

Mixing adjectives: A variable equivalence hypothesis for bilingual word order conflicts

Rena Torres Cacoullós & Jessica Vélez Avilés, Pennsylvania State University

Abstract

How do bilinguals mix adjectives and nouns from two languages with a word order conflict at the boundary between them? Prominently competing theories of code-switching (CS) that appeal to abstract features or to a matrix language remain in a stalemate, since their predictions have been reported to mostly coincide. Here, we contribute data from northern New Mexico bilingual community members who switch between Spanish and English in both directions. Beyond the NP-internal mixes within the purview of the theories, the widened data set encompasses all relevant mixes and positions: every adjective or associated noun at the boundary with the other language. We thus assess lone-item and multi-word mixing types, distinguishing also between multi-word CS at different points of the NP. Multi-word CS at the adjective-noun boundary is indeed rare. These bilinguals choose CS after the determiner with prenominal modifiers in English adjective-noun pairs, as previously observed, and at the external NP boundary. Furthermore, they disproportionately prefer the shared predicative position. Accounting for all adjective mixes, the Variable Equivalence hypothesis proposes that, where cross-language equivalence is not consistent due to language-internal variability, bilinguals prefer CS at alternative syntactic boundaries that are consistently equivalent and more frequent in their combined linguistic experience.

Keywords: code-switching, word order, adjectives, mixed NP, variable equivalence

1. Introduction

In debates on the grammar of code-switching (CS)—going back and forth between two languages—some theories start with the assumption that rules for CS follow from general principles of monolingual grammar. One such view is that there are "no CS-specific constraints", but rather abstract grammatical features, as determined for each of the monolingual grammars (MacSwan, 2020, p. 94). Another prominent proposal is that the grammar of just one of the languages, designated as the Matrix Language, is dominant (e.g., Myers-Scotton, 2002). These competing theories have been extensively compared on their predictions for adjective placement. Here, too, we focus on mixing adjectives in a pair of languages with a word placement conflict, whereby attributive adjectives are positioned before the noun overwhelmingly in one (English) but only variably so in the other (Spanish). Building on the widely acknowledged notion of equivalence for CS between languages (Poplack, 1980, p. 586; cf. Deuchar, 2005, p. 256; Muysken, 2015, p. 259; Pfaff, 1979, p. 306), we put forward the Variable Equivalence hypothesis: where cross-language equivalence is not consistent due to language-internal variability, bilinguals opt for CS at alternative syntactic boundaries that are consistently equivalent and more frequent considering their combined linguistic experience in both languages.

The two main competing accounts of CS involving adjectives are not concerned with the boundaries between two languages but with formal syntactic principles and assigning adjective

placement rules to one of the two languages. As a generative syntax account, the Minimalist Program (MP) appeals to abstract properties or phi-features such as number and gender (Cantone & MacSwan, 2009; MacSwan, 2020). It thus predicts that in noun phrase (NP)-internal switching "the word order requirements of the language of the adjective determine word order" (Cantone & MacSwan, 2009, pp. 266-267). The Matrix Language Frame Model (MLF) posits an overarching asymmetry such that "the structures of the Matrix Language (ML) are always preferred", while the other language is restricted to content morphemes and Embedded Language (EL) islands, inserted phrases that internally follow EL grammar, but "meet [...] ML conditions applying to [...] phrase placement" (Myers-Scotton & Jake, 2009, p. 337-338). The prediction is that word order in the clause is determined by the ML, operationalized as the language of the verb's morphology (e.g., Parafita Couto & Gullberg, 2019, p. 697).

Evaluation of the competing theories has been hindered by coinciding predictions. The language of the adjective (Adj) and the verb are usually the same when a noun (N) from one language is incorporated into the other. Both theories thus predict (1), with an English N incorporation into Spanish resulting naturally in both a Spanish Adj and a Spanish verb. The theories would be distinguished by switches at the boundary between Adj and N where the Adj and verb are not in the same language. For example, in (2) the MP predicts the prenominal English Adj. Another distinguishing mixing type would be other-language Adj incorporations, with which the verb is most likely in the surrounding language. For example, in (3) the MLF, but not the MP, predicts the prenominal Spanish Adj (cf. Parafita Couto et al., 2015, p. 80-81). In the translation of examples on the right, italic and roman type represent English and Spanish, respectively, in the original.¹

(1)

Leandro:	<i>.. ya le puso un roof nuevo y todo.</i>	'.. she already gave it a new roof and all.'
		[25, 26:31-26:33]

(2)

Dora:	<i>ahora estaba cantando en --</i>	'now she was singing in --,
	<i>.. a new disco hoy.</i>	<i>.. a new record today.'</i>
		[24, 54:24-54:27]

(3)

Victoria:	<i>... but he sings it all gabacho style.</i>	'... but he sings it all gringo style.'
		[12, 08:07-08:10]

¹ Examples are from the New Mexico Spanish-English Bilingual corpus (Torres Cacoullous & Travis, 2018, Chapters 2 and 3; <https://nmcode-switching.la.psu.edu>). Within brackets is the recording number and time stamp, given in (hour:)minutes:seconds. Responding to the stigmatization of minority language communities and the often personal nature of recordings by in-group interviewers in close-knit communities, the corpus has not been posted on the internet to protect from unintentional misinterpretation of local vernaculars or publication of stereotyping examples and to protect participant privacy. People interested in contributing to or working with NMSEB data sets should contact Rena Torres Cacoullous. Support from the National Science Foundation (BCS-1019112/1019122, 1624966) is gratefully acknowledged.

Results from numerous studies with different language pairs have not resolved the controversy. In corpus data, for example, English-Welsh mixed NPs were better predicted by the MLF (94%), though the MP did not fare badly (73%) ($n=137$ different-language Adj-N pairs) (Parafita Couto et al., 2015, p. 70). Of note, though, is that "only a small proportion of the data could distinguish between the two models", since English N incorporations, which are "compatible with both approaches", made up two-thirds of the data (Parafita Couto et al., 2015, p. 71). In another study of Welsh-English, (Miami) Spanish-English, and Papiamentu-Dutch, most frequent were combinations of determiners (Dets) from the first language of the pair and Adj-N clusters from the other (ex. (4) below) ($n=50$ NPs with a Det and Adj) (Parafita Couto & Gullberg, 2019, p. 702). While this mixing type "match[es] the generativist predictions" it is also "allow[ed] for by the MLF" as EL islands (Parafita Couto & Gullberg, 2019, p. 703). Correspondingly, in experimental results, acceptability judgments were not accounted for "by either the MP or the MLF model on their own" (Mexican Spanish-American English) (Stadthagen-González et al., 2019, p. 215), just as there was "a lack of difference between conditions" predicted by these models in an ERP comprehension study (Papiamentu-Dutch) (Pablos et al., 2019, p. 727).

The Variable Equivalence hypothesis is concerned with the boundary between languages, requiring neither that CS rules be derivable from formal syntactic principles of monolingual grammar nor that one of the languages dominate as a Matrix. The hypothesis builds on the Equivalence Constraint, established in the first systematic community-based CS study among Puerto Ricans in El Barrio, New York, where fewer than 1% ($n=1,835$) of switches occurred at points where the word orders of the two languages were different (Poplack, 1980, p. 600). The Equivalence Constraint states that multi-word CS internally follows the grammar of the respective language but occurs at the kinds of syntactic boundaries that are present in both languages (Poplack, 1980, p. 586; Poplack, 2013; Sankoff, 1998, pp. 46-47). We define points of *variable equivalence* as syntactic boundaries that occur variably in one or both of the languages, so that cross-language equivalence is not consistent (Torres Cacoulos & Poplack, 2016; Torres Cacoulos, 2020, p. 2). For English and Spanish, the attributive Adj-N boundary is a point of variable equivalence, since Adj-N order is not consistently the same in the two languages.

Here, we evaluate the competing accounts by quantitatively assessing speaker choices in bilingual discourse, in line with a view of constraints on CS as probabilistic (Kootstra, 2015, pp. 50-51; cf. Stadthagen-González et al., 2019, p. 213). Bilinguals make choices for adjective mixes along three dimensions:

- (a) position (pre- vs. postnominal attributive, vs. predicative),
- (b) language (language X vs. Y, same as N vs. different from N), and
- (c) mixing type (lone-item vs. multi-word, CS at different points of the NP).

We will begin with the bilingual community and data set. Before examining mixes, we compare monolingual Spanish and English, as well as bilinguals' unilingual varieties, to pinpoint cross-language conflict sites in adjective placement, while dismissing convergence. We next juxtapose the predictions of the models for within-NP mixes and then, in accounting for all relevant mixes, we confirm quantitative avoidance of multi-word CS at the boundary between attributive Adj and N. Bilinguals instead disproportionately prefer the predicative over the attributive position or multi-word CS at points of the NP other than the Adj-N boundary, with prenominal modifiers in English Adj-N pairs. These bilingual choices are consistent with cumulative experience in both languages.

2. Community and corpus

Spanish was spoken before English for centuries in northern New Mexico, located in the Southwest region of the United States. Since the arrival of English-speaking settlers with the annexation of the territory in the mid-19th century and the expansion of the railroad, Spanish and English have coexisted as the main competing languages for over 150 years (Bills & Vigil, 2008, pp. 29-47). With the imposition of English in educational institutions by the mid-1940s, however, bilingualism has been threatened by language shift and stigmatization of New Mexican Spanish with respect to extralocal varieties (Bills & Vigil, 2008, p. 313; Gonzales-Berry, 2000).

We draw on the New Mexico Spanish-English Bilingual (NMSEB) corpus (Torres Cacoullos & Travis, 2018, Chapters 2 and 3). The participants ($n=40$, 23 women and 17 men) were born between 1922 and 1993, have a range of occupations (including mineworkers, ranchers, teachers, and service employees), and most live in rural areas. The sample was selected to be made up of bilinguals who *use both languages regularly* in their everyday interactions. Notions such as L1 vs. L2 are blurred for these speakers, for whom use of both languages has always been a fact of daily life (see Torres Cacoullos & Travis, 2018, pp. 57–73 on measures of bilingualism).

The participants are *bilingual speech community* members in that they share common sociolinguistic experiences, the same local variety of each of their languages and unified conventions for mixing them (Torres Cacoullos & Travis, 2018, p. 25). Mixing languages depends on community norms (Poplack, 2010 [1985]), which must be learned by individual bilinguals (Valdés-Kroff, 2016, p. 297; cf. Labov, 2012). These norms include the wheres and whens of CS. In northern New Mexico, "intra-situational" CS is a community discourse mode, where the two languages are used in a single speech event with no change in interlocutor or topic (cf. Poplack, 2015, p. 918).

Mixing is of two broad types, single-word incorporations, or *lone items*, and multi-word strings, or *multi-word CS*, generally corresponding to the distinction between CS of the insertional and alternational kind (Muysken, 2000, 2015, pp. 251-254; cf., Poplack, 2018, p. 6). The distinction is important, because lone items tend to be English words, mostly nouns, embedded in Spanish (Figure 1a), whereas multi-word CS goes in both directions: linear strings of English followed by Spanish occur at approximately the same rate as the reverse (Figure 1b). This bidirectionality of multi-word CS overall in the corpus will allow us to detect any particular skewing for adjective mixes, whether in adjective language or position.

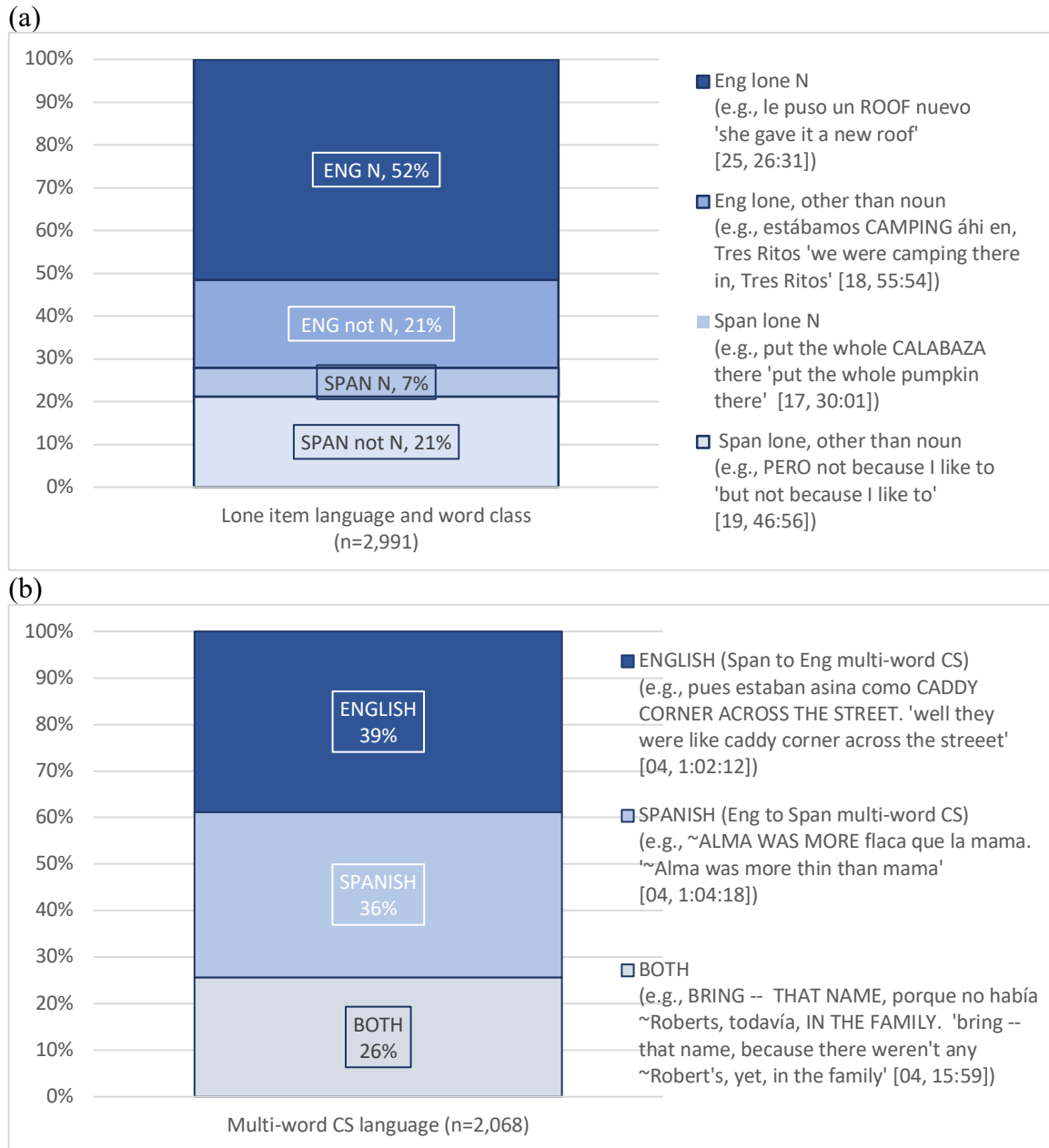


Figure 1. Distribution of languages in the corpus. (a) Skewed distribution: most lone items are English nouns embedded in Spanish (in the examples, lone items are in uppercase) (NMSEB, from Torres Cacoulos et al., 2022, p. 648); (b): Even distribution: multi-word CS is bidirectional (“English” = Spanish to English, “Spanish” = English to Spanish, “Both” = more than one multi-word CS within the prosodic sentence; in the examples, English strings are in uppercase) (NMSEB sample, from Trawick, 2022, Figure 6.7).

Bilingual speech was recorded through conversational sociolinguistic interviews, in which participants tell their own life stories (Labov, 1984, pp. 32-42). Thus, the switching that occurs in the corpus did not arise in response to direct elicitation. The speech stream is transcribed

prosodically, each line representing an Intonation Unit (IU); punctuation marks the transitional continuity between IUs (Du Bois et al., 1993, p. 47) (see Appendix 1 for transcription conventions).² The NMSEB corpus comprises 29 hours from 31 recordings, adding up to 300,000 words in 98,000 IUs. The result is a remarkably rich dataset, in size and variety, of spontaneously-produced adjective mixes.

3. Adjective mixes data set

Adjective mixes encompass every adjective or associated noun at the border with the other language. The dataset was constructed to include NPs within which the two languages co-occur, as with the lone Ns featuring largely in prior studies (e.g., *un roof nuevo* 'a new roof' (1)), as well as any adjective (phrase) that directly borders other-language material or whose syntactically associated (determiner plus) noun does.³ Thus, besides within-NP multi-word CS at the Adj-N boundary (*a new disco hoy* 'a new record today' (2)) and lone attributive Adjs (*all gabacho style* 'all gringo style' (3)) (Section 1), and in addition to multi-word CS after the Det (4), there are also instances of CS at the external boundary of the NP (5) or AdjP (6). The reason to include all mixing types and both attributive and predicative positions is that bilinguals can choose not only the language of the adjective, but also the exact site of the associated code-switch. In counting all instances in which the phenomenon of interest occurred as well as those where it *could have* but did not, we are applying the Principle of Accountability in order to identify mixing patterns or bilingual preferences (Labov, 1972, p. 72; cf. Beatty-Martínez et al., 2020, p. 2).

(4)

Ivette:	<i>.. he can find one .. very cheap.</i>	' <i>.. he can find one .. very cheap.</i>
	<i>... en una de las inside flea markets.</i>	<i>... in one of the inside flea markets.</i>
		[06, 35:32-35:36]

(5)

Dora:	<i>... and you find,</i>	' <i>... and you find,</i>
	<i>muchas cosas bien baratas.</i>	<i>many very cheap things.'</i>
		[20, 24:27-24:29]

(6)

Rubén:	<i>y era el --</i>	'and was the --,
	<i>el río,</i>	the river,
	<i>... deep enough para,</i>	<i>... deep enough for,'</i>
Víctor:	<i>en partes estaba hondo,</i>	'in parts it was deep,'
Rubén:	<i>for boats?</i>	'for boats?'

² The prosodic sentence is one or more IUs containing at least one clause and ending in intonational completion (cf. Chafe, 1994, p. 139).

³ Lone items do not include established loanwords listed in monolingual dictionaries (Merriam Webster, <https://www.merriam-webster.com/>, *Diccionario de la Lengua Española*, <http://www.rae.es/recursos/diccionarios/drae>), *Diccionario del Español de México*, <https://dem.colmex.mx/>).

		[29, 16:09-16:15]
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(7)

Ivette:	.. <i>I mean white,</i>	‘.. <i>I mean white,</i>
	.. <i>stockings all the way.</i>	.. <i>stockings all the way.</i>
Rafael:	. <i>m/hm</i>].	. <i>m/hm</i>].
Ivette:	.. <i>[to the] top.</i>	.. <i>[to the] top.</i>
	...(1.8) --	...(1.8) --
	<i>y yo con mi little short socks.</i>	and me with my <i>little short socks.</i> ’
		[06, 13:37-13:44]

The data set includes independent, unattached NPs/AdjPs in “increments” (Ford et al., 2002), as in (7), but not adjectives with no clearly associated noun (8). Also excluded were adjectives internal to multi-word CS, as with *viejita* 'old' in (9), as were proper nouns (e.g., *Little Golden Books* [15, 33:10]), and metalinguistic uses (e.g., *a huevo means forced* [17, 28:33]). Determiners or limiting adjectives such as (*an*)*other/otro* or *many/muchos* (5) do not belong in the data set (Schachter & Shopen, 2007, p. 13).

(8)

Dolores:	<i>y echó el cigarro en un Ziplock bag,</i>	‘and she put the cigarette in a <i>Ziplock bag,</i>
	<i>como bien <u>illegal</u>.</i>	like real <i><u>illegal</u>.</i> ’
		[22, 19:01-19:04]

(9)

Fabiola:	<i>and that truck has been a good truck no más que,</i>	‘and that truck has been a good truck just that,
	<i>ahora sí está <u>viejita</u>,</i>	now it's really <i><u>old</u>,</i> ’
		[09, 37:37-37:39]

Finally, separately included are non-dictionary listed compounds, or adjacent nouns of which one modifies the meaning of the other (Bell & Plag, 2012, p. 488), for example, *business manager*, *árbol de moras* (10).

(10)

a. Samuel:	.. <i>la .. que estaba de,</i>	‘.. the .. one who was a,
	... <i>business manager?</i>	... <i>business manager?’</i>
		[07, 33:36-33:39]
b. Miguel:	<i>we'd just race to the árbol de moras.</i>	‘we'd just race to the mulberry tree’
		[04, 33:57]

These protocols yield 419 adjective mixes (examples (1)-(7)), distributed according to (a) position, (b) language, and (c) mixing type as shown in Figure 2. Mixing type is distinguished by extent—lone-item vs. multi-word—and by switch point for multi-word CS—between Adj and N, after Det, and at NP/AdjP boundary. The 136 compound mixes (10) are overwhelmingly English NN ($n=130$). The analysis of the mixes is situated with respect to benchmark unilingual English ($n=865$) and Spanish ($n=462$) adjectives from the same speakers.

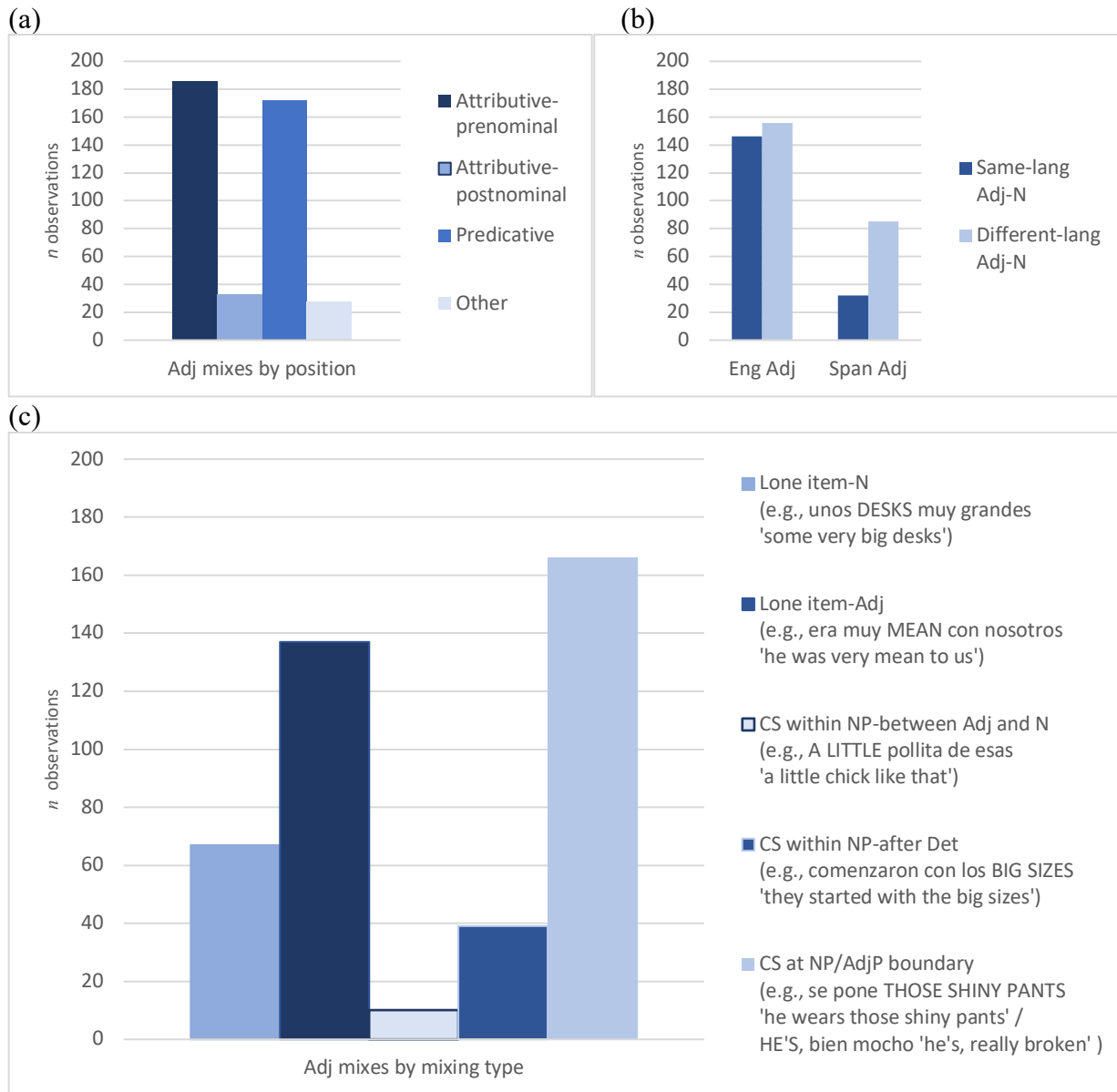


Figure 2. Overview of adjective mixes ($n=419$) according to position, language, and mixing type. (a) Position: prenominal attributive and predicative are more frequent than postnominal attributive position. (b) Language: English Adjs are more frequent than Spanish Adjs; different-language Adj-N (*era muy mean* 'he was very mean') and same-language Adj-N (*los big sizes* 'the big sizes') are both frequent. (c) Mixing type: lone items are either Ns or Adjs; multi-word CS is of three types—between Adj and N, after Det, at NP/AdjP boundary (see within-figure examples of the five types, where English is capitalized).

4. Adjectives in English vs. Spanish: Variable equivalence

English and Spanish are typologically similar, with adjectives as a distinct word class that indicates a descriptive property of a noun (Schachter & Shopen, 2007, pp. 13-14). In both languages, adjectives occur as attributive modifiers (11) or in predicative position (12). In Spanish, adjectives are also marked for the gender and number of their associated noun (11b, 12b).

(11)

a. Aurora:	<i>... I think he bought,</i>	
	<i>.. this old bed,</i>	[15, 06:05-06:08]
b. Aurora:	<i>a .. ti sí te gustan las cosas viejas.</i>	‘you really do like old things.’
		[15, 02:01-02:03]

(12)

a. Miguel:	<i>... he always compared himself that</i>	
	<i>he was already real old.</i>	[04, 34:13-34:16]
b. Miguel:	<i>pero ya yo estoy viejo.</i>	‘but I’m already old .’
		[04, 34:20-34:21]

The two languages differ in the orders of modifying adjective and noun (Dryer, 2013). Adjectives are overwhelmingly prenominal in English. NAdj order constitutes approximately 2% of adjective occurrences (in the Brown ($n=71,703$) and Frown ($n=82,189$) corpora (Blöhdorn, 2009, pp. 11, 14)), occurring with indefinite pronouns (e.g., *anything* (13)), "heavy" adjectives with complements (*the grown woman **ready** to retire* [03, 27:06]), and adjectives ending in *-able/-ible* or *-ed* (*with the bases **loaded*** [07, 08:41]) (e.g., Šaldová, 2021).

(13)

Bartolomé:	<i>... anything new come up he would try it you know?</i>	
		[02, 51:00-51:03]

While in Spanish the dominant order is NAdj, variation in adjective position is more robust, said to respond to distinctions such as intersective vs. non-intersective or restrictive vs. non-restrictive meaning (e.g., Demonte, 2008). Quantitative studies indicate that variable prenominal position is influenced by lexical frequency (Kanwit & Terán, 2020) more so than by semantic classes such as evaluative vs. color adjective (e.g., Delbeque, 1990), as well as by structural considerations of length (e.g., File-Muriel, 2006) and discourse meanings related to contrast (Bolinger, 1972; Klein-Andreu, 1983). Overall rates of prenominal position differ by genre, reported to range from 5% ($n=226$) of attributive adjectives in "semi-formal" interviews (File Muriel, 2006, pp. 208, 212), to 22% ($n=343$) in interview-conversations (Centeno Pulido, 2012, p. 36), to 55% ($n=203$) in a gossip magazine (Klein-Andreu, 1983, p. 172). The higher prenominal Adj rate in the gossip magazine is a function of the association of non-contrastive position with "the intent to comment rather than simply to describe fact" (Klein-Andreu, 1983, p. 171).

Table 1 summarizes cross-language equivalence and conflict sites (shaded). For attributive adjectives, equivalence is not consistent, since prenominal position is partially shared between the

two languages, while postposition is a locus of structural divergence. The boundary between attributive Adj and N is thus a point of variable equivalence. Bilinguals should favor points of consistent equivalence—predicative position or, with attributives, CS after the Det—quantitatively avoiding multi-word CS at the Adj-N boundary.

Table 1: English-Spanish adjective placement equivalence and conflict sites

Language	Attributive Adjective				Predicative Adjective
	Position 1 Determiner	Position 2 PreN Attributive	Noun	Position 2 PostN Attributive	
English	√	√	√	X (minor)	√
Spanish	√	√ (variable)	√	√	√

5. Adjectives in unilingual benchmarks: Ruling out convergence

Before assessing adjective mixes, we need to rule out grammatical convergence—whereby languages in contact become structurally more similar—because one way that bilinguals could conceivably resolve cross-language word order conflict is by speaking varieties that are structurally more similar than their respective monolingual baselines are (e.g., Adamou et al., 2021). Samples of unilingual English ($n=865$) and Spanish ($n=462$) adjectives were extracted from stretches of speech (at least one IU) with no other-language items, in the first 1,000 IUs of each of the 31 NMSEB transcriptions (Section 2).

Postnominal adjectives in these bilinguals' unilingual English occur at a rate of approximately 1% (9/865), mostly (8/10) with indefinite pronouns, as in (13) above, matching monolingual English. Prenominal position is at 45% (386/865), or 58% when including NN compounds such as *baseball field*. Predicative adjectives constitute another 38% (331/865).

In contrast, postnominal attributives in bilinguals' Spanish make up 18% (83/462), as opposed to 12% (54/462) in prenominal position. Predicative adjectives constitute 56% (259/462) and occur with a variety of linking verbs in addition to copulas *estar* and *ser* 'be', for example, *quedarse* 'remain' (ex. 20b).

Bilinguals also distinguish their two languages by the frequency of sequences of two or more adjectives, which constitute just 2% (2/137) of Spanish attributives (*un lugarcito, ... pegadito chiquito* 'a little place, ... nearby small' [31, 04:02]) compared with 7% (28/395) in English (e.g., *that little golden green bag* [03, 25:25]). Bilinguals' Spanish further differs from their English in the lesser productivity of compounding, at 6% (28/462), in the N *de* 'of' N configuration (e.g., *licencia de plomero* 'plumbers license'), compared with 14% (118/865) for English NN. There is a residue of adjectives that are unattached or in other structures in both samples.⁴ Table 2 summarizes bilinguals' unilingual English vs. Spanish attributive modifiers.

⁴ Other structures (English $n=21$, Spanish $n=38$, mixes $n=28$) include Adjs following prepositions (e.g., *desde muy chiquitos* 'from [when we were] very young' [17, 25:25]), turn-initial instances (e.g., *.. no, ... como, pink*. '.. no, ... like, pink' [25, 43:26]), and Adjs occurring alone in increments, as in *me compró ropa. nueva*. 'she bought me clothes. new.' [06, 12:27] (also ex. (7)). Considering increments like this, postnominal attributives constitute 20% (92/462) in unilingual Spanish.

Table 2: Differences between bilinguals' English and Spanish attributive modifiers

Language	Prenominal	Postnominal	2+ Adjectives	Compounding
English	98% (386/395)	2% (9/395)	7% (28/395)	14% (118/865), NN
Spanish	39% (54/137)	61% (83/137)	2% (2/137)	6% (28/462), N de N

*All differences are statistically significant (by Fisher's exact test, $p \leq 0.01$).

The most stringent quantitative test of grammatical similarity between these bilinguals' Spanish and monolingual varieties is parallelism in the linguistic conditioning of variation. Despite genre differences in the overall rate of prenominal adjectives (by up to 50 percentage points), variable attributive adjective placement in Spanish is consistently conditioned by lexical, structural and discourse factors (see preceding section). Bilinguals' Spanish maintains the same constraints, depicted in Table 3.

Table 3. Factors in prenominal adjective position: monolingual varieties and bilinguals' Spanish

	Monolingual Spanish	Bilinguals' Spanish		
	Prenominal position is favored by:	Prenominal position is favored by:		
Lexical frequency of Adjective	Frequent adjectives	Frequent adjectives		
	Kanwit & Terán (2020, pp. 15-16), Martínez (2009, p. 1301).	<i>bueno</i> 'good'	86%	24/28
		<i>puro</i> 'pure, all'	100%	9/9
		Adjs of 2-7 tokens	23%	18/77
		Hapax legomena	13%	3/23
Syllable length of Adjective relative to Noun	Shorter adjectives	Shorter adjectives		
	File-Muriel (2006, p. 210), Hoff (2014), Kanwit & Terán (2020, p. 16).	Shorter Adj	57%	26/46
		Same length as N	39%	20/51
		Longer Adj	20%	8/40
Definiteness of Noun	Definite nouns	Definite nouns		
	Klein-Andreu (1981, p.171), Martínez (2009, p. 1297)	Definite	24%	11/45
		Indefinite	13%	5/40
		Total Prenominal	39%	54/137

First is the role of frequent evaluative Adjs *bueno* 'good' and *puro* 'pure, all', which highly favor prenominal order compared with less frequent Adjs (e.g., *tuve la buena suerte* 'I had the good luck' [10, 17:06]). Second, as to relative syllable length, prenominal position is favored by shorter Adjs (e.g., *malas palabras* 'bad words' [05, 19:13]). Consistent with this 'weight' effect, the presence of an adverb modifier such as *muy* 'very' highly disfavors prenominal position (0/31), again as in monolingual varieties (e.g., *edificios muy altos* 'very tall buildings' [02, 35:28]) (cf. Martínez, 2006, p. 1298). Third, adjective position is sensitive to discourse status of the noun, operationalizing contrast by definiteness. Prenominal order is more likely with definite than indefinite determiners because nouns "should be more likely to be characterized contrastively to the extent that their referents are NOT expected to be known or identifiable... Conversely, ... [for nouns whose referents ARE expected to be known] it should be easier to attribute characteristics to them as something that can be taken for granted" (Klein-Andreu, 1983, p. 170). This discourse tendency also remains in bilinguals' Spanish.

In sum, linguistic continuity is evident for these bilinguals' Spanish and English, which are syntactically indistinguishable from their respective monolingual baselines. Based on their distinct

patterns of adjective placement for each language, these speakers are highly bilingual (on other structures, see Torres Cacoullós & Travis, 2018, p. 204). Important here is that the Adj-N boundary is certainly a site of variable equivalence for these bilinguals, since in their English attributive Adjs are overwhelmingly prenominal but in their Spanish prenominal position is variable, conditioned by language-internal factors. Having established bilinguals' Spanish and English as unilingual benchmarks, the analysis of mixes now follows.

6. Adjectives in mixed NPs: Positioned by abstract features or a matrix language?

Recall that the Minimalist Program (MP) predicts that the language of the *adjective* determines word order within the NP, whereas the Matrix Language Frame Model (MLF) predicts that the language of the *finite verb* does (Section 1). The competing accounts are juxtaposed in Table 4. The MP straightforwardly predicts (14a,b) and the MLF predicts (15a,b), attributing (14a) to variable placement of the Spanish Adj and allowing (14b) as an EL island.⁵ Both theories predict (16a,b,c).

Table 4. Within-NP adjective mixes: Adjective position predictions of abstract features/ minimalism (MP) vs. matrix language (MLF) account

Adj	Verb	Example	Translation	Predictions
		(14)		
Eng	Span	a. <i>ahora estaba cantando en -- .. a new disco hoy.</i> [24, 54:24]	a. 'now she was singing in -- .. a new record today.'	MP+ / MLF+ (EL island)
Span	Eng	b. <i>do you use the harina preparada?</i> [20, 10:22]	b. 'do you use the prepared flour?'	
		(15)		
Eng	Span	a. <i>y a él le tocó los padrinos más !modern.</i> [04, 15:07]	a. 'and he got the most modern godparents'	MP- / MLF+
Span	Eng	b. <i>... but he sings it all gabacho style.</i> [12, 08:07]	b. '... but he sings it all gringo style.'	
		(16)		
Span	Span	a. <i>... tenían unos desks muy grandes,</i> [03, 53:25]	'... they had some very big desks,'	MP+ / MLF+
		b. <i>... yeah porque tienes puras girls,</i> [09, 44:11]	'.. yeah because you have all girls,'	
Eng	Eng	c. <i>she used to put the whole calabaza !there,</i> [17, 30:01]	'she used to put the whole pumpkin !there ,'	

⁵ For *new disco* (14a), the corresponding monolingual Spanish "nuevo disco" has a frequency of 1.63 per million, compared with 0.06 for postnominal position in "disco nuevo" (*Corpus del Diccionario histórico de la lengua española*, www.rae.es, accessed 16 Aug 2022; search restricted to 1950-2010).

Table 5. Within-NP adjective mixes: Adjective position by adjective and verb language, according to mixing type ($n=110$)

Mixing type	Adj lang	Verb lang*	Post nomin	Pre nomin	n	MP Accuracy	MLF Accuracy**
Lone-item incorporation							
Lone Noun							
N_{ENG} <i>desks muy grandes (16a), puras girls (16b)</i>	Span	Span	12	27	39	97% (38/39)	90% (26/29)
N_{SPAN} <i>the whole calabaza (16c)</i>	Eng	Eng	0	15	15	100% (15/15)	100% (13/13)
Lone Adj							
Adj_{ENG} <i>padrinos más modern (15a)</i>	Eng	Span	5	1	6	50% (3/6)	83% (5/6)
Adj_{SPAN} <i>all gabacho style (15b)</i>	Span	Eng	0	2	2	50% (1/2)	100% (2/2)
Multi-word CS							
Between Adj and N							
$\text{Adj}_{\text{ENG}}N_{\text{SPAN}}$ <i>a new disco hoy (14a)</i>	Eng	(Eng)	0	6	6	100% (6/6)	80% (4/5)
$\text{Adj}_{\text{SPAN}}N_{\text{ENG}}$ <i>es puro talk show really (17b)</i>	Span	Span	1	3	4	100% (4/4)	100% (4/4)
After Det							
$\text{Det}_{\text{SPAN}}\text{Adj}_{\text{ENG}}N_{\text{ENG}}$ <i>con los big sizes (18a)</i>	Eng	(Span)	2	35	37	95% (35/37)	100% (10/10) (26/26)
$\text{Det}_{\text{ENG}}N_{\text{SPAN}}\text{Adj}_{\text{SPAN}}$ <i>use the harina preparada (14b)</i>	Span	Eng	1	0	1	100% (1/1)	100% (1/1)
Total			21	89	110	94% (103/110)	95% (91/96)**

* Just 6% (4/62) of lone N or Adj occur in the same language as the verb (e.g., *yo te presto my ca- -- my -- my little carritos* 'I'll lend you my little cars' [22, 36:08]). For multi-word CS, verbs with $\text{Adj}_{\text{ENG}}N_{\text{SPAN}}$ are 4/6 English (Appendix 3); with $\text{Det}_{\text{SPAN}}\text{Adj}_{\text{ENG}}N_{\text{ENG}}$, 31/36 are Spanish, e.g., (18a,b) vs. (18c).

**Denominators differ for MLF because of the omitted 13% (14/110) of mixed NPs with no syntactically associated finite verb, e.g., (7). Shading indicates the 25% (27/110) of mixed NPs allowed as EL islands, e.g., (14b).

Table 5 shows adjective position in mixed NPs by adjective and verb language as well as by mixing type. By distinguishing mixing type—lone (N or Adj) vs. multi-word (CS between Adj and N or CS after Det)—we are able to make two sets of observations. First, even for these bilinguals, for whom multi-word CS is a community discourse mode, half of the within-NP adjective mixes occurred as lone Ns (49%, 54/110), as in *unos desks muy grandes* 'some very big desks' (16a). Lone Ns are seven times as frequent as lone attributive Adjs (15), and five times as

frequent as multi-word CS between Adj and N (14a). The "frequency of switched nouns" is a consistent finding (Parafita Couto et al., 2015, p. 75; cf. Poplack, 1980, p. 603; 2018). It has even been remarked, in light of electrophysiological results, that "the fact that both theoretical proposals seem to be contributing to determining noun-adjective code-switching may just be a by-product of this general tendency in use" (Vaughan-Evans et al., 2020, p. 17).

With incorporation of a lone N, by definition, the language and word order of both the Adj and verb will generally be that of the language surrounding the N. Adjs with English lone Ns are postnominal (16a) or, when prenominal, though disproportionately so (Section 8), they are also prenominal in monolingual Spanish, for example, *bueno* 'good', *mero* 'mere', *puro* 'pure, all' (16b) (cf. Torres Cacoullos & Aaron, 2003, pp. 315-316).⁶ Likewise, Adjs with Spanish lone Ns (16c) are all prenominal as in monolingual English. Lone-item status also explains why the MLF fares better than the MP when the incorporated item is an Adj. Lone Adj placement is naturally consistent with the surrounding language, which again generally includes the verb, and not that of the Adj itself, as in (15).

Second, there are two distinct types of multi-word CS for within-NP adjective mixes. Multi-word CS *between* Adj and N, as in (14a) and (17), concerns only 9% (10/110) of mixed NPs.

(17) Multi-word CS between Adj and N

a. Miguel:	... <i>that's what she ... gave me,</i>	'... <i>that's what she ... gave me,</i>
	<i>a little pollita de esas.</i>	<i>a little</i> chick like that.'
		[04, 21:02-21:05]
b.	.. <i>es puro talk show really.</i>	'.. it's pure <i>talk show really</i> '
		[04, 40:57-40:58]

One bilingual alternative to CS between Adj and N is multi-word CS *after* the determiner, as in (14b) and (18). Here, Adj and N are in the same language. As already noted in previous studies, "it is striking that switches predominantly occur between Dets and AN clusters—not between As and Ns" (Parafita Couto & Gullberg, 2019, p. 703). The MP is easily successful with this type because most instances are of a Spanish Det and an English Adj-N pair in which, as predicted by the theory but also natural, the adjective occurs prenominal. The MLF, on the other hand, is successful for multi-word CS after Det by positing EL islands. These islands (18a,b), shaded in Table 5, are more than twice as frequent as instances with the predicted matching ML verb (18c).

⁶ Other generally prenominal Adjs are *diferente(s)* 'various', *mejor* 'better', *mismo* 'same', *pinche* 'damn', *pobre* 'unfortunate', *propio* 'own'; the one exception is *tenían muy bonitos uh beads* 'they had very pretty uh beads' [14, 37:44]. Adjs with lone N_{ENG} may follow Spanish word order patterns, with prenominal rates at 76% (13/17) vs. 64% (14/22) for shorter/same length vs. longer Adj, and at 5/8 vs. 1/9 for definite vs. indefinite NPs (see Section 4). Disproportionate determinerless forms are at least in part due to *puro* 'pure, all', 14/39, of which all instances are prenominal and nearly all (13/14) without a determiner (Ex. 16b).

(18) Multi-word CS after Det

a. Ivette:	...(0.8) <i>después comenzaron con los big sizes.</i>	‘...(0.8) then they started with the big sizes. ’
		[06, 32:44-32:47]
b. Javier:	.. <i>era una Anglo girl.</i>	‘.. she was an Anglo girl. ’ ²
		[17, 17:04-17:06]
c. Enrique:	.. <i>and I give them .. dulces,</i>	‘.. <i>and I give them .. candies,</i>
	<i>uh uh --</i>	uh uh --
	<i>uh los best suckers,</i>	uh los best suckers, ²
		[20, 45:45-45:49]

Most striking is the imbalance between the two CS types. Multi-word CS after the Det is more frequent than multi-word CS between Adj and N by over three times (38/110 vs. 10/110). This "infrequency in natural speech of mixed noun-adjective constructions" (Parafita Couto et al., 2015, p. 67) has been apparent in sizable datasets of mixed NPs, even with some marred by the inclusion of limiting adjectives such as *otro* ‘another’. For example, in a large corpus from Northern Belize Spanish-English bilinguals, only 10% (125/1203) of mixed NPs featured an Adj in a different language from the N (Balam & Parafita Couto, 2019, p. 203). Though not addressed by MP or MLF predictions, the low corpus frequency of multi-word CS between attributive Adj and N is linguistically significant: it indicates that bilinguals sidestep CS at the Adj-N boundary.

In sum, we replicate findings from previous studies, with both frameworks achieving equally accurate predictions. However, half the data are constituted by lone N, with which adjective placement is achieved without having to invoke abstract features for adjectives or an ML necessitating EL islands for multi-word CS. Another third is constituted by multi-word CS after the determiner, which as previously reported and again found here, far outweighs multi-word CS between Adj and N, in spite of no relevant prediction by either theory.

7. All adjective mixes: Contextualizing by adjective position and mixing type

As we have seen, the purview of the most discussed theories is restricted to NP-internal mixing, that is, sequences of Det, Adj, and N where one of the three is in a different language from the other two. Here the data set is composed of every adjective or associated noun at the border with the other language (Section 3). Table 6 thus extends Table 5 by adding a third multi-word mixing type, CS at the boundary of an internally same-language NP/AdjP and, further, by juxtaposing predicative to attributive adjectives.

Table 6. All adjective mixes according to mixing type, language, and position ($n=527$)*

Mixing type	Adj lang	Post nom	Pre nom	Attributive (post + pre)	Predicative	Totals	Compound
Lone item incorporation						186	3
Lone Noun						60	
N _{ENG}	Span	12	27	39	5	44	1
N _{SPAN}	Eng	0	15	15	1	16	0
Lone Adj						126	
Adj _{ENG}	Eng	5	1	6	99 2	107	0
Adj _{SPAN}	Span	0	2	2	17	19	2
Multi-word CS						205	81
Between Adj and N						10	
Adj _{ENG} N _{SPAN}	Eng	0	6	6	NA	6	1
Adj _{SPAN} N _{ENG}	Span	1	3	4	NA	4	0
After Det						38	
Det _{SPAN} Adj _{ENG} N _{ENG}	Eng	2	35	37	NA	37	79
Det _{ENG} N _{SPAN} Adj _{SPAN}	Span	1	0	1	NA	1	1
At NP/AdjP boundary						157	52
(Det _{ENG}) Adj _{ENG} N _{ENG} / AdjP _{ENG}	Eng	2	92	94	14 14	122	51
(Det _{SPAN}) N _{SPAN} Adj _{SPAN} / AdjP _{SPAN}	Span	10	5	15	9 11	35	1
Totals		33	186	219	172	391	136

*Shading indicates different-language Adj-N pairs. Omitted are other syntactic structures (see note 4) ($n=28$).

We begin with attributive adjectives. As Table 5 already indicated, other than lone N incorporations, most mixed NPs with a Det and Adj have the switch after the Det. By extending our view of mixing type, we see that a further alternative is to switch at the boundary of an internally same-language NP, such that the sequence of (Det) Adj and N is all in the same language, as in (19).⁷ That is, the speaker could have switched within the NP after the Det but chose not to (compare *los big sizes* 'the *big sizes*' (18a) and *those shiny pants* (19a)). Both CS after Det ($n=38$) and CS at NP boundary ($n=94+15=109$) are alternatives to multi-word CS between Adj and N. Adding them together, CS *not* between Adj and N overshadows multi-word CS between Adj and N (147 vs. 10). So, it is fair to say that, once all relevant attributive adjective mixes are accounted for, multi-word CS at the Adj-N boundary is quantitatively *avoided*, in agreement with the Equivalence constraint (Poplack, 1980, p. 600).

⁷ NP/AdjP-boundary includes CS at the beginning ($n=85$) (ex. 19a, 19b, 21a) or end ($n=72$) (ex. 19c, 21b) of an internally same-language NP or AdjP, sometimes at a clause boundary (ex. 7) ($n=38$), since speakers could have begun CS just before the clause boundary, switching between Adj and N, as in *the wrong pastillas, y le dieron mal* 'the *wrong* pills, and they harmed him' [25, 1:03].

(19) CS at NP boundary

a. Dolores:	.. <i>y se pone those shiny pants.</i>	‘.. and he wears <i>those shiny pants.</i> ’
		[22, 52:55 - 52:57]
b. Monica:	<i>ya comencé yo a agarrar,</i>	‘I already started getting,
	.. <i>part-time jobs.</i>	.. <i>part-time jobs.</i> ’
		[11, 04:18 - 04:20]
c. Dora:	<i>parecía uno de esos de México y</i>	‘he looked like one of those guys from
	<i>luego with that big hat,</i>	Mexico and then <i>with that big hat,</i>
	<i>y con el rifle también.</i>	and with the rifle too.’
		[20, 26:04 - 26:08]

Figure 3 depicts bilinguals' avoidance of multi-word CS at the Adj-N boundary, showing mixing type by whether the Adj and N are in different languages. In fact, most attributive Adjs occur in same-language Adj-N pairs (67%, 146/219). Most cases of different-language attributive Adj-N pairs are due to lone Ns (74%, 54/73) rather than to multi-word CS at the Adj-N boundary (14%, 10/73). That is, *unos desks muy grandes* 'some very big desks' (16a) is strongly preferred over *a little pollita de esas* 'a little chick like that' (17a). However, the eschewal of CS at the Adj-N boundary cannot be ascribed to a general lack of multi-word CS, since bilinguals do avail themselves of multi-word CS involving attributive adjectives, as long as it is after the Det within an NP or at the external boundary of an internally same-language NP.

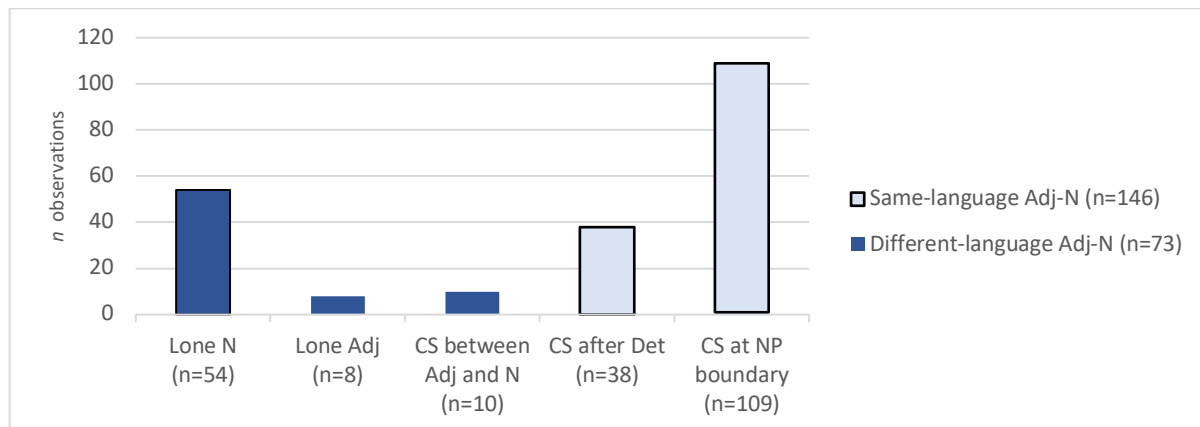


Fig. 3 Attributive adjectives by mixing type and Adj-N language: Attributive Adjs are mostly in the same language as the N (67%, 146/219); different-language Adj-N are mostly due to lone Ns (74%, 54/73). Multi-word CS between Adj and N is just 5% (10/219) of attributive adjective mixes. (Row and column totals differ by one token of CS at NP boundary with Different-language Adj-N.)

But perhaps avoidance of multi-word CS at the Adj-N boundary is due to a general avoiding of different-language Adj-N pairs. Let us consider now predicative position, mostly lone Adjs, as in (20), though one-quarter is multi-word CS at the boundary of an internally unilingual AdjP, as in (21) (28%, 48/172, of predicative adjective mixes). Figure 4 divides adjective mixes by whether the Adj is in the same language as the N and also by adjective position. Overall, different-language Adj-N pairs are not avoided, making up slightly more than half the adjective mixes (55%, 217/391). However, two-thirds (66%, 144/217) appear with predicative adjectives

(as in (20a,b) and (21a)).⁸ Such a preference for predicative Adjs has been previously reported and related to structural parallelism or equivalent boundaries between the languages (Deuchar, 2005, p. 262-263; Pfaff, 1979, pp. 304-306; Sankoff & Poplack, 1981, pp. 33-34).

(20) Lone predicative adjective

a. Enrique:	<i>porque era muy mean con nosotros.</i>	‘because he was very <i>mean</i> to us.’
		[23, 48:13 - 48:15]
b. Benita:	<i>todo queda black.</i>	‘everything is <i>black</i> .’ ((literally: remains))
		[31, 58:02 - 58:03]

(21) Multi-word CS at predicative AdjP boundary

a. Carmela:	<i>he's, ... bien mocho,</i>	‘he's, ... real broken,’ ((his Spanish))
		[31, 38:01 - 38:03]
b. Javier:	<i>... they kept them tied up allá en ~Pilar,</i>	‘... they kept them <i>tied up</i> there in ~Pilar,’
		[17, 51:48 - 51:51]

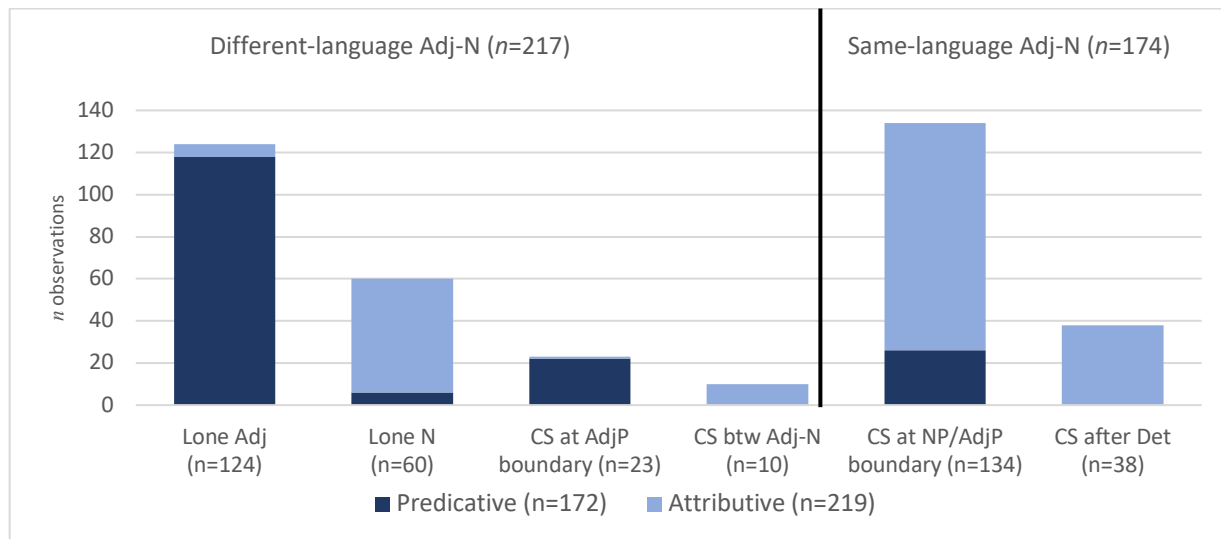


Figure 4. Adjective mixes by Adj-N language, same (n=174) vs. different (n=217), adjective position (predicative vs. attributive) and mixing type (lone item vs. multi-word CS). Different-language Adj-N pairs are mostly with predicative adjectives (67%, 146/217). Same-language Adj-N pairs are mostly with attributive adjectives (85%, 146/174). Multi-word CS between Adj and N is just 5% (10/205) of all multi-word adjective mixes.

⁸ Two lone predicative Adjs are in the same language as the N (*se volteara green la light* 'the light would turn green' [06, 49:52], *a uranium que sale, ... refined* 'a uranium that comes out, ... refined' [18, 33:-09]).

In sum, bilinguals readily produce multi-word CS with attributive adjectives, but do so with same-language Adj-N pairs, switching before or after the Det. Bilinguals also produce adjective mixes resulting in Adj and N in different languages, but do so in predicative position. Once we account for all multi-word adjective mixes (i.e., CS involving an Adj or associated N at the boundary with the other language), multi-word CS between Adj and N within the NP is just 5% (10/205).

8. Code-switching preferences and bilingual experience

Comparison with unilingual benchmarks of both languages produced by the same bilinguals allows us to observe *disproportions* in adjective mixes. First, these bilinguals disproportionately select predicative over attributive position for different-language Adj-N pairs as compared with their unilingual English adjectives (90% vs. 38%); the same tendency is observed for their Spanish adjectives (81% vs. 65%) (Table 7). We have learned, then, that not only do bilinguals avoid multi-word CS between Adj and N but that they quantitatively prefer the shared predicative position—a consistent equivalence site between the two languages—as opposed to the variably equivalent attributive position.

Table 7. Adjectives in different language from noun: Disproportion of predicative vs. attributive in comparison with unilingual benchmarks

	Adj lang	Predicative		Attributive		Total
			<i>n</i>		<i>n</i>	<i>n</i>
Adjective mixes	Eng	90%	113	10%	12	125
Unilingual	Eng	46%	331	54%	395	726
Adjective mixes	Span	81%	26	19%	6	32
Unilingual	Span	65%	259	35%	137	396

*Difference is statistically significant for English ($p < 0.0001$), not quite so for Spanish ($p = 0.0798$), by Fisher's exact test. Not counted are mixes due to lone Ns.

Second, within the attributive Adjs, there is also an overall disproportion of prenominal position. Table 8 (left half) shows that the rate of prenominal Spanish attributive Adjs is higher in mixes than in bilinguals' unilingual Spanish (61% vs. 39%); prenominal position is close to ceiling for English Adjs across the board (excepting lone Adjs incorporated into Spanish). In addition, prenominal position is mostly taken up by English Adj-N pairs (68%, 127/186) (see Table 6).

Table 8. Attributive adjective and compound mixes: Disproportion of prenominal modifiers in comparison with unilingual benchmarks by language

	Adj/ Mod. lang	Attributive Adj Postnominal		Attributive Adj Prenominal		Attr. Adj Total	Compound Modifier Prenominal		Com- pound Total	Adj & Compound Prenominal		Adj & Compound Total
		%	<i>n</i>	%	<i>n</i>	<i>n</i>	%	<i>n</i>	<i>n</i>	%	<i>n</i>	<i>n</i>
Adj Mixes	Eng	6%	9	94%	149	158	98%	130	132	64%	279	436
Unilingual	Eng	2%	9	98%	386	395	100%	118	118	58%	504	865
Adj Mixes	Span	39%	24	61%	37	61	50%	2	4	33%	39	119
Unilingual	Span	61%	83	39%	54	137	0	0	28	12%	54	462

*Difference is statistically significant for Spanish, both for proportion of attributive Adjs that are prenominal ($p=0.0084$) and for proportion of all Adjs and compound modifiers that are prenominal ($p < 0.0001$), by Fisher's exact test. For English, the difference is not significant ($p=0.0598$) for attributive Adjs, achieving significance ($p=0.0479$) for attributive Adjs and compound modifiers combined. Compound total includes *N de N* (see note 10).

What is the explanation for this (Det_{SPAN} +) Adj_{ENG}N_{ENG} pattern? English Adjs are preferred in adjective mixes overall (74%, 288/391) (Table 6), the exception being mixes by virtue of lone Ns, most of which are English incorporations into Spanish (from which it follows that the accompanying Adj would be Spanish). Recall the predilection for incorporating lone English Ns into Spanish rather than the reverse (88%, 1541/1744 (Figure 1a)). Lone Adjs, too, are predominately English (85%, 107/126) (Table 6). These are incorporated as predicatives, 25% (25/101) with linking verbs besides 'be' (e.g., *queda black* 'is/remains *black*' (20b)), as in bilinguals' unilingual Spanish, while the occasional attributives appear postnominally (e.g., *los padrinos más modern* 'the most *modern* godparents' (15a)) (5/6), likewise following Spanish patterns.⁹ However, English Adjs also predominate in adjective mixes with multi-word CS (80%, 165/205), especially CS after Det (97%, 37/38) (Table 6).

For these bilinguals the disproportionately more mixing involving English Adjs than Spanish Adjs, as previously observed for nominal mixes, must simply be recognized as a linguistically arbitrary community convention, even if it may have extra-linguistic origins (Torres Cacoullos et al., 2022, pp. 647-649; cf. Valdés-Kroff, 2016, p. 281) (see Section 2). The community preference for lone English Ns and Adjs does, however, have linguistic consequences in the pattern of (Det_{SPAN} +) Adj_{ENG}N_{ENG}, where English Adj and N are paired.

Note that this Adj_{ENG}N_{ENG} pattern would be *strengthened by bilinguals' combined linguistic experience*: the prenominal Adj order that is partially shared across the languages is more frequent, whereas the postnominal order of one of the languages is a minority variant when we consider bilinguals' use of both languages. Let us in addition consider compounds, pairs of nouns of which one modifies the meaning of the other. A more general [Prenominal modifier-N]_{ENG} organizational pattern would be further strengthened by English NN compounds, which are more frequent and productive than corresponding Spanish *N de N* compounds (Section 5).

Returning to Table 6, the rightmost column adds to the adjective dataset a relatively large number of compound mixes, with multi-word CS either after the Det (22) or at the boundary of an internally unilingual NP (10). Virtually all compound mixes are same-language English pairs

⁹ Linking verbs other than the 'be' copulas make up 25% (25/101) of lone English predicative Adjs, comparable to 23% (59/259) in unilingual Spanish (Section 4).

(96%, 130/136).¹⁰ Once these are added, the disproportion of prenominal modifiers in mixes compared with unilingual benchmarks is even more noticeable, at 33% vs. 12% of all Adjs and compounds combined for Spanish, and 64% vs. 58% for English (Table 8, right half).

(22) English NN compound mix

Enrique:	<i>si hasta el paint job,</i>	'even the <i>paint job</i> ,
	<i>.. thousand dollars cada .. paint job.</i>	<i>.. thousand dollars every .. paint job.'</i>
		[23, 1:00:17 - 1:00:19]

The role of bilingual experience has been raised in prior studies, with the suggestion that "the prenominal adjective word order advantage [...] may [...] be determined by speakers' relative experience with the adjective-noun combinations" (Parafita Couto & Gullberg, 2019, p. 704). The Dets_{SPAN} + Adj_{ENG}N_{ENG} pattern has been further related to chunking of NN pairs, the cognitive process by which words frequently used together are treated as units (Beatty-Martínez et al., 2020, p. 9; cf. Bybee, 2010, pp. 34-37). Thus, the preference for English prenominal modifiers in attributive adjective mixes arises from a community norm to incorporate lone English Ns and Adjs into Spanish together with the higher frequency of prenominal Adjs in bilinguals' aggregate linguistic experience. Bilinguals' experience with the productivity of English NN compounds would further reinforce the pattern of (Dets_{SPAN} +) [Prenominal modifier-N]_{ENG}.

9. Conclusion

In this study, we brought to bear data from bilingual community members who regularly use both languages and we contextualized the within-NP mixing that has preoccupied competing CS theories which depend on abstract features or on a matrix language. By distinguishing lone-item from multi-word mixing types and broadening the universe of data to include all adjective mixes, we are able to identify quantitative preferences to switch at particular sites.

From relative frequencies of spontaneous mixing types, it is evident that these bilinguals circumvent multi-word CS at the Adj-N boundary, a point of cross-language variable equivalence. They disproportionately select different-language Adj-N pairs in the consistently equivalent predicative position and opt to switch at the NP external boundary or after the determiner—also a consistent equivalence site. The preference for same-language English Adj-N pairs within the noun phrase follows from bilingual community norms (for English lone Ns and Adjs) and linguistic experience (with greater frequency of [Prenominal modifier-N]).

In sum, confronting cross-language variable equivalence arising from language-internal variability, the Variable Equivalence hypothesis proposes that bilinguals choose CS at alternative syntactic boundaries that are consistently equivalent and more frequent in their combined linguistic experience. As attested by the northern New Mexico bilingual community, while maintaining distinct grammars within each language, code-switchers opt for shared word orders and aggregate grammatical patterns at the boundary between languages.

¹⁰ Compound mixes are English NNs, except for $n=3$ N de N (*un ranch de vaquero* 'a cowboy ranch' [23, 00:28], *the árbol de moras* 'mulberry tree' [04, 33:57], *un saco de, de, .. gunnysack* 'a sack of, of,' [17, 58:40]); $n=2$ Spanish prenominal modifiers (*a farolito display* 'luminaria' [22, 47:26], *a peregrinos march* 'pilgrim' [02, 47:25]); $n=1$ English postnominal modifier (*una máquina roe sacks, it's netty material* 'a roe sack machine' [18, 20:21]).

Appendix 1: Transcription Conventions (Du Bois et al. 1993)*

Carriage return new Intonation

Unit**

.	final intonation contour	..	short pause (0.2 secs)
,	continuing intonation contour	...	medium pause (0.3-0.6 secs)
?	appeal intonation contour	...()	timed pause (0.7 secs or longer)
--	truncated intonation contour	X	one syllable of unclear speech
-	truncated word	!	booster, notably high pitch
~	pseudonymized proper noun	[]	overlapped speech

*For the purposes of readability, removed are vocal noises, laughter and vowel lengthening.

** Where the IU does not fit on one line, the second line is indented.

Appendix 2: Examples of adjective mixes (shaded cells have more than 5 tokens) (Table 6)

Mixing type	Attributive Postnominal	Attributive Prenominal	Predicative
Lone N _{ENG}	<i>un roof nuevo y todo.</i> (1)	<i>tienes puras girls,</i> (16b)	<i>se veían tan suaves los colors.</i> [06, 08:46]
Lone N _{SPAN}		<i>the whole calabaza !there,</i> (16c)	<i>I built .. the cemento, solid también.</i> [04, 46:01]
Lone Adj _{ENG}	<i>los padrinos más !modern.</i> (15a)	<i>.. el northeastern parte, ... de, ... Colorado.</i> [16,05:17]	<i>era muy mean con nosotros.</i> (20a)
Lone Adj _{SPAN}		<i>all gabacho style.</i> (15b)	<i>no one's .. gordito in the m- videos.</i> [22, 12:17]
CS betw Adj and N Adj _{ENG} N _{SPAN}		<i>a little pollita de esas.</i> (17a)	
CS betw Adj and N Adj _{SPAN} N _{ENG}	<i>full of uh, green chile no más tirado</i> [17, 58:40]	<i>es puro talk show really.</i> (17b)	
CS after Det Det _{SPAN} Adj _{ENG} N _{ENG}	<i>[] le di el color yellow. it was yellow.</i> [04, 43:25]	<i>comenzaron con los big sizes.</i> (18a)	
CS after Det Det _{ENG} Adj _{SPAN} N _{SPAN}	<i>do you use the harina preparada?</i> (14b)		
CS phrase-boundary (Det _{ENG})Adj _{ENG} N _{ENG} / Adj _{P_{ENG}}	<i>tenías que usar -- como .. zap- -- .. eh, .. pants light.</i> [06, 46:00]	<i>se pone those shiny pants.</i> (19a)	<i>... era kinda big.</i> [04, 29:22]
CS phrase-boundary (Det _{SPA})N _{SPA} Adj _{SPA} / Adj _{P_{SPAN}}	<i>... and you find, muchas cosas bien baratas.</i> (5)	<i>.. grandma te puedo pagar como, ... next week,</i> [11, 09:16]	<i>he's, bien mocho</i> (21a)

Appendix 3: All instances of within-NP CS between Adj and N ($n=10$, Table 5)

Adj lang	Verb lang	Adj Position	Instances
Eng	Eng	Prenominal	<i>but I still .. renewed my license, .. this past .. diciembre, ... por .. tres años más, [27, 06:25]</i>
		Prenominal	<i>... that's what she ... gave me, a little pollita de esas. [04, 21:02]</i>
		Prenominal	<i>and I'm like, !oh, my poor hijito, ...(1.2) bien bien mocho. [31, 37:10]</i>
		Prenominal	<i>... they gave them the wrong pastillas, y le dieron mal, [25, 01:03:40]</i>
Span	Span	Prenominal	<i>.. es puro talk show really. nomás oyes los mitotes de la gente. [04, 40:57]</i>
		Prenominal	<i>y ahora es puro -- the Wii. ... puro tv. [04, 26:20]</i>
		Prenominal	<i>.. se entremete ahí un -- el mejor eh, ... interpretation in Eng- -- en español, [27, 33:02]</i>
		Postnominal	<i>.. él quería dar un saco de, de, .. gunnysack, .. full of uh, green chile no más tirado asina, which I could pick with one hand, [17, 58:40]</i>
Eng	Span	Prenominal	<i>ahora estaba cantando en -- .. a new disco hoy. [24, 54:24]</i>
Eng	not prosodically connected verb	Prenominal	<i>... estaba llena de toys. like a little .. gorra o algo. and we would -- [04, 24:07]</i>

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