1984. Modeling lexical borrowability. *Language Variation and Change* 6: 39–62. [CrossRef]

Vinther, Thora. 2002. Elicited imitation: A brief overview. *International Journal of Applied Linguistics* 12: 54–73. [CrossRef]

Waltermire, Mark. 2006. Social and Linguistic Correlates of Spanish-Portuguese Bilingualism on the Uruguayan-Brazilian Border. Ph.D. dissertation, University of New Mexico, Albuquerque, NM, USA.

Waters, Gloria, David Caplan, and Sasha Yampolsky. 2003. On-line syntactic processing under concurrent memory load. *Psychonomic Bulletin & Review* 10: 88–95.