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An experimental study on the loss of VS order in monolingual and bilingual speakers of Brazilian Portuguese

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Abstract: This paper presents an experimental approach to subject inversion in Brazilian Portuguese (BP). We investigated the acceptability of SV and VS sentences by two groups of speakers: monolingually-raised and bilingual heritage speakers of BP, using acceptability judgment tasks to test the effect of verb type, definiteness and pragmatic context. Results confirm that BP lost VS order with the exception of unaccusative constructions. Both speaker groups accept SV orders in all contexts, rejecting VS in sentences with transitive and unergative verbs. With respect to unaccusative verbs, pragmatic context and definiteness play a role in the acceptance of VS structures: with narrow focus on the subject, monolingual speakers accept VS order with definite and indefinite postverbal subjects. However, in all-new contexts, they tend to reject definite postverbal subjects. Given this differential behavior in the two contexts, we assume that BP exhibits two different syntactic positions for postverbal subjects in unaccusative constructions. Heritage speakers of BP are generally stricter in rejecting VS order. They do not allow for postverbal definite subjects in VS clauses independent of pragmatic context, indicating that they are progressively eliminating a residual postverbal focus position in unaccusative constructions. We take this as another indication that heritage speakers may promote and accelerate ongoing diachronic change.

Keywords: Brazilian Portuguese; subject-verb inversion; unaccusative verbs; heritage speakers; diachronic change

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1 Introduction

Previous theoretical work has observed that Brazilian Portuguese (BP) differs from European Portuguese (EP) with respect to the availability of subject inversion structures (VS) (Kato 2000).

(1) *Cantam* *os* *pássaros.* *BP EP
sing+3PPL the birds
'THE BIRDS sing.' (Kato 2000)

Corpus studies confirm this claim (Berlinck 1989, 2000): VS order is restricted in the corpora, despite of residual contexts, mainly in thetic sentences and with unaccusative verbs.

The decrease of a structure in oral speech could be interpreted in two ways: it may reflect a reduced use, due to the preference for a competing structure, or it may show that a structure became obsolete or even ungrammatical. Studies using acceptability judgment tasks can complement theoretical and corpus investigations and provide additional evidence to diagnose ongoing grammatical changes (see Rinke et al. 2023).

We conducted two studies, each one consisting of two acceptability judgment tasks. In the first study, we investigate the acceptability of subject inversion in monolingual speakers of BP. We ask whether monolingual speakers of BP do indeed reject VS orders as reported in previous literature and whether verb type, definiteness and pragmatic context are relevant factors determining their acceptability of VS structures.

In a second study, we tested bilingual heritage speakers of BP living in Germany. We investigate whether the alleged ongoing change concerning the loss of VS structure in BP is also found in heritage speakers (HSs), despite of abundant VS orders in their contact language German. Going a step further, we ask whether a potential change is even more pronounced in bilingual speakers than in monolinguals, as it would be expected based on previous research on EP as a heritage language (HL) where we argued that heritage speakers may promote and accelerate ongoing diachronic change in Portuguese (see Rinke and Flores 2014, 2021; Rinke et al. 2018).

2 The loss of subject inversion in BP

It is a well-established fact that BP differs from EP with respect to subject–verb inversion structures (for BP, see Kato and Tarallo 2003; Berlinck 2000, Kato 2000,

among others; for a comparative approach, see Barbosa et al. 2005). In EP, VS order is possible, given the right pragmatic context (e.g. narrow focus on the subject, see (2a)). In BP, VS is generally marked as ungrammatical (see 2b., Kato 2000).

(2) a. *Respondeu-a/* *a pergunta* *a Maria.* *BP EP
answered+3PSG CLITIC the question the Maria
'Mary answered the question.'

b. *Respondeu* *a pergunta* *uma aluna* *BP EP
answered+3PSG the question a student
'A student answered the question.'
(Kato 2000: 232)

Berlinck (1989, 2000) provides corpus data showing a steady decrease of VS orders in BP over the centuries. She argues that the restricted availability of VS is a result of diachronic change. But her corpus data also show that VS has not yet completely disappeared: in contemporary BP, inversion is mainly available with unaccusative and copulative verbs. Kato (2000: 232) also claims that, in contrast to transitive sentences like (2a) and (2b), "spoken Brazilian Portuguese (BP) retains a productive VS order in unaccusative and existential constructions" (see 3).

(3) a. *Tinha* *chegado* *muitas* *cartas.*
had+3PSG arrived many letters
'There arrived many letters.'

b. *Tem* *um* *gato* *em baixo* *da* *mesa.*
has a cat under the table
'There is a cat under the table.'
(Kato 2000: 232)

As can be seen in example (3a), in spoken BP, the finite verb may not agree with the postverbal subject in thetic sentences with an unaccusative verb (Kato and Martins 2016).

The pragmatic context also impacts on the acceptability of VS structures in BP. Sentences like (3a)–(3b) are thetic sentences,[1] allowing more easily for a postverbal subject. In thetic sentences starting with a locative adverbial phrase ('locative inversion', see Pilati 2006), VS order also seems to be more easily available (ex. 4) with unergative verbs.

(4) a. *Nesta* *casa* *morou* *o* *Jobin.*
in.this house lived the Jobin
'Jobin lived in this house.'

1 Thetic sentences are sentences without a topic, in which all the information is new and no referent is given. The notions *thetic* and *categorical* come from Kuroda (1972), see also Martins (1994) for EP.

b. *Nesta obra trabalham imigrantes de toda a America Latina.*
in.this construction work immigrants of all the America Latin
'Immigrants of all Latin America work in this construction.'
(Kato and Martins 2016: 17)

Inversion in thetic sentences like (3) and (4) is grammatical in both EP and BP. However, in categorical sentences, EP and BP differ with respect to the availability of VS order. EP allows for inversion of a focussed subject (5), but not BP, where a focussed subject appears in *preverbal* position (6) (Kato and Martins 2016).

(5) Q: *Quem cozinhou batatas?*
who cooked potatoes
'Who cooked potatoes?'

A1: *Cozinhou (batatas) a Maria.* *BP EP
cooked (potatoes) the Mary
'Mary cooked potatoes.'
(Kato and Martins 2016: 14)

(6) *Quem levou o meu laptop?*
who took the my laptop
'Who took my laptop?'
[$_F$ O LADRÃO] levou ele. BP *EP
the thief took it
'The thief took it.' (Kato and Martins 2016: 19)

Again, unaccusatives represent an exception: they allow for a subject focus interpretation of a postverbal subject in BP.

(7) Q: Quem caiu?
who fell
'Who fell?'

A1: *Caiu uma criança.* BP EP
fell a child
'A child fell.' (Kato and Martins 2016: 14)

The examples in (3) and (7) show that in unaccusative structures, a postverbal subject can either be part of a thetic sentence or the focussed subject of a categorical sentence. The same variability is found with respect to preverbal subjects of unaccusative verbs. They can either be the subject of a categorical sentence (as in EP) or receive a thetic reading (see Kato and Martins 2016, example (8)).

(8) *O Paulo chega hoje.* BP #EP (thetic/descriptive reading in BP)
the Paul arrives today (categorical reading favored in EP)
'Paul arrives today.' (Kato and Martins 2016: 12)

Although this factor is not often explicitly discussed in the literature, VS order in BP seems also to be related to definiteness. Based on corpus data, Santos and Duarte (2006) report that definiteness plays a role for the occurrence of VS order in unaccusative structures. Their examples suggest that the postverbal position is preferentially occupied by indefinite and the preverbal position by definite subjects. This is also in accordance with the examples for VS order in BP cited above which usually include an indefinite subject (3a/b; 4b; 7).

Summing up the findings from introspective judgments and corpus investigations: VS orders have decreased in BP and only continue to be residually available in thetic contexts and with unaccusative verbs.[2] Definiteness also seems to be an influential factor, although it is less studied in previous research and its role is less clear.

According to Kato (2000), the loss of free inversion is related to the change of the null subject property in BP (Duarte 1993, 2000).[3] For null subject languages (NSL) like Spanish (and presumably EP), Kato assumes that pronominal agreement checks the relevant features in TP. Therefore, no specifier of TP has to be projected and a preverbal definite subject (of a categorical sentence) is placed outside TP in a higher projection (in her account ΣP, see the Spanish example in (9a.)). Free inversion is then the result of prosodically motivated movement, adjoining the TP to the left of a focussed subject (9b.):

(9) a. [$_{\Sigma P}$ **Juan$_i$** [$_{TP}$ lo comi-**ó$_i$** [$_{VP}$ …..]]]
Juan it ate+3PSG
'Juan ate it.' (Kato 2000: 214)

b. [$_{\Sigma P}$ [$_{TP}$ lo comi-**ó** [$_{VP}$ …..] [$_{\Sigma P}$ **Juan**$_{[+F]}$ [t$_{TP}$]
it ate+3PSG Juan
'JUAN ate it.' (Kato 2000: 219)

For indefinite subjects in VOS constructions with transitive verbs, Kato (2000) assumes that P-movement does not necessarily apply because an indefinite subject can be unmarked (Benincà and Salvi 1988). It remains in situ (vP) and occurs to the right of the V+Agr-complex in T (see 10). The same is true for the indefinite subjects of unergative and unaccusative verbs.

2 We leave aside here cleft sentences and sentences involving contrastive focus movement (see Kato and Martins 2016).

3 See also Rodrigues (2002, 2004) for an analysis of the change of the null subject property in BP.

(10) [$_{TP}$ comi-**ó$_{i}$** [$_{vP}$ la torta$_{j}$ [$_{vP}$ [$_{DP}$ t$_{i}$ **un gato**] [$_{VP}$ t$_{j}$ [t$_{v}$ [t$_{j}$]]]]]]
ate+3PSG the cake a cat
'A cat ate the cake.' (Kato 2000: 223)

As for the change in BP, Kato (2000) assumes that the appearance of a free weak nominative pronoun paradigm in BP led to the reanalysis of the agreement affixes as non-pronominal. As a result, the projection of Spec of TP has become mandatory and nominative pronouns occupy this position. Following this analysis, the postverbal subject position is no longer available for a definite subject DP, because it has to move to Spec of TP to check its nominative and φ-features as shown in Figure 1. As a consequence, focalization of the subject is only possible in preverbal position as in languages like English:

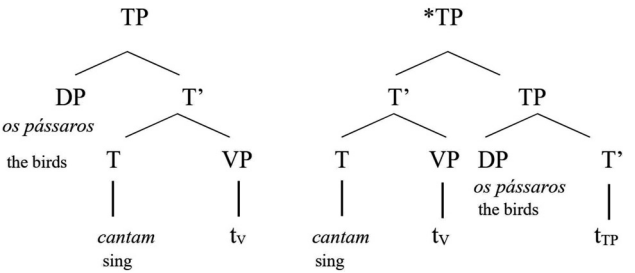

Figure 1: Derivation of sentences with definite subject DPs in BP according to Kato (2000: 233).

The question arises, how residual cases of inversion can be accounted for. According to Kato (2000), indefinite free inversion was reanalyzed as an expletive construction with an empty expletive. After the loss of agreement in the spoken language, BP patterns with French (11a)–(11b).

(11) a. *Il y a des chats sous la table.*
EXPL LOC-CL has of cats under the table
'There are cats under the table.'

b. *Il est arrivé plusieurs des lettres.*
EXPL is arrived many of letters
'There arrived many letters.' Kato (2000)

According to Kato (2000), in BP unaccusative constructions like (3a). (Here repeated as (12)), a non-argumental null affix (∅) appears as an independent item in the numeration and is merged with V+T to check its D-features. Because the neuter ∅-affix eliminates the Case and φ-features of T, the postponed subject of unaccusatives shows lack of agreement in spoken BP, similar to the French examples in (11).

(12) *Tinha chegado muitas cartas.*
had+3PSG arrived many letters
'There arrived many letters.'

An interesting consequence of this analysis is that a definiteness effect is expected in these constructions, similar to French, where only indefinite but not definite subjects can occur post-verbally. We will include definiteness as a factor in our experimental study and come back to its role in the discussion in Section 4.

3 Experimental study 1: subject-verb inversion in monolingual Brazilian Portuguese

Section 3 presents an experimental study conducted with monolingual speakers of BP. The aim of this study is to empirically test the generalizations and observations discussed in the previous section.

3.1 Research questions

As discussed in Section 2, most of the studies on word order variation in BP are based on corpus data or introspection. However, the fact that speakers of BP produce less VS orders does not necessarily imply a grammatical change. It could rather reflect preference of a competing structure. In this case, speakers would judge both SV and VS structures equally grammatical although they prefer one structure (for instance, in colloquial discourse). Alternatively, if a grammatical change occurred, we would expect that the speakers systematically reject one of the orders. In this scenario, L1 speakers would treat SV and VS orders in different ways, depending on the pragmatic context, the verb type and probably the definiteness of the subject DP. With respect to monolingual L1 speakers, we will consider the following research questions:

1. Can we confirm the loss of inversion in BP based on experimental judgment data?
2. Can we confirm that the factors verb type, pragmatic context (broad vs. narrow focus) and definiteness play a role in the degree of acceptance of VS structures in BP?

3.2 Methodology and Participants

We applied two separate acceptability judgment tasks to different groups of BP speakers. In both tasks, the same experimental items were included: the items were

constructed taking into consideration the factors *verb type* (with the values *transitive, unergative* and *unaccusative*) and *definiteness* of the subject in unaccusative constructions (with the values *definite* and *indefinite*). The following verbs were used:

(13) *Verbs used (in both tasks):*
   a. transitive verbs: *fazer* ('to make'), *ler* ('to read'), *arrumar* ('to tidy up'), *escrever* ('to write'), *devolver* ('to give back'), *cozinhar* ('to cook')
   b. unergative verbs: *sorrir* ('to smile'), *chorar* ('to cry'), *nadar* ('to swim'), *viajar* ('to travel'), *gritar* ('to shout'), *trabalhar ('to work'*)
   c. unaccusative verbs: *cair* ('to fall'), *chegar* ('to arrive'), *subir* ('to go up'), *aparecer* ('to appear'), *morrer* ('to die'), *faltar* ('to miss')

Each verb occurred once, with a definite subject and in a sentence with SV and VS order. For the unaccusative verbs, an additional sentence with an indefinite subject was included, also showing SV and VS order. In sum, each test comprised 36 experimental items testing the *verb type* with a definite subject (12 items with transitive verbs, 12 with intransitive verbs, 12 with unaccusative verbs). 12 more items were added to test the factor *definiteness* (12 items with unaccusative verbs and indefinite subjects). The experiment also included 24 fillers (12 with gender errors; 12 with agreement errors).

In order to test for the *pragmatic context*, the experimental items in task 1 were preceded by a context inducing a focus reading of the subject constituent:

(14) *Context favouring an information focus interpretation of the subject (1st study):*
- Marina:

Na segunda-feira um dos meus irmãos apareceu no
in.the Monday one of.the my brothers appeared in.the
meu trabalho de surpresa.
my work for surprise
'On Monday, one of my brothers appeared surprisingly on my work.'

- Aline:

Sério? Quem foi que apareceu na segunda-feira?
really who was that appeared on-the Monday
'Really? Who was it that appeared on Monday?

Experimental item: (condition: unaccusative verb, postverbal subject, definite)
- Marina:

Na segunda-feira apareceu o Lucas.
in.the Monday appeared the Luca
'On Monday, Lucas appeared.'

In the second task, no context was given with the intention of providing an 'out-of-the blue' or all-new/wide focus context. We give an example with a postverbal subject for each verb type.

(15) a. *Anteontem caiu um menino.* (condition: unaccusative verb, postverbal subject, indefinite)
day.before. yesterday fell a boy
'The day before yesterday a boy fell.'

b. *Ontem gritou o gerente.* (condition: unergative verb, postverbal subject)
yesterday shouted the manager
'Yesterday the manager shouted.'

c. *Ano passado leu o manual o Pablo.* (condition: transitive verb, postverbal subject)
year last read the manual the Pablo
'Pablo read the manual last year.'

The test was applied online, individually and in written form using the platform Google docs. The participants were asked to consider whether they think the experimental phrase was correct and whether they would utter it in the same way. They were asked to rate the relevant constructions on a *Likert scale from 1 to 5* (1 = *muito ruim* 'very bad', 2 = *ruim* 'bad', 3 = *indiferente* 'indifferent', 4 = *bom* 'good', 5 = *muito bom* 'very good'). The two tasks were not applied to the same participants. Task 1 (narrow subject focus) was applied to 32 monolingual speakers of BP (21 women, 11 men, age 13–73 years), who grew up and live in Brazil. In the second study (Task 2), 18 monolingual speakers of BP also living in Brazil (6 women, 12 men, age 20–57 years) took part.[4]

3.3 Results

We will report the results organized by tasks (with and without context), by running two mixed ordinal regression models for each task, one testing the effect of verb type

4 A reviewer noted that the age range of the participants was relatively wide and asked about possible effects on the results. The large age range of the participants was chosen as stated in order to guarantee a wide age range of speakers. In order to see whether age had an effect on the results, we ran a preliminary regression model with age as predictor variable. Since the model did not show a significant effect of age and did not improve the models (presented in Section 3), we excluded this variable. Thus, we will not go into further detail here concerning this aspect and the question of potential generational language change. We leave it for future research with more participants.

(including the 36 items with definite subjects), and the other of definiteness (including the 24 items with unaccusative verbs and definite/indefinite subjects).

Data processing was conducted in R (version 4.1.3, Core Team, 2022).[5] In the sets of models testing the effect of verb type, the dependent variable was the participants' rating scores (i.e., *Response*) and the predictors were *word order* (SV/VS), *verb type* (UNERG/TRANS/UNACC), and their interactions. As for definiteness, the dependent variable was the same, and the predictors were *word order* (SV/VS), *definiteness* (indef/def), and their interactions.[6] *Participant* and *item* were introduced as random intercepts into the models. Predicted probabilities derived from the models were extracted using the *ggpredict()* function from the *ggeffects* package (version 1.2.3; Lüdecke 2018).

3.3.1 Task 1: sentences with context (subject focus)

We will start by reporting the results for the stimuli with a context inducing a focus reading of the subject.

3.3.1.1 Verb type

Figure 2 shows the proportion of ratings for SV and VS sentences per *verb type* (the darker the color, the better the sentences are rated).

The visual inspection of Figure 2 shows a similar distribution of the rating scores for all three verb types in SV sentences. Conversely, we observe differences between the verb types in VS sentences. Sentences with transitive verbs are most frequently rated with the scores 1 and 2. Unergative verbs are also often rated with the scores 1 and 2, but to a lesser extent. As for sentences with unaccusative verbs, they are rated with higher scores compared to the other two verb type conditions.

In order to confirm the observed patterns, a mixed-effect ordinal regression was fitted as in [1].

[1] Response ~ Word Order * Verb Type + (1 | Participant) + (1 | Item)

The main findings of Model [1], summarized in Table 1, show that there is a significant effect of *word order* (b = –2.54, CI = [–2.97 to –2.10], p < 0.001) as well as of the

5 We used the *tidyverse* package (version 1.3.2, Wickham et al. 2019), and data visualization was performed by means of the packages *ggplot2* (version 3.4.0; Wickham 2016) and *sjPlot* (version 2.8.12; Lüdecke 2022). The mixed ordinal regression models were fit to the data using the *ordinal* package (version 2022.11.16, Christensen 2022).

6 Before running the mixed ordinal regression models, the categorical predictors were coded as follows: the two-level factor variables *word order* and *definiteness* were coded using sum contrasts coding (–0.50/.50) and the three-level factor *verb type* was coded using simple contrast coding (UCLA Statistical Consulting 2011).

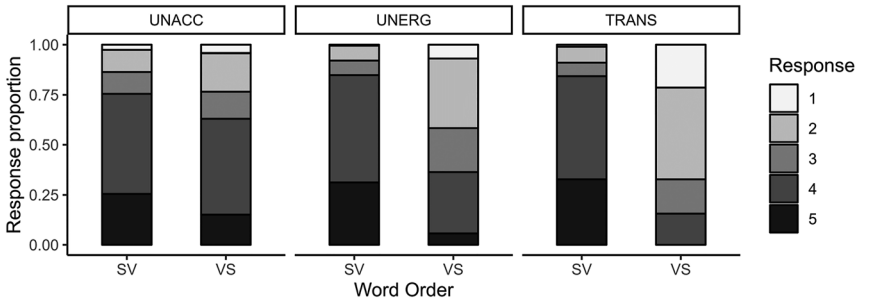

Figure 2: Task 1: proportion of rating scores per verb type and word order context (monolingual group).

Table 1: Summary of Model [1]. The fixed effects, their estimates, standard errors (SE), confidence intervals (CI), statistic (*z*), and *p*-values are given.

Predictors	Estimate	SE	CI	*z*	*p*
Word order (VS vs. SV)	−2.54	0.22	−2.97 to −2.10	−11.47	**<0.001**
Verb type (UNERG vs. UNACC)	−0.37	0.25	−0.87 – 0.12	−1.47	0.141
Verb type (TRANS vs. UNACC)	−1.06	0.26	−1.56 to −0.55	−4.11	**<0.001**
Word order (VS vs. SV) * verb type (UNERG vs. UNACC)	−1.73	0.51	−2.73 to −0.73	−3.38	**0.001**
Word order (VS vs. SV) * verb type (TRANS vs. UNACC)	−3.12	0.52	−4.14 to −2.11	−6.04	**<0.001**

Note. Reference levels: word order = SV; verb type = UNACC. Statistically significant *p* values appear in bold.

interaction term *word order * verb type*, meaning not only that the overall ratings are different for SV and VS contexts (b = −2.54, CI = [−2.97 to −2.10], $p < 0.001$), but also that unaccusatives receive significantly different ratings, when they are being contrasted with transitives (b = −3.12, CI = [−4.14 to −2.11], $p < 0.001$) and unergatives (b = −1.73, CI = [−2.73 to −0.73], $p = 0.001$), depending on the word order context.

In order to better understand these effects, we present, in Table 2, the predicted probabilities derived from Model [1]. For reasons of space, we will present, throughout the results section, the predicted probabilities of selecting the scores 2 and 4 by way of example (= the generally more frequently used scores for acceptance/rejection) instead of presenting the predicted probabilities for all response levels for each verb type in SV and VS contexts.

Table 2 shows that the predicted probabilities of rating the SV sentences as being *good* (Level 4) are high and similar for all verb types (60 %–63 %). The probabilities are distinct in VS contexts, with transitive verbs being the less likely to be scored 4

Table 2: Predicted probabilities of response levels 2 and 4 per verb type and word order context (Task 1, monolingual group).

	SV	95 % CI	VS	95 % CI
Predicted probability of response level = 2 (bad)				
UNACC	0.07	[0.03, 0.11]	0.15	[0.07, 0.23]
UNERG	0.04	[0.02, 0.07]	0.36	[0.23, 0.48]
TRANS	0.04	[0.02, 0.07]	0.56	[0.50, 0.63]
Predicted probability of response level = 4 (good)				
UNACC	0.63	[0.59, 0.67]	0.56	[0.47, 0.66]
UNERG	0.60	[0.53, 0.67]	0.33	[0.20, 0.45]
TRANS	0.60	[0.53, 0.67]	0.11	[0.05, 0.18]

(11 %) and unaccusatives being the most likely (56 %, close to SV contexts). Sentences with unergative verbs are rated in-between the other two verb types. The inverse is observed for the predicted probabilities of selecting the score 2 (bad) in VS contexts, with unaccusatives being the less likely (15 %) to be considered *bad*, followed by unergatives (36 %), and transitives being the most likely (56 %).

3.3.1.2 Definiteness

Figure 3 shows the distribution of the ratings per word order context for the unaccusative contexts with definite and indefinite subjects.

The visual inspection of Figure 3 reveals very similar distributions for sentences with definite and indefinite subjects in SV and VS contexts. In order to confirm the above-observed patterns, a mixed-effect ordinal regression was fitted as in [2].

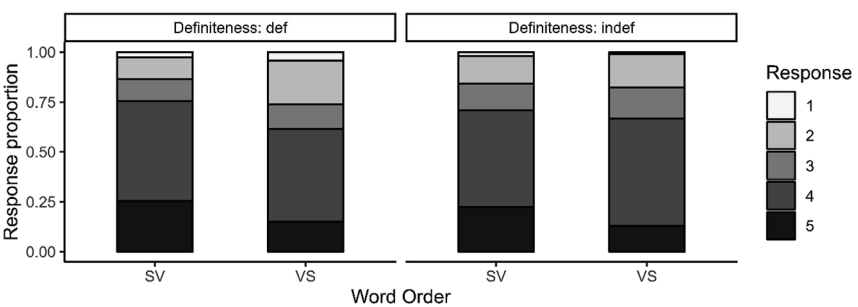

Figure 3: Task 1: proportion of rating scores for unaccusatives per definiteness and word order context (monolingual group).

[2] Response ~ Word Order * Definiteness + (1 | Participant) + (1 | Item)

The results of Model [2], summarized in Table 3, show that, in fact, there is an effect of *word order* (b = –0.71, CI = [–1.18 to –0.25], p = 0.002), meaning that going from a SV to a VS context decreases the log-odds of observing a higher rating score; but no effect of definiteness (b = 0.01, CI = [–0.45 to 0.47], p = 0.959) and no significant interaction between word order and definiteness (b = 0.67, CI = [–0.25 to 1.59], p = 0.154) were found. Thus, in the first task including a subject-focus context, speakers did not distinguish between definite and indefinite subjects of unaccusative verbs when judging SV or VS sentences.

The similar behavior for definite and indefinite subjects is further confirmed by the predicted probabilities extracted from Model [2]. Again, we selected the scores 2 and 4 to show these probabilities (Table 4).

Table 4 reveals that the monolingual BP speakers do, in fact, show similar probabilities of selecting a 4 score for definite (SV: 66 %; VS 59 %) and for indefinite subjects (SV: 66 %; VS: 63 %) in SV and VS word order contexts. For the score 2, definite and indefinite subjects are equally (un)likely to be judged as being *bad* in SV and VS contexts.

Table 3: Summary of Model [2]. The fixed effects, their estimates, standard errors (SE), confidence intervals (CI), statistic (z), and p-values are given.

Predictors	Estimate	SE	CI	z	p
Word order (VS vs. SV)	–0.71	0.24	–1.18 to –0.25	–3.02	**0.002**
Definiteness (indef vs. def)	0.01	0.23	–0.45 to 0.47	0.05	0.959
Word order (VS vs. SV) * Definiteness (indef vs. def)	0.67	0.47	–0.25 to 1.59	1.43	0.154

Note. Reference levels: word order = SV; definiteness = def. Statistically significant p value appear in bold.

Table 4: Predicted probabilities of response levels 2 and 4 per definiteness and word order context (Task 1, monolingual group).

	SV	95 % CI	VS	95 % CI
Predicted probability of response level = 2 (bad)				
DEF	0.06	[0.02, 0.10]	0.15	[0.06, 0.23]
INDEF	0.08	[0.03, 0.13]	0.11	[0.04, 0.18]
Predicted probability of response level = 4 (good)				
DEF	0.66	[0.62, 0.71]	0.59	[0.47, 0.70]
INDEF	0.66	[0.61, 0.71]	0.63	[0.55, 0.72]

3.3.2 Task 2: sentences without context question (all-new information)

We consider now the results of the second task, with context-less, all-new sentences.

3.3.2.1 Verb type

Figure 4 displays the distribution of the rating scores of SV and VS sentences per verb type in all-new contexts (where the subjects, again, are all definite).

A closer look at Figure 4 indicates a similar distribution of the rating scores for all three verb types of the SV contexts: overall, the degrees of acceptance are high, which is similar to what we had observed in the first task (Subsection 3.3.1.1). However, the degree of acceptance is much lower in VS contexts, with all verb types. To confirm the described pattern, a mixed-effect ordinal regression was fitted as in [3].

[3] Response ~ Word Order * Verb Type + (1 | Participant) + (1 | Item)

Table 5 reports the outcome of Model [3]. The results show again an effect of *word order* (b = –3.79, CI = [–4.37 to –3.21], p < 0.001) and *verb type*. As in the first study, there is also a significant effect of the interaction term *word order* * *verb type*. This means that, the sentences with unaccusative verbs are rated differently in SV and VS contexts, when contrasted with sentences with transitive (b = –3.20, CI = [–4.51 to –1.89], p < 0.001) and with unergative verbs (b = –2.14, CI = –3.44 to –0.84], p = 0.001).

It is again worthwhile to look at the predicted probabilities of observing a rating score of 2 and 4. As shown in Table 6, the predicted probabilities of selecting the score 4 in SV contexts lies between 49 % and 57 % for the three verb types. In the VS contexts, the probability of scoring 4 with unaccusatives lowers to 44 %. Here, it is important to draw attention to the wide confidence intervals (CI), which range from

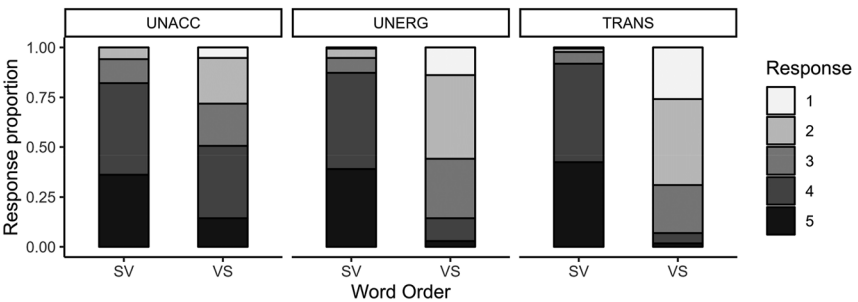

Figure 4: Task 2: proportion of rating scores per verb type and word order context (monolingual group).

Table 5: Summary of Model [3]. The fixed effects, their estimates, standard errors (SE), confidence intervals (CI), statistic (*z*), and *p*-values are given.

Predictors	Estimate	SE	CI	*z*	*p*
Word order (VS vs. SV)	−3.79	0.30	−4.37 to −3.21	−12.80	**<0.001**
Verb type (UNERG vs. UNACC)	−0.83	0.33	−1.48 to −0.18	−2.50	**0.012**
Verb type (TRANS vs. UNACC)	−1.08	0.33	−1.73 to −0.42	−3.23	**0.001**
Word order (VS vs. SV) * Verb type (UNERG vs. UNACC)	−2.14	0.66	−3.44 to −0.84	−3.22	**0.001**
Word order (VS vs. SV) * Verb type (TRANS vs. UNACC)	−3.20	0.67	−4.51 to −1.89	−4.79	**<0.001**

Note. Reference levels: word order = SV; verb type = UNACC. Statistically significant *p* values appear in bold.

Table 6: Predicted probabilities of response levels 2 and 4 per verb type and word order context (Task 2, monolingual group).

	SV	95 % CI	VS	95 % CI
Predicted probability of response level = 2 (bad)				
UNACC	0.02	[0.01, 0.04]	0.15	[0.06, 0.25]
UNERG	0.02	[0.00, 0.03]	0.47	[0.36, 0.59]
TRANS	0.01	[0.00, 0.03]	0.54	[0.49, 0.60]
Predicted probability of response level = 4 (good)				
UNACC	0.57	[0.47, 0.66]	0.44	[0.29, 0.59]
UNERG	0.54	[0.42, 0.65]	0.12	[0.04, 0.20]
TRANS	0.49	[0.35, 0.63]	0.06	[0.02, 0.10]

29 % to 59 %, differently from the first task where CI = [0.47–0.66]. With transitive verbs, the probability of giving a 4 score decreases to 6 % and, with unergative verbs, to 12 %. The inverse pattern is observed for score 2.

3.3.2.2 Definiteness

We conclude the data analysis of the monolingually-raised speakers by looking at the distribution of the rating scores for the sentences with unaccusative verbs and definite versus indefinite subjects per word order context (see Figure 5).

As Figure 5 depicts, the ratings for definite and indefinite subjects in the SV contexts are equally distributed, similarly to what was already observed in the first study. However, upon visual inspection, in the VS contexts the proportion of high ratings (4 and 5) is higher for indefinite than for definite subjects. To investigate the

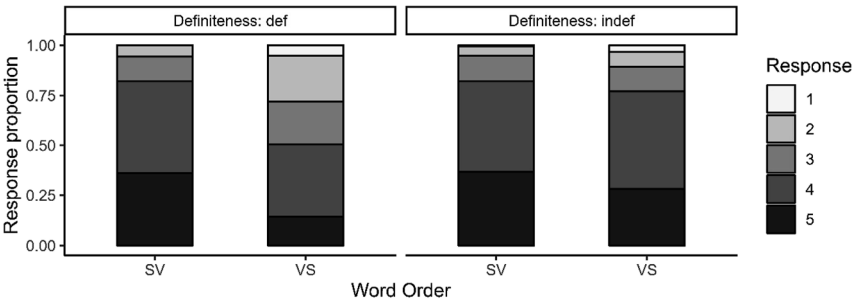

Figure 5: Task 2: proportion of rating scores for unaccusatives per definiteness and word order context (monolingual group).

significance of the observed differences/similarities, we fitted another mixed-effect ordinal regression to the data, as in [4].

[4] Response ~ Word Order * Definiteness + (1 | Participant) + (1 | Item)

Similarly to the results of the first task, the outcome of Model [4], summarized in Table 7, shows that there is a significant effect of *word order* (b = –1.22, CI = [–2.10 to –0.34], p = 0.007), meaning that VS sentences decrease the log-odds of providing a higher rating score relative to SV sentences. No significant effect was found for *definiteness* (b = 0.73, CI = [–0.15 to 1.61], p = 0.106) nor for the *interaction* between *word order* and *definiteness* (b = 1.45, CI = [–0.31 to 3.21], p = 0.107).

Nevertheless, even though the ordinal regression model did not find a significant effect of *definiteness*, it is worth looking at the predicted probabilities of providing the rating scores 2 and 4 in order to identify tendencies.

Table 8 confirms the visual inspection of Figure 5, i.e., the predicted probabilities of giving a score of 2 are identical for definite and indefinite subjects (3 %) in SV contexts. The same is true for the probability of rating SV order with score 4 (57 %–58 %). However, this changes in the VS contexts, where the probability of judging a

Table 7: Summary of Model [4]. The fixed effects, their estimates, standard errors (SE), confidence intervals (CI), statistic (z), and p-values are given.

Predictors	Estimate	SE	CI	z	p
Word order (VS vs. SV)	–1.22	0.45	–2.10 to –0.34	–2.71	**0.007**
Definiteness (indef vs. def)	0.73	0.45	–0.15 to 1.61	1.62	0.106
Word order (VS vs. SV) * Definiteness (indef vs. def)	1.45	0.90	–0.31 to 3.21	1.61	0.107

Note. Reference levels: word order = SV; definiteness = def. Statistically significant p value appear in bold.

Table 8: Predicted probabilities of response levels 2 and 4 per definiteness and word order context (Task 2, monolingual group).

	SV	95 % CI	VS	95 % CI
Predicted probability of response level = 2 (bad)				
DEF	0.03	[0.00, 0.05]	0.15	[0.03, 0.28]
INDEF	0.03	[0.00, 0.05]	0.04	[0.00, 0.08]
Predicted probability of response level = 4 (good)				
DEF	0.58	[0.45, 0.70]	0.48	[0.29, 0.67]
INDEF	0.57	[0.45, 0.70]	0.61	[0.56, 0.67]

sentences with indefinite subjects as good (score 4) is much higher than that for sentences with definite subjects (61 % against 48 %). The inverse happens regarding the probabilities of giving the score 2, with 15 % for definite and only 4 % for indefinite ones. This shows that the ratings for definite and indefinite subjects with unaccusative verbs are clearly further apart in Task 2 compared to Task 1, although we could not identify a statistically significant effect. Once again, the rating of definite subjects in VS contexts is characterized by wide CIs, ranging from 3 % to 28 % for score 2, and from 29 % to 67 % for score 4. This denotes less consistent intuitions for definite VS contexts in all-new sentences.

3.4 Discussion: monolingually-raised BP speakers' judgments of subject verb inversion

Based on our experimental results, we can confirm a grammatical change concerning the loss of VS order in BP.

Monolingual BP speakers accept VS order in general less than SV order, and show higher variability in their judgments. There are two exceptions: in Task 1 (narrow focus on the subject), there is virtually no difference between speaker's ratings of SV and VS order of sentences with unaccusative verbs. This finding is independent of the definiteness of the subject. The second exception arises in Task 2 (all-new sentences), but here only for sentences with unaccusative verbs and indefinite subjects. The likelihood of rating such sentences as good is equally high for SV and VS order.

The findings show, as predicted by previous research, that transitivity is an important factor shaping the acceptance of VS. In both tasks, VS order is least

accepted with transitive verbs, more accepted (but still generally rejected) with unergative verbs and most accepted with unaccusative verbs. The higher acceptance of unergative VS sentences may be due to the parallelism with narrative inversion structures (AdvVS).

In both tasks, SV and VS order in sentences with unaccusative verbs with indefinite subjects is equally accepted. A difference between the two tasks arises with respect to definite subjects in unaccusative contexts. As mentioned before, in Task 1, the monolingual speakers accept SV and VS in sentences with unaccusative verbs and definite subjects more or less equally. In contrast, in Task 2, monolinguals do differentiate and give lower ratings to VS order. This difference between Task 1 and Task 2 shows that the acceptance of VS with definite subjects in unaccusative constructions is also dependent on the pragmatic context.

We suggest that the postverbal subject of unaccusative verbs occupies different positions in all-new and subject focus contexts. We base our assumptions on the proposals by Belletti (2004) and Belletti and Bianchi (2016), according to which postverbal subjects of unaccusative verbs occupy a low focus position outside vP if they bear information focus. This position is available for definite and indefinite subjects – no definiteness effect arises. In all-new contexts, on the contrary, the postverbal subject of the unaccusative verb occupies a complement position within VP, where only (weak) indefinites are licensed. Examples like (7) mentioned above (here replicated as 16) exemplify the first case for BP. In contrast to the subject of transitive and unergative verbs, the (definite or indefinite) subject of an unaccusative verb can bear information focus in postverbal position.

(16) Q: Quem caiu?
who fell
'Who fell?'

A1: *Caiu uma criança/ a criança.*
fell a child/ the child
'A child/the child fell.'

As for the findings obtained in Task 2 and the effect of definiteness in the acceptability of VS structures, we suggest that in all-new contexts the postverbal position of unaccusative verbs is less felicitous for definite subjects.

(17) (O que aconteceu?)
('What happened?')
*Chegaram três meninas /*as meninas.*
arrived three girls the girls
'Three girls/the girls arrived.'

This is an expected effect if this structure is indeed parallel to the French constructions as has been claimed by Kato (2000):

(18) *Il est arrivé trois filles /*les filles*
EXPL is arrived.MSG three girls/ the girls
'There arrived three/*the girls.'

If this explanation is on the right track, the difference between the first and the second task is expected. That the judgments reflect a high degree of individual variation and some uncertainty (especially for definite subjects in Task 2) may be due to the fact that some speakers would have expected a lack of subject verb agreement. On the other hand, this type of sentences belongs to the colloquial register and could be rejected in a written judgment task, which elicits primarily explicit knowledge (Vafaee et al. 2017).

To conclude, our results confirm the assumption of a diachronic development in BP. They show that VS order is in general rated as infelicitous with transitive and also with unergative verbs but acceptable with unaccusative verbs and indefinite subjects. With unaccusative verbs and definite subjects, the pragmatic context is relevant for the degree of acceptance.

4 Experimental study 2: heritage speakers as accelerators of ongoing diachronic change?

In a second study, we applied the previous experiments to bilingual speakers of BP and German. Most of the bilinguals were born and raised in Germany, some came to Germany at a very early age (before the age of 3). These speakers are HSs of BP because they acquire and use Portuguese as a family language (i.e. their HL) in a setting where German is the dominant societal language, being present in practically all other contexts of their life. German is also the language of schooling and the language in which they mostly read and write, and usually their preferred and also their stronger language. This does not necessarily imply that their linguistic system in Portuguese is deprived or incomplete, since they receive input from birth and are continuously exposed to their HL throughout their childhood and adolescence (Rinke and Flores 2021).

Nevertheless, despite early exposure, the speech of HSs may show some particularities (Rinke and Flores 2014). Different linguistic and extralinguistic factors have been discussed in the literature as sources of the particular development of heritage grammars, e.g. reduced input, lack of formal education and literacy, and cross-linguistic influence (Montrul 2015). Importantly, it can be observed that

particularities observed in bilingual speech are not random and often follow predictable patterns (Flores and Rinke 2020; Polinsky and Scontras 2020).

In previous research, we attributed some linguistic particularities observed in the language competence of EP HSs to variation that is typical of colloquial speech and to ongoing language change, also observable in monolinguals to some extent. In the latter group, variation and language change may be less obvious because of their reliance on the standard language. In one of the first studies on EP as HL in Germany (Rinke and Flores 2014), we found that HSs accept isolated accentuated dative pronouns without a resumptive clitic more easily than isolated accusative pronouns, although the occurrence of strong pronouns generally requires the presence of a clitic in EP. This case asymmetry is partly also attested in the monolingual controls, although to lower degrees, and relates to the lower semantic load of dative clitics in comparison to accusatives ones (Andersen 1982; Bleam 1999). Diachronically, datives typically change before the accusative is affected (Fischer and Rinke 2013; Gabriel and Rinke 2010, with respect to clitic doubling in Spanish). We concluded that the linguistic knowledge of the HSs is "innovative, because it promotes linguistic changes which are inherent in the speech of native monolinguals" (Rinke and Flores 2014: 681).

The same conclusion was reached concerning the distribution of null objects in EP as HL in a corpus study on two generations of Portuguese migrants living in Germany (Rinke et al. 2018). The analysis showed that the production of null objects was more expressive in the speech of EP HSs than in the speech of the first generation migrants or the L1 speakers living in Portugal. Furthermore, we observed that HSs produced significantly more animate null objects than the other speaker groups. We argued that, by expanding the use of null objects to animate referents, the HSs extend the semantic-pragmatic conditions of null object realization along the referential hierarchy, a universal diachronic pathway predicted by Cyrino et al. (2000).

If we are on the right track arguing that HSs accelerate or promote diachronic changes (cf. a similar, more recent argumentation in Kupisch and Polinsky 2022), we may formulate specific predictions for their acceptance of VS orders in BP. More concretely, we expect that HSs of BP will promote the change of BP from a SV/VS language to a predominantly SV language. This would mean that HSs do not only reject VS order with transitives and unergatives but also may tend to reject residual cases of VS order with unaccusative verbs. Against the backdrop of the discussion in Section 3.4, it will be interesting to find out whether both postverbal subject positions of unaccusative verbs will be affected in the same way. If Kato's (2000) assumption is correct that spoken BP developed a French-like expletive construction with an empty expletive lacking agreement and including a definiteness effect, we may speculate that this position will probably be more resistant to loss than the postverbal focus position.

However, other outcomes are also possible. What is interesting from a linguistic point of view in the present setting is the fact that German, as a V2 language, shows a lot of evidence for inverted subjects or VS order. As shown in (19), in German, the subject has to occur postverbally, whenever another constituent occupies the sentence initial position.

(19) *Gestern hat Maria einen Kuchen gebacken.*
yesterday has Mary a cake baked
'Mary made a cake yesterday.'

Of course, this apparent similarity of the VS order in both languages is only superficial, since the syntactic derivation of subject inversion in German differs from that of non-V2 languages. Inversion in German is the result of verb movement to C, crossing the subject constituent in TP.

(20) $[_{CP}$ Gestern $[_{C'}$ hat_V $[_{TP}$ Maria $[_{T'}$ t_v $[_{VP}$ t_S $[_{V'}$ einen Kuchen gebacken]

It has been shown in many studies with bilinguals who acquired German and a non-V2 language that the V2 property of German is a very stable grammatical feature in language contact situations (Flores et al. 2022; Hopp and Putnam 2015; Schmid 2002). For example, in the study by Flores et al. (2022) on Hunsrückisch German spoken as minority language in Brazil has revealed that the speakers produce German V2 order almost without exception – even after eight generations of language contact with BP. However, much less is known about possible language contact induced changes or effects of cross-linguistic influence from a dominant V2 language on the word order of a non-V2 language. Evidence for this scenario comes from (a reduced number of) studies on Spanish or Italian, as non-V2 heritage languages, in contact with the V2 languages German or Dutch (Listanti and Torregrossa 2023; van Osch and Sleeman 2018; van Osch et al. 2019).

The study by van Osch and Sleeman (2018) investigates the acceptability of inversion in Spanish as a HL in contact with Dutch, the majority language. Spanish is comparable to EP, with postverbal subjects in thetic sentences and in contexts of subject focus in categorical sentences. The authors applied an acceptability judgment task targeting SV and VS orders based on verb type (unaccusatives vs. unergatives), pragmatic context (broad focus vs. subject focus) and definiteness (definite vs. indefinite subjects). Despite of their unexpected acceptance of SV orders in some contexts, the monolingual control group performed as expected for Spanish: they showed a preference of VS in narrow focus contexts (SV with broad focus), with unaccusatives (SV with unergatives) and with indefinite subjects (SV with definite subjects). Although the HSs showed some sensitivity to verb type and focus (but not to definiteness), they differed from the monolinguals by showing an

overall higher acceptance rate of VS structures and by *preferring VS order in all contexts*. The authors attribute this finding to cross-linguistic influence from the V2 language Dutch. In a study on Italian as HL in contact with German, involving narratives produced by bilingual children, Listanti and Torregrossa (2023) observe target SV–VS alternations with unaccusative verbs but infelicitous VS orders with transitive verbs. Given that the observed VS sentences start with an adverb and, thus resemble a typical German V2 order (AdvVS), the authors argue, similarly as van Osch and Sleeman (2018), that cross-linguistic influence from German may be at play.

Although the mentioned studies tested similar structures and language combinations, it is unclear whether the findings from these studies could possibly be extended to BP as HL, given that BP – in contrast to Spanish and Italian – has lost so-called free inversion and shows only residual cases of VS order, as shown in the first part of this paper.

4.1 Research questions

Against the backdrop of the results obtained from the monolingual speakers, we formulate the following research questions for the HSs of BP living in Germany:

1. Do HSs of BP living in Germany extend the linguistic change that is observed in monolingual BP (i.e. the loss of VS) and, if yes, in which way?
2. Or do HS of BP show an overacceptance of VS order due to language contact with German V2?

As outcome, there are three principled possibilities. Since the study involves HSs who have early and continued contact with their HL, we may expect that they show the same grammatical knowledge as monolingual speakers of BP, not revealing a different internal grammar (Rinke and Flores 2021). An alternative outcome would be the observation of similar tendencies of acceptability in monolingual and heritage BP speakers, but with a more severe rejection of VS structures in the HS groups, even with unaccusatives. This could be interpreted as acceleration of the ongoing diachronic change in the BP grammar by eliminating residual variability. A third outcome would point to cross-linguistic influence or transfer of German VS structures. In this scenario, BP HSs would extend the acceptance of inversion to more contexts and be more permissive, given the regular and frequent occurrence of VS in their dominant language (as argued by van Osch and Sleeman 2018; Listanti and Torregrossa 2023).

4.2 Methodology and participants

We applied the same two separate acceptability judgment tasks described above to the HSs: Task 1 includes a context and a context question (subject focus); Task 2 lacks context sentences (all-new sentences). We also varied the factors *verb type* (with the values *transitive, unergative* and *unaccusative*) and *definiteness* of the subject in unaccusative constructions (with the values *definite* and *indefinite*).

As in the monolingual group, the two tasks were not applied to the same participants. In the first study (Task 1: narrow subject focus), 12 bilingual speakers (age 14–25 years; 7 female) participated. German was their dominant societal language and BP their home or family language. Most of them were simultaneous bilinguals, 10 were born and raised in Germany, two came to Germany before age 5. In the second study (Task 2), 18 bilinguals (age 14–39 years; 12 female) took part. The speakers had the same profile as the ones who participated in the first task. Again, the majority of the HSs were simultaneous bilinguals, 16 born and raised in Germany and two came to Germany before age four.

4.3 Results

Now, we report the results for the HSs of BP, following the same procedure and using the same statistical analyses as in the previous sections.

4.3.1 Task 1: sentences with context (subject focus)

4.3.1.1 Verb type

We start by presenting, in Figure 6, the proportion of ratings for SV and VS sentences per verb type.

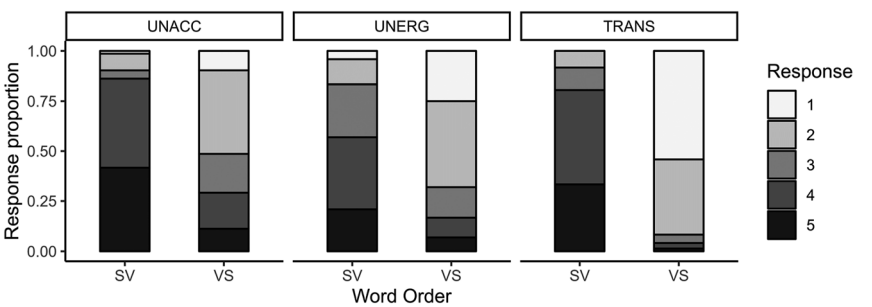

Figure 6: Task 1: proportion of rating scores per verb type and word order context (bilingual speakers).

The visual inspection of Figure 6 reveals large proportions of 4 and 5 rating scores for all SV contexts and, inversely, large proportion of 1 and 2 scores for VS contexts, with the transitive verbs presenting the largest rejection scores in VS sentences. In order to confirm the observed patterns, we fitted a mixed-effect ordinal regression as in [5].

[5] Response ~ Word Order * Verb Type + (1 | Participant) + (1 | Item)

The main findings of Model [5], summarized in Table 9, reveal that, similarly to the results of the monolingual group, there is a significant effect of *word order* (b = –3.12, CI = [–3.60 to –2.64], $p < 0.001$) and of the interaction term *word order * verb type*, but only when unaccusatives are being contrasted with transitives (b = –2.09, CI = [–3.05 to –1.13], $p < 0.001$). Differently from the findings of the monolinguals, there is no significant interaction between *word order* and *verb type*, when unaccusatives are contrasted with unergatives (b = 0.23, CI = [–0.70 to 1.15], $p = 0.628$), meaning that HSs present the same behavior for unaccusatives and unergatives, that is, they do not give unaccusatives a different status in VS contexts with focused subjects, as it was observed for monolinguals.

The predicted probabilities, based on the model, of selecting the scores 2 and 4 are displayed in Table 10.

A closer look at Table 10 shows that the predicted probabilities of HSs rating VS sentences as *good* (score 4) are very low for all verb types – they range from 23 % for unaccusatives to 3 % for transitives.

4.3.1.2 Definiteness

Regarding the unaccusative contexts with definite and indefinite subjects, Figure 7 illustrates the distribution of the ratings, per word order context.

Table 9: Summary of Model [5]. The fixed effects, their estimates, standard errors (SE), confidence intervals (CI), statistic (z), and p-values are given.

Predictors	Estimate	SE	CI	z	p
Word order (VS vs. SV)	–3.12	0.25	–3.60 to –2.64	–12.69	**<0.001**
Verb type (TRANS vs. UNACC)	–1.36	0.25	–1.85 to –0.88	–5.54	**<0.001**
Verb type (UNERG vs. UNACC)	–1.03	0.24	–1.50 to –0.56	–4.31	**<0.001**
Word order (VS vs. SV) * Verb type (TRANS vs. UNACC)	–2.09	0.49	–3.05 to –1.13	–4.27	**<0.001**
Word order (VS vs. SV) * Verb type (UNERG vs. UNACC)	0.23	0.47	–0.70 to 1.15	0.48	0.628

Note. Reference levels: word order = SV; verb type = UNACC. Statistically significant p values appear in bold.

Table 10: Predicted probabilities of response levels 2 and 4 per verb type and word order context (Task 1, bilingual group).

	SV	95 % CI	VS	95 % CI
Predicted probability of response level = 2 (bad)				
UNACC	0.06	[0.03, 0.10]	0.38	[0.29, 0.48]
TRANS	0.08	[0.04, 0.13]	0.37	[0.26, 0.47]
UNERG	0.17	[0.09, 0.24]	0.49	[0.41, 0.56]
Predicted probability of response level = 4 (good)				
UNACC	0.39	[0.31, 0.47]	0.23	[0.15, 0.32]
TRANS	0.42	[0.35, 0.49]	0.03	[0.01, 0.05]
UNERG	0.41	[0.34, 0.48]	0.12	[0.06, 0.18]

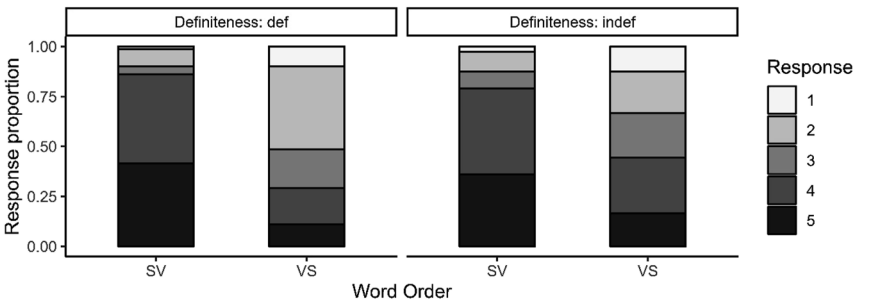

Figure 7: Task 1: proportion of rating scores for unaccusatives per definiteness and word order context (bilingual speakers).

The response proportions depicted in Figure 7 reveal similar ratings for definite and indefinite subjects in SV contexts. The ratings in VS contexts are lower than in SV sentences (i.e., in VS contexts, there are greater proportions of 1 and 2 scores), but the distribution appears to be similar for definite and indefinite subjects. To confirm the above observations, a mixed-effect ordinal regression was fitted as in [6].

[6] Response ~ Word Order * Definiteness + (1 | Participant) + (1 | Item)

The results of Model [6], displayed in Table 11, confirm that there is a significant effect of *word order* (b = –1.94, CI = [–2.50 to –1.37], $p < 0.001$), meaning that the probability of providing a higher rating score decreases in VS contexts relative to the SV ones; no significant effect of *definiteness* (b = 0.16, CI = [–0.36 to 0.67], p = 0.552) or of its interaction with *word order* (b = 0.91, CI = [–0.13 to 1.95], p = 0.086) was found.

Table 11: Summary of Model [6]. The fixed effects, their estimates, standard errors (SE), confidence intervals (CI), statistic (*z*), and *p*-values are given.

Predictors	Estimate	SE	CI	*z*	*p*
Word order (VS vs. SV)	−1.94	0.29	−2.50 to −1.37	−6.73	**<0.001**
Definiteness (indef vs. def)	0.16	0.26	−0.36 to 0.67	0.60	0.552
Word order (VS vs. SV) * Definiteness (indef vs. def)	0.91	0.53	−0.13 to 1.95	1.72	0.086

Note. Reference levels: word order = SV; definiteness = def. Statistically significant *p* values appear in bold.

The predicted probabilities, extracted from the ordinal model, of selecting the scores 2 and 4 are displayed in Table 12. They show that in SV contexts, the Brazilian HSs do not distinguish sentences with definite and indefinite subjects nor do they in VS contexts. There is an overall tendency to reject VS sentences in general. The predicted probabilities of giving a score of 4 (*good*) to SV sentences with definite subjects is 39 % and to SV sentences with indefinite ones is 42 %. In the VS context, these probabilities lower down to 25 % and 35 %, respectively.

4.3.2 Task 2: sentences without context (all-new sentences)

4.3.2.1 Verb type

Figure 8 illustrates the distribution of the rating scores of SV and VS sentences per verb type in all-new contexts (the subjects are all definite).

The visual inspection of Figure 8 reveals a similar distribution of ratings in SV contexts across all verb types, with the response levels 4 and 5 presenting larger proportions compared to the other levels. Conversely, in the VS contexts, we see

Table 12: Predicted probabilities of response levels 2 and 4 per definiteness and word order context (Task 1, bilingual group).

	SV	95 % CI	VS	95 % CI
Predicted probability of response level = 2 (bad)				
DEF	0.07	[0.02, 0.11]	0.36	[0.25, 0.47]
INDEF	0.09	[0.03, 0.14]	0.27	[0.16, 0.37]
Predicted probability of response level = 4 (good)				
DEF	0.39	[0.30, 0.48]	0.25	[0.15, 0.35]
INDEF	0.42	[0.34, 0.50]	0.35	[0.25, 0.45]

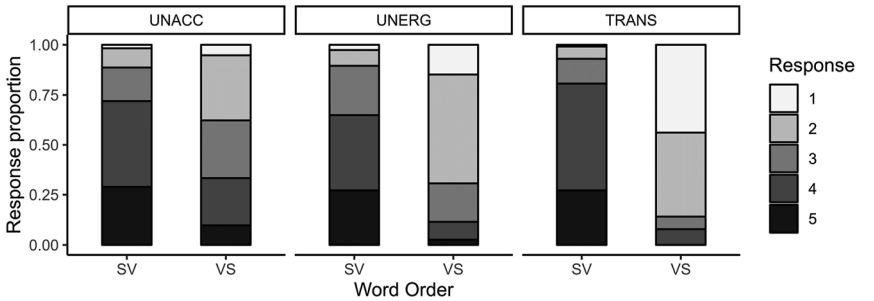

Figure 8: Task 2: proportion of rating scores per verb type and word order context (bilingual speakers).

larger proportions of 1 and 2 ratings, particularly in transitive and unergative contexts. VS sentences with unaccusatives receive higher ratings than the other VS contexts. To confirm the analyses of the visual inspection, we fitted a mixed-effect ordinal regression as in [7].

[7] Response ~ Word Order * Verb Type + (1 | Participant) + (1 | Item)

The main findings of Model [7], summarized in Table 13, confirm that there are significant effects of *word order* (b = –3.23, CI = [–3.66 to –2.80], p < 0.001), of *verb type*, not only when unaccusatives are being contrasted with transitives (b = –1.32, CI = [–1.77 to –0.87], p < 0.001), but also when they are being compared to unergatives (b = –0.86, CI = [–1.29 to –0.42], p < 0.001), and of the interaction term *word order* * *verb type*, both when unaccusatives are being contrasted with transitives (b = –3.04, CI = [–3.94 to –2.13], p < 0.001) and with unergatives (b = –1.21, CI = [–2.08 to –0.35], p = 0.006).

Table 13: Summary of Model [7]. The fixed effects, their estimates, standard errors (SE), confidence intervals (CI), statistic (z), and p-values are given.

Predictors	Estimate	SE	CI	z	p
Word order (VS vs. SV)	–3.23	0.22	–3.66 to –2.80	–14.79	**<0.001**
Verb type (TRANS vs. UNACC)	–1.32	0.23	–1.77 to –0.87	–5.72	**<0.001**
Verb type (UNERG vs. UNACC)	–0.86	0.22	–1.29 to –0.42	–3.87	**<0.001**
Word order (VS vs. SV) * Verb type (TRANS vs. UNACC)	–3.04	0.46	–3.94 to –2.13	–6.57	**<0.001**
Word order (VS vs. SV) * Verb type (UNERG vs. UNACC)	–1.21	0.44	–2.08 to –0.35	–2.75	**0.006**

Note. Reference levels: word order = SV; verb type = UNACC. Statistically significant p values appear in bold.

Table 14: Predicted probabilities of response levels 2 and 4 per verb type and word order context (Task 2, bilingual group).

	SV	95 % CI	VS	95 % CI
Predicted probability of response level = 2 (bad)				
UNACC	0.07	[0.03, 0.11]	0.30	[0.18, 0.41]
UNERG	0.09	[0.04, 0.14]	0.54	[0.46, 0.62]
TRANS	0.06	[0.02, 0.09]	0.49	[0.39, 0.60]
Predicted probability of response level = 4 (good)				
UNACC	0.50	[0.45, 0.55]	0.28	[0.17, 0.39]
UNERG	0.50	[0.44, 0.55]	0.09	[0.04, 0.14]
TRANS	0.50	[0.44, 0.55]	0.03	[0.01, 0.04]

The predicted probabilities, displayed in Table 14, show an overall low probability of rating the VS sentences with a score of 4, but there are different tendencies regarding the VS context. The VS sentences with unaccusatives present much higher probabilities of being rated as *good*, compared to the other two verb types, whose predicted probabilities indicate that they are less likely rated as *good*.

4.3.2.2 Definiteness

Finally, we look at the definiteness effect in all-new sentences with unaccusative verbs in the HSs' group.

The visual inspection of the ratings' distribution in Figure 9 reveals similar proportions for definite SV and indefinite SV sentences. The proportions of scores 4 and 5 appear to be lower for definite VS than for indefinite sentences. In order to

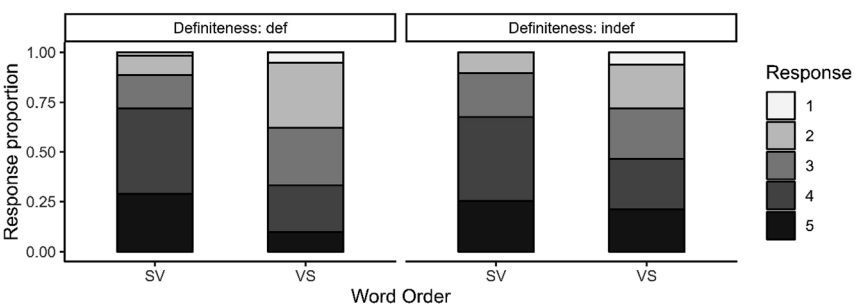

Figure 9: Task 2: proportion of rating scores for unaccusatives per definiteness and word order context (bilingual speakers).

investigate the above-described patterns, we fitted the last mixed-effect ordinal regression to the data, as in [8].

[8] Response ~ Word Order * Definiteness + (1 | Participant) + (1 | Item)

The results of Model [8], summarized in Table 15, reveal a significant effect of *word order* (b = –1.46, CI = [–2.20 to –0.71], p < 0.001), showing that going from SV to VS contexts decreases the log-odds of providing a higher rating score. No significant effect was found for *definiteness* (b = 0.28, CI = [–0.46 to 1.01], p = 0.458) nor for the interaction between *word order* and *definiteness* (b = 0.89, CI = [–0.58 to 2.36], p = 0.234).

Once more, even though the regression model does not capture a definiteness effect, it is indispensable to look at the predicted probabilities, based on the model (see Table 16), to capture relevant tendencies.

The results depicted in Table 16 reveal identical predicted probabilities of giving a 4 score to definite and indefinite subject sentences with SV order (50 %), with identical small ranges of the values of the CIs. The probabilities of giving a score of 2

Table 15: Summary of Model [8]. The fixed effects, their estimates, standard errors (SE), confidence intervals (CI), statistic (z), and p-values are given.

Predictors	Estimate	SE	CI	z	p
Word order (VS vs. SV)	–1.46	0.38	–2.20 to –0.71	–3.83	**<0.001**
Definiteness (indef vs. def)	0.28	0.37	–0.46 to 1.01	0.74	0.458
Word order (VS vs. SV) * Definiteness (indef vs. def)	0.89	0.75	–0.58 to 2.36	1.19	0.234

Note. Reference levels: word order = SV; definiteness = def. Statistically significant p values appear in bold.

Table 16: Predicted probabilities of response levels 2 and 4 per definiteness and word order context (Task 2, bilingual group).

	SV	95 % CI	VS	95 % CI
Predicted probability of response level = 2 (bad)				
DEF	0.06	[0.01, 0.11]	0.28	[0.11, 0.45]
INDEF	0.07	[0.01, 0.13]	0.16	[0.04, 0.29]
Predicted probability of response level = 4 (good)				
DEF	0.50	[0.44, 0.56]	0.26	[0.10, 0.42]
INDEF	0.50	[0.43, 0.56]	0.39	[0.23, 0.54]

are also very similar in definite and indefinite subject contexts with SV order, and the values of the CIs are also very small and identical. This is different in VS contexts, where the acceptance of indefinite VS sentences is much higher (39 %) than that of the definite ones (26 %). The results also show a wider range of the values of the CIs (from 23 % to 54 % for VS sentences with indefinite subjects, and from 10 % to 42 % for VS sentences with definite subjects).

4.4 Discussion: BP heritage speakers' judgments of subject verb inversion

The first relevant observation regarding the bilinguals' results is that they show a strong word order effect, just like the monolingual BP speakers. This means that heritage speakers of BP living in Germany judge SV sentences always better than VS sentences, regardless of verb type and definiteness and both in contexts of narrow focus on the subject and all-new contexts. This clearly shows that HSs are bilingual native speakers who do not necessarily differ substantially from other groups of native speakers who grew up in a monolingual setting. The results also show that the speakers keep their two native grammars apart as the relevant SV structures that receive high acceptance ratings are verb-third sentences, which would be ungrammatical in German. We also do not find any other effect of cross-linguistic influence, e.g. with respect to the over-acceptance of VS order due to a prevalence of post-verbal subjects in German V2 sentences, contrary to the observations of van Osch and Sleeman (2018) and Listanti and Torregrossa (2023). A tentative explanation for the difference to our results may be that in contrast to BP and German, there is some structural overlap of surface VS order in German or Dutch on the one hand and Spanish or Italian on the other, given that the two latter still show regular subject inversion in both narrow subject focus and wide focus contexts.

However, it is not the case that the bilingual HSs of BP in our study perform in a *fully identical way* to the monolingually-raised speakers of our first experiment, which leads us to the question of accelerated diachronic development. In narrow focus contexts, the BP HSs treat VS sentences with unaccusative verbs on a par with VS sentences with unergative verbs. Overall, the results show a clear tendency of accepting SV orders and rejecting VS orders with all verb types in sentences with subject focus. In this case, the bilinguals differ from the monolinguals, who showed identical probabilities of rating SV and VS order as 4 (*good*) for sentences with unaccusative verbs in subject focus contexts. Recall that we interpreted the ratings of the monolinguals in this context (including the absence

of a definiteness effect) as showing the availability of a low postverbal focus position (cf. Belletti 2004; Belletti and Bianchi 2016). The rejection of VS order in this context by the HS group can with some caution be taken as evidence that this residual context of VS order is no longer equally available in the heritage grammar, which can be interpreted as a further step of diachronic development. Actually, due to the loss of a null-subject grammar, this low focus position is already lost in monolingual grammars for sentences with unergative and transitive verbs, where focus can only be assigned in preverbal position (see Section 2). Hence, the availability of the postverbal focus position for unaccusatives represents a true relic and, in addition, a case of true optionality in the monolingual grammar, where focus can alternatively also be assigned to a *preverbal subject* of an unaccusative verb (see Section 2). We conclude, thus, that the heritage grammar is diachronically more advanced because – as expected from a diachronic perspective – the residual structural position is being lost and optionality tends to be removed from the system (following the "Blocking Effect", Aronoff 1976, applied to diachronic change by Lightfoot 1999: 99).

Interestingly, the same difference between monolingually and bilingually-raised speakers cannot be confirmed with respect to all-new contexts. In these contexts, the predicted probabilities show that VS sentences with unaccusatives present much higher probabilities of being rated as *good*, compared to the other two verb types. In addition, we find that the acceptance of VS sentences with unaccusative verbs and indefinite subjects is much higher (39 %) than that of VS sentences with unaccusative verbs and definite subjects (26 %), even though the numbers are still low.[7] Although the results have to be taken with caution because of the overall low number of participants, we may conclude that in this context, the judgments of the bilinguals do not differ from the ones of the monolinguals: although both speaker groups show variation and a high degree of uncertainty, they are more likely to reject VS orders in sentences with unaccusative verbs and definite subjects than sentences with unaccusative verbs and indefinite subjects. If our structural interpretation of these judgments in the monolingual group is on the right track, it may reflect that there is still a postverbal position available for indefinite subjects in this context. Against the backdrop of the syntactic analysis, this is expected, given that a vP-internal subject position for indefinite subjects of unaccusative verbs is universally available in such (expletive) – constructions independently of the status of a given language as a null-subject or non-null subject language.

7 The low ratings of the VS sentences with indefinite subjects could be due to the fact that the postverbal indefinite subjects still agreed with the finite verb in our stimuli.

5 Summary and conclusions

To conclude, the two experimental studies reported here, with monolingual and heritage speakers of BP, confirmed the diachronic change described in previous theoretical work and corpus studies: VS order has become obsolete for BP speakers in most linguistic contexts and is only residually available with unaccusative verbs. The judgments of the monolingual speakers revealed that they seem to have two postverbal subject positions with unaccusative verbs at their disposal (Belletti 2004; Belletti and Bianchi 2016): (i) a low focus position outside the vP, which can be occupied by postverbal definite and indefinite subjects in narrow subject focus contexts, and (ii) a vP internal subject position, mostly associated with indefinite subjects of unaccusative verbs in all-new or wide focus contexts.

The former position can be seen as a relic of the former null subject grammar of BP, which seems to be no longer available with other than unaccusative verbs. In sentences with transitive and unergative verbs, the subject is focussed in preverbal position. This option is also available for focussed subjects of unaccusatives, which can optionally (and presumably even preferentially) also be realized in the preverbal position.

The vP internal postverbal subject position in all-new contexts is mainly restricted to indefinite subjects and universally available for subjects of unaccusative verbs, independently of the null subject or non-null subject (or partial null subject) status of a language. So-called expletive structures differ cross-linguistically with respect to the availability of an overt expletive, the verb type used in existential constructions of the same type and the existence of subject-verb agreement (Kato 2000; Roberts 1993).

In the second experimental study, we tested bilingual HSs of BP living in Germany. We investigated whether the alleged ongoing change concerning the loss of VS structure in BP is also found in HSs (despite the abundant VS orders in their contact language German). Going a step further, we asked whether a potential change is even more pronounced in bilingual speakers than in monolinguals, as it would be expected based on previous research on EP as a heritage language. In previous work, we argued that HSs may promote and accelerate ongoing diachronic change in Portuguese, mainly due to their dominant reliance on colloquial registers of that language (see Rinke and Flores 2014; Rinke et al. 2018).

The results of the second study revealed that overall the HSs of BP show a very similar behavior to the monolinguals with respect to their judgments: they tend to accept SV orders and to reject VS orders, not showing a tendency to overaccept VS orders that could be due to language contact with German. Their performance is also similar to the monolingual group with respect to VS order in unaccusative verbs in

all-new contexts. As in the monolingual group, this word order pattern is more likely to be accepted with indefinite subjects.

With respect to VS orders in sentences with unaccusative verbs in narrow subject focus contexts, we find that bilinguals are quite strict in their rejection of VS order. This contrasts with the behavior of the monolinguals, who do not distinguish between SV and VS in this context. We interpret this finding as indicating an acceleration of ongoing diachronic change: bilingual speakers are on their way to eliminate this residual position from their system. This ongoing development is expected given the availability of a functionally identical alternative preverbal focus position and the ongoing change concerning the null subject grammar.

Finally, we would like to mention that the present data may be taken as one more piece of evidence in favor of the hypothesis, put forward by Rinke and Flores (2014), that HSs promote diachronic change. However, we are aware that our conclusions have to be taken with caution, given the methodological limitations of this study. First, we tested an overall low number of participants; second, the presentation of the stimuli in written form did not allow us to test the effect of prosodic factors, which also play a relevant role in SV–VS orders (Kato and Duarte 2021); third, the inclusion of agreement in unaccusative constructions, which tends to be omitted in spoken registers, may have further influenced the speakers' judgments. These shortcomings should be addressed in future empirical studies, in order to confirm or disconfirm our findings and conclusions.

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References

Andersen, Roger W. 1982. Determining the linguistic attributes of language attrition. In Robert D. Lambert & Barbara F. Freed (eds.), *The loss of language skills*, 83–118. Rowley, MA: Newbury House.

Aronoff, Mark. 1976. *Word formation in generative grammar*. Linguistic Inquiry Monograph. Cambridge/MA: MIT Press.

Barbosa, Pilar, Eugénia Duarte & Mary A. Kato. 2005. Null subjects in European and Brazilian Portuguese. *Journal of Portuguese Linguistics* 4(2). 11–52.

Belletti, Adriana. 2004. Aspects of the low IP area. In Luigi Rizzi (ed.), *The structure of CP and IP*, 16–51. New York/Oxford: Oxford University Press.

Belletti, Adriana & Valentina Bianchi. 2016. Definiteness effect and unaccusative subjects: An overview and some new thoughts. In Susann Fischer, Tanja Kupisch & Esther Rinke (eds.), *Definiteness effects. Bilingual, typological and diachronic variation*, 14–65. Newcastle upon Tyne: Cambridge Scholars.

Benincà, Paola & Giampaolo Salvi. 1988. L'ordine normale degli elementi nella frase semplice. In Lorenzo Renzi (ed.), *Grande grammatica italiana di consultazione, I*, 119–129. Bologna: il Mulino.

Berlinck, Rosane. 1989. A construção V SN no Português do Brasil: uma visão diacrônica do fenômeno da ordem. In Fernando Tarallo (ed.), *Fotografias sociolingüísticas*, 95–112. Campinas: Pontes.

Berlinck, Rosane. 2000. Brazilian Portuguese VS order: A diachronic analysis. In Mary A. Kato & Esmeralda Negrão (eds.), *Brazilian Portuguese and the null subject parameter*, 175–194. Frankfurt a. M., Madrid: Vervuert Verlagsgesellschaft.

Bleam, Tonia. 1999. *Leísta Spanish and the syntax of clitic doubling*. University of Delaware Ph.D. dissertation.

Christensen, Rune H. B. 2022. ordinal – Regression models for ordinal data. R package version 2022. 11–16. Available at: https://CRAN.R-project.org/package=ordinal.

Cyrino, Sonia M. L., Maria Eugénia Lammoglia Duarte & Mary A. Kato. 2000. Visible subjects and invisible clitics in Brazilian Portuguese. In Mary A. Kato & Esmeralda V. Negrão (eds.), *Brazilian Portuguese and the null subject parameter*, 55–74. Frankfurt a. M., Madrid: Vervuert Verlagsgesellschaft.

Duarte, Maria Eugénia Lammoglia. 1993. Do pronome nulo ao pronome pleno. In Ian Roberts & Mary Aizawa Kato (eds.), *Português brasileiro: Uma viagem diacrônica*, 107–128. Campinas: University of Campinas.

Duarte, Maria Eugénia Lammolia. 2000. The loss of the 'Avoid Pronoun' principle in Brazilian Portuguese. In Mary Kato & Esmeralda Vailati Negrão (eds.), *Brazilian Portuguese and the null subject parameter*, 17–36. Frankfurt: Vervuert/IberoAmericana.

Fischer, Susann & Esther Rinke. 2013. Explaining the variability of clitic doubling across Romance: A diachronic account. *Linguistische Berichte* 236. 255–272.

Flores, Cristina, Esther Rinke & Claudia Wagner. 2022. "To hón ich imma insistieat." Syntactic stability in heritage Hunsrückisch German spoken in Brazil. *Linguistic Approaches to Bilingualism* 12(3). 251–279.

Flores, Cristina & Esther Rinke. 2020. The relevance of language-internal variation in predicting heritage language grammars. *Bilingualism: Language and Cognition* 23(1). 25–26.

Gabriel, Christoph & Esther Rinke. 2010. Information packaging and the rise of clitic doubling in the history of Spanish. In Gisella Ferraresi & Rosemarie Lühr (eds.), *Diachronic studies on information structure. Language acquisition and change*, 63–86. Berlin: De Gruyter.

Hopp, Holger & Mike T. Putnam. 2015. Syntactic restructuring in heritage grammars: Word order variation in Moundridge Schweitzer German. *Linguistic Approaches to Bilingualism* 5. 180–214.

Kato, Mary Aizawa. 2000. The partial pro-drop nature and the restricted VS order in Brazilian Portuguese. In Mary A. Kato & Esmeralda. V. Negrão (eds.), *Brazilian Portuguese and the null subject parameter*, 223–258. Frankfurt: Vervuert/IberoAmericana.

Kato, Mary Aizawa & Maria Eugênia Lammoglia Duarte. 2021. Determinantes prosódicos em mudança sintática. *Cadernos de Linguística* 2(1). e350.

Kato, Mary A. & Fernando Tarallo. 2003. The loss of VS syntax in Brazilian Portuguese. In Brigitt Schliebe-Lange, Ingedore Koch & Konstanze Jungbluth (eds.), *Dialogue between schools: Sociolinguistics, conversational analysis and generative theory in Brazil*, 101–129. Münster: Nodus Publicationen, Klaus D. Ditz.

Kato, Mary A. & Ana Maria Martins. 2016. European Portuguese and Brazilian Portuguese: An overview on word order. In Leo Wetzels, Sergio Menuzzi & João Costa (eds.), *The handbook of Portuguese linguistics*, 15–40. Hoboken, NJ: Wiley-Blackwell.

Kupisch, Tanja & Maria Polinsky. 2022. Language history on fast forward: Innovations in heritage languages and diachronic change. *Bilingualism: Language and Cognition* 25(1). 1–12.

Kuroda, S. Yuki. 1972. The categorical and the thetic judgement. *Foundations of Language* 9. 153–185.

Lightfoot, David. 1999. *The development of language. Acquisition, change and evolution*. Oxford: Blackwell.

Listanti, Andrea & Jacopo Torregrossa. 2023. The production of preverbal and postverbal subjects by Italian heritage children: Timing of acquisition matters. *First Language* 43(4). 431–460.

Lüdecke, Daniel. 2018. ggeffects: Tidy data frames of marginal effects from regression models. *Journal of Open Source Software* 3(26). 772.

Lüdecke, Daniel. 2022. sjPlot: Data visualization for statistics in social science. R package version 2.8.12. Available at: https://CRAN.R-project.org/package=sjPlot.

Martins, Ana Maria. 1994. *Clíticos na História do Português*. Lisbon: Faculdade de Letras, Universidade de Lisboa.

Montrul, Silvina. 2015. *The acquisition of heritage languages*. Cambridge: Cambridge University Press.

van Osch, Brechje & Petra Sleeman. 2018. Subject position in Spanish as a heritage language in The Netherlands: External and internal interface factors. In Anna Gavarró (ed.), *On the acquisition of the syntax of Romance (Language Acquisition and Language Disorders 62)*, 187–214. Amsterdam & Philadelphia; UK: John Benjamins.

van Osch, Brechje, Elisabet García González, Aafke Hulk, Petra Sleeman & Suzanne Aalberse. 2019. The development of subject position in Dutch-dominant heritage speakers of Spanish: From age 9 to adulthood. *Languages* 4(4). 88.

Polinsky, Maria & Gregory Scontras. 2020. Understanding heritage languages. *Bilingualism: Language and Cognition* 23(1). 4–20.

Pilati, Eloisa. 2006. *Aspectos sintáticos e semânticos da ordem verbo-sujeito no português*. University of Brasília PhD thesis.

R Core Team. 2022. *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing. Available at: https://www.R-project.org/.

Rinke, Esther & Cristina Flores. 2014. Heritage Portuguese bilinguals' morphosyntactic knowledge of clitics. *Bilingualism: Language and Cognition* 17(4). 681–699.

Rinke, Esther, Cristina Flores & Pilar Barbosa. 2018. Null objects in the spontaneous speech of monolingual and bilingual speakers of European Portuguese. *Probus* 30(1). 93–119.

Rinke, Esther & Cristina Flores. 2021. Portuguese as heritage language in Germany – a linguistic perspective. *Languages* 6(1). 10.

Rinke, Esther, Sol Lago & Carolina Andrea Gattei. 2023. Diachronic change and variation in use. Judgments of clitic doubling in Peninsular vs. Rioplatense Spanish. *Isogloss* 9(1). 1–18.

Roberts, Ian. 1993. Postfácio. In Ian Roberts & Mary A. Kato (eds.), *Português Brasileiro: uma viagem diacrônica (Homenagem a Fernando Tarallo)*, 409–421. Campinas, SP: Editora da UNICAMP.

Rodrigues, Cilene. 2002. Morphology and null subjects in Brazilian Portuguese. In David Lightfoot (ed.), *Syntactic effects of morphological change*, 160–178. Oxford: Oxford University Press.

Rodrigues, Cilene. 2004. *Impoverished morphology and A-movement out of case domains*. University of Maryland PhD dissertation.

Santos, Danielle R. & Maria Eugênia Lammoglia Duarte. 2006. A ordem V SN com verbos inacusativos na fala e na escrita padrão. *Cadernos do Congresso Nacional de Lingüística e Filologia. Rio de Janeiro* 9(15).

Schmid, Monika. 2002. *First language attrition, use and maintenance. The case of German Jews in anglophone countries*. Amsterdam & Philadelphia: John Benjamins.

UCLA Statistical Consulting Group. 2011. *R library: Contrast coding systems for categorical variables*. Los Angeles, CA: UCLA Statistical Consulting Group. https://stats.idre.ucla.edu/r/library/r-library-contrast-coding-systems-for-categorical-variables (accessed August 2022).

Vafaee, Payman, Yuichi Suzuki & Ilina Kachisnke. 2017. Validating grammaticality judgment tests: Evidence from two new psycholinguistic measures. *Studies in Second Language Acquisition* 39(1). 59–95.

Wickham, Hadley. 2016. *ggplot2: Elegant graphics for data analysis*. New York: Springer-Verlag. Available at: https://ggplot2.tidyverse.org.

Wickham, Hadley, Mara Averick, Jennifer Bryan, Winston Chang, Lucy McGowan, Romain François, Garrett Grolemund, Alex Hayes, Lionel Henry, Jim Hester, Max Kuhn, Thomas Pedersen, Evan Miller, Stephan Bache, Kirill Müller, Jeroen Ooms, David Robinson, Dana Seidel, Vitalie Spinu, Kohske Takahashi, Davis Vaughan, Claus Wilke, Kara Woo & Hiroaki Yutani. 2019. Welcome to the tidyverse. *Journal of Open Source Software* 4(43). 1686.