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The role of INFL in code-switching: a study of a Papiamentu heritage community in the Netherlands

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Introduction: In heritage bilingualism studies, code-switching has often been overlooked, with a focus on either the heritage language or the dominant societal language of the bilingual individual. However, exploring code-switching can provide valuable insights into heritage speakers' grammar, revealing patterns that may not be apparent when only examining monolingual speech. Recent research suggests that in code-switched clauses, functional elements must align with the language of verbal inflection (INFL), which encompasses tense, aspect, voice, and agreement. This generalization is usually referred to as the Matrix Language Frame (MLF). The present study explores the empirical validity of this generalization using an experimental protocol that controls for variables that earlier work did not take into consideration. These variables are (a) adjacency between INFL and the functional element, (b) the interaction of the MLF with embedded islands, and (c) the possibly degrading effects of inserting a functional category. Thus, the aim of this study is to provide evidence in support (or not) of the INFL constraint beyond the experimental limitations in earlier work. The study focuses on the bilingual combination Papiamentu–Dutch. Our results, by and large, support the MLF generalization.

Methods: We carried out an online audio survey (3-point Likert scale) with 43 Papiamentu–Dutch bilinguals. We manipulated the position of the switch and controlled for potential directionality effects by presenting code-switches in both switching directions.

Results: We find a scale of acceptability, where the conditions that respect the INFL constraint are preferred. Additionally, and consistent with recent corpus and experimental literature, our results point to a clear asymmetry regarding directionality effects or choice of ML, reflecting how code-switching is deployed in the community.

Discussion: Controlling for directionality allows us to discern the mechanisms of the INFL constraint. Thus, these findings underscore the intertwining influence of linguistic factors and community norms in guiding code-switching dynamics. Such insights extend beyond the specific context to shed light on broader dynamics within (heritage-language) bilingualism.

KEYWORDS

code-switching, nominal constructions, inflection, heritage bilingualism, Papiamentu/Papiamentu, Dutch, Matrix Language Frame

1 Introduction: the verbal inflection constraint

Heritage speakers (HSs), much like other multilingual speakers, commonly integrate elements from their languages within the same expression—whether it occurs in a single sentence or spans an entire conversation. This linguistic phenomenon is recognized as code-switching (CS; Deuchar, 2012). In the realm of heritage language (HL) bilingualism studies, CS has often been overshadowed, with most investigations concentrating on either the HL or the dominant societal language of the bilingual individual. However, delving into CS can significantly enhance our understanding of HSs' grammar by revealing patterns that remain concealed when solely examining monolingual speech (cf. van Osch et al., 2023).

In recent decades, there has been a growing consensus that CS is not random (cf. Poplack, 1980; López, 2020; Parafita Couto et al., 2023). Several studies have found evidence that intra-sentential CS within the nominal domain seems to be regulated by verbal inflection (see Herring et al., 2010; Blokzijl et al., 2017; Parafita Couto and Gullberg, 2019; Parafita Couto and Stadthagen-Gonzalez, 2019; Ramírez Urbaneja, 2020). In particular, all the functional elements of the clause must be in the same language as the verbal inflection (INFL encompasses several functional categories such as tense, aspect, voice, and agreement). In Example 1, CS between the determiner (D) and the noun phrase (NP) is licensed by INFL, to the extent that the D must remain in the same language as INFL. The sub-indices in (1) represent the two languages involved in the speech act:

- (1) INFL Constraint
INFL₁ ... [DP D₁ NP₂]

Table 1 provides an overview of recent corpora studies and data sets, all of which show a match between D and matrix language (ML), supporting the INFL constraint.

This hypothesis has also been tested experimentally with both Likert and two alternative forced-choice judgment tasks. Here is an example:

- (2) English/Spanish
Edgar wanted these *zapatos*.
(3) *Edgar wanted *estos* shoes.
(Parafita Couto and Stadthagen-Gonzalez, 2019, p. 356)

As shown with the traditional asterisk, Parafita Couto and Stadthagen-Gonzalez (2019) show that (2) is acceptable by early Spanish–English bilinguals living in the United States while (3) is not. They argue that the reason for this difference is the demonstrative in the direct object: the demonstrative is in the same language as the INFL in (2), following the schema in (1). Example (3), which has the D *estos* in Spanish is correspondingly ruled out. For now, let us hold on to the fact that these two sentences differ in the number of switch points.

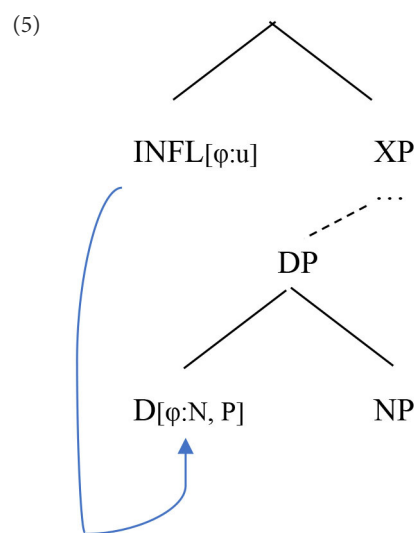
The argument for the role of INFL has been contextualized in the work mentioned earlier within the Matrix Language Frame (MLF) approach to the study of CS (Myers-Scotton, 1993 et seq.). The MLF views CS as an insertionist strategy: a sentence is

structured around one of the participating languages (referred to as ML), while the other language (the embedded language or EL) provides occasional lexical items or phrases, which are inserted in the ML discourse. One way to identify the ML of a clause is by inspecting INFL, which is always in the ML (see Blokzijl et al., 2017 for discussion). Thus, the MLF provides a possible descriptive explanation for the contrast between (2) and (3): if there is CS between the D and the noun, the D must be in the ML.

As a descriptive generalization, it is possible to frame the MLF within a broader theoretical paradigm because it implicitly entails that there is a syntactic dependency between INFL and the Ds of subjects and objects (and maybe other constituents). Thus, within the framework of assumptions presented in Chomsky (2000, 2001), dependencies are established by means of an Agree operation in which a functional category with unvalued features, the probe, seeks a goal, a category that has valued features of the same type. In our case, we can posit that INFL comes into the derivation with unvalued ϕ -features, which we can represent as $[\phi:u]$. A D has valued features that can value the $[\phi:u]$ of INFL:

- (4) INFL $[\phi:u]$...D $[\phi:\text{Number, Person}] \rightarrow$ INFL $[\phi:\text{Number, Person}]$.

Let us now introduce two more assumptions. The first is that both the subject and the direct object are in an Agree relationship with some feature of the INFL complex, even if this relationship is visible only in a few languages (an assumption that harks back to Pollock, 1989; Chomsky, 1993). The second is that feature valuation is construed as matching: the set of features of the probe must match those of the goal (as in Chomsky, 1993).



Keeping these theoretical assumptions in mind, let's return to (2), (3), and (4). Assume that the ML INFL has unvalued ϕ -features that can be valued against a D under matching. Let's now adopt an additional assumption: if INFL and D are in the same language, the INFLs and D's features will match, and D will be able to value the features of the INFL. But if they are drawn from different languages, matching is not guaranteed because ϕ -features vary from language to language. This uncertainty leads to subjects' preference of (2) over (3). In the particular case of Papiamentu and Dutch, there are

TABLE 1 Naturalistic production data sets showing a match between determiner and matrix language in mixed determiner–noun constructions (adapted from Parafita Couto et al., 2021).

Language pair	Corpus	Data characteristics	Studies
Spanish–English	Miami Corpus	<ul style="list-style-type: none"> • 85 adult speakers (52 female) • Dyads • Collected in Miami, FL, US • Mixed NPs $n = 276$ 	Herring et al. (2010): subset of 5:27 h (19 speakers) selected Blokzijl et al. (2017): full corpus Parafita Couto and Gullberg (2019): subset 5:27 h/20 (19 speakers) selected
	Nicaragua Corpus	<ul style="list-style-type: none"> • 42 adult speakers • 12 h • Dyads or groups • Collected in 2006 in the south Atlantic coast area of Nicaragua • Mixed NPs $n = 142$ 	Blokzijl et al. (2017): full corpus
	Las Pláticas Corpus	<ul style="list-style-type: none"> • 14 adult speakers • 10 h • Collected in 2018 in New Mexico, U.S. • Mixed NPs $n = 259$ 	Ramírez Urbaneja (2020): full corpus
	Three corpora from the CHILDES database	<ul style="list-style-type: none"> • 15 child speakers • Ages (1.11–6.4) • Collected in Los Angeles, CA, US; Michigan, US; and Spain • Mixed NPs $n = 202$ 	Ramírez Urbaneja (2020): full corpora
Welsh–English	Siarad Corpus	<ul style="list-style-type: none"> • 151 adult speakers (81 female) • Dyads • Collected at the Center for Research on Bilingualism, Bangor, UK • Mixed NPs $n = 171$ 	Parafita Couto and Gullberg (2019): subset of 18:40 h/40 (42 speakers) selected
Dutch–Papiamentu	MPI Corpus	<ul style="list-style-type: none"> • 25 adult speakers (15 female) • 3 h • Four-party conversations • Collected at the MPI for Psycholinguistics, the Netherlands • Mixed NPs $n = 60$ 	Parafita Couto and Gullberg (2019): subset of 3 h (25 speakers) selected
German–English	Eppler's 2003 corpus of German/English spoken interaction	<ul style="list-style-type: none"> • 9 adult speakers • 18:16 h • Collected in London, UK • Mixed NPs $n = 187$ 	Eppler et al. (2017): subset of 18:16 h (9 speakers) selected

NP, noun phrase. Child Language Data Exchange System: <https://childes.talkbank.org/>. Max Planck Institute for Psycholinguistics: <https://www.mpi.nl/>

some obvious differences in the ϕ -features of both languages: Dutch INFL inflects for person and number, while Papiamentu INFL does not express these features; the Dutch D inflects for gender and number, while the Papiamentu D has no gender, and number is expressed on a functional head separate from the D, which is invariant. These differences suggest that a sentence constructed with the INFL and the D in different languages would be perceived as discordant by bilingual speakers (following Liceras et al., 2008, we do not necessarily think that this discordance should lead to a categorical rejection).

Regarding the experimental work on the INFL constraint, there are some loose variables that we would like to control for. First, notice that there is a third type of sentence that was not tested by Parafita Couto and Stadthagen-Gonzalez (2019). Consider a sentence in which the entire DP is in the EL, such as (6):

- (6) English/Spanish
Edgar wanted *estos zapatos*.

In this example, the D is not in the same language as the INFL. However, it could be argued that this DP does not fall under the purview of (1) because, in the MLF framework, it constitutes an EL

island. An island¹ is the insertion of a full phrase from the EL into a sentence constructed in the ML. Regarding the acceptability of (6) vis-à-vis (2), we should predict that (2) would be better than (6), as suggested by the following quote:

1 Myers-Scotton (1993, 2002) characterizes EL islands as unilingual EL phrases that conform to the grammatical rules of the EL. Mixed constituents, by comparison, incorporate morphemes from both the ML and the EL, with the grammatical framework of mixed constituents being determined by the ML. EL islands, in contrast, consist solely of EL morphemes and adhere to the grammatical requirements of the EL. Some aspects of EL islands may be influenced by the ML, such as their position within the larger CP. An anonymous reviewer has astutely pointed out that the definition of EL islands provided by Myers-Scotton could potentially result in a circular definition, especially when considering contemporary views on phrase structure. We concur with the reviewer's observation and would like to propose that an EL island includes not just a phrase but an extended projection, which includes the phrase projected by the core lexeme as well as its functional projections. So a whole Determiner Phrase (DP), a Prepositional Phrase (PP) or Complementizer Phrase (CP) can be EL islands. We think this maintains the spirit of Myers-Scotton's view.

The Bilingual NP Hypothesis: the system morphemes in mixed NPs come from only one language, called the ML. An asymmetry between mixed NPs and full NPs from the EL obtains: full EL NPs are dispreferred because their system² morphemes (and their uninterpretable features) do not match other system morphemes and their uninterpretable features elsewhere in the bilingual Complementizer Phrase (Jake et al., 2002).

Thus, the MLF predicts a gradient of acceptability: the INFL constraint should be preferred to an EL island, and the latter should be preferred to a violation of the INFL constraint that does not constitute an EL island.

Second, the examples tested in Parafita Couto and Stadhagen-Gonzalez (2019), as well as most of those extracted from the production data discussed in the corpus studies (cf. Table 1), involve a direct object adjacent to the verb [see (2) and (3)]. This may have affected the results. It is a fact of English grammar that functional categories cliticize to the left—for instance, auxiliaries cliticize to the subject and negation cliticizes to the auxiliary. If so, it might be the case that the D of the direct object cliticizes to the verb. CS between a clitic and its host is a well-known restriction on CS (Poplack, 1980; MacSwan, 1999; Koronkiewicz, 2014). This might have led to the difference in acceptability between (2) and (3). As for the Spanish D, it is well-known that syllabification in this language crosses word boundaries from left to right (Harris, 1983), and as Hoot (2012) has argued, prosodic structure is built from left to right. This suggests that the direct object D may more easily attach to the verb than to its object. Thus, it seems desirable to test the hypothesis with examples in which the D and the INFL are not adjacent.

Third, notice that (3) involves two consecutive switches in which only a functional category (a D) is in the EL. Although we are not aware of any research in this area, our experience working in CS tells us that inserting a functional word usually yields low acceptability, in contrast with the pervasive fact of lexical insertion. We should design experimental stimuli that control for this confound.

The findings from the corpora studies in Table 1 display congruence between the ML and the D's language. The studies also report that different preferences toward the ML surfaced among the communities. It has been posited that these disparities might stem from sociocultural factors, such that the less powerful language is used as the ML and the EL is the one wielded for power or esteemed communication within a community (e.g., Blokzijl et al., 2017; Parafita Couto and Gullberg, 2019). In recent research, these community asymmetries in choice of the ML have been shown to have an effect on how quickly children mirror the CS patterns of adults in the community. In their study of adjective–noun order during an elicited production task

involving Papiamentu–Dutch CS, van Osch et al. (2023) showed that children exhibited a faster adoption of adult CS patterns when Papiamentu served as the ML compared to when Dutch was the ML. Similarly, the asymmetry in the choice of ML also seems to have an effect on processing. For example, in a recent electrophysiological study on adjective–noun switching in Welsh–English, Vaughan-Evans et al. (2020) found different processing signatures depending on the ML of the sentence (Welsh or English). The authors attributed these differences to the prevalence of code-switched constructions in the Welsh–English community when the ML was Welsh. According to them, the higher frequency of CS in this direction is what led participants to form stronger expectations regarding the placement of the CS. Conversely, when the ML is English, these expectations may not hold due to the relatively rare occurrence of Welsh insertions into English sentences (see Vaughan-Evans et al., 2020 for further discussion). Evidence of this nature suggests that the ease of processing CSs varies depending on an individual's experience with CS and the norms of the community (see also Litcofsky and Van Hell, 2017; Bosma and Blom, 2019; Suurmeijer et al., 2020). Given these insights into how community norms play a significant role across studies, we could adopt the approach of Valdés Kroff and Dussias (2023) to the processing of CS and broaden their adaptive predictability hypothesis to encompass speaker evaluations in judgment tasks. If, in fact, acceptability judgments somewhat mirror individual production inclinations, it becomes crucial to observe asymmetries in production. This is significant because the distributional trends in CS production might affect the speakers' judgments of code-switched clauses due to their accumulated exposure to code-switched speech. Nevertheless, this aspect has not garnered much attention in judgment studies to date.

Thus, the aim of the current study is to ascertain whether the INFL constraint holds true, irrespective of the constraints posed by the experimental and corpus limitations in prior research. To examine these matters, we carried out an online survey (judgment task) with Papiamentu–Dutch bilinguals in the Netherlands. As elaborated in the preceding paragraphs, previous work shows that the INFL constraint seems to hold true for Papiamentu–Dutch in production data (Parafita Couto and Gullberg, 2019). We expand upon the existing body of evidence by introducing experimental data that examine Papiamentu–Dutch judgments.

The remainder of the paper is structured as follows: Section 2 outlines the research questions and hypotheses. In Section 3, we delve into the Dutch–Papiamentu survey. The outcomes are discussed in Section 4. Section 5 encapsulates the conclusions drawn from this study.

2 Research questions and hypotheses

The judgment tasks reported in this article attempt to answer the two research questions (RQs):

RQ1: Can the INFL constraint be empirically supported if we control for adjacency?

This RQ generates two hypotheses:

2 According to Jake and Myers-Scotton (1997, p. 26). "system morphemes neither assign nor receive thematic roles. In addition, most system morphemes have the feature [+ quantification]. For example, Tense is a system morpheme and it quantifies over events; articles quantify over NP reference. System morphemes are not identical with either closed class items or functional elements (Abney, 1987); not all members of such grammatical categories as pronouns and prepositions are either content or system morphemes."

H1.1: Sentences in which a non-adjacent D and INFL are in the same language are judged as more natural than sentences where they are in different languages, thus supporting the INFL constraint.

H1.2: Sentences in which a non-adjacent D and INFL are in the same language are judged as less natural than or the same as sentences in which they are in different languages, thus not supporting the INFL constraint.

Consider, first, Example (2) again, repeated for the reader's convenience. This is acceptable to the participants in Parafita Couto and Stadthagen-Gonzalez (2019). The D "these" and the INFL are in the same language. However, INFL and the D are also adjacent, the factor that we want to control for. Consider now (7), in which a sentence is started in English and is then code-switched to Spanish. In (7), CS takes place within the direct object, which is separated from the INFL by the indirect object. If this type of example is acceptable, then the acceptability of (2) in Parafita Couto and Stadthagen-Gonzalez (2019) is not the by-product of an adjacency effect. Moreover, we expect (7) to be better than (8) because the direct object of the latter is an EL in which the INFL and the D are in different languages. A preference of (7) over (8) confirms H1.1. A preference of (8) over (7) or an equal judgment favors H1.2.

- (2) Edgar wanted these *zapatos*.
- (7) She gave the woman her *carta*.
- (8) She gave the woman *la carta*.

Consider now the following two examples, in which, again, the switch takes place in a position not adjacent to the INFL:

- (9) This *muchacha* is very polite.
- (10) This *muchacha está muy bien educada*.
"This girl is very polite."
- (11) This girl *está muy bien educada*

In (9), the D and the INFL are in the same language and should be judged as natural according to H1. In (10) and (11), the D and the INFL are not in the same language. H1.1 predicts that (10) and (11) should be dispreferred; H1.2 predicts no difference in acceptability among the three sentences.

RQ2: Can the INFL constraint be empirically supported if we avoid inserting functional items, which would result in double switching?

As mentioned, the rejection of (3) might be caused by a double-switch effect caused by inserting a functional category. In order to control for this constraint, we test sentences in which the D is first in the clause so as to avoid the double-switch effect, as in (10).

- (3) *Edgar wanted *estos* shoes.
these
- (10) This *muchacha está muy bien educada*.
"This girl is very polite."

This RQ yields the following two hypotheses:

H2.1: Example (10) is judged as more natural than (3). This means that the rejection of (3) may have been caused

by a double-switch effect. This result does not support the INFL constraint because the D and the INFL in (10) are in different languages.

H2.2: Example (10) is judged as unnatural compared to (3). This result supports the INFL constraint and shows that it is independent of double-switch effects.

Because the MLF predicts a gradient of acceptability, the INFL constraint should be preferred to an EL island, and the latter should be preferred to a violation of the INFL constraint that does not constitute an EL island; the MLF predicts an acceptability scale such that (9) > (11) > (10).

The subsequent section tackles these inquiries, drawing on Papiamento–Dutch bilinguals within a community where Papiamento appears to operate as the ML (cf. Parafita Couto and Gullberg, 2019).

3 Testing the role of INFL in Papiamento–Dutch bilinguals

Papiamento³ is a Portuguese-based creole with partial Spanish relexification (Jacobs, 2012; Kouwenberg and Muysken, 1994). It is spoken across the ABC islands (Aruba, Bonaire, and Curaçao) in the Caribbean, where it holds official status alongside Dutch and English. Papiamento is the predominant language for more than 80% of the population (Kester and Fun, 2012; Jacobs and Muysken, 2019). Additionally, a considerable part of the Antillean migrants residing in the (European) Netherlands are also proficient in Papiamento. As explained by van Osch et al. (2023), the historical connection of the ABC islands with the Netherlands has led to a close linguistic bond. Papiamento's prevalence in the Netherlands, influenced by extensive historical interactions with Dutch and widespread bilingualism in its country of origin, positions it as a postcolonial HL (cf. Jacobs and Muysken, 2019). It has been reported that Papiamento–Dutch bilinguals hold positive attitudes toward their HL (Kester and Hortencia, 2010; Kester and Fun, 2012; Pablos et al., 2019), which might be linked to the observable CS pattern in naturalistic production, in which Papiamento usually serves as the ML, with embedded Dutch elements (Muysken et al., 1996; Parafita Couto and Gullberg, 2019).

3.1 Methodology

3.1.1 Participants

A total of 43 Dutch–Papiamento bilinguals (26 females, age range = 20–69, $M_{age} = 33$, $SD_{age} = 11.8$) participated in this experiment. Most of them were born either in the ABC islands or in the Netherlands and moved back and forth between these locations, as is typical for this population. Criteria for exclusion were low proficiency in at least one of the languages (e.g., if they started learning one of the languages after primary school), as

³ The spellings *Papiamento* and *Papiamentu* are often used interchangeably. While *Papiamento* is commonly used in Aruba, *Papiamentu* is more frequently used in Curaçao and Bonaire.

well as consistently low ratings (e.g., if they rated all stimuli with a score of 1), as this suggested no engagement with the task. The application of these criteria resulted in the exclusion of six participants. Thus, we analyzed the data of 37 Dutch–Papiamentu bilinguals (24 females, age range = 21–69, $M_{age} = 31$, $SD_{age} = 10.5$).

A total of four participants were raised in the Netherlands, 12 in Aruba, 19 in Curaçao, one in Bonaire, and one in Jamaica. In addition, participants were asked to specify their perceived nationality: 15 identified as Curaçaoan, three as Dutch, 14 as Aruban, three as Antillean, one as Latino, and one as a world citizen. Twelve participants reported being students. The remaining participants reported a variety of different professions and trades, for example, engineer, teacher, therapist, accountant, and midwife. Additionally, participants were requested to evaluate each language based on attributes like “modern,” “friendly,” “influential,” “inspiring,” “useful,” and “beautiful,” using a 1–5 scale. The results, depicted in Figure 1, reveal that Papiamentu received higher ratings than Dutch across all characteristics except for “useful.” This suggests a more positive perception of Papiamentu among participants, while Dutch is considered equally useful. One potential explanation for this pattern is that Dutch is commonly employed in formal settings, whereas Papiamentu is prevalent in more informal contexts.

Recruitment was carried out via social media and the personal network of the experimenters. Participants took part on a voluntary basis and signed a consent form before starting the experiment. After the experiment, they filled in a background questionnaire regarding their personal, educational, and linguistic backgrounds.

3.1.2 Stimuli

A total of 36 sentences that involved CS within a DP were recorded by a male Dutch–Papiamentu bilingual. These sentences were constructed in 10 different ways and are first categorized into two primary conditions based on the sentence position of the DP (i.e., sentence-initial or sentential-final). Subsequently, they are divided into various sub-conditions based on the language of the D and the ML. The first two conditions are shown in Condition 1, where an indirect object is inserted between the verb and the direct object to avoid the D from the direct object cliticizing to the verb. In these examples, Papiamentu functions as the ML, and Dutch (in italics) functions as the EL. We avoided CS nouns that were cognates in the two languages and used possessives as Ds, which are less likely to cliticize to previous material than plain Ds because of word stress.⁴

⁴ An anonymous reviewer points out that the preferred sentences, those that have the D and the INFL in the same language, are also examples in which CS affects only one word. This fact raises the classic problem of whether a one-word switch should be regarded as borrowing or CS. When multilingual speakers speak, they use words from the different languages in their repertoire. Many linguists adopt the assumption that borrowing and CS are different phenomena (Poplack and Meechan, 1998, p. 132): borrowing would describe a situation in which speaking language X, a speaker produces a word originally from language Y, which is an established element in language X; CS would describe a speech act in which a multilingual person produces words from multiple languages within the same utterance. Thus, if

Condition 1: Sentence-final DP

ML Papiamentu D = INFL	Duna	e	muhé	su	<i>brief.</i>
ML Papiamentu D ≠ INFL	Duna	e	muhé	<i>haar</i>	<i>brief.</i>
ML Dutch D = INFL	<i>Geef</i>	<i>de</i>	<i>vrouw</i>	<i>haar</i>	karta.
ML Dutch D ≠ INFL	<i>Geef</i>	<i>de</i>	<i>vrouw</i>	su	karta.
	give.IMP	the	woman	POSS.3SG	
				letter	
					“Give the woman her letter”

In the ML Papiamentu D = INFL example, the D *su* is in the ML, while in the ML Papiamentu D ≠ INFL example, the D *haar* is in the EL. Thus, the MLF hypothesizes that bilinguals should prefer ML Papiamentu D = INFL to ML Papiamentu D ≠ INFL, as ML Papiamentu D = INFL adheres to the INFL constraint. To control for directionality effects, we also included the same sentences with the two languages switched: ML Dutch D = INFL and ML Dutch D ≠ INFL.

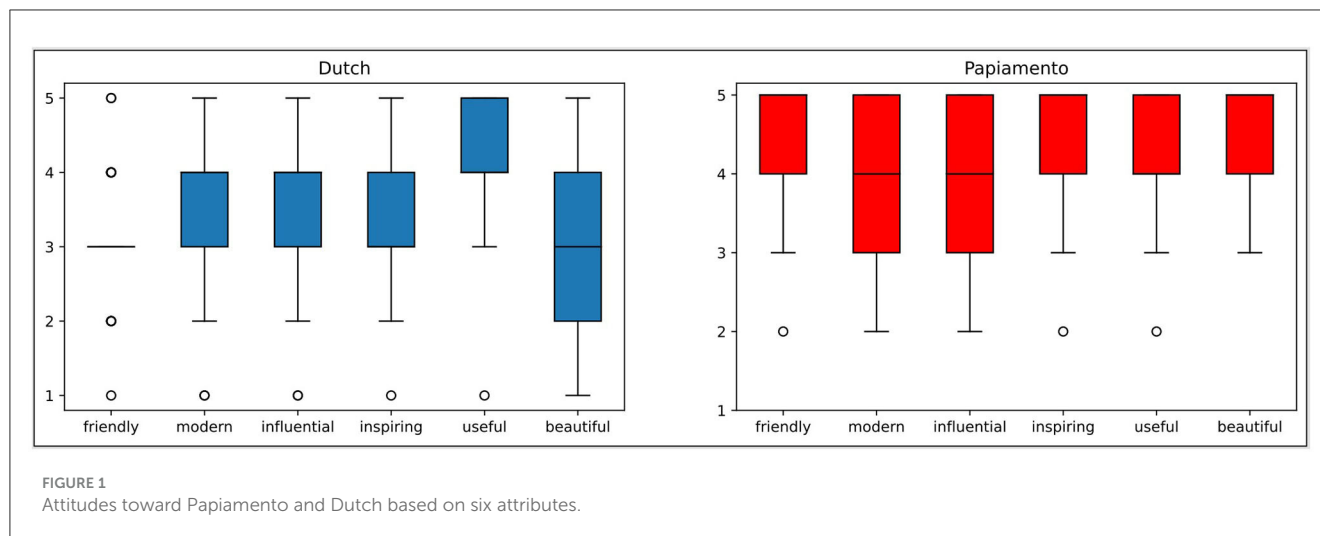
We then created six conditions in which the DP that involved CS was in the subject position at the front of the sentence, such that the insertion of a code-switched D was avoided (i.e., a switch could only occur after the determiner instead of two switches surrounding it). These conditions are shown in Condition 2.

Condition 2: Sentence-initial DP

ML Dutch D ≠ INFL	Bo	<i>kind</i>	<i>snijd</i>	<i>het</i>	<i>brood.</i>
ML Dutch Embedded	Bo	<i>mucha</i>	<i>snijd</i>	<i>het</i>	<i>brood.</i>
					Island
ML Papiamentu D ≠ INFL	<i>Jouw</i>	<i>mucha</i>	<i>ta</i>	<i>korta</i>	<i>e pan.</i>
ML Papiamentu Embedded	<i>Jouw</i>	<i>kind</i>	<i>ta</i>	<i>korta</i>	<i>e pan.</i>
					Island
ML Dutch D = INFL	<i>Jouw</i>	<i>mucha</i>	<i>snijd</i>	<i>het</i>	<i>brood.</i>
ML Papiamentu D = INFL	Bo	<i>kind</i>	<i>ta</i>	<i>korta</i>	<i>e pan.</i>
					POSS.2SG child PROG cut the bread
					“Your kid cuts the bread”

According to the MLF, ML Dutch D = INFL and ML Papiamentu D = INFL should be the most acceptable constructions for bilinguals because those are the only two cases in which all functional words are in the ML (and thus adhere to the INFL constraint). Moreover, the MLF predicts that the ML Dutch Embedded island and the ML Papiamentu Embedded island will receive higher ratings than ML Dutch D ≠ INFL and ML Papiamentu D ≠ INFL because of the Embedded islands (i.e., the

we adopt the assumption that borrowing and CS are indeed distinct, then we may be comparing apples and oranges in our study to the extent that one-word switches might, in fact, instantiate borrowing. This is a relevant point that deserves our attention. We believe that none of the one-word switches in our study could be regarded as borrowings because of the method that we used to create the stimuli. We asked our language consultants to produce sentences in Papiamentu and Dutch and then replace one word (or phrase) with a Dutch or Papiamentu word (or phrase); additionally, we instructed our consultants to not include cognates, and we inspected every stimulus. We conclude that it is highly unlikely that a loanword could have fallen through the cracks.



subject DP), and this should be more acceptable for bilinguals than just having the D (i.e., a functional word) in the EL.

We constructed six sentences for each of the four sub-conditions in Condition 1 and two sentences for each of the six sub-conditions in Condition 2. Additionally, we constructed 36 distractor sentences featuring CS elsewhere within the clause.

Both the materials and the language background questionnaire as well as the entire survey can be found at https://osf.io/zcef9/?view_only=1514e912b60a470f821fdeb84763057f.

3.1.3 Procedure

In a survey conducted through the web-based survey platform Qualtrics,⁵ the 36 audio fragments were presented in a random order. Participants were instructed to rate each fragment with a score from 1 to 3, with 1 being unnatural, 2 being unsure, and 3 being natural. To facilitate understanding of the ranking, an example was provided for reference. After the survey, participants filled in a background questionnaire.

3.2 Results

3.2.1 Controlling for adjacency

We first compared the ratings for the sub-conditions within Condition 1 (i.e., the sentence-final DPs), where sentences that adhered to the INFL constraint were contrasted with sentences that did not adhere to the INFL constraint. Since each participant was exposed to all conditions, ratings were compared using the paired samples *t*-test, comparing two conditions at a time. The results are shown in [Supplementary Table S1](#) and visualized in [Figure 2](#).

As shown in [Figure 2](#), participants significantly preferred sentences that adhere to the INFL constraint over sentences that do not adhere to the INFL constraint, both when Papiamento is the ML (i.e., ML Papiamento D = INFL is preferred over ML Papiamento \neq INFL) and when Dutch is the ML (i.e., ML Dutch D = INFL is preferred over ML Dutch D \neq INFL). This suggests that the

predictions of the MLF hold regardless of the adjacency of the D and the INFL.

Interestingly, participants also showed a preference for Papiamento functioning as the ML: they significantly preferred ML Papiamento D = INFL over ML Dutch D = INFL, even though both conditions adhere to the INFL constraint. This preference aligns with the patterns observed in production, as discussed in [Parafita Couto and Gullberg \(2019\)](#).

3.2.2 Controlling for double switch

Next, all the sub-conditions in Condition 2 (i.e., sentence-initial DPs) were compared against each other, again using the paired samples *t*-test. The results are shown in [Supplementary Table S2](#) and visualized in [Figure 3](#). Participants showed a clear preference for ML Papiamento D = INFL over all other sub-conditions in Condition 2. This result aligns with the predictions of the MLF.

Interestingly, Papiamento D = INFL was favored over ML Dutch D = INFL. Again, this preference can be attributed to a directionality effect, indicating that participants prefer Papiamento to serve as the ML in the given context.

Although both ML Papiamento Embedded island and ML Papiamento D \neq INFL received lower average ratings than Papiamento D = INFL, a significant preference was observed for ML Papiamento Embedded island over ML Papiamento D \neq INFL. The MLF correctly predicts this preference.

[Figure 3](#) illustrates a preference ranking among sentences that adhere to the INFL constraint Papiamento D = INFL, sentences with an EL island ML Papiamento Embedded island, and sentences containing an inserted functional item Papiamento D \neq INFL. Interestingly, this ranking was only evident when Papiamento served as the ML, not when Dutch was the ML (see [Figure 4](#)).

4 Discussion

We find a scale of acceptability such that the conditions that respect the INFL constraint are preferred over EL islands and the latter are preferred over insertions of a D—even if the insertion of a D does not involve double switching because

⁵ <https://leidenuniv.eu.qualtrics.com/>

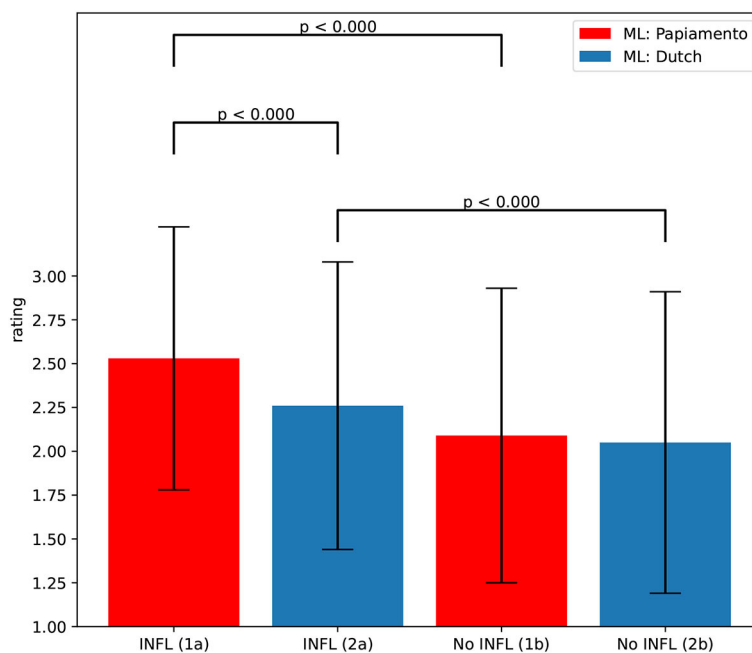


FIGURE 2 Pairwise comparisons of sub-conditions in Condition 1: ML Papiamento D = INFL, ML Papiamento D ≠ INFL, ML Dutch D = INFL and ML Dutch D ≠ INFL. y-axis, ratings; x-axis, condition; ML, matrix language; D, determiner, INFL, verbal inflection.

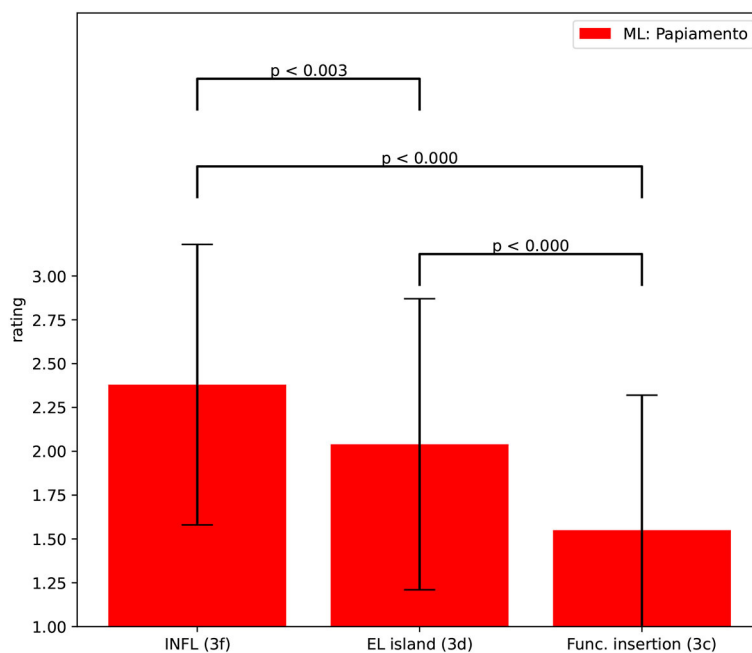


FIGURE 3 Preference ranking between conditions ML Papiamento D = INFL, ML Papiamento Embedded island and ML Papiamento D ≠ INFL. y-axis, ratings; x-axis, condition; ML, matrix language; D, determiner, INFL, verbal inflection.

switching occurs at the beginning of the clause. It is worth noting that we also found a clear asymmetry, with CS from Papiamento into Dutch being significantly more preferred than the reverse, from Dutch into Papiamento. This directionality effect reflects the dynamics of CS within the community

(Parafita Couto and Gullberg, 2019). Let's break this down step by step.

RQ1: Can the INFL constraint be empirically supported if we control for adjacency?

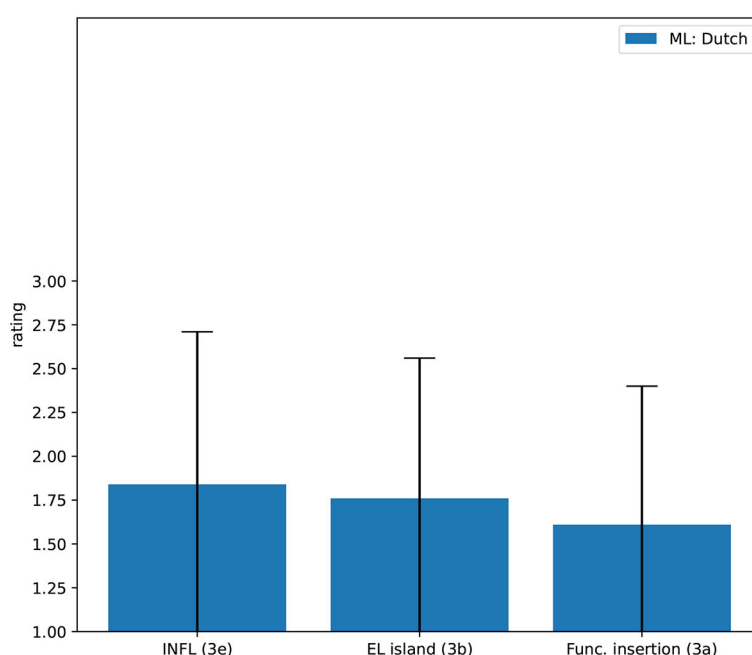


FIGURE 4

Preference ranking between conditions ML Dutch D = INFL, ML Dutch Embedded island and ML Dutch D ≠ INFL. y-axis, ratings; x-axis, condition; ML, matrix language; D, determiner, INFL, verbal inflection.

The results provide support for the INFL constraint regarding both the conditions that involve the direct object and those that involve the subject. However, it is important to highlight that the INFL constraint emerges as a strong predictor of acceptability when the ML is Papiamentu. This trend is less conspicuous in the reverse-switching direction, which incidentally corresponds to the less customary and less natural form of CS within this community.

First, we see that, in the sentences of Condition 1, ML Papiamentu D = INFL and ML Dutch D = INFL are preferred over ML Papiamentu D ≠ INFL and ML Dutch D ≠ INFL, respectively—in other words, in object or subject position, the participants preferred insertion of a lexical item to insertion of a full noun phrase (NP, or EL island). In both sets of stimuli, the adjacency confound was controlled for.

Sentence-final DP:

ML Papiamentu D = INFL > ML Papiamentu D ≠ INFL confirms INFL constraint.

ML Dutch D = INFL > ML Dutch D ≠ INFL supports the INFL constraint.

Sentence-initial DP:

ML Papiamentu D = INFL > (ML Papiamentu Embedded island) supports the INFL constraint.

ML Papiamentu D = INFL > ML Papiamentu D ≠ INFL supports the INFL constraint.

RQ2: Can the INFL constraint be empirically supported if we avoid inserting functional items, which would result in double switching?

In the sentences in Condition 2, in both sub-conditions ML Dutch D ≠ INFL and ML Papiamentu D ≠ INFL, there is a switch after the initial D, which constitutes a violation of the INFL constraint. However, this avoids the double switch of a functional category. It is important to note that both examples receive the lowest scores, which are lower than sub-conditions ML Dutch D = INFL and ML Papiamentu D = INFL, which adhere to the INFL constraint. Additionally, they score lower than the sub-conditions involving ML Dutch Embedded island and ML Papiamentu Embedded island, both of which are considered EL islands.

The subject examples in our stimuli suggest that when the D and the INFL are in the same language, there is indeed an improvement over the conditions in which the D and the INFL are not in the same language. This improvement is independent of the linear position of the NP as well as the grammatical function of the NP.

An additional noteworthy finding of this study is that the participants in this task exhibited sensitivity to the prevailing distribution of the ML within the community. Notably, when the ML was Papiamentu, distinct and discernible judgments were made by the participants: the acceptability rating of the condition ML Dutch D = INFL, which respects the INFL constraint, reached only 1.8 on a 1–3 scale, whereas full acceptability would be expected based on the INFL constraint. In contrast, ML Papiamentu Embedded island, which both disobeys the INFL constraint and functions as an EL island, garners a score of 2.1. Clearly, directionality interacts as a predictor of acceptability with the INFL constraint. Thus, we can conclude that the INFL constraint plays a role in the acceptability of sentences, but we also see that it is modulated by the ML of the sentence. We have to

note that in the absence of Parafita Couto and Gullberg's (2019) study demonstrating directionality effects on production through a publicly available corpus (cf. Gullberg and Indefrey, 2003–2004), the interpretation of our task results would be considerably challenging. This highlights the importance of future research that takes into account production asymmetries (as illustrated in Table 1) in order to interpret the results of more restricted and (semi-)experimental tasks more effectively. Consequently, it emphasizes the importance of open-access production corpora, which enables us to better comprehend the production tendencies across speakers and communities and the potential impacts of these patterns on our experimental results.

Thus, our study, in conjunction with recent research (Balam et al., 2020; Vaughan-Evans et al., 2020; Parafita Couto et al., 2021; van Osch et al., 2023), emphasizes that the complexities of CS cannot be simplified into purely structural explanations. We align with van Osch et al. (2023) and propose that instead of discussing CS in terms of rigid grammatical constraints, it might be more suitable to conceptualize a collection of linguistic, cognitive, and social predictors with varying degrees of influence. Our role as researchers involves identifying these predictors and gauging their relative significance across different individuals and multilingual communities. This proposition aligns with Muysken's (2013) proposal, which centers on bilingual strategies employed by speakers in specific language contact scenarios. Muysken asserts that these strategies are molded by social factors, the processing limitations of speakers' bilingual competence, and perceived language distance. Consequently, diverse outcomes should arise from distinct combinations of these strategies among bilingual speakers and their communities, underscoring the need to explore the intricate connections between these strategies and other influencing factors (see also Aalberse et al., 2019). While it is indeed the case that there have been calls for the integration of structural, sociolinguistic, and psycholinguistic factors (Backus, 2015; Stell and Yakpo, 2015; Goldrick et al., 2016; Gullberg and Parafita Couto, 2016; Beatty-Martínez et al., 2018; Lipski, 2019; Parafita Couto et al., 2023; Valdés Kroff and Dussias, 2023, among others), only after accumulating sufficient evidence can we contemplate crafting a framework capable of bridging these perspectives on CS. By further investigating diverse language combinations in varying multilingual scenarios, we can progress toward a comprehensive understanding of the multifaceted aspects that define multilingual practices and CS. From a theoretical point of view, we follow Aboh and Parafita Couto (2023) and endorse a paradigm shift that recognizes the intricate and interconnected nature of linguistic features, hybridity, community norms, and multilingualism. This perspective aims to cultivate a more comprehensive understanding of language by acknowledging the existence of interconnected systems that impact multilingual practices. This alignment with Bronfenbrenner's (1977) ecological systems theory of human development establishes a link between the understanding of multilingual practices and linguistic development within a multilingual context (cf. Titone and Tiv, 2023).

Certainly, our research has its limitations. Ideally, we would have conducted a comparative analysis by juxtaposing the outcomes of our study with those derived from individuals who

are bilingual in Papiamentu and Dutch on the ABC islands, where Papiamentu holds societal dominance. This comparative approach would have offered valuable insights into how the prevalence of a specific language in a given societal context influences the patterns of CS. Unfortunately, the requisite data for such a comparison is currently unavailable.

Additionally, examining preference patterns among subdivided groups, such as those formed based on attitudes toward CS or the primary language spoken at home, presented a challenge in this study due to the reduction in statistical power in such scenarios. In future research endeavors, prioritizing different types of data collection in diverse settings will be essential to enhance our understanding of the intricate interplay between language use patterns and CS behaviors. However, it is also important to acknowledge the resource-intensive nature of such endeavors, both in terms of time and cost. We believe that a collaborative effort in future research is crucial to comprehensively address these complexities. By pooling resources and expertise, researchers can undertake more extensive studies, incorporating diverse settings and capturing the nuanced interconnections between linguistic and extralinguistic factors.

5 Conclusion

Our study provides evidence in support of the INFL constraint, which posits that in CS, functional elements should align with the language of INFL. Returning to our discussion surrounding (6), we can rephrase these results as providing additional evidence that the mismatching of functional features in bilingual speech leads to degraded acceptability. We placed particular emphasis on the Papiamentu–Dutch bilingual population, an underrepresented group in heritage bilingualism research. Our results from a judgment task corroborate previous observations from corpus studies, confirming that the language of the D in mixed DPs generally corresponds to the ML.

The research findings not only substantiate the validity of the INFL constraint in CS but also draw attention to a noteworthy asymmetry in directionality effects: CS from Papiamentu to Dutch is preferred, mirroring previous findings from naturalistic production in this population. Notably, when the ML of the clause aligns with the ML predominantly used in the community (in this instance, Papiamentu), higher and more distinct naturalness judgments seem to emerge. In contrast, when the ML is Dutch, speakers seem to be unable to make judgments in a similar manner, presumably due to their limited exposure to CS in this particular direction. We posit that this is a consequence of children being exposed to an input that obeys the MLF and that privileges CS going in one direction. As a consequence, their linguistic system develops the corresponding structures, and this leads to the judgments of “naturalness” that we obtained. So, appearance in input leads to judgment preference, but these are mediated by the developing system. At the same time, it is important to acknowledge that the number of experimental items per condition may be relatively low, which constitutes a limitation. Nevertheless, we aimed to strike a balance between the study's length and the feasibility of recruiting an adequate number of participants. The trends we have identified

in this study should be subject to further examination in future follow-up research. We envision this study as a foundational step for future investigations in this area.

The research presented in this study represents an effort to broaden the research scope on CS within an understudied heritage bilingual community. Our findings underscore the necessity for additional research to fully understand the theoretical and empirical implications. Irrespective of the various scholarly traditions, our findings highlight a structural factor, namely, the role of the INFL constraint in CS. They also underscore the significance of investigating CS from a language-ecological lens. As such, understanding the nuances of grammatical constraints (cf. López, 2020) and recognizing the significance that individual experience and community practices hold in both judgment and other processing experiments (cf. MacDonald, 2013; Valdés Kroff and Dussias, 2023) elevate the importance of open-access corpora containing multilingual speech to a paramount level. The absence of access to community practices, which encompass real-world language use, leaves us handicapped when it comes to interpreting results from experimental tasks. Unfortunately, only a limited number of such corpora are presently openly accessible (cf. Deuchar et al., 2014), despite being compiled with public funding in most cases. We maintain an optimistic outlook, hoping that this practice will evolve in the foreseeable future (cf. Toribio, 2017, 2018; Parafita Couto et al., 2023).

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found in the article/Supplementary material.

Ethics statement

The studies involving humans were approved by Ethics Committee, Faculty of Humanities, Leiden University. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

MP: Conceptualization, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources,

References

- Aalberse, S., Backus, A., and Muysken, P. (2019). *Heritage Languages: A Language Contact approach*. Amsterdam: John Benjamins. ISBN 9789027204714. doi: 10.1075/sibil.58
- Abney, S. (1987). *The Noun Phrase in Its Sentential Aspect* [Ph.D. Dissertation]. Cambridge: MIT.
- Aboh, E. O., and Parafita Couto, M. C. (2023). *Modelling multilingual ecologies beyond the L1-L2 Binary. Linguistic Approaches to Bilingualism*.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/flang.2023.1288198/full#supplementary-material>

- Backus, A. (2015). "A usage-based approach to code-switching: the need for reconciling structure and function," in *Code-Switching Between Structural and Sociolinguistic Perspectives*, eds G. Stell, and K. Yakpo (Berlin: De Gruyter), 19–38. doi: 10.1515/9783110346879.19

- Balam, O., Parafita Couto, M. C., and Stadthagen-González, H. (2020). Bilingual verbs in three Spanish/English code-switching communities. *Int. J. Biling.* 24, 952–967. doi: 10.1177/1367006920911449

- Beatty-Martínez, A. L., Valdés Kroff, J. R., and Dussias, P. E. (2018). From the field to the lab: a converging methods approach to the study of codeswitching. *Languages* 3, 19. doi: 10.3390/languages3020019
- Blokzijl, J., Deuchar, M., and Parafita Couto, M. C. (2017). Determiner asymmetry in mixed nominal constructions: the role of grammatical factors in data from Miami and Nicaragua. *Languages* 2, 20. doi: 10.3390/languages2040020
- Bosma, E., and Blom, E. (2019). A code-switching asymmetry in bilingual children: code-switching from Dutch to Frisian requires more cognitive control than code-switching from Frisian to Dutch. *Int. J. Biling.* 23, 1431–1447. doi: 10.1177/1367006918798972
- Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *Am. Psychol.* 32, 513–531. doi: 10.1037/0003-066X.32.7.513
- Chomsky, N. (1993). *A Minimalist Program for Linguistic Theory*. MIT Occasional Papers in Linguistics. Cambridge: The MIT Press, 1–67.
- Chomsky, N. (2000). “Minimalist inquiries: the framework,” in *Step by Step: Essays on Minimalist Syntax in Honor of Howard Lasnik*, eds R. Martin, D. Michaels, and J. Uriagereka (Cambridge: The MIT Press), 89–155.
- Chomsky, N. (2001). “Derivation by phase,” in Ken Hale: A Life in Language, ed. M. Kenstowicz (Cambridge, MA: MIT Press), 1–54. doi: 10.7551/mitpress/4056.003.0004
- Deuchar, M. (2012). “Code-switching,” in *Encyclopedia of Applied Linguistics*, ed. C. A. Chapelle (New York, NY: Wiley), 657–664. doi: 10.1002/97811405198431.wbeal0142
- Deuchar, M., Davies, P., Herring, J., Parafita Couto, M. C., and Carter, D. (2014). “Building bilingual corpora,” in *Advances in the Study of Bilingualism*, eds E. Thomas, and I. Mennen (Bristol: Multilingual Matters), 93–110. doi: 10.21832/9781783091713-008
- Eppler, E., Luescher, A., and Deuchar, M. (2017). Evaluating the predictions of three syntactic frameworks for mixed determiner-noun constructions. *Corpus Linguist. Theory* 13, 27–63. doi: 10.1515/cllt-2015-0006
- Goldrick, M., Putnam, M. T., and Schwarz, L. S. (2016). Co-activation in bilingual grammars: a computational account of code mixing. *Biling.: Lang. Cogn.* 19, 857–876. doi: 10.1017/S1366728915000802
- Gullberg, M., and Indefrey, P. (2003–2004). *Item “Code-Switching” in collection “DBD”*. The Language Archive. Available online at: <https://hdl.handle.net/1839/00-0000-0000-0001-289E-4> (accessed September 01, 2023).
- Gullberg, M., and Parafita Couto, M. C. (2016). An integrated perspective on code-mixing patterns beyond doubling? *Biling. Lang. Cogn.* 19, 885–886. doi: 10.1017/S1366728916000080
- Harris, J. (1983). *Syllable Structure and Stress in Spanish: A Nonlinear Analysis*. Cambridge, MA: The MIT Press.
- Herring, J., Deuchar, M., Parafita Couto, M. C., and Moro, M. (2010). ‘I saw the madre’: evaluating predictions about codeswitched determiner-noun sequences using Spanish-English and Welsh-English data. *Int. J. Biling. Educ. Biling.* 13, 553–573. doi: 10.1080/13670050.2010.488286
- Hoot, B. (2012). *Presentational Focus in Heritage and Monolingual Spanish* [PhD dissertation]. Chicago, IL: University of Illinois at Chicago.
- Jacobs, B. (2012). *Origins of a Creole: The History of Papiamentu and Its African Ties*. Boston, MA: Walter de Gruyter. doi: 10.1515/9781614511076
- Jacobs, B., and Muysken, P. (2019). “Heritage languages in a post-colonial setting: focus on Papiamentu” in *Heritage Languages: A Language Contact Approach*, eds S. Aalberse, A. Backus, and P. Muysken (Amsterdam: John Benjamins Publishing Company), 204–223.
- Jake, J. L., and Myers-Scotton, C. (1997). Codeswitching and compromise strategies: implications for lexical structure. *Int. J. Biling.* 1, 25–39. doi: 10.1177/136700699700100103
- Jake, J. L., Myers-Scotton, C., and Gross, S. (2002). Making a minimalist approach to codeswitching work: adding the matrix language. *Biling.: Lang. Cogn.* 5, 69–91. doi: 10.1017/S1366728902000147
- Kester, E. P., and Fun, J. (2012). “Language use, language attitudes and identity among Aruban students in the Netherlands” in *Multiplex Cultures and Citizenships*, eds N. Faraclas, R. Severing, C. Weijer, and L. Ehteld, Vol. 2012 (Willemstad: University of Curaçao/Fundashon pa Planifikashon di Idioma), 231–248.
- Kester, E. P., and Hortencia, T. (2010). “Language use, language attitudes and identity among Curaçaoan high school students” in *Continuity, Divergence and Convergence in Language, Culture and Society on the ABC-Islands*, eds N. Faraclas, R. Severing, C. Weijer, and E. Ehteld (Willemstad: Fundashon di Planifikashon di Idioma), 25–38.
- Koronkiewicz, B. (2014). *Pronoun Categorization: Evidence from Spanish/English Code-Switching* [Ph.D. dissertation]. Chicago, IL: University of Illinois at Chicago.
- Kouwenberg, S., and Muysken, P. (1994). “Papiamentu,” in *Pidgins and Creoles*, eds J. Arends, P. Muysken, and N. Smith (Amsterdam: John Benjamins Publishing Company), 205–218. doi: 10.1075/cll.15.23kou
- Liceras, J., Fernández Fuertes, R., Perales, S., Pérez-Tattam, R., Spradlin, K., Perez-Tattam, R., et al. (2008). Gender and gender agreement in bilingual native and non-native grammars: a view from child and adult functional-lexical mixings. *Lingua* 118, 827–851. doi: 10.1016/j.lingua.2007.05.006
- Lipski, J. M. (2019). Field-testing code-switching constraints: a report on a strategic languages project. *Languages* 4, 7. doi: 10.3390/languages4010007
- Litcofsky, K. A., and Van Hell, J. G. (2017). Switching direction affects switching costs: behavioral, ERP and time-frequency analyses of intra-sentential codeswitching. *Neuropsychologia* 97, 112–139. doi: 10.1016/j.neuropsychologia.2017.02.002
- López, L. (2020). *Bilingual Grammar: Toward an Integrated Model*. Cambridge: Cambridge University Press. doi: 10.1017/9781108756181
- MacDonald, M. C. (2013). How language production shapes language form and comprehension. *Front. Psychol.* 4, 226. doi: 10.3389/fpsyg.2013.00226
- MacSwan, J. (1999). *A Minimalist Approach to Intrasentential Code-Switching*. New York, NY: Garland Publishing.
- Muysken, P. (2013). Language contact outcomes as the result of bilingual optimization strategies. *Biling.: Lang. Cogn.* 16, 709–730. doi: 10.1017/S1366728912000727
- Muysken, P., Kook, H., and Vedder, P. (1996). Papiamentu/Dutch codeswitching in bilingual parent-child reading. *Appl. Psycholinguist.* 17, 485–505. doi: 10.1017/S0142716400008213
- Myers-Scotton, C. (1993). *Duelling Languages: Grammatical Structure in Codeswitching*. Oxford: Clarendon Press. doi: 10.1093/oso/9780198240594.001.0001
- Myers-Scotton, C. (2002). *Contact Linguistics: Bilingual Encounters and Grammatical Outcomes*. Oxford: Oxford University Press doi: 10.1093/acprof:oso/9780198299530.001.0001
- Pablos, L., Parafita Couto, M. C., Boutonnet, B., De Jong, A., Perquin, M., De Haan, N., et al. (2019). Adjective-noun order in Papiamentu-Dutch code-switching. *Linguist. Approach. Bilingual.* 9, 710–735. doi: 10.1075/lab.17036.pab
- Parafita Couto, M., Bellamy, K., and Ameka, F. (2023). “Theoretical linguistic approaches to multilingual code-switching,” in *The Cambridge Handbook of Third Language Acquisition (Cambridge Handbooks in Language and Linguistics)*, eds J. Cabrelli, A. Chaouch-Orozco, J. González Alonso, S. Pereira Soares, E. Puig-Mayenco, and J. Rothman (Cambridge: Cambridge University Press), 403–436.
- Parafita Couto, M. C., Greidanus Romanelli, M., and Bellamy, K. (2021). *Codeswitching at the Interface Between Language, Culture, and Cognition*. Available online at: <https://hal.science/halshs-03280922/> (accessed September 01, 2023).
- Parafita Couto, M. C., and Gullberg, M. (2019). Code-switching within the noun phrase: evidence from three corpora. *Int. J. Biling.* 23, 695–714. doi: 10.1177/1367006917729543
- Parafita Couto, M. C., and Stadthagen-Gonzalez, H. (2019). El book or the libro? Insights from acceptability judgments into determiner/noun code-switches. *Int. J. Biling.* 23, 349–360. doi: 10.1177/1367006917728392
- Pollock, J. Y. (1989). Verb movement, universal grammar, and the structure of IP. *Linguist. Inq.* 20, 365–424.
- Poplack, S. (1980). Sometimes I’ll start a sentence in Spanish y termino en español: toward a typology of code-switching. *Linguistics* 18, 581–618. doi: 10.1515/ling.1980.18.7-8.581
- Poplack, S., and Meechan, M. (1998). How languages fit together in code-mixing. *Int. J. Biling.* 2, 127–138. doi: 10.1177/136700699800200201
- Ramirez Urbaneja, D. R. (2020). ¿Tú tienes una little pumpkin? Mixed noun phrases in Spanish-English bilingual children and adults. *Int. J. Biling.* 24, 824–839. doi: 10.1177/1367006919888580
- Stell, G., and Yakpo, K. (ed.) (2015). *Code-Switching between Structural and Sociolinguistic Perspectives (Linguae et Litterae 43)*. Berlin: De Gruyter. doi: 10.1515/9783110346879
- Suurmeijer, L., Parafita Couto, M. C., and Gullberg, M. (2020). Structural and extralinguistic aspects of code-switching: evidence from papiamentu-dutch auditory sentence matching. *Front. Psychol.* 11, 592266. doi: 10.3389/fpsyg.2020.592266
- Titone, D., and Tiv, M. (2023). Rethinking multilingual experience through a systems framework of Bilingualism. *Biling. Lang. Cogn.* 26, 1–16. doi: 10.1017/S1366728921001127
- Toribio, A. J. (2017). “Structural approaches to code-switching: research then and now,” in *Romance Languages and Linguistic Theory 12: Selected papers from the 45th Linguistic Symposium on Romance Languages, Campinas, Brazil*, eds R. Lopes, J. Ornelas de Avelar, and S. Cyrino (Amsterdam: John Benjamins), 213–233. doi: 10.1075/rllt.12.14tor
- Toribio, A. J. (2018). “The future of code-switching research,” in *CodeSwitching: Experimental Answers to Theoretical Questions: In Honor of Kay González Vilbazo*, ed. L. López (Amsterdam: John Benjamins), 257–267. doi: 10.1075/i11l.19.10tor
- Valdés Kroff, J. R., and Dussias, P. E. (2023). “Production, processing, and prediction in bilingual codeswitching,” in *Psychology of Learning and Motivation*, eds K. D. Federmeier, and J. L. Montag, Vol. 78 (Cambridge, MA: Academic Press), 195–237. doi: 10.1016/bs.plm.2023.02.004
- van Osch, B., Parafita Couto, M. C., Boers, I., and Sterken, B. (2023). Adjective position in the code-switched speech of Spanish and Papiamentu heritage speakers in the Netherlands: individual differences and methodological considerations. *Front. Psychol.* 14, 1136023. doi: 10.3389/fpsyg.2023.1136023
- Vaughan-Evans, A., Parafita Couto, M. C., Boutonnet, B., Hoshino, N., Webb-Davies, P., Deuchar, M., et al. (2020). Switchmate! An electrophysiological attempt to adjudicate between competing accounts of adjective-noun code-switching. *Front. Psychol.* 11, 549762. doi: 10.3389/fpsyg.2020.549762