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Evaluating the form of third-person anaphoric direct objects in Portuguese: A cross-dialectal study

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Both Brazilian Portuguese (BP) and European Portuguese (EP) permit definite third-person null direct objects (DOs) in anaphoric contexts, but differ with regard to the overt DO variant, with the former variety favoring tonic pronouns, the latter clitics. Previous research on language production has shown that the choice between variants in both varieties is constrained by semantic-pragmatic features such as animacy and specificity. We analyze speaker evaluation of these forms in EP and BP, using an experimental acceptability judgment task in which stimuli varied according to DO variant, animacy, and specificity. Data are drawn from the evaluative responses (n= 1752) of 215 Portuguese-speaking participants. Our results demonstrate that the null variant is evaluated most positively overall in both varieties. For EP and BP respectively, the clitic and tonic variants were evaluated most positively with animate specific referents. Our findings show that the patterns of variation previously found in production are reflected in gradient evaluations of anaphoric DOs in EP and BP. This provides support for the hypothesis that in the shift from clitic to tonic DO pronouns in BP, the overt tonic variant has preferentially taken on the same properties of the former clitic DOs.

1. Introduction

It is well-known that both Brazilian (BP) and European Portuguese (EP) permit definite third-person null direct objects (DOs) in anaphoric contexts (Cyrino, 1998; Raposo, 1986), and that this feature distinguishes them from other Romance varieties (e.g., Spanish, Campos, 1986; but see Schwenter, 2006; Reig Alamillo, 2009 for exceptions in Spanish). Not only is there variation, however, between the null variant and overt pronominal variants, especially in conversational or informal written varieties of both BP and EP, the overt variants differ by dialect. Examples below show (1a) the null variant, frequent in both BP and EP, (1b) the clitic pronoun variant, found in EP but rare in spoken BP, and (1c) the tonic pronoun variant, found in BP but not EP.

(1) (a) Eu conheço a Joana, e ele conhece Ø também.
I know the Joana and he knows NULL.DO too
'I know Joana, and he knows (her) too.'

(b) Eu conheço a Joana, e ele a conhece também.
I know the Joana and he CLITIC.DO knows too
'I know Joana, and he knows her too.'

(c) Eu conheço a Joana, e ele conhece ela também.
I know the Joana and he knows DO.PRON too
'I know Joana, and he knows her too.'

An open question in the research on this variation is whether speakers evaluate the acceptability of the null vs. overt variants in similar fashion and moreover, whether these judgments differ across the two dialects. Are the null variants evaluated positively, even though they are not part of the prescriptive grammar of Portuguese, and are not taught in schools in either Brazil or Portugal? Are the overt variants evaluated similarly in the two dialects, even though the clitic forms are considered normative in all dialects, and the tonic forms are proscribed by the educational system in Brazil? To our knowledge, no prior research has dealt with these topics. Therefore, these are the questions we seek to answer in this paper. More generally, our research contributes to the growing body of work on native speaker evaluations in Portuguese, a language that has lagged behind as a target of this particular approach to linguistic inquiry (Oushiro, 2021).

In what follows, we first provide some necessary background on the distribution of forms found in both BP and EP for the encoding of DOs in section 2. In section 3, we detail the experimental methods employed to collect native speaker evaluations of DO realization in both Portuguese varieties. Section 4 presents the results of the experiment, including the overall distribution of the data and an inferential analysis using ordinal regression. Section 5 offers a discussion of our findings and the conclusions of our study.

2. Background

In this section, we summarize the state of knowledge about anaphoric DOs in both Brazilian and European Portuguese. As we will detail, there has been quantitative research demonstrating that the distribution of the null and overt forms is very much parallel in both varieties. This claim is important for our study of speaker evaluations, since it provides the basis for the hypothesis that speakers should evaluate the different DO variants similarly across the two dialects, despite their well-known differences in the realm of DO marking (Kato, Martins, & Nunes, 2022).

In modern spoken Brazilian Portuguese, anaphoric direct objects are manifested either as null objects, i.e., as discourse referents with no overt realization, or as tonic pronouns, which coincide with the forms used for nominative subjects in both BP and EP. These uses are illustrated in the constructed examples (2) and (3), respectively.

(2) A Larissa comprou um sapato mas devolveu Ø hoje
The Larissa buy.3SG.PRET a shoe but return.3SG.PRET NULL.DO today
'Larissa bought a pair of shoes, but she returned it today.'

(3) Carla é minha amiga e eu vi ela ontem.
Carla be.3SG.PRES my friend and I see.1SG.PRET DO.PRON yesterday
'Carla is my friend, and I saw her yesterday.'

However, in the history of BP, third-person DOs were formerly expressed as clitic pronouns *o(s), -lo(s)* 'it, him, them', and *a(s), - la(s)* 'it, her, them', a feature maintained by modern EP (in both proclitic and enclitic position). As attested by Cyrino (1994, 1998), BP underwent a diachronic change in which null DO marking became the preferred form, as shown in **Table 1**, where null DOs increase by nearly 70% between the 16th and 20th centuries.

Century	Null	Overt	Total
16th	31/10.7%	259/89.3%	290/100%
17th	37/12.6%	256/87.4%	293/100%
18th	53/18.5%	234/81.5%	287/100%
19th	122/45%	149/55%	271/100%
20th	193/79%	51/20.9%	244/100%

Table 1: Distribution of null vs. overt DO variants in BP by century (From Cyrino, 1994, p. 169).

In addition to the documentation of historical changes in the distribution of DO variants in EP and BP, previous work has also endeavored to examine the factors that constrain the variation between overt and null anaphoric DOs. In particular, several semantic and pragmatic features have been found to play key roles in the choice between null and overt DO variants in both varieties. For example, studies of both BP (Cyrino, 1994; Duarte, 1989; *inter alia*) and EP (Barbosa et al., 2005; Cyrino & Matos, 2002; *inter alia*) have found that overt objects are favored for animate referents, whereas the null option is more prevalent with inanimate referents. In addition to animacy, Cyrino (1994) found that a specific antecedent is more likely to yield the null variant than a non-specific one, thereby introducing specificity as another probabilistic determining factor in the choice of DO forms. Additionally, Creus and Menuzzi (2004)'s work on BP found that semantic gender was an important constraint on DO expression for animate referents. Namely, they found that animate referents with identifiable semantic gender (e.g., *mulher*, 'woman') are more likely to be expressed as overt pronouns than those without identifiable semantic gender (e.g., *pessoa*, 'person').

Building on the work of Cyrino (1994, 1998) and other scholars such as Duarte (1989), Schwenter and Silva (2003) demonstrated that animacy and specificity serve as the primary semantic and pragmatic factors influencing anaphoric direct object choice in Brazilian Portuguese. They extracted 1250 cases of anaphoric objects from the *Programa de Estudos sobre o Uso da Língua* (PEUL) corpus, which consists of sociolinguistic interviews recorded in the 1980s with speakers from lower socioeconomic classes residing in Rio de Janeiro and classified them according to animacy and specificity. Their results revealed a strong overall preference for null objects in three out of four factor combinations (animate/non-specific, inanimate/specific, and inanimate/non-specific). Conversely, overt object pronouns were favored only when the referent was animate and specific.[1] The authors interpreted these results as indicative of a grammatical distinction in Brazilian Portuguese concerning animate third-person objects, specifically between specific and non-specific entities. Null objects emerge as the default choice in terms of frequency for all inanimate anaphoric DOs and animate non-specific anaphoric DOs. However, null objects assume a marked status for animate, specific anaphoric DOs, which are preferably expressed as tonic pronouns (Schwenter & Silva, 2003, p. 109). In essence, the type of anaphoric direct object marking can be anticipated probabilistically by considering the semantic and pragmatic properties of the direct object referents.

In addition to null objects, EP speakers also employ direct object pronouns (*a, o, as,* and *os* 'it, him, her, them') such as the proclitic *Eu não o vi* 'I did not see him' or the enclitic *Eu bebi-a ontem* 'I drank it yesterday', but never employ the tonic pronoun (e.g., *ele/ela*) for anaphoric DOs.

[1] Third-person clitic forms were exceedingly rare in their data, with only four tokens found in the 1250 occurrences analyzed.

In comparative terms, scholars have found syntactic differences between null direct objects in EP and BP, for instance the observation that null DOs in syntactic islands can be found in BP, but not in EP (Cyrino & Matos, 2002; Kato, 2011; Costa & Duarte, 2013). Perhaps due to this focus on the syntactic distinctions between BP and EP, much less attention has been paid to the similarities in distribution of null and overt objects in naturally occurring data from the two varieties.

This gap in the literature was at least partially filled by quantitative variationist research by Schwenter (2014) and Sainzmaza-Lecanda and Schwenter (2017), where mixed-effects logistic regression analysis was utilized to uncover the similarities between BP and EP (for other languages, Meyerhoff, 2002; Vallejos et al., 2020). In these two works, naturally-occurring spoken data from both varieties—the PEUL corpus data described above for BP, and the oral portion of the *Corpus de Referência do Português Contemporâneo*[2] for EP—were analyzed in order to test the hypothesis that the underlying constraints on the variable use of null versus overt forms are similar in the two varieties of Portuguese. Sainzmaza-Lecanda and Schwenter (2017) found that the constraint types and their ordering in the two dialects are nearly identical despite the obvious difference in the pronominal forms employed for third-person referents across dialects: clitic (EP) versus tonic (BP). Their findings showed that the null object was the most frequent option for direct objects in both dialects, although there were more null objects in BP (and more repetition of lexical NPs in EP; see Schwenter, 2014 for explanation). The null variant in each dialect corresponded to direct objects with the prototypical semantic and pragmatic features (inanimate, non-specific) of this grammatical function. At the same time, overt forms (clitic or tonic) were employed to mark DOs with features atypical of this grammatical function (Comrie, 1989), that is, those that are animate and specific[3]. Sainzmaza-Lecanda and Schwenter (2017) concluded, based on the results of their regression analyses, that the tonic pronoun forms (deriving from the nominative subject pronoun) in BP are the forms that have replaced the clitic forms still found in modern-day EP and that the distribution of these two types of pronouns essentially mirrored each other across the two dialects.

However, an open question in research on DOs in Portuguese is whether speakers evaluate the acceptability of null forms vis-à-vis their overt pronominal counterparts in a positive fashion and what semantic and pragmatic factors affect their judgments. While overt forms are either prescribed (clitic pronouns) or proscribed (tonic pronouns) in formal schooling, little attention has been paid to null objects in the educational system (they are not found as an option for DOs, for instance, in pedagogical grammars for native speakers). Furthermore, an additional question

[2] Available online at https://www.clul.ulisboa.pt/recurso/corpus-de-referencia-do-portugues-contemporaneo.

[3] Following the typological generalization made by Comrie (1989), we assume that prototypical subjects cross-linguistically are animate, especially human, while prototypical direct objects are inanimate. This is why, per Comrie, there is often "special" marking of animate DOs, on the one hand, but "special" marking of inanimate subjects, on the other.

is whether, given the similarity in usage constraints across EP and BP, speakers of the two dialects also show parallel judgments in their acceptance of the different forms. In other words, if the distinct forms in BP and EP, including null objects, are essentially serving the same purpose/ function, then we predict that speaker evaluations of them in the same contexts should also be essentially the same. If BP speakers and EP speakers show similar gradient judgments for the anaphoric DO variation, and they also show the same judgments for null objects, then it would be reasonable to conclude that their underlying grammars of DO realization are similar, despite the formal difference between the pronouns utilized in each variety.

3. Methods

3.1. Stimuli

To approximate real-world language usage, all stimuli for our experiment were designed according to a pre-established social-situational context, described to participants before they began the evaluation task. Stimuli were described as part of conversations that took place after a robbery at a local mall (a familiar context for both the Brazilian and Portuguese populations), in which police officers asked bystanders (described as *várias pessoas; gerentes de lojas, pessoas que estavam comprando nas lojas e também outras que estavam na praça de alimentação* 'various people; store managers, shoppers, and also people who were in the food court') relevant questions about the event, in order to encourage participants to imagine the items that they are judging as having been uttered by many different kinds of people.

All the contexts in the experimental design consisted of an adjacency pair, in which one person, a police officer, asked a second person, a bystander, a question about an event that the bystander witnessed, as in the representative exchange in (4). All the responses contained sentential negation to keep the word order of the potential bystander responses consistent and to avoid the possibility of enclitic word order in EP, since sentential negation is a well-known proclitic trigger in EP (Kato et al., 2022, p. 238). In addition, to the extent that DO clitics occur in BP, they would be in proclitic position with simple finite verbs such as *vi* 'I saw' in (4).

(4) Você viu o acontecido?
you see.2SG.PRET the event
'Did you see what happened?'

Não, não {o/Ø} vi.
No not {it/Ø} see. 2SG.PRET
'No, I didn't see it.'

Either of the two responses in (4) are possible in Portuguese, and particularly in EP, where clitic pronouns such as *o* are relatively frequent in naturally occurring data (Schwenter, 2014). In BP, as discussed above, such third-person clitic pronouns are essentially moribund in naturally

occurring spoken language, and speakers have the option of using a tonic pronoun in variation with the null object, in postverbal position, as in (5). The propositional content of the response is the same with all three variants, clitic, null, or tonic pronoun.

(5) Não, não vi {ele/Ø}
No not see.1SG.PRET {it/Ø}
'No, I didn't see it.'

A potential objection that could be raised at this point is that such responses (often termed "echoic" replies; see Rosemeyer and Schwenter, 2019), especially with the null object, are not truly instances of a null object but rather are cases of VP-ellipsis (cf. Kato et al., 2022, p. 267). An uncontroversial example of VP-ellipsis comes from either an affirmative or negative response to the question in (6):

(6) Você viu a mulher com dois cachorros?
You see.2SG.PRET the woman with two dogs
'Did you see the woman with two dogs?'

(Não) Vi.
(no) see.1SG.PRET
'[Yes] I (didn't) saw [the woman with two dogs]'

In this example, it is necessarily understood that not only did the respondent see the woman in question, but that he specifically saw the woman with two dogs. The elided material from the VP, namely everything but the corresponding verbal echo (*viu* > *vi*), is comprehended by the simple verbal response. However, when there are no modifiers like the adverbial PP *com dois cachorros* 'with two dogs' in (6), it is impossible to tell whether responses like those in (4) or (5) above are cases of VP ellipsis or just a null DO. Obviously, when the response contains a pronoun such as *o*, then there is no ellipsis, but rather anaphoric reference via that pronoun to its antecedent in the interlocutor's preceding question, i.e., *o acontecido* 'the event'. To put it succinctly, when the VP contains only the verb and the DO, there is variation between responses with and without an anaphoric DO pronoun. It is this variation that is of interest to us, and therefore is the target of our analysis. We will remain agnostic about the correct syntactic analysis of our examples, insofar as we are only interested in the surface contrast between the pronouns (clitic in EP, tonic in BP), on the one hand, and the null DO, on the other.

Data are drawn from a larger experimental survey exploring speaker evaluations of the distinct forms that DOs take in the two Portuguese varieties. Experimental items were designed as syntactic minimal pairs, where the items corresponding to the conditions above had versions varying only according to DO variant. Clitic and tonic variants were considered for the first and second person items. The third-person items were fully crossed according to animacy (animate

vs. inanimate), and specificity (specific vs. non-specific), with the DO form depending on the dialect (EP: null vs. clitic; BP: null vs. tonic), labeled “null” and “overt” in **Table 2**. For animate, specific referents, we also tested the potential effects of semantic gender (identifiable semantic gender vs. unidentifiable semantic gender). See Appendix 1 for a list of the third-person singular items relevant to the present analysis.

Condition	Person	DO Type	EP	BP	Animacy	Specificity	Sem. Gender
1	1	clitic	me	me			
2	1	tonic	eu	eu			
3	2	clitic	te	te			
4	2	tonic	você	você			
5	3	overt	o/a	ele/ela	+	+	+
6	3	null	Ø	Ø	+	+	+
7	3	overt	o/a	ele/ela	+	+	–
8	3	null	Ø	Ø	+	+	–
9	3	overt	o/a	ele/ela	+	–	
10	3	null	Ø	Ø	+	–	
11	3	overt	o/a	ele/ela	–	+	
12	3	null	Ø	Ø	–	+	
13	3	overt	o/a	ele/ela	–	–	
14	3	null	Ø	Ø	–	–	

Table 2: Distribution of experimental conditions.

For each of the conditions in **Table 2**, we created two experimental items, for a total of 28 experimental stimuli. We elected to include only two items per experimental condition, in order to keep the overall number of experimental items low to minimize the saliency of the grammatical forms under investigation. Nevertheless, we attempted to counterbalance this increased risk of the influence of individual variation with a larger population sample size (100 participants for BP, 115 for EP) and through the random effects structure in our inferential models, described in Section 3.3.

3.2. Experimental Design

To limit participant awareness of the target variable and to avoid potential priming effects, we used the total 28 experimental items to create two versions of the instrument, each containing 14 target stimuli and 14 distractor items, for a total of 28 items. Relevant to the present study's focus, in each version, 10 of the 14 target items included third-person singular DO referents. To create these two versions, we used the Latin Squares methodology to evenly distribute the experimental conditions across lists. For example, items (7) and (8) both possess animate, specific referents. EP Version 1 of the experiment included (7a) and (8b) and EP Version 2 included (7b) and (8a). In this way, each participant would see both the clitic and the null DO variant with an animate, specific referent, but would see each contextual item only once. This same procedure was followed for each of the DO referent conditions, such that each participant saw two items with each of the combinations of DO referent characteristics, once with the null variant and once with the overt variant. In this fashion, factor values were equally distributed across versions. Versions for BP were created in the same manner but used the tonic variant in place of the clitic. See Appendix 1 for the full list of experimental stimuli.

(7) **[+animate, +specific]**
Policial: Viu a mulher?
Police officer see.3SG.PRET the.F woman
'Police Officer: Did you see the woman?'

(a) Não, não vi.
No no see.1SG.PRET
'No, I did not see her.'

(b) Não, não a vi.
No no 3SG.CLITIC.F see.1SG.PRET
'No, I did not see her.'

(8) **[+animate, +specific]**
Policial: Viu a gerente?
Police officer see. 3SG.PRET the.F manager
'Police Officer: 'Did you see the manager?'

(a) Não, não vi.
No no see.1SG.PRET
'No, I did not see her.'

(b) Não, não a vi.
No no 3SG.CLITIC.F see. 1SG.PRET
'No, I did not see her.'

The experiment was hosted on Qualtrics[4] and was published on social media platforms (Facebook, Twitter) and also distributed via e-mail to our friends and associates, employing the friend-of-a-friend sampling method. Upon beginning the experiment, each respondent was randomly assigned to one of the two versions by the built-in randomization tool, and questions within each version were also randomized for each participant to mitigate potential ordering effects.

Before beginning the experiment, participants were informed of their rights and provided with information regarding the study's purpose, procedures, potential risks and benefits, confidentiality measures, and their voluntary participation rights in accordance with the approved Institutional Review Board (IRB) protocol (2017E0523). At the start of the survey, participants were presented with a description of the goal of the study, which we described as an investigation of *a fala cotidiana dos brasileiros* ('Brazilians' everyday speech') or *a fala cotidiana dos portugueses* ('Portuguese people's everyday speech'). Each participant was also told that they would be asked to *dar a sua opinião sobre algumas frases* ('give your opinion of some sentences'), and were told that there were no correct answers, but rather that we were interested only in their personal opinions. After providing informed consent, participants read the introductory context and were then asked to judge the acceptability of the different responses on a 7-point Likert Scale, where point 1 was *totalmente não aceitavel (*'totally unacceptable') and point 7 was *totalmente aceitável* ('totally acceptable') and were reminded again that we were interested in their personal evaluations of the responses.

In addition to providing judgments, participants responded to sociodemographic questions to allow for examination of social constraints on their responses, as well as to guarantee that only responses from native speakers of EP/BP over the age of 18 years of age who resided in Brazil or Portugal for the majority of their lives were included in our analysis. Respondents were asked to provide demographic information for level of education, socioeconomic status (self-judged), age, gender, birthplace, and place of residence.

3.3. Statistical Methods

To evaluate the potential relationships between participant evaluation of DO type and grammatical factors and participant demographic characteristics, we employed several statistical procedures. We analyzed the BP and EP data separately but followed the same procedure for each. For both analyses, we constructed a series of nested mixed-effects cumulative linking models using the *ordinal* package (Christensen, 2023) in R (R Core Team, 2023). For both sets of models, we included DO type (EP: clitic vs. null; BP: null vs. tonic), object animacy (animate vs. inanimate),

[4] https://www.qualtrics.com/.

object specificity (specific vs. non-specific), and participant demographic characteristics (age, gender, socioeconomic status) as potential predictors of acceptability.[5] Additionally, we included participant and item as random intercepts in all models, to account for repeated measures and potential item-based variation. After constructing the models, we compared each set of models using the ANOVA function, a likelihood ratio test, to determine the best-fit model for the data. Finally, we generated conditional inference trees to visualize the interactions in our data using the *party* package in R (Hothorn et al., 2006).

As noted, we employed ordinal regression in our inferential analysis to appropriately account for the ordered categories of the Likert scale data. However, for the reader's ease, several of the figures in the results section display data normalized by participant to facilitate interpretation of the spread and variability of the data across conditions. This was done solely for descriptive purposes.

3.4. Participants

A total of 100 respondents from throughout Brazil, ranging in age from 18–70 years old (median = 32) completed the task. Additionally, the Brazilian sample included 25 men and 75 women. A total of 115 respondents from Portugal, ranging in age from 21–81 years old (median = 44), completed the task. The Portuguese sample included 36 men (31.3%), 77 women (66.9%), and two participants in other gender categories (1.7%).

4. Results

The overall results of the experimental task show that animacy and specificity are significant predictors of respondent evaluation of third-person DO variants in both EP and BP. In both cases, the use of the null variant is evaluated more favorably overall, when compared to clitic pronouns in EP and tonic pronouns in BP. Nevertheless, the two language varieties present some differences with the regard to the influence of animacy and specificity in the evaluation of DO variants. Specifically, evaluations of both null and clitic variants in EP are constrained by animacy and specificity of the referent, while in BP only evaluations of tonic pronouns are mediated by these factors. We did not find effects of semantic gender for animate referents or effects related to the demographic characteristics of our participants in the present data sets. The

[5] In Sainzmaza-Lecanda and Schwenter (2017), number was also a significant differentiator of BP and EP DO coding. However, we did not test for number differences in the experimental materials, since this would have meant doubling of the number of stimuli. In the future, we plan to investigate the evaluation of number differences in a separate study.

following sections detail the individual analyses of the evaluation of third-person null versus overt DOs in EP and BP, respectively.[6]

4.1. European Portuguese

4.1.1. Description of the data

The EP data included a total of 822 evaluations of third-person anaphoric DOs. **Figure 1** visualizes the distribution of participant evaluative scores by DO referent. Overall, these distributions reveal a marked preference for choosing '7' among participants overall. Nevertheless, the distribution shows a larger tendency for the null variant to receive a score of '7', and a larger tendency for clitics to receive scores lower than '7' when compared to the null variant. See Appendix 2 for the distribution of responses across the ordinal scale by experimental condition.

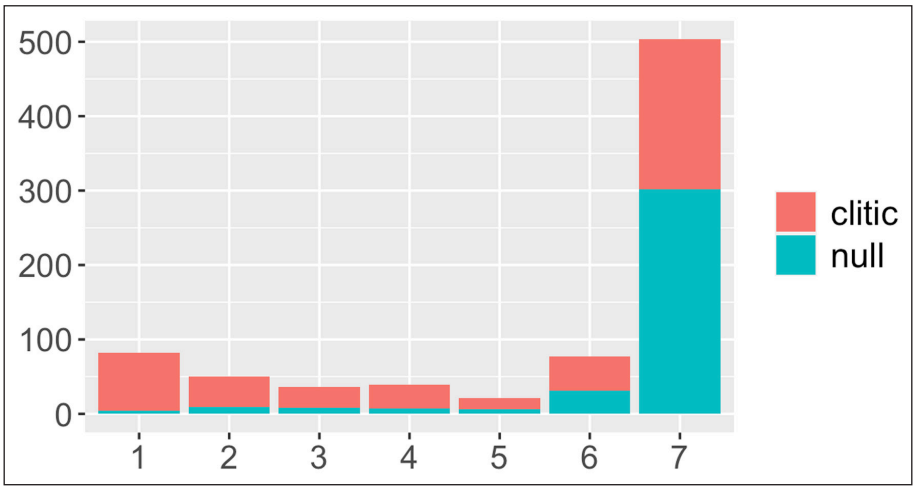

Figure 1: Overall distribution of EP responses by DO referent.

A similar pattern can be observed in the normalized data. Most notably, while the median scores for null and clitic variants are not vastly different, the spread of participant evaluations of

[6] We elected to conduct separate analyses of the EP and BP data, rather than combine them for several reasons. First, though our results ultimately show parallel evaluative patterns and constraints on evaluation between the clitic variant in EP and the tonic variant in BP, the latter is a newer form that does not enjoy the prescriptive acceptance. As we noted in our introduction, clitic forms are considered normative, whereas the tonic forms are proscribed by the educational system in Brazil. Because of this, the overall ratings of the tonic pronoun are *lower* than those of the clitic pronoun, despite being subject to the influence of animacy and specificity in similar ways. Second, a combined model would necessitate a 4-way interaction between variety (EP vs. BP), DO Type (null vs. overt), Animacy (animate vs. inanimate), and Specificity (specific vs. non-specific) in order to be meaningful. Higher-order interactions increase the risk of overfitting the model, and lead to issues of interpretability. For these reasons, we elected to conduct two separate analyses and compare them.

clitic pronouns is much wider than the spread of evaluations for the null variant, as visualized in **Figure 2**.

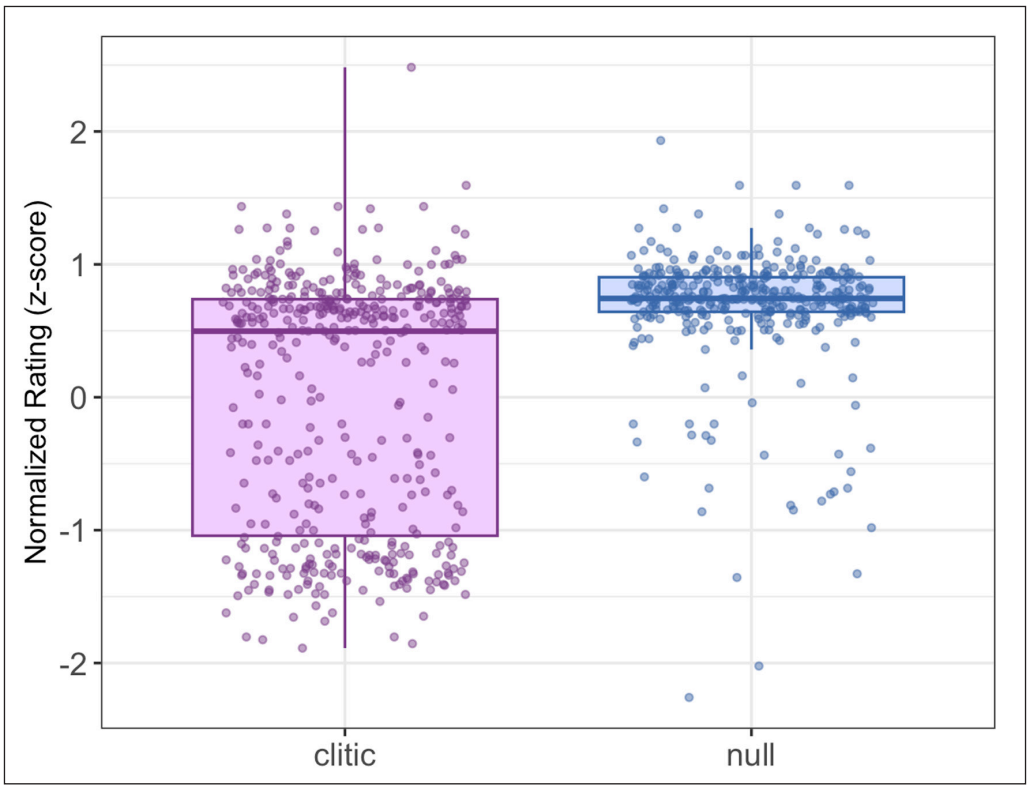

Figure 2: Overall distribution of EP participant responses by DO referent.

Despite the notable tendency towards higher scores for both null and clitic variants illustrated in **Figures 1** and **2, Figure 3** reveals some important differences in the evaluation of DO form based on the characteristics of the referent. Across all conditions, the null variant generally has a higher and more consistent normalized ratings compared to the clitic, which shows greater variability in evaluation. The clitic pronoun, however, showed greater differences across conditions.

Specifically, the use of the clitic pronoun with both specific and non-specific inanimate referents received the lowest overall evaluations. The use of the clitic pronoun with animate, non-specific references received higher scores than the two previously mentioned conditions, but evaluations still showed a wider spread, indicating lack of consensus in acceptability judgments. By contrast, the distribution of respondent evaluations of the clitic with an animate and specific DOs was parallel to the evaluations of the null DO in all cases, showing higher overall scores and a reduced spread. The inferential analysis that follows will show that

particular combinations of dependent variable values increase the likelihood of higher and lower participant evaluations.

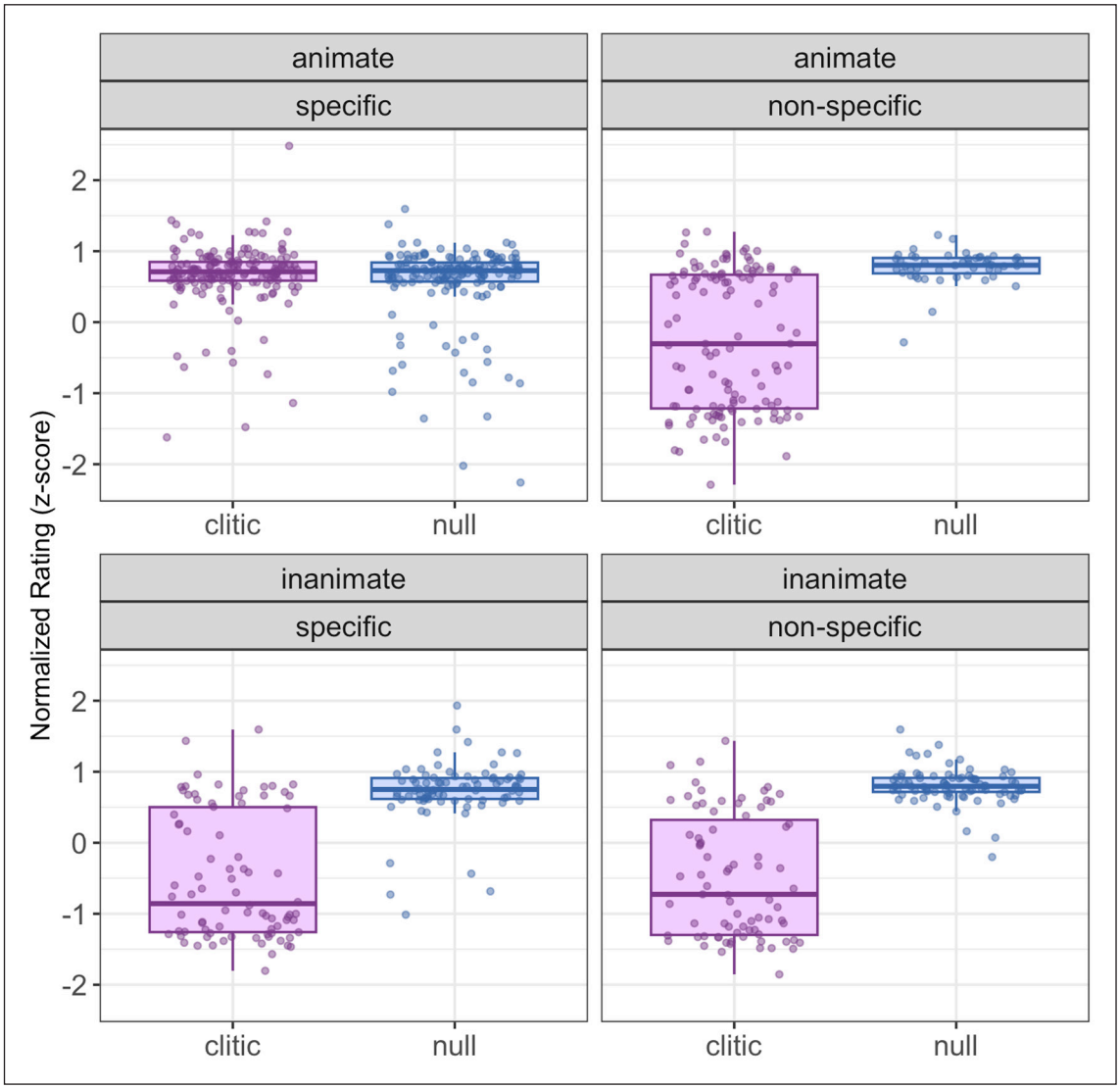

Figure 3: Distribution of EP participant evaluations by DO variant, animacy, and specificity.

4.1.2. Inferential analysis

The best-fit ordinal model for the data included a three-way interaction between DO variant, animacy, and specificity as significant predictors of participant ratings, with random intercepts for participant and item. The model output is shown in **Table 3**, where the reference level is the use of a null variant for an inanimate, non-specific referent. The threshold coefficients for the ordinal scale are shown in **Table 4**.

Variant	Animacy	Specificity	Estimate	Std. Error	z value	Pr(>|z|)
Clitic	Animate	Specific	–1.3216	0.4971	–2.658	0.00785 **
Null	Animate	Specific	–1.4346	0.4495	–2.895	0.00379 **
Clitic	Inanimate	Specific	–4.1522	0.5283	–7.860	<0.001 ***
Null	Inanimate	Specific	–0.8117	0.5689	–1.427	0.15362 *ns*
Clitic	Animate	Non-specific	–3.8112	0.5218	–7.304	<0.001 ***
Null	Animate	Non-specific	–0.1825	0.6678	–0.273	0.78466 *ns*
Clitic	Inanimate	Non-specific	–4.2232	0.4832	–8.740	<0.001 ***

Table 3: Output of the best-fit ordinal model for EP.

Threshold	Estimate	Std. Error	z-value
1|2	–5.2140	0.4879	–10.686
2|3	–4.4788	0.4758	–9.414
3|4	–4.0506	0.4695	–8.627
4|5	–3.6331	0.4638	–7.834
5|6	–3.3839	0.4605	–7.349
6|7	–2.6936	0.4519	–5.961

Table 4: Threshold coefficients for best-fit ordinal model for EP data.

The output of this model reveals several interesting trends. Notably, the negative estimates for the threshold coefficients highlight the overall positive response to stimuli among participants, such that a response of '7' was the most likely overall. With regard to the predictor coefficients, their negative estimates reveal that the reference level, in this case the use of the null variant with an inanimate, non-specific referent received the highest ratings overall in the data set. However, the use of a null variant with a referent that is *either* inanimate or non-specific is not evaluated significantly differently from the use of a null variant with a referent that is *both* inanimate and non-specific, suggesting that only one of these features (animate *or* specific) is needed to elicit the highest evaluations of the null variant. On the other end of the spectrum, the items that received the lowest overall ratings in these data were those that included a clitic

pronoun to refer to an inanimate referent. The conditional inference tree in **Figure 4**,[7] offers a visualization of these interactions.

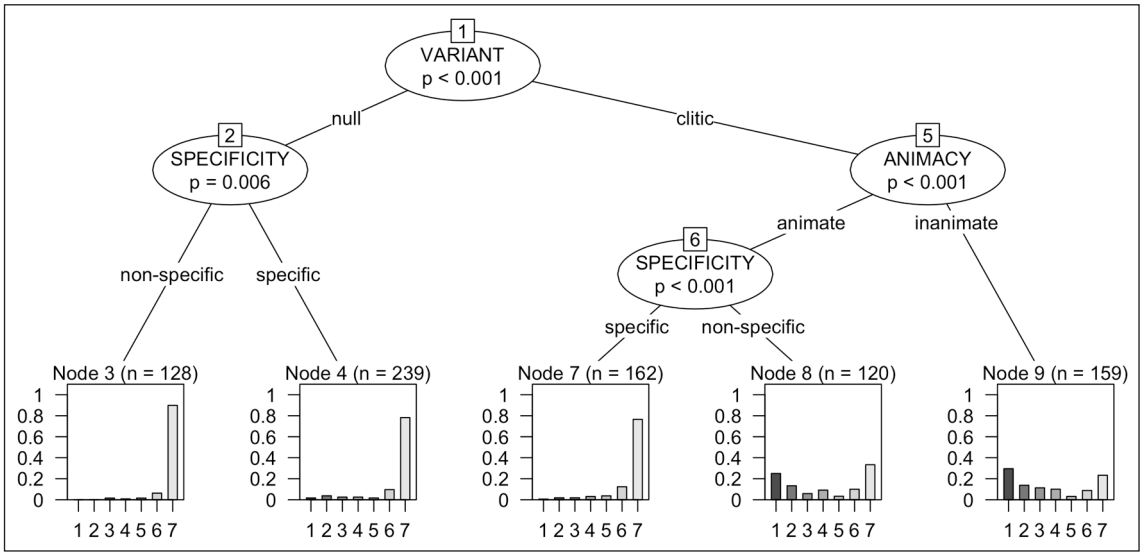

Figure 4: Conditional inference tree visualizing the interaction effects for EP.

Regarding the clitic variant in particular, node 5 in the tree suggests that animacy is the strongest determiner of evaluations of the use of this form, whereby preferential evaluations are given to the use of a clitic with an animate referent. This effect is further strengthened for referents that are both animate and specific, as shown in node 7. Overall, these patterns highlight the important interaction between animacy and specificity in predicting evaluations of clitic DOs in EP (Schwenter, 2014).

4.2. Brazilian Portuguese

4.2.1. Description of the data

The BP data included 930 evaluations of third-person object anaphoric DOs. **Figure 5** visualizes the distribution of participant evaluation scores by DO referent. These distributions reveal a

[7] Of note in this image is the absence of the factor animacy in the left branch for null objects. The ordinal regression output showed no significant difference between ratings of null objects with animate, non-specific referents, and null objects with inanimate, specific referents. Conditional inference trees (CIT) in the *party* package in R (Hothorn et al. 2006), use regression and p-values to identify the best splits in predictors to visualize interactions and subsets of the data. CITs use recursive binary partitioning of the dependent variable based on covariates, or the independent variables. At each node in the tree, splits in the data are generated by permutation-based significance tests between the dependent and independent variables. For null objects, animacy and specificity are statistically equally predictive of ratings, rather than having nested effects, as with clitics. For this reason, given the nature of CITs, only specificity is visualized in this image with regard to null objects.

greater tendency for the null variant to receive a score of '7', and a greater tendency for the tonic variant to receive scores lower than '7' when compared to the null variant. See Appendix 2 for the distribution of responses by condition across the ordinal scale.

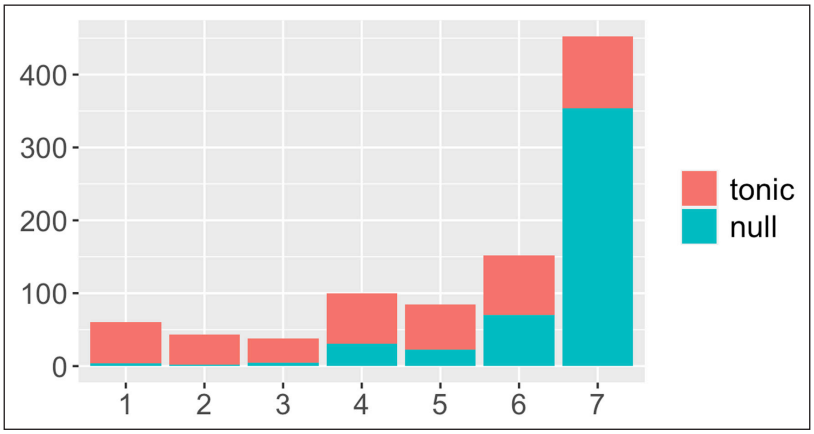

Figure 5: Overall distribution of BP responses by DO referent.

Visualization of the normalized data further highlights the patterns in **Figure 5**. **Figure 6** shows that not only does the tonic pronoun variant tend to be evaluated markedly less favorably than the null variant, but the former also shows a wider spread in evaluation.

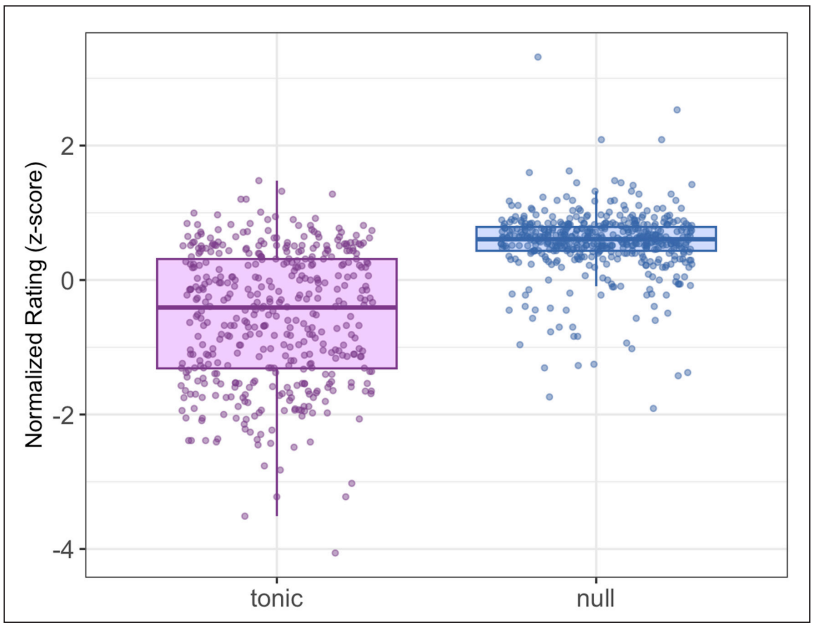

Figure 6: Overall distribution of EP participant responses by DO referent.

Nevertheless, more nuanced patterns can be observed in **Figure 7**, which visualizes the normalized responses by experimental condition. As in EP, the null variant generally has higher and more consistent normalized ratings. As was the case for the clitic variant in EP, the tonic variant tends to receive lower scores with greater spread overall. Nevertheless, this result varies by experimental condition.

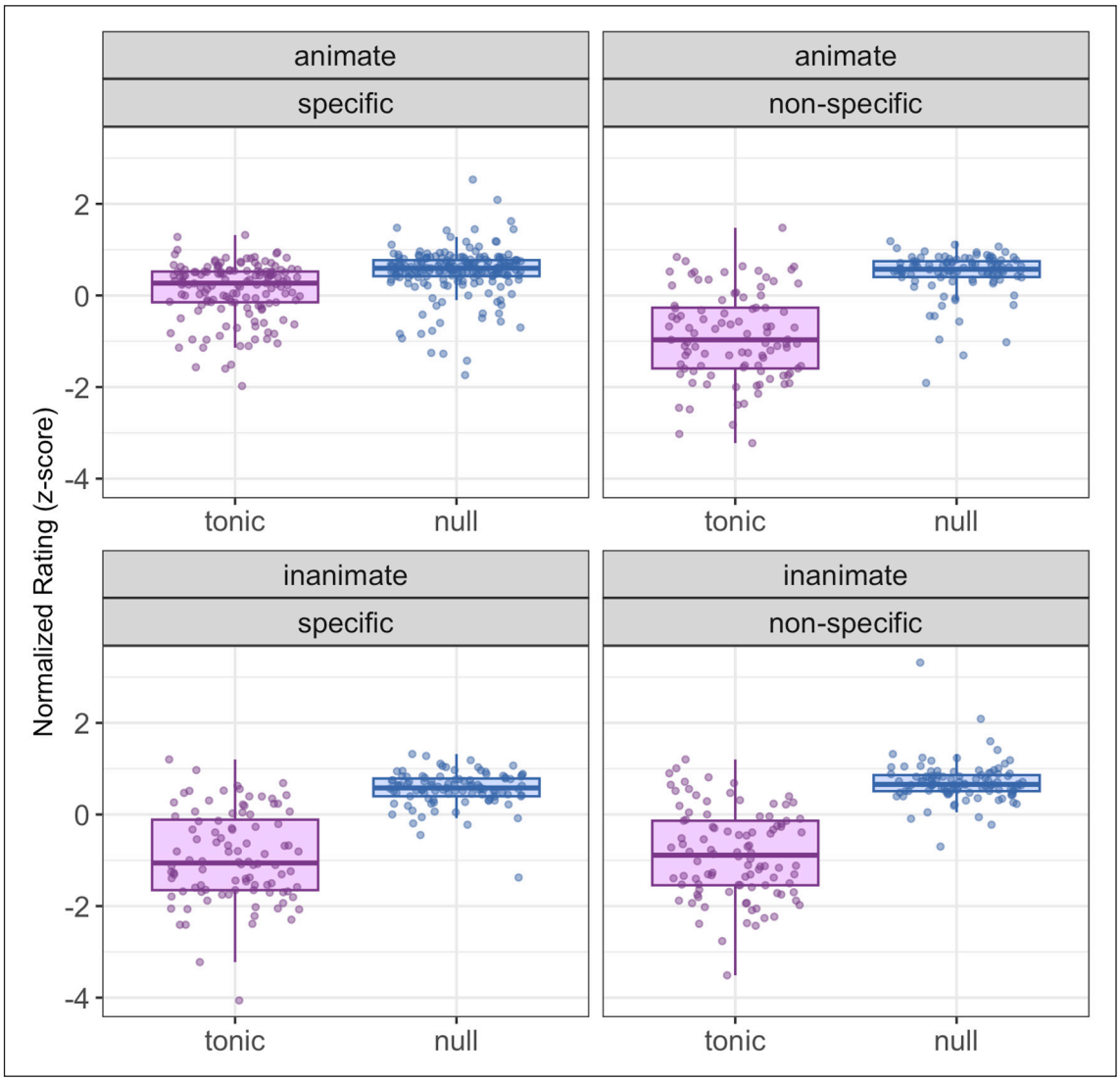

Figure 7: Distribution of BP evaluations by DO variant, animacy, and specificity.

Most evidently among the cases with tonic pronouns, only those co-occurring with animate and specific referents showed a pattern of overall positive evaluations that approximated the evaluation of the null variant across conditions. The inferential analysis that follows will show

the specific ways in which the evaluation of the tonic variant is mediated by animacy and specificity.

4.2.2. Inferential analysis

As with the EP data, the best-fit ordinal model for the data included a three-way interaction between DO variant, animacy, and specificity as significant predictors of participant ratings, with random intercepts for participant and item. The model output is shown in **Table 5**, where the reference level is the use of a null variant for an inanimate, non-specific referent. The threshold coefficients for the ordinal scale are shown in **Table 6**.

Variant	Animacy	Specificity	Estimate	Std. Error	z value	Pr(>|z|)
Tonic	Animate	Specific	–2.3986	0.3280	–7.312	<0.001 ***
Null	Animate	Specific	–0.8320	0.3258	–2.554	0.0107 *
Tonic	Inanimate	Specific	–4.6659	0.3705	–12.592	<0.001 ***
Null	Inanimate	Specific	–0.6080	0.3718	–1.635	0.1020 *ns*
Tonic	Animate	Non-specific	–4.5635	0.3690	–12.368	<0.001 ***
Null	Animate	Non-specific	–0.8620	0.3665	–2.352	0.0187 *
Tonic	Inanimate	Non-specific	–4.5481	0.3678	–12.365	<0.001 ***

Table 5: Output of best-fit ordinal model for BP.

Threshold	Estimate	Std. Error	z-value
1|2	–6.6761	0.4021	–16.603
2|3	–5.8881	0.3862	–15.244
3|4	–5.3403	0.3768	–14.174
4|5	–4.1887	0.3577	–11.709
5|6	–3.3585	0.3456	–9.718
6|7	–1.9779	0.3280	–6.030

Table 6: Threshold coefficients for best-fit ordinal model for BP data.

In the same vein as in the EP analysis, this model's output highlights several interesting findings for BP. As with EP, the BP threshold coefficients illustrate the overall positive response to stimuli among participants, such that a response of '7' was the most likely overall. Regarding the predictor coefficients, their negative estimates reveal that the null variants are more likely to be rated favorably overall. Furthermore, the use of the null variant with an inanimate and specific referent is not evaluated significantly differently from its use with an inanimate and non-specific referent. This fact, in combination with the overall positive evaluation of the null variant, reveals that their use is not modulated by the same factors as those that influence the evaluation of tonic variants. Indeed, respondent evaluations of tonic pronouns are constrained by both animacy and specificity. This interaction is visualized in the conditional inference tree in **Figure 8**.

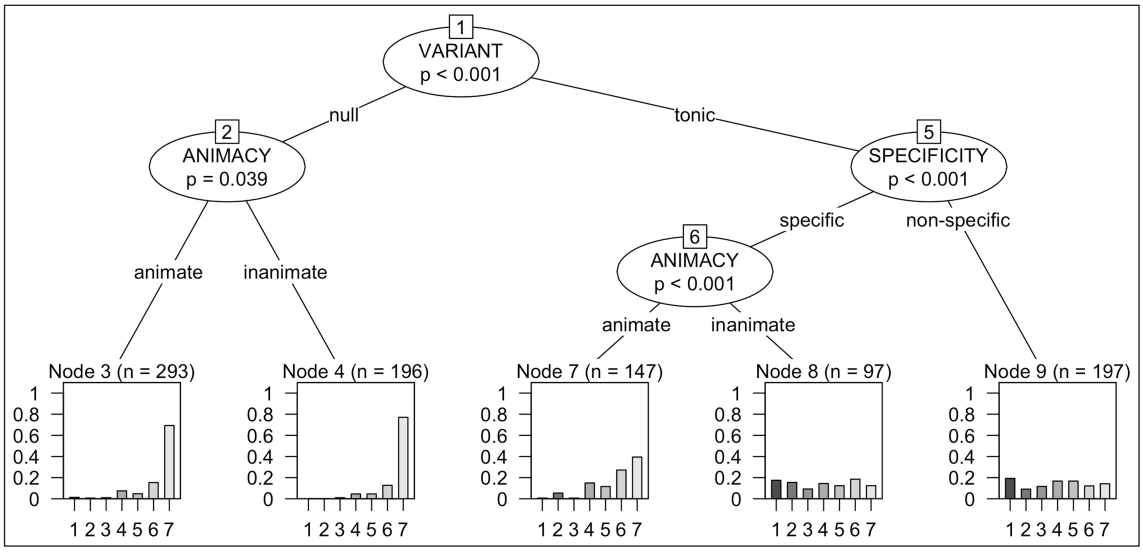

Figure 8: Conditional inference tree visualizing the interaction effect for BP.

In particular, the interaction between animacy and specificity for tonic pronouns shows that they are evaluated most favorably when used to refer to animate, specific referents, as shown in Node 6. These findings again highlight the important interaction between animacy and specificity in predicting evaluations of tonic DOs in BP, and parallel our findings on the evaluation of clitic DOs in EP.

5. Discussion and Conclusions

The data presented in this article reveal several important trends which provide additional insight into what are ultimately coherent patterns of DO evaluation in EP and BP, despite the obvious differences in the form of the overt variant employed in each dialect. Not only

do we find parallels between both varieties in terms of constraints on evaluation of DO variants, but we also corroborate previous findings from analyses of naturally occurring data (Sainzmaza-Lecanda & Schwenter, 2017), demonstrating that the same predictors that operate in language production are also present in BP and EP speakers' perception and evaluation of DO variants.

Beginning with the null variant, our findings align with previous studies of DO use in naturally occurring language production, which found the null variant to be overwhelmingly more frequent in both EP and BP (Schwenter, 2014; Sainzmaza-Lecanda & Schwenter, 2017). Similarly, our evaluative data reveal that speakers of both EP and BP show a marked preference for null forms compared to their overt counterparts, consistently evaluating them in more positive fashion. Looking only at evaluations of the null variants, there were some small differences. In EP, neither the combination of null DO with an animate, non-specific referent, nor the combination of null DO with an inanimate, specific referent, were evaluated significantly differently than the use of a null DO with a referent that was both inanimate and non-specific. This suggests that while null DOs with inanimate and non-specific referents are evaluated positively, only one of these features is necessary for speakers to evaluate the null variant as natural. One possible explanation for this is that many studies have demonstrated that the most frequent, "default" linguistic structures tend to be less pragmatically constrained, are "felt to be more usual, more normal, less specific" than other competing forms (Dahl, 1985, p. 19; cf. Schwenter & Torres Cacoullos, 2008), and are often the zero-coded form, as is the case in this study. Thus, this tendency is consistent with our results in which EP speakers positively evaluate null DOs with fewer feature requirements than the overt variant.

This is particularly evident in BP, where only the combination of a null DO with an inanimate, specific referent, was not evaluated significantly differently compared to the use of a null DO with a referent that was both inanimate and non-specific. In contrast to EP, BP speakers evaluated the use of the null variant with an animate, non-specific referent as significantly less acceptable than with inanimate, specific referents, suggesting the greater importance of animacy for null variants in this variety. Nevertheless, the coherence between patterns of use of null objects in both varieties and their evaluation by speakers illustrate that BP and EP have extremely similar underlying usage-based tendencies. This finding is of special import because it reveals that Brazilian Portuguese maintains pragmatic constraints in the domain of DO coding that are similar to those of EP despite clear diachronic changes in the BP system (Cyrino, 1994), thereby adding to the accepted idea in usage-based models of grammar that language change is gradual, and correspondingly, evaluations are probabilistic (Bybee, 2009).

Regarding the evaluation of the overt variants in EP and BP, several compelling findings emerged from our data. First, animacy and specificity played a role in the evaluation of overt DOs in both varieties. In both EP and BP, the overt variants were evaluated most positively with

animate, specific referents. Critically, our data provide an evaluative complement to Schwenter's (2014) and Sainzmaza-Lecanda & Schwenter's (2017) assertions that tonic pronouns in BP are this variety's replacement of the third-person direct object clitic pronouns in EP. Other than that, these results also contribute to the concept of the dynamicity of language change (Bybee, 2010), meaning that, even though tonic pronouns are supplanting BP's former clitics, this new pronominal option has conserved the same referential features expressed by the clitics. Therefore, based on these findings, it is possible to claim that as the overt variant was (is) more frequently used in BP, it conventionally assumed (and continues to assume) the former clitic pronoun properties that are still conserved in EP.

Overall, our findings show that the patterns of variation previously found in anaphoric DOs in conversational production in EP and BP are reflected in gradient evaluations in an experimental task. In addition to this contribution, our results have also suggested some possible paths of change regarding Brazilian Portuguese's shift from clitic to tonic DO pronouns, in which we argue that it is possible that the overt variant could have preferentially taken on the same properties of the clitic DOs that are now extremely rare in this dialect. Furthermore, other than the differences found between overt and clitic evaluations, our results have indicated that the preferred strategy overall in both dialects was the null variant. Following our results, the null variant seems to be less pragmatically constrained in EP than in BP, considering that only one of the tested referent's features is necessary for speakers to evaluate the null variant as acceptable in the contexts we tested. However, future studies could test this hypothesis in greater depth with a broader range of contextual cues, across these and other Portuguese varieties.

Appendix 1: Experimental Stimuli

The following list shows the experimental items that included third-person singular DO referents. Each numbered item represents a target stimuli sentence from this experiment, labeled with the features of the DO referent. All item versions included the initial question from the police, followed by the target structure in the answer. Items labeled (a) include the null variant and were evaluated by both EP and BP respondents. Items marked (b) include the clitic pronoun variant and were evaluated by EP respondents. Items marked (c) include the tonic pronoun variant and were evaluated by BP respondents. Readers may note more items for [+animate, +specific] DO referents. This is because this experiment also explored the potential role of semantic gender in DO evaluations, which was not found to play a significant role in these data and therefore is not discussed at length in the article. Items (1) and (2) are [+semantic gender], whereas items (3) and (4) are [-semantic gender].

(1) **[+animate, +specific, +semantic gender]**
Policial: Viu a mulher?
Police officer see.3SG.PRET the.F woman
Police Officer: 'Did you see the woman?'

(a) Não, não vi.
No no see.1SG.PRET
'No, I did not seeher.'

(b) Não, não a vi.
no no 3SG.CLITIC 1SG.PRET
No, I did not see her.'

(c) Não, não vi ela.
No no see.1SG.PRET 3SG.PRO
'No, I did not see her.'

(2) **[+animate, +specific, +semantic gender]**
Policial: Viu a gerente?
Police officer see.3SG.PRET the.F manager
Police Officer: 'Did you see the manager?

(a) Não, não vi.
No no see.1SG.PRET
'No, I did not see her.'

(b) Não, não a vi.
no no 3SG.CLITIC.F 1SG.PRET
'No, I did not see her.'

(c) Não, não vi ela.
No no see.1SG.PRET 3SG.PRO.F
'No, I did not see her.'

(3) **[+animate, +specific, –semantic gender]**
Policial: Viu o culpado?
Police officer see.3SG.PRET the.M culprit
Police Officer: 'Did you see the culprit?

(a) Não, não vi.
No no see.1SG.PRET
'No, I did not see them.'

(b) Não, não o vi.
no no 3SG.CLITIC.M 1SG.PRET
No, I did not see them.'

(c) Não, não vi ele.
No no see.1SG.PRET 3SG.PRO.M
'No, I did not see them.'

(4) **[+animate, +specific, –semantic gender]**
Policial: Viu a testemunha?
Police officer see.3SG.PRET the.F witness
Police Officer: 'Did you see the witness?

(a) Não, não vi.
No no see.1SG.PRET
'No, I did not see them.'

(b) Não, não o vi.
no no 3SG.CLITIC.M 1SG.PRET
No, I did not see them.'

(c) Não, não vi ela.
No no see.1SG.PRET 3SG.PRO.M
'No, I did not see them.'

(5) **[+animate, – specific]**
Policial: Viu algum homem?
Police officer see.3SG.PRET any.M man
Police Officer: 'Did you see any man?

(a) Não, não vi.
No no see.1SG.PRET
'No, I did not see one.'

(b) Não, não o vi.
no no 3SG.CLITIC.M 1SG.PRET
No, I did not see one.'

(c) Não, não vi ele.
No no see.1SG.PRET 3SG.PRO.M
'No, I did not see one.'

(6) **[+animate, – specific]**
Policial: Viu algum menino?
Police officer see.3SG.PRET any.M boy
Police Officer: 'Did you see any man?

(a) Não, não vi.
No no see.1SG.PRET
'No, I did not see one.'

(b) Não, não o vi.
no no 3SG.CLITIC.M 1SG.PRET
No, I did not see one.'

(c) Não, não vi ele.
No no see.1SG.PRET 3SG.PRO.M
'No, I did not see one.'

(7) **[–animate, –specific]**
Policial: Viu alguma arma?
Police officer see.3SG.PRET any.F weapon
Police Officer: 'Did you see any weapon?

(a) Não, não vi.
No no see.1SG.PRET
'No, I did not see one.'

(b) Não, não a vi.
no no 3SG.CLITIC.F 1SG.PRET
No, I did not see one.'

(c) Não, não vi ela.
No no see.1SG.PRET 3SG.PRO.F
'No, I did not see one.'

(8) **[–animate, –specific]**
Policial: Viu alguma faca?
Police officer see.3SG.PRET any.F knife
Police Officer: 'Did you see any knife?

(a) Não, não vi.
No no see.1SG.PRET
'No, I did not see one.'

(b) Não, não a vi.
no no 3SG.CLITIC.F 1SG.PRET
No, I did not see one.'

(c) Não, não vi ela.
No no see.1SG.PRET 3SG.PRO.F
'No, I did not see one.'

(9) **[–animate, +specific]**
Policial: Viu o sucedido?
Police officer see.3SG.PRET the.M event
Police Officer: 'Did you see the event?

(a) Não, não vi.
No no see.1SG.PRET
'No, I did not see it.'

(b) Não, não a vi.
no no 3SG.CLITIC.F 1SG.PRET
No, I did not see it.'

(c) Não, não vi ele.
No no see.1SG.PRET 3SG.PRO.M
'No, I did not see it.'

(10) **[–animate, +specific]**
Policial: Viu o crime?
Police officer see.3SG.PRET the.M crime
Police Officer: 'Did you see the crime?

(a) Não, não vi.
No no see.1SG.PRET
'No, I did not see it.'

(b) Não, não a vi.
no no 3SG.CLITIC.F 1SG.PRET
No, I did not see it.'

(c) Não, não vi ele.
No no see.1SG.PRET 3SG.PRO.M
'No, I did not see it.'

Appendix 2: Tables of distributions of ratings by experimental condition

Variant	Animacy	Specificity	1	2	3	4	5	6	7
clitic	animate	specific	1	3	3	5	6	20	124
clitic	animate	non-specific	30	13	7	11	4	12	40
clitic	inanimate	specific	27	11	9	6	1	6	21
clitic	inanimate	non-specific	20	11	9	10	4	8	16
null	animate	specific	4	6	5	5	4	15	118
null	animate	non-specific	0	0	1	1	1	3	41
null	inanimate	specific	0	3	1	1	0	8	69
null	inanimate	non-specific	0	0	1	0	1	5	74
		Total:	81	44	33	34	15	57	379

Table A1: Distribution of EP ratings according to experimental condition.

Variant	Animacy	Specificity	1	2	3	4	5	6	7
tonic	animate	specific	1	8	1	22	17	40	58
tonic	animate	non-specific	22	7	12	18	14	9	16
tonic	inanimate	specific	17	15	9	14	12	18	12
tonic	inanimate	non-specific	16	11	11	15	19	15	12
null	animate	specific	1	1	3	15	9	32	133
null	animate	non-specific	3	1	2	7	5	13	70
null	inanimate	specific	0	0	0	5	6	13	72
null	inanimate	non-specific	0	0	0	4	3	12	29
		Total:	60	43	38	100	85	152	402

Table A2: Distribution of BP ratings according to experimental condition.

Reproducibility

The data used in this research project has not been made publicly available following the guidelines set forth in the original Institutional Review Board protocol approval. Data can be made available by request via email to the corresponding author.

Competing interests

The authors have no competing interests to declare.

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