Microvariation in the resolution of pronominal subjects in Romance: European Portuguese vs. Italian

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Abstract

The present study investigates how adult native speakers of two null subject Romance languages, European Portuguese (EP) and Italian, interpret null and overt pronominal subjects in intrasentential contexts. Participants were 30 speakers of EP and 30 of Italian. Each language group was administered two multiple-choice tasks (speeded and untimed), which crossed the following variables: 'animacy of the matrix object' ([+ human] vs. [-human]) and 'type of pronominal embedded subject' (overt vs. null). Our results show that there is microvariation in the resolution of overt pronominal subjects in EP and in Italian: the position of the antecedent is the most relevant factor in EP, whereas, in Italian, the animacy of the antecedent is the preponderant factor. Moreover, our results reveal that

the resolution of null subjects is an area of microvariation: the bias for subject antecedents is weaker in Italian than in EP. Possible reasons for the observed microvariation are discussed in detail.

Keywords: microvariation; anaphora resolution; animacy; null subject; Romance languages

1. Introduction

Over the past decades, a large body of research on anaphora resolution in consistent null subject languages has shown that, in native grammars, overt subject pronouns are typically assigned to a non-subject antecedent, either an antecedent in object position or an extralinguistic referent, whereas null subjects tend to retrieve antecedents in subject position (e.g., Carminati 2002, Alonso-Ovalle et al. 2002). However, recent comparative studies have found differences among null subject languages with respect to these interpretative preferences (e.g., Filiaci 2010, Filiaci et al. 2013, for a comparison between Italian and Spanish; Torregrossa et al. 2020, for a comparison between Italian and Greek). Hence, the available evidence points to the existence of microvariation among null subject languages.

Microvariation is understood as variation that depends on microparameters, which account for small-scale differences among closely-related languages (Kayne 2005). Microparameters are assumed to be located in the lexicon, following a hypothesis that has come to be known as the *Borer–Chomsky conjecture*, according to which "[a]ll parameters of variation are attributable to differences in the features of particular items (e.g., the functional heads) in the lexicon" (Baker 2008: 353).

The interpretation of pronominal subjects appears to vary not only crosslinguistically, but also intralinguistically, depending on factors such as the relative position of the matrix and the subordinate clauses, in the case of intrasentential contexts (Chamorro 2018), and the semantic features of the antecedent (Cardinaletti & Starke 1999). With respect to semantics, considering that, in general, studies on subject pronoun resolution have investigated contexts in which all potential antecedents were [+ human], clearly more research is needed if we are to reach a better understanding of the role of this semantic feature. Moreover, it is important to extend this research to null subject languages which have not been included in any of the comparative studies conducted to date, as is the case of European Portuguese (EP).

The present study investigates the resolution of overt and null pronominal subjects in two consistent null subject Romance languages (NSRL), EP and Italian, in pragmatically neutral intrasentential contexts with the order matrix-subordinate, taking into account the role of antecedent animacy.[1] The study is based on two multiple-choice tasks (speeded and untimed), administered to 30 native speakers of EP and 30 native speakers of Italian. Our results point to the existence of microvariation in the resolution of overt and null pronominal subjects in EP and Italian. We will argue that the small-scale differences between these NSRLs may be attributed to differences in the architecture of their pronominal systems and the featural makeup of subject pronouns.

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[1]   In this work, animacy will refer specifically to the features [+human] and [-human].

The paper is organised as follows: section 2 presents an overview of previous studies on anaphora resolution in NSRLs; in section 3, we present the research questions and hypotheses; in section 4, we describe the methodology adopted in the present study and the results are presented in section 5; and finally, in section 6, we discuss the results and present the main conclusions of the study.

2. Anaphora resolution in null subject Romance languages

It is well-known that null subject languages such as EP and Italian exhibit a division of labour between anaphoric third person null and overt pronominal subjects. According to Ariel's (1990) Accessibility Theory, the choice of anaphoric expression is determined by the accessibility of its antecedent – the more accessible (i.e., prominent) the antecedent is, the less informative (and hence less explicit) the anaphoric expression is expected to be. The accessibility of an antecedent depends, among other factors, on its structural position and on its discourse status – topics, which tend to occupy the subject position, are more accessible than non-topics, which are typically realised in non-subject positions. In recent years, research focusing on the syntactic and discourse conditions which govern the interpretation of overt and null subject pronouns in NSRLs has shown that these anaphoric expressions clearly differ in their resolution preferences: overt pronouns tend to mark topic shift and are typically assigned to a non-subject antecedent (either an antecedent in object position or an extralinguistic referent), whereas null subjects tend to mark topic continuity and are generally assigned to an antecedent in subject position (e.g., Carminati 2002, for Italian; Alonso-Ovalle et al. 2002, for Spanish; Costa et al. 1998, Luegi 2012, Lobo et al. 2017, for EP). This is illustrated for Italian and EP in (1a) and (1b), respectively (the Italian example is taken from Carminati 2002: 58).

(1) a. Quando Mario$_i$ há   telefonato a Giovanni$_j$, lui$_j$ / *pro$_i$* aveva appena
        when   Mario has   called   to Giovanni   he   had   only
        finito   di mangiare.
        finished of eat.INF
     b. Quando o   Mário$_i$ telefonou ao   João$_j$, ele$_j$ / *pro$_i$* tinha acabado de
        when   the Mário   called   to.the João   he   had   finished of
        comer.
        eat.INF
        'When Mario/Mário called Giovanni/João, he had just finished eating.'

It is important to note that these are only interpretative biases, rather than categorical interpretations, which can be cancelled under certain conditions, as illustrated in the EP example in (2) (taken from Lobo 2013: 2323), where the context favours the extrasentential antecedent for the embedded null subject over the matrix subject antecedent.

(2)   O   João$_i$ não viu o   despertador. O Rui pensa que *pro$_i$* vai   chegar
       the João not saw the alarm.clock the Rui thinks that   goes arrive.INF
       atrasado.
       late
       'João didn't see the alarm clock. Rui thinks that [-] will be late.'

Following Carminati (2002), these interpretative preferences correspond to a parsing strategy, known as the *Position of Antecedent Strategy* (PAS), according to which, in intrasentential contexts, "the null pronoun prefers an antecedent which is in the SpecIP position, while the overt pronoun prefers an antecedent which is not in the SpecIP position" (ibid 2002: 57). Using a self-paced reading task, Carminati shows that adult native speakers of Italian are faster at processing complex sentences such as (3a) and (4b) below, where the context favours the preferred interpretation of the subject pronoun (i.e., coreference with the subject antecedent for the null subject and coreference with the object antecedent for the overt subject pronoun), than sentences such as (3b) and (4a), where the context disfavours these interpretations. The results indicate that the penalty is more severe when the null subject is forced to retrieve an object antecedent (4a) than when the overt subject is forced to retrieve a subject antecedent (3b) (the examples in (3) and (4) are taken from Carminati 2002: 69).

(3)   Dopo che Giovanni$_i$ ha messo in imbarazzo   Giorgio$_j$ di fronte a tutti,
        after that Giovanni has put   in embarrassment Giorgio of front to all
        a. *pro$_i$* si   è scusato ripetutamente.
                REFL is excused repeatedly
        b. lui$_i$ si   è scusato   ripetutamente.
           he REFL is excused repeatedly
        'After Giovanni embarrassed Giorgio in front of everyone, he apologised repeatedly.'

(4)   Quando Giovanni$_i$ ha messo in imbarazzo   Giorgio$_j$ di fronte a tutti,
        when   Giovanni has put   in embarrassment Giorgio of front to all
        a. *pro$_j$* si   è offeso   tremendamente.
                REFL is offended tremendously
        b. lui$_j$ si   è offeso   tremendamente.
            he REFL is offended tremendously
        'When Giovanni embarrassed Giorgio in front of everyone, he was offended.'

Cardinaletti & Starke (1999) propose that the differences in interpretation between null and overt subjects may be related to the different grammatical properties that characterise each form. The null subject corresponds to a grammatically defective category, which explains its preference for antecedents that occur in a more prominent structural position (i.e., the canonical subject position). Null subjects tend to be more stable than overt subject pronouns in adult native grammars and to develop earlier in first language acquisition (e.g., Costa & Ambulate 2010, Silva 2015, Lobo & Silva 2017). Overt pronominal subjects, on the other hand, are either strong or weak pronouns, whose interpretation is largely determined by semantic, pragmatic, and discourse factors, which are associated with higher processing costs (e.g., Carminati 2002, Costa & Ambulate 2010).

Recent studies have indicated that there may be variation in the antecedent preferences of subject pronouns in consistent null subject languages. For example, Filiaci (2010) and Filiaci et al. (2013) show that overt pronouns appear to allow subject antecedents more easily in Spanish than in Italian. According to Filiaci et al. (2013), these differences in the resolution of overt pronominal subjects may be related to

differences in the architecture of the pronominal systems of the two languages: while Italian has two types of overt subject pronouns (strong and weak), Spanish only has strong pronouns, which may explain the less categorical division of tasks between overt and null pronouns found in Spanish.

Although variation appears to affect particularly overt pronominal subjects, some studies have shown that it may also occur with null subjects. For example, in a study comparing the production and comprehension of null subjects in Italian and Greek, Torregrossa et al. (2020) found that the null subject shows a weaker subject antecedent bias in the latter language than in the former. They derive these different patterns from an interplay of syntactic and discourse factors which result in differences in the prominence of subjects and objects between the two languages. In general, the evidence concerning the resolution of null subjects is not clear, but it appears to suggest that, in some contexts, they may allow object antecedents, at least in some languages (e.g., Carminati 2002, Sorace & Filiaci 2006, Filiaci 2010, Chamorro 2018). For example, Sorace & Filiaci (2006), in their study on forward (and backward) anaphora in native and non-native Italian, tested sentences in pragmatically neutral contexts as in (5) below (taken from Sorace & Filiaci 2006: 352), in which the embedded pronominal subject can potentially be assigned either to the antecedent in subject position (*la mamma*) or to the antecedent in object position (*la figlia*) or even an extralinguistic referent.

(5)   La   mamma dà   un bacio   alla   figlia   mentre lei/*pro* si   mette il
        the mother gives a kiss   to.the daughter while she   REFL puts   the
        cappotto.
        coat
        'The mother kisses the daughter while she puts the coat on.'

The judgements of the native Italian participants in the study regarding null subjects suggest that the bias observed in previous studies towards a subject antecedent may be weakened in certain situations. In fact, the Italian native speakers were found to display optionality in the resolution of null subjects, allowing both subject and object antecedents (51% and 44%, respectively) (cf. Figure 1). To explain these results, Sorace & Filiaci (2006: 357-8) propose that, in this case, "the pragmatic plausibility, topicality and accessibility (in terms of recency of presentation) of the complement all converge in overriding the PAS and its bias against non-subject referents". These results contrast with those obtained for the overt subject pronoun (cf. Figure 1), with respect to which native speakers present much clearer judgments, showing a strong preference for antecedents in object position (82%), in agreement with what was observed in previous studies.

Figure 1. Anaphoric resolution of overt and null subject pronouns in native Italian
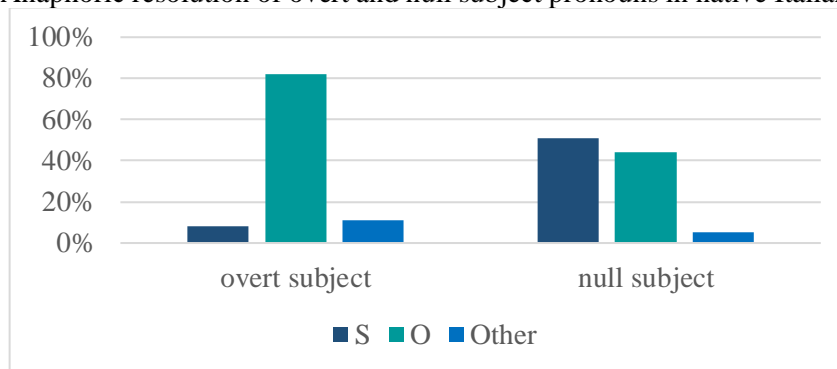
Source: Sorace & Filiaci (2006: 355-6)

In a study on forward (and backward) anaphora resolution in pragmatically neutral contexts in EP, Lobo et al. (2017) showed that, similarly to what happens in Italian, in adult native grammars, the overt subject has a strong preference for antecedents in object position (85%) in sentences as in (6b). However, a comparison between the results of this study and those of Sorace & Filiaci's suggests that the two languages may differ with respect to the resolution of null subjects, as, in EP, these are preferentially assigned to antecedents in subject position (90% vs. 51% in Italian), as indicated in (6a) (the examples are taken from Lobo et al. 2017: 153).

(6)   a. O bombeiro$_i$ molhou o menino quando *pro*$_i$ saiu   da   garagem.
           the fireman   wet   the boy   when   exited of.the garage
           'The fireman wet the boy when he came out of the garage.'
       b. O avô   fotografou   o menino$_j$ quando ele$_j$ saiu da   garagem.
           the grandpa photographed the boy   when   he exited of.the garage
           'The grandpa photographed the boy when he came out of the garage.'

The optionality observed in the interpretation of null subjects in these contexts may be related to clause order. There is some evidence that, in Italian (and also in Spanish; see e.g., Chamorro 2018), the PAS is adopted for null subjects when the order is subordinate-matrix, leading to a preference for antecedents in subject position (e.g., Carminati 2002, Filiaci 2010), but not when it is matrix-subordinate, in which case the null pronoun may recover either a subject or an object antecedent, as shown clearly in the results of Sorace & Filiaci's (2006) study (see also Carminati 2002, Filiaci 2010). However, it is possible that clause order does not affect the resolution of null subjects in every language. For example, Lobo et al. (2017) found that the PAS preferences of null subjects were maintained in EP even with the order matrix-subordinate.

In addition to the syntactic and discourse factors described above, semantic properties such as animacy may also play a role in anaphora resolution (e.g., Cardinaletti & Starke 1999). It has been proposed that, in languages such as Italian and EP, at least some overt subject pronouns (but not null subjects) may be sensitive to antecedent animacy, as they tend to recover [+ human] antecedents (Barbosa et al. 2005, Cardinaletti 2004, Morgado et al. 2018). This appears to be the case of Italian overt pronouns such as *lui* 'he' and *lei* 'she', which are specified as [+human] (Cappellaro 2017, Cardinaletti 2004). Similarly, in one of the few experimental studies investigating this phenomenon in EP, Morgado et al. (2018) found that, in the presence

of two potential antecedents (one in subject position and the other in object position), EP native speakers prefer to interpret the overt pronoun as coreferential with the object when this is [+ human] (as in (7a)); however, this bias disappears when the object is [-human] (as in (7b)), in which case there is optionality in antecedent assignment (51% object antecedent and 49% subject antecedent) (the examples in (7) are taken from Morgado et al. 2018: 280).

(7)   a.   Depois de o instrutor pintar   o recruta…, ele   ficou
             after   of the instructor paint.INF the recruit   PRON became
             camuflado...
             camouflaged
             'After the instructor painted the recruit…, he was camouflaged…'
    b.   Depois de o instrutor pintar   o capacete…, ele   ficou
             after   of the instructor paint.INF the helmet   PRON became
             camuflado...
             camouflaged
             'After the instructor painted the helmet…, he/it was camouflaged …'

Despite the extensive research on pronominal subject resolution in Romance, there are still many open questions in this domain. For example, previous research suggests that there may be differences in the resolution of pronominal subjects between EP and Italian, namely with respect to the weight attributed to the position of the antecedent in the resolution of null subject pronouns, which appears to be consistently determined by the PAS in EP, but not in Italian (at least in biclausal sentences with the order matrix-subordinate). However, no studies have so far compared EP and Italian in this respect. Moreover, the role played by animacy in overt pronoun resolution is still not well understood, as studies on anaphora resolution have as a rule considered only contexts in which all potential antecedents are [+ human]. Therefore, further research is necessary to understand the effect of animacy in this domain.

The focus of the present study will be on the interpretation of third person singular subject pronouns in EP and Italian, which are two NSRLs with different pronominal systems. As shown in Table 1, EP only has strong overt subject pronouns, while Italian has strong and weak overt pronouns. Both languages have referential null subjects.

Table 1. Third person singular subject pronouns in EP and Italian

	Overt subject pronouns				Null subject pronoun
	Strong		Weak		
	Fem	Masc	Fem	Masc	
EP	ela	ele	-	-	*pro*
Italian	lei	lui	ella essa	egli esso	*pro*

3. Research questions and predictions

In this section, we describe the research questions that guided the present study and the predictions arising from each of them. The study focuses on the interpretation of pronominal subjects in pragmatically neutral intrasentential contexts with the order matrix-subordinate in EP and Italian, considering the role of animacy in antecedent assignment, which is still understudied. Given the current state of the art, we formulated two research questions:

RQ.1 – In matrix-subordinate contexts where all potential antecedents are [+ human], are there differences between EP and Italian in the resolution of overt and null pronominal subjects?

RQ.2 – In matrix-subordinate contexts where the antecedent in subject position is [+ human] and the object is [- human], are there differences between EP and Italian in the resolution of overt and null pronominal subjects?

Considering that previous studies on matrix-subordinate contexts with [+ human] antecedents suggest that there might be a difference between EP and Italian regarding the resolution of null subjects but not overt subjects (cf. section 2), we make the following predictions regarding the first research question:

P.1.1. When all the antecedents are [+ human], the overt pronominal subjects will preferentially retrieve an antecedent in object position both in EP and Italian.

P.1.2. When all the antecedents are [+ human], the null subject will preferentially retrieve the subject antecedent in EP, but not in Italian, which will exhibit optionality.

As for the second research question, it is proposed in the literature that strong subject pronouns are specified with a [+ human] feature in Italian, while in EP the association of strong pronouns to this feature is less clear, as previous experimental findings show optionality in the interpretation of the third person pronominal subject (cf. section 2). Null subject interpretation, on the other hand, has not been shown to be contingent on animacy factors. Therefore, we formulate the following predictions for the second research question:

P.2.1. When the antecedent in object position is [- human] and the subject is [+ human], the overt subjects will preferably retrieve the subject antecedent in Italian, whereas in EP there will be optionality between the subject and the object.

P.2.2. When the antecedent in object position is [- human] and the subject is [+ human], the null subject will retrieve the antecedent in subject position in EP, but not in Italian, which will exhibit optionality.

4. Methodology

4.1. Participants
Thirty native speakers of EP and thirty native speakers of Italian participated in this study. The EP speakers were university students, with an average age of 27.9 years. They had all lived in Portugal throughout their lives and EP was their only L1. Most speakers were from the region of Lisbon (19). The others were from the districts of Santarém (3), Setúbal (3), Faro (3), Funchal (1), and Viseu (1). The Italian speakers were also university students, with an average age of 28.3 years, and Italian was also their only L1. The speakers were from different regions in Italy (7 from Campania; 5 from Lombardy; 3 from Veneto; 3 from Puglia; 2 from Lazio; 2 from Sicily; 1 from Abruzzo; 1 from Calabria; 1 from Emilia-Romagna; 1 from Liguria; 1 from Marche; 1 from Piedmont; 1 from Trentino Alto-Adige; 1 from Tuscany). In the EP and Italian groups, analyses of individual results did not reveal any differences among participants of different origins.

4.2. Experimental design
Two multiple-choice tasks (with and without time pressure) were used with each group to elicit the preferred interpretation in complex sentences where the main clause is followed by an adverbial subordinate clause introduced by *quando* ('when'). This type of subordinate clause was chosen to ensure comparability with previous studies on anaphora resolution in matrix-subordinate contexts in Romance, which have mostly used temporal adverbial clauses introduced by *when* (e.g., Chamorro 2018, Lobo et al. 2017) or *while* (e.g., Sorace & Filiaci 2006). The tasks were applied with an interval of one week and in random order. The two multiple-choice tasks (untimed and speeded) had a 2x2 design crossing the variables 'animacy of the matrix object' ([+ human] vs. [- human]) and 'type of pronominal embedded subject' (overt vs. null). In this study, only strong subject pronouns were used, on the one hand, because there are no weak pronouns in EP and, on the other, because the use of weak pronouns is infrequent in spoken Italian (Cardinaletti 2021, Cordin 2021). There were 6 items per condition, totalling 24 experimental items, and 24 fillers. Test items and fillers were the same in the tasks used with both groups. Only the language varied (Italian or EP). In all experimental items, the verbs in the matrix clause were transitive and those in the subordinate clause were unaccusative. All were in the past tense (past tense of the indicative in EP and *passato prossimo* in Italian). Sample experimental items are presented in Table 2.

Table 2. Example of test item

	Null pronominal subject	**Overt pronominal subject**
[+ Human] object	*O porteiro viu o professor quando [-] caiu das escadas.* *Il portiere ha visto l'insegnante quando [-] è caduto dalle scale.* The doorman saw the teacher when [-] fell from the stairs.	*O porteiro viu o professor quando ele caiu das escadas.* *Il portiere ha visto l'insegnante quando lui è caduto dalle scale.* The doorman saw the teacher when he fell from the stairs.
[- Human] object	*O menino viu o brinquedo quando [-] caiu da cadeira.* *Il bambino ha visto il giocattolo quando [-] è caduto dalla sedia.* The boy saw the toy when [-] fell from the chair.	*O menino viu o brinquedo quando ele caiu da cadeira.* *Il bambino ha visto il giocattolo quando lui è caduto dalla sedia.* The boy saw the toy when he/it fell from the chair.

In the untimed multiple-choice task, the participants read a complex sentence and, based on their preferred interpretation of the sentence, selected the most appropriate option to complete a statement like the one presented in example (8), with one of three options: the matrix subject, the matrix object, and neither the subject nor the object. The options appeared in random order.

(8)   O   porteiro   viu o   professor quando ele caiu das   escadas.
        the doorman saw the teacher   when   he fell from.the stairs
        'The doorman saw the teacher when he fell down the stairs.'

        _____ caiu das   escadas.
                              fell   from.the stairs
        '_____ fell down the stairs.'

Options: o   porteiro, o professor, nem   o   porteiro nem o   professor
         the doorman, the teacher,   neither the doorman nor the teacher

In the speeded multiple-choice task, we adapted the procedure commonly used in speeded acceptability judgment tasks (e.g., Bader & Häussler 2010, Hopp 2007) to collect interpretation data. For each item of the multiple-choice task, first, a fixation cross appeared for 1500 milliseconds and then the sentence was displayed in the centre of the screen word by word, in a non-cumulative way, at a rate of 450 milliseconds per word. Finally, a multiple-choice question about the sentence appeared. As in the untimed task, this question involved choosing the most appropriate option for completing a statement like (8). The participant had to respond as quickly as possible. The response time and the participant's response were recorded for each item.

This task was used for two reasons. First, the rapid presentation of stimuli and the requested speed of response do not give participants enough time to think about their responses and force them to rely essentially on their implicit knowledge. Thus, like the speeded acceptability judgment tasks (e.g., Bader & Haüssler 2010, Bowles 2011, Ellis 2005, Godfroid et al. 2015), the multiple-choice task with time pressure

that we used allows us to collect unconscious and automatic responses to linguistic stimuli, which is not guaranteed to happen in a task where the participants have time to think about their responses and use explicit knowledge. Second, it has been shown that offline tasks with time pressure, such as speeded acceptability judgment tasks, can capture information about processing since the pace of the task forces the parser to follow its preferred processing route and does not allow enough time for a complete reanalysis of the sentence (for an overview, see Hopp 2007). In these tasks, response time is interpreted as an indicator of processing effort (longer times reflect more effort). The multiple-choice task with time pressure thus complements the task without time pressure, allowing us to obtain a more complete picture of the resolution of pronominal subjects in EP and Italian.

4.3. Data analysis

Statistical analyses were conducted on R, using mixed-effects models with random effects for subjects and items. We conducted two types of analyses: (i) global analyses of each group's results, and (ii) analyses that aimed to determine whether each group made a significant distinction between subject and object antecedents in each experimental condition (e.g., null subject x [+ human] object).

In the global analyses, the variables 'type of subject' and 'object animacy' were modelled as fixed effects. The two levels within each fixed effect were contrast coded as 0.5 and −0.5. Following Cunnings (2012) and Linck & Cunnings (2015), the analyses included random intercepts for subjects and items and by-subject random slopes for the variables 'subject type', 'object animacy' and their interaction. We used the function *lmer* of the lme4 package for analysing the response times in the speeded task and the function *glmer* of the same package, with the specification 'family = binomial', for analysing the participants' responses in the untimed and speeded tasks. As the selection rate of the option 'neither the subject nor the object antecedent' was very low, ranging from 0% to 7%, responses were treated as binary and coded as 'subject antecedent'= 1 and 'non-subject antecedent'= 0.

In the second type of analyses, the variable 'antecedent' (subject *vs.* object) was modelled as the fixed effect. The analyses included random intercepts for subjects and items, and by-subject random slopes for 'antecedent'. The two levels within the fixed effect were contrast coded as 0.5 and −0.5. For each level, participants' answers were coded as 'chooses this antecedent' = 1 and 'does not choose this antecedent' = 0. These analyses were conducted using the function *glmer*, with the specification 'family = binomial'. This type of analysis was conducted for each experimental condition. In each analysis, only the subset of data relevant to the comparison being made was considered.

5. The results

Experimental tasks reveal that EP and Italian speakers display different preferences in the interpretation of pronominal subjects. Statistical analyses of EP speakers' responses indicate that, in both untimed and speeded tasks, there is a significant main effect of 'subject type' (untimed task: estimate = -9.6367, SE = 2.3439, $p < .001$; speeded task: estimate = -4.3628, SE = .5782, $p < .001$), but no effect of 'object animacy' (untimed task: estimate = 3.1071, SE = 1.9176, $p = .1052$; speeded task:

estimate = .3397, SE = .4546, *p* = .4548) nor any interaction between this factor and 'subject type' (untimed task: estimate = 4.1099, SE = 3.6778, *p* = .2638; speeded task: estimate = 1.1640, SE = .9020, *p* = .1969). In other words, in EP, the only factor that influences the interpretation of the embedded subject pronoun is its null/overt status. In Italian, on the other hand, more factors play a role in subject pronoun resolution. In the two experimental tasks on this language, there is a significant main effect of 'object animacy' (untimed task: estimate = 1.8846, SE = .4181, *p* < .001; speeded task: estimate = 1.7580, SE = .3653, *p* < .001), which is qualified by a significant 'object animacy' x 'subject type' interaction (untimed task: estimate = 4.0228, SE = .4181, *p* < .001; speeded task: estimate = 1.7580, SE = .3653, *p* < .001). The main effect of 'subject type' is only nearly significant in Italian (untimed task: estimate = .6363, SE = .4678, *p* = .0874; speeded task: estimate = .4813, SE = .4218, p = .095376). It is thus much weaker than in EP. Details about Italian and EP speakers' results are described in subsections 5.1 and 5.2, which focus on overt and null pronominal subjects, respectively.

5.1. Overt pronominal subjects

As shown in Figures 2 and 3, in EP, the overt subject pronoun recovers the object antecedent, regardless of animacy factors and task type (subject *vs*. object antecedent assignment: all *p*s < .001; for the complete statistical analysis, see Table 3). However, EP speakers' response times in the speeded task suggest that there may be a weak animacy effect in overt subject resolution, since, as shown in Table 4, times are significantly higher in the [- human] condition than in the [+ human] (estimate = 2335.1, SE = 971.9, *t* = 2.403, *p* = .01676796).

Italian patterns like EP only when all potential antecedents are [+ human]. In this context, the overt subject pronoun tends to be assigned to the object antecedent in both the untimed and speeded tasks (subject *vs*. object antecedent assignment: all *p*s < .001). Unlike what happens in EP, in Italian, the preference for the object antecedent is not maintained when this antecedent is [- human]. In this context, the overt subject tends to recover the [+ human] antecedent in subject position in both tasks (subject *vs*. object antecedent assignment: all *p*s < .001). Italian, therefore, exhibits a strong animacy effect in overt pronoun resolution. This effect is observed in speakers' responses, but not in their response times (see Table 4). No significant difference was found between their times in the [+ human] and [- human] conditions (estimate = -3020, SE = 3339, *t* = .904, *p* = .3666226).

Figure 2. Interpretation of the overt pronominal subject in the untimed task
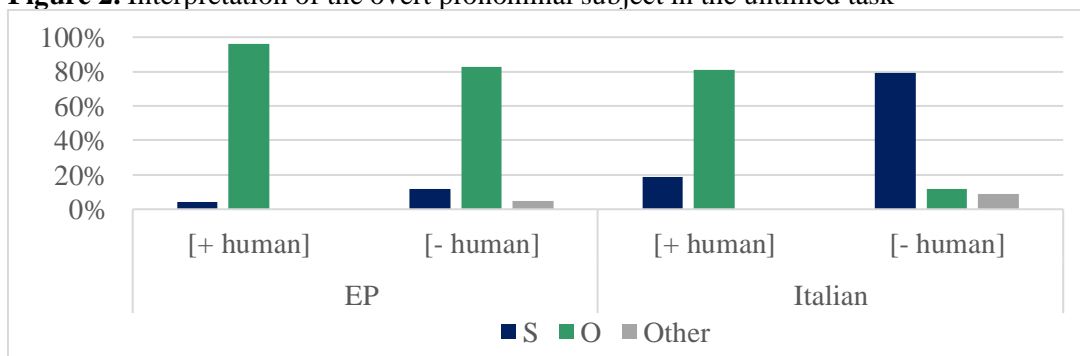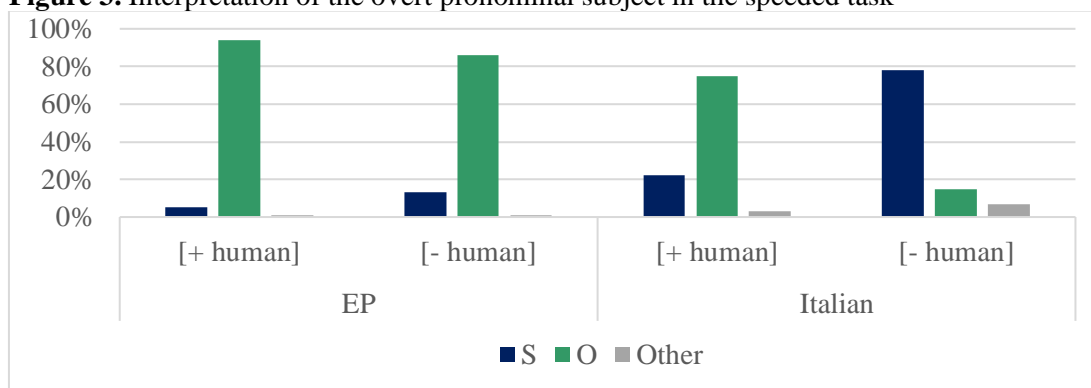
Figure 3. Interpretation of the overt pronominal subject in the speeded task

Table 3. Difference between subject and object antecedent assignment in overt pronoun resolution

Group	Task	Matrix object	Estimate	SE	p
EP	Untimed	[+ human]	6.46687	.90992	<.001*
		[- human]	5.0373	.8469	<.001*
	Speeded	[+ human]	7.9005	1.5532	<.001*
		[- human]	5.6857	.7117	<.001*
Italian	Untimed	[+ human]	3.78939	.663037	<.001*
		[- human]	-5.2070	1.0047	<.001*
	Speeded	[+ human]	2.8499	.5012	<.001*
		[- human]	-3.4226	.4733	<.001*

Table 4. Response times (in milliseconds) in the speeded task

	EP		Italian	
Condition	Mean	SD	Mean	SD
Overt subject x [+ human] object	5911	5391	7930	12419
Overt subject x [- human] object	8246	8968	4910	4954

5.2. Null pronominal subjects

Results indicate that EP and Italian also differ in the interpretation of null subjects. As shown in Figures 4 and 5, in EP, the null subject is interpreted as coreferential with the antecedent in subject position, regardless of animacy factors and the type of task (subject *vs*. object antecedent assignment: all $ps \leq .0127$; for the complete statistical analysis, see Table 5). In Italian, overall, there is no consistent preference for either a subject or an object antecedent. In the [+ human] condition, speakers exhibit optionality between the subject and object antecedents in the untimed task ($p = .216$) and a slight preference for the object in the speeded one ($p = .036$). In the [- human] condition, they display a slight preference for the object antecedent in the untimed task ($p = .0133$) and optionality in the speeded one ($p = .599$). The complete statistical analysis of the differences between subject and object antecedent assignment in null subject resolution is presented in Table 5.

EP and Italian speakers only behave alike in one respect: their response times in the null subject conditions (see Table 6) were unaffected by the animacy features of the object antecedent (EP: estimate = 777.7, SE = 1075.5, t = .723, p = .4701506; Italian: estimate = -90.87, SE = 770.35, t = -.118, p = . 9061359).

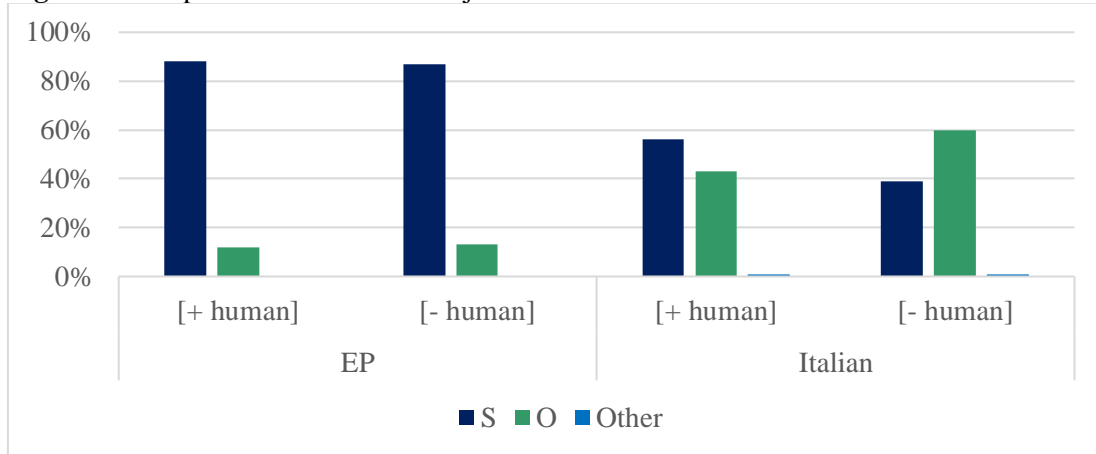**Figure 4.** Interpretation of the null subject in the untimed task

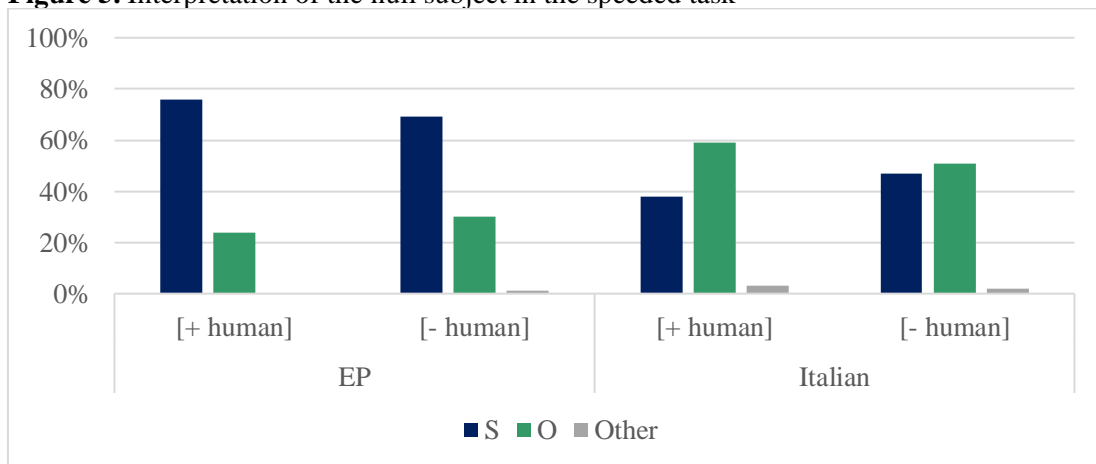**Figure 5.** Interpretation of the null subject in the speeded task

Table 5. Difference between subject and object antecedent assignment in null pronoun resolution

Group	Task	Matrix object	Estimate	SE	P
EP	Untimed	[+ human]	-6.703174	1.441231	<.001*
		[- human]	-11.59450	4.64999	.0127*
	Speeded	[+ human]	-3.64021	.82984	<.001*
		[- human]	-3.18800	.91668	<.001*
Italian	Untimed	[+ human]	.67946	.54943	.216
		[- human]	.94010	.37991	.0133*
	Speeded	[+ human]	1.1400	.5438	.036*
		[- human]	.24575	.46699	.599

Table 6. Response times (in milliseconds) in the speeded task

	EP		Italian	
Condition	*Mean*	*SD*	*Mean*	*SD*
Null subject x [+ human] object	6938	7268	5682	4727
Null subject x [- human] object	7716	7287	5591	5755

6. Discussion and conclusions

The results obtained in the present experimental study show that there is microvariation in the resolution of pronominal subjects in EP and Italian in intrasentential contexts with the order matrix-subordinate.

Our first research question asked whether there were differences between these NSRLs in the resolution of pronominal subjects when all potential antecedents are [+ human]. The results indicate that EP and Italian behave alike in overt pronoun resolution, as overt pronouns recover object antecedents in both languages. EP and Italian only differ in the interpretation of null subjects: in EP, the null subject is assigned to the subject antecedent in both tasks, while, in Italian, overall, there is no consistent preference for either a subject or an object antecedent. It is, however, important to note that we found a slight preference for the object antecedent in the [+ human] condition in the speeded task and in the [- human] condition in the untimed task. Crucially, the fact that this preference is weak and not consistently observed in both tasks, unlike the preferences we found in other conditions, is compatible with the idea that Italian null pronouns can retrieve either object or subject antecedents. The existence of a slight preference for the object in some cases may be due to the fact that participants were forced to choose just one option and the object was the more recently mentioned antecedent. These results thus confirm predictions P.1.1. and P.1.2 and are consistent with previous studies on Italian by Sorace & Filiaci (2006) and on EP by Lobo et al. (2017), which focused on the same type of context tested in the present work (matrix-temporal adverbial clause). It remains to be investigated whether the same preferences would be found in matrix-subordinate contexts with other (sub)types of subordinate clauses and other conjunctions.

Our second research question asked whether there were differences between EP and Italian in the resolution of pronominal subjects when the antecedent in subject position is [+ human] and the object is [- human]. Our results reveal that, in Italian, the overt pronoun is assigned to the subject antecedent in both tasks. There is thus a clear animacy effect. In contrast, in EP, no animacy effects were found in the participants' responses, since the overt pronoun maintains its bias for the object antecedent in both tasks. Animacy effects are only visible in the participants' response times in the speeded task. Their response times are significantly higher in the [- human] condition than in the [+ human], which may be evidence of a conflict between the bias of the overt pronoun towards object antecedents and a bias towards [+ human] antecedents. Crucially, this conflict is resolved in favour of the object bias. Overall, these findings indicate that, in EP, animacy effects are weaker than proposed in previous work (Barbosa et al. 2005, Morgado et al. 2018). In sum, our results reveal that Italian and EP speakers perform differently with respect to overt pronoun

resolution, as predicted by P.2.1. However, this prediction is only partially confirmed, since EP does not display the optionality that we had predicted.

As for null subjects, Italian and EP speakers' interpretative preferences are similar to those observed when the matrix object is [+ human]. In EP, the null subject is assigned to the subject antecedent, while, in Italian, overall, there is no consistent preference for either a subject or an object antecedent. In other words, null subject resolution is not affected by animacy in both languages. These results thus confirm prediction P.2.2.

Our findings indicate that EP and Italian vary with respect to the weight attributed to the position and the animacy of the antecedent. In EP, position is a more relevant factor than animacy, whereas, in Italian, animacy is the preponderant factor. In the spirit of Filiaci's et al. (2013) account for the differences between Italian and Spanish in overt subject resolution, we argue that the differences between EP and Italian may be a consequence of the fact that these languages differ with respect to the architecture of the pronominal system.

Italian has a pronominal system with two types of overt subject pronouns, strong and weak (cf. Table 1). As a result, its strong pronoun can be semantically more specialized, bearing a [+ human] feature, which explains its strong preference for [+ human] antecedents. Unlike Italian, EP only has one type of overt subject pronouns: strong pronouns. This leads to less semantic specialization of the overt pronoun, which is underspecified for animacy in EP. As for null subjects, they are deficient pronominal forms in Italian and EP. This is why they are underspecified for animacy.

A potential obstacle to our account of the differences between EP and Italian is that some previous studies found animacy effects in EP. Nonetheless, both Barbosa et al.'s (2005) corpus-based study and Morgado et al.'s (2018) experimental study do not consider the same contexts investigated in the present work. Barbosa et al. (2005) examined a heterogeneous set of contexts, including intersentential contexts with only one potential antecedent, where there is no ambiguity. Morgado et al. (2018) focused on intrasentential contexts, but used a different clause order: subordinate-matrix. This may be a relevant difference, since previous studies have shown that clause order can influence subject pronoun resolution at least in some languages (cf. Chamorro 2018).

Though EP speakers' responses in the present study indicate that the third person overt subject pronoun does not bear a [+ human] feature in EP, their response times suggest that animacy is not a completely irrelevant factor in overt subject interpretation. This may be related to the role of referentiality, which, according to Cyrino et al. (2000), is relevant for the choice of pronominal forms across null subject languages. These authors propose that there is a referential hierarchy, where first and second person pronouns, which are inherently human, are in the highest position, followed by the third person pronoun, which is considered more referential when it is [+human] than when it is [- human]. They claim that, cross-linguistically, "the more referential, the greater the possibility of a non-null pronoun" (Cyrino et al. 2000: 59). This is a matter of tendency, and not necessarily a categorical requirement, which, in EP, is only visible in speakers' longer response times in the [- human] condition. This happens because subject pronouns in this language are underspecified for animacy. In Italian, on the other hand, this tendency is encoded in the featural makeup of the strong pronoun, which is specified as [+ human], thus appearing as a categorical property.

We propose that, as subject pronouns are not semantically specialized in EP, they are more sensitive to discourse factors: overt subject pronouns are associated with

topic shift (which explains their preference for the object antecedent) and null pronouns are associated with topic continuity (which explains their preference for the subject, which tends to be the topic of the sentence).

Given that, in Italian, third person strong subject pronouns are semantically specialized, overall, the resolution of subject pronouns is primarily guided by semantics and, as a result, tends to be less sensitive to discourse factors. The underspecification of the null pronoun, together with the lower sensitivity of Italian to discourse factors, may explain the lack of a clear preference in null subject resolution.[2]

In a nutshell, although EP and Italian are closely related languages, which are both classified as consistent null subject languages, they display small-scale differences which may be attributed to differences in the features of particular lexical items, namely in the featural makeup of the third person pronoun, which bears a [+ human] feature in Italian and is unspecified for animacy in EP. Due to the higher specialization of Italian subject pronouns, in this language, subject pronoun resolution is driven mainly by grammatical factors. As subject pronouns are less specified in EP, their resolution is more permeable to discourse factors: overt subjects are consistently associated with topic shift and null subjects with topic continuity. In Italian, the lower sensitivity of subject resolution to discourse factors, together with the underspecification of the null pronoun, may lead to optionality in the interpretation of this pronoun. Hence, the microvariation that we found between EP and Italian is located in the lexicon, in line with recent Minimalist views on variation.

Acknowledgements

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[2] In recent work, Frascarelli (2018) proposes that the interpretation of *pro* in consistent null subject languages depends on aboutness-topic chains and explains cases where *pro* does not have a preferred reading in embedded clauses by claiming that, in the absence of a context, the aboutness-topic heading the chain can be either the matrix subject or another antecedent. However, this analysis does not account for our EP data, which shows a strong subject bias even in the absence of a context.

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