Journal of Portuguese Linguistics

Barbosa, P., et al. (2020). Constraints on multiple dependencies in the left-periphery in European Portuguese. *Journal of Portuguese Linguistics,* 19: 11, pp. 1–33. DOI: https://doi.org/10.5334/jpl.229

RESEARCH PAPER

Constraints on multiple dependencies in the left-periphery in European Portuguese

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This paper focuses on intervention effects obtained by embedding a topic constituent (either a displaced topic or a clitic left-dislocated topic) within the domain of wh-movement. We present the results of two acceptability judgment tests carried out in European Portuguese (EP), which indicate that only a subset of the constructions in which a topic intervenes in the path of wh-movement is judged acceptable by native speakers. The pattern that emerges can be described by the following generalization: (1) *A wh-movement dependency may contain a topicalized or clitic left-dislocated constituent in its scope iff the full topic-(cl)-gap dependency is contained within the path of wh-movement*. This generalization indicates that a version of the no crossing constraint (e.g., Fodor 1978; Pesetsky 1982) holds in these configurations. We discuss the challenges faced by a purely syntactic account of (1) and suggest that a more promising line of an approach is one that attempts to derive (1) from processing constraints.

Keywords: acceptability judgments; clitic left dislocation; Topicalization; wh-movement

1. Introduction

Although the construction known as "Clitic Left Dislocation" (henceforth, CLLD) in Romance may appear in embedded contexts, such as (1), embedding a CLLDed topic under the domain of wh-movement has been reported to yield deviant results in European Portuguese (EP) (Costa & Duarte 2002; Duarte 1997). Thus, example (1a) is fine in comparison to (1b). (1b) should also be contrasted with (1c), which shows that a subject may intervene between the wh-phrase and the verb.

(1) a. Não sei se, à Maria, lhe vou oferecer
not .know.PRES.1SG if to.the Maria CL.DAT.3SG go.PRES.1SG give.INF
esse livro.
that book
'I don't know if I'll give that book to Maria.'

b. *Não sei ainda que prenda, à Maria, lhe
not know. PRES.1SG yet which gift to.the Maria CL.DAT.3GS
vamos oferecer no Natal
go.PRES.1PL give.INF at.the Christmas
'I don't know yet which gift we will get for Maria this Christmas.'

c. Não sei ainda a quem a Maria vai oferecer
not know.PRES.1SG yet to whom the Maria go.PRES.3SG offer.INF
essa prenda.
this book
'I don't know to whom Maria will offer this book.'

The following sentences show that the restriction against an intervening topic also applies in relative clauses (2) and in root questions introduced by a d-linked wh-constituent (3).

(2) Relative clause

a. Já li os artigos que aquela revista não quis publicar
already read.PAST.1SG the articles that that journal not want.PAST.3SG publish.INF
'I have already read the articles that that journal didn't want to publish.'

b. */?Esse é o editor que, os teus artigos, nunca os quis publicar nessa revista.
that is the editor that the your articles never them wanted publish.INF in.that journal.
'That is the editor that never wanted to publish your articles in that journal.'

(3) Root question with d-linked wh

a. Que exame a Maria está a pensar mostrar a esse médico?
which exam the Maria be.PRES.3SG at think.INF show.INF to that doctor
'Which exam is Mary thinking of showing to that doctor?'

b. *Que exame, a esse médico, estás a pensar mostrar-lhe?
which exam to that doctor be.PRES.2SG at think.INF show.INF-CL.DAT.3SG
'Which exam are you thinking of showing to that doctor?'

There are two main lines of analysis of CLLD in the literature. One influential approach is that of Rizzi (1997), who proposed that CLLDed topics are introduced by a Topic head that establishes a kind of "higher predication" between the Topic in Spec, TopP and the rest of the clause. On this analysis, the Topic is moved to Spec, TopP. (1a) would thus be analysed as in (4) (Rizzi 1997 proposes an articulated structure for the CP field, but since this is not directly relevant for the issue at hand, we will continue to use the label C, which stands for Force in Rizzi's system):

(4) V $[_{CP}$ $[_{C}$ se] $[_{TopP}$ [à Maria] $[_{Top'}$ Top … $[_{TP}$ lhe vou dar esse livro]]]]

The other approach (Anagnostopoulou 1997; De Cat 2007; Dermidache 1991; Raposo 1998) assumes that the Topic-Comment articulation is licensed by "rules of predication" (Chomsky 1977) that require that the topic be "base-generated" in a position of adjunction to the XP that is predicated of it, namely either TP (in embedded clauses) or CP (in root clauses). The pronominal clitic provides the open position required for the clausal projection to function as a predicate. This analysis is motivated by the observation that CLLD doesn't display the full range of properties associated with A-bar movement (cf. Cinque 1990). In EP, CLLD doesn't display reconstruction effects, it doesn't license parasitic gaps and it doesn't display strong cross-over effects (Duarte 1987).

(5) V $[_{CP}$ $[_{C}$ se] $[_{TP}$ [à Maria] $[_{TP}$ lhe vou dar esse livro]]]

Under both accounts, one might attempt to rule out the deviant cases above by invoking minimality. On the assumption that the relative clause in (2) involves movement of a null

operator to Spec-CP, in all of the deviant examples above the topic intervenes between the wh-operator/phrase and its base position. For concreteness, we quote Rizzi's (2004: 225) formulation of minimality:

(6) Y is in a Minimal Configuration (MC) with X iff there is no Z such that
1. Z is of the same structural type as X, and
2. Z intervenes between X and Y

Assuming that both CLLDed topics and wh-phrases occupy A-bar positions, the presence of the topic in (1b), (2b) and (3b) would prevent chain formation to take place between the wh-phrase (or the null operator in [2b]) in Spec,CP and its trace.

(7) $[_{CP}\ \textit{Wh-phrase}_i/\textit{Op}_i\ [\ \textit{Topic}_k\ [\ \ldots\ t_i\ \ldots]]]$

Rizzi (1997), however, shows that this view is actually too simplistic. According to him, the following Italian examples are fine or, at best, slightly marginal:

(8) Italian (Rizzi 1997)
a. un uomo a cui, il premio Nobel, lo daranno senz'altro
'a man to whom, the Nobel Prize, they will give it undoubtedly.'
Rizzi (1997: 289)
b. ?Mi domando a chi, il premio Nobel, lo potrebbero dare.
'I wonder to whom, the Nobel Prize, they would give it.' Rizzi (1997: 289)

Haegeman (2012) reports on similar judgements in French:

(9) French (Haegaman 2012: 57–58)
a. Voici l'étudiant à qui, ton livre, je le donnerai.
here.is the'student to whom your book I it give.FUT.1SG
'Here is the student to whom, this book, I will give.'
b. J'aimerais savoir à qui, ton texte, tu comptes le montrer d'abord.
I'like.COND.1SG know.INF to whom, your text, you count.PRES.2SG it show.INF first
'I would like to know who, your text, you intend to show to first.'

Rizzi (2004: 245) concludes that topics do not act as interveners in other A-bar chains, thus falling outside the typology of A-bar dependencies that interfere with wh-movement.[1]

Concerning EP, there is one observation that renders a minimality account of the deviance of (1b, 2b, 3b) hard to maintain. Besides CLLD, EP has another means of expressing the Topic-Comment relation, whereby the topicalized element is simply associated with a gap in argument position and no clitic is present (Duarte 1987). This construction, known as Topicalization due to its affinities with English-type Topicalization, is illustrated in (10):

(10) [Esse manuscrito], enviei [-] hoje para a editora.
that manuscript send.PAST.1SG [-] today to the publishers
'That manuscript, I sent today to the publishers.'

Now let us consider the topicalized counterparts to (1b), (2b) and (3b):

[1] In effect, once minimality is incorporated under the definition of *Attract*, as in the Minimalist Program (Chomksy 1995), it is not at all easy to see which feature topics and operators have in common that would count as closest for the purposes of feature attraction.

(11) ??Não sei ainda que prenda, à Maria, vamos oferecer no
not know.1SG yet which gift to.the Maria go.1PL offer.INF at.the
Natal.
Christmas
'I don't know which gift, to Maria, we will offer for Christmas.'

(12) ??Esse é o editor que, os teus artigos, nunca quis
that is the editor that the your articles never wanted.PAST.3SG
publicar nessa revista.
publish.INF in.that journal.
'That is the editor that, your articles, never wanted to publish in that journal.'

(13) ??Que exame, a esse médico, estás a pensar mostrar?
which exam to that doctor be.PRES.2SG at think.INF show.INF
'Which exam are you thinking of showing to that doctor?'

Even though examples such as (11–13) are not fully acceptable, they are clearly better than (1b), (2b) and (3b), with a clitic.[2] On a minimality analysis, this is unexpected given that topicalization, unlike CLLD, passes the diagnostics for movement (Duarte 1987: 226). In particular, it differs from CLLD in that it displays strong crossover effects:

(14) a. CLLD: no strong cross-over effects
Esse rapaz, disseram-me que *pro*$_i$ sabe que não
that boy tell.PAST.3PL-CL.DAT.1SG that know.PRES.3SG that not
o$_i$ procurámos.
CL.ACC.3SG search.PAST.1PL
'That boy, they told me that he knows that we didn't search for him.'

b. Topicalization: strong cross-over effects
*Esse rapaz$_i$, disseram-me que *pro*$_i$ sabe que não
that boy tell.past.3PL-CL.DAT.1SG that *pro* know.PRES.3SG that not
procurámos [-]$_i$.
search.PAST.1PL
(Examples adapted from Duarte 1987: 226)

Previous analyses of CLLD and topicalization in EP indeed assume that the latter involves some sort of A-bar movement whereas the former doesn't.[3] Thus, if minimality were operative in these contexts, the pattern that would be predicted would be the opposite of what is actually found.

Another relevant observation concerning this type of intervention effects is that there is a contrast between high dative Experiencers (15) and lower dative Goals (2b), regardless of the presence of the clitic. The following examples are taken from Barbosa (2005: 184):

(15) Vi hoje a casa que$_i$, à Maria$_k$, mais (lhe$_k$)
saw.1SG today the house that to.the Maria$_k$, more (CL.DAT.3SG)
convém comprar
is.convenient buy.INF
'Today I saw the house that, for Maria, it is more convenient to buy.'

[2] Duarte (1987) claims that there is a dialect difference: some speakers allow the intervening topic, others don't.
[3] For Duarte (1987), the topic moves and adjoins to TP. For Raposo (1998), the topic is base-generated in place and what moves is a null D, which fulfills the role of a null operator. Topicalization does not display (weak) island effects. According to Raposo, this follows from the fact that D movement is movement of an X^0.

The following examples illustrate other contexts in which a preverbal dative Experiencer is allowed with or without a resumptive clitic (our own judgments):

(16) Sabes quando, ao Pedro, mais (lhe) convém lá ir?
know.2SG when to.the Pedro, more to.him is convenient there go.INF
'Do you know when, to Pedro, it is more convenient to go there?'

(17) Que discos, ao João, mais (lhe) agradará receber?
which records, to.the João, more to.him please.FUTURE receive.INF
'Which records will please João the most?'

Curiously, in this case, the presence of the clitic doesn't appear to contribute to a decrease in acceptability.

In their seminal paper on the topic, Belletti & Rizzi (1988) argue that dative Experiencers in pre-verbal position are not real left-dislocated topics, but are rather quirky subjects; i.e., oblique arguments that behave like surface subjects. If so, then these dative Experiencers in pre-verbal position are predicted to pattern with pre-verbal subjects with regard to extraction rather than with dative Goals.

These observations, however, have never been checked against a sufficiently large pool of native speaker informants. In this paper, we report on the results of two acceptability judgment tasks designed to determine the extent to which such structures with multiple dependencies are accepted by native speakers of EP and the factors that contribute to improved acceptability.

Study 1 (Section 2) seeks to determine the effect of embedding a fronted dative Experiencer as opposed to a fronted dative Goal within the domain of wh-movement, while at the same time controlling for the effect of the presence of the clitic. Our results show that dative Goals yield lower ratings than dative Experiencers. We will examine the hypothesis that preverbal dative Experiencers are quirky subjects in light of this result. We will discuss evidence that the clitic that occurs with preverbal Experiencers is a marker of inherent case, but we will argue that the pattern of responses obtained for the dative Experiencers does not quite warrant the conclusion that preverbal dative experiencers are subjects. We will examine the problems raised by the quirky subject analysis of these preverbal dative Experiencers and we will conclude that there is not reason to think that they are not topics.

Dative Experiencer arguments differ from dative Goals in two ways: (i) they are assigned inherent case; (ii) in the base, they are located higher than the nominative argument (the Theme). In (15–17), the Theme is the infinitival clause, which contains the trace of wh-movement. Schematically, we have the structure in (18) for (15–17), in which the base position associated with the Experiencer is higher than the trace of the wh-phrase:

(18) [$Wh_{\mathbf{i}}$ [*Dative Experiencer*$_{\mathrm{k}}$ [(*lhe*$_{\mathbf{k}}$) V [-]$_{\mathbf{k}}$ … [CP … [-]$_{\mathbf{i}}$ …]]]]

In this configuration, the full topic-(cl)-gap dependency is contained within the path of wh-movement. In the examples with a dative Goal topic (1b, 3b), by contrast, the trace of the wh-phrase/operator c-commands the argument position associated with the topic, as illustrated in (19):

(19) [$Wh_i/Op_{\mathbf{i}}$ [*Dative Goal*$_{\mathrm{k}}$ [(*lhe*$_{\mathbf{k}}$) … V [-]$_{\mathbf{i}}$ [-]$_{\mathrm{k}}$…]]]

Likewise, (2b) also involves a crossing dependency (the trace of the wh-subject c-commands the argument position associated with the object CLLDed topic). Thus, while (15–17) involve nested dependencies, (1b, 2b, 3b) involve crossing dependencies. Nested dependencies have been argued to be favored over crossing dependencies quite generally (Fodor 1978; Pesetsky 1982).

In order to evaluate whether a version of the no-crossing constraint is operative in these multiple dependency constructions, a second acceptability judgement task was created (Section 3). This time, the function of the topic was held constant and we manipulated the height of the base position of the relative operator, subject *vs.* low dative. Presence *vs.* absence of the clitic was also manipulated.

(20) *wh* -SUBJECT: CROSSING CONDITION
Esse é o editor [Op_i que, os teus artigos$_k$, nunca [-]$_i$
that is the editor that the your articles never
(os$_k$) quis publicar [-]$_k$ nessa revista].
(CL.DAT.3PL$_k$) want.PAST.3SG publish.INF in.that journal
'That is the editor that never wanted to publish your articles in that journal.'

(21) *wh* -DATIVE*:* NESTING CONDITION
Esse é o revisor a quem$_k$, os teus textos$_i$, já (os)
that is the referee to whom$_k$ the your texts$_i$, already (cl.DAT.3PL)
tentei enviar [-]$_i$ [-]$_k$ várias vezes.
try.PAST.1SG send.INF several times
'That is the referee to whom, your texts, I have already tried to send several times.'

An ordinary logistics regression analysis revealed a significant difference between the two conditions: *wh*-dative relatives received higher rates than *wh*-subject relatives. Sentences without the clitic also received significantly higher rates. The pattern that emerges can thus be described by the following generalization:

(22) *A wh-movement dependency may tolerate a topicalized or clitic left-dislocated constituent in its scope iff the full topic-(cl)-gap dependency is contained within the path of wh-movement.*

We discuss the challenges faced by a purely syntactic account of (22) and suggest that a more promising line of approach would be to derive (22) from processing constraints. Viewed from a parsing perspective, (22) is equivalent to the claim that maintaining an active filler in the course of processing a wh-filler gap dependency is costly for the human processor. Our hypothesis is the following: if, at the point of retrieval of a wh-filler, an active topic (i.e., a displaced topic looking to be integrated with its subcategorizer) intervenes between the wh-gap and the wh-filler, the amount of cognitive resources required to retrieve and integrate the wh-filler in the representation raises to a threshold that results in perception of unacceptability.

One result of the present study that would receive a natural explanation on these grounds is the effect of the presence of the clitic. Previous studies on the processing of CLLD (Pablos 2006) provide evidence that left-dislocated topic fillers are reactivated at the clitic, before the verb is encountered. If this is true, then by reactivating the representation of the topic, the presence of the clitic immediately before the verbal complex has the effect of bringing the topic to the focus of attention. By hypothesis, this enhances the interfering effect of the topic on retrieval and integration of the wh-filler.

2. Study 1

The goal of this study is to determine the effect of embedding a fronted dative Experiencer as opposed to a fronted dative Goal within the domain of wh-movement, while at the same time controlling for the effect of the presence of the clitic.

2.1. Method

2.1.1. Participants

Sixty-six undergraduate and postgraduate students from University of Minho participated in Experiment 1 on a voluntary basis (average age 21,6, SD = 6,8; 51 females, 15 male). All participants were native speakers of European Portuguese, naive regarding the purpose of the experiment and reported not to speak any other language at home.

2.1.2. Materials

Twelve experimental sentences and twenty-four fillers were created for this experiment. The experimental items consisted of relative clauses containing dative phrases in pre-verbal position (see Appendix). The sentences were manipulated to examine the role of two independent factors: (i) the theta-role of the dative phrase and (ii) presence *versus* absence of the resumptive clitic. The twelve items were evenly divided in two sentences types, considering the theta-role of the topic ("dative-*Experiencer*" and "dative-*Goal*"). In half of the two sentences types the clitic was present ("Clitic") and in the other half it was absent ("No-Clitic").

(23) Experimental conditions (Study 1)

a. Dative-Experiencer and clitic present (DatExp-Clit)
Já li o artigo que, ao editor$_k$, mais
already read.PAST.1SG the article that to.the editor more
lhe interessa publicar nesta revista.
to.him.CL.DAT.3SG interest.PRES.3SG publish.INF in.this journal
'I already read the article that the editor is most interested in publishing in this journal.'

b. Dative-Experiencer and clitic absent (DatExp-NoClit)
Já li o artigo que, ao editor$_k$, mais interessa (…)
already read.PAST.1SG the article that to.the editor more interest.3SG (…)

c. Dative-Goal and clitic present (DatGoal-Clit)
Já li a mensagem que, ao diretor, tanto
already read.PAST.1SG the message that, to.the director, so
lhe querem enviar ainda hoje.
CL.DAT.3SG want.PRES.3 PL send.INF still today
'I already read the message that they want so much to send to the director today.'

d. Dative-Goal and clitic absent (DatGoal-NoClit)
Já li a mensagem que, ao diretor, tanto
already read.PAST.1SG the message that, to.the director, so
querem enviar (…)
want.PRES.3 PL send.INF (…)

The experimental items were created so as to maximize naturalness and balance between the two sets of conditions. Even though (23a, b) and (23c, d) are not structurally identical (in the latter case the wh-object and the dative are coarguments; in the former, they are not), they are identical from the point of view of information structure: in both cases, the dative is topical and the rest of the clause constitutes the comment. The reason why we have decided to embed the trace of the wh-operator in an infinitival complement in all conditions is that, otherwise, the two sets of examples would differ with respect to

the function of the relativized argument. In the Experiencer conditions, the relativized argument would be a subject and, in the dative condition, it would be a direct object, as shown in (24):

(24) a. Já li os livros que, ao editor, (lhe)
already read.PAST.1SG the books that to.the editor, (CL.DAT.3SG)
interessam mais.
interest.PRES.3PL most
'I already read the books that interest the editor the most.'

b. Já li os livros que, ao editor, (lhe)
already read.PAST.1SG the books that to.the editor, (CL.DAT.3SG)
oferecemos no Natal.
offer.PAST.1PL in.the Christmas
'I already read the books that we offered to the editor for Christmas.'

Since the different function of the relativized argument would introduce an unwanted variable in the paradigms tested, our option was to embed it in an infinitival clause and keep the examples as identical as possible. So as to maximize the parallelism between the two sets of conditions, in the DatGoal-Clit condition, the clitic associated with the lower verb appears attached to the superordinate verb (all of the superordinate verbs chosen in this condition allow for clitic-climbing). In order to avoid a possible adjacency effect, we inserted an adverbial or quantifier between the fronted dative and the clitic.

To minimize the identification of the experimental items due to repetition of the syntactic structure, the twenty-four fillers also had repeated syntactic structures. Three sets of eight sentences were created (see 25 a–c): adverbial phrases introduced by "in general"; subordinate clauses prior to the main clause, all preceded by "while"; and syntactically varied sentences.

(25) Fillers examples

a. In general—NP—V(to be)—adjective-adjunct/complement
Em geral, as igrejas são bonitas na cidade de Florença.
'In general, churches are beautiful in the city of Florence.'

b. [While—NP—Intransitive V]$_{SUB}$ [NP—VP]$_{MAIN\ CLAUSE}$
Enquanto o rapaz estudava, a professora corrigia os testes de matemática.
While the boy was studying, the teacher corrected the math tests.'

c. [While—NP—Intransitive V]$_{SUB}$ [NP—VP]$_{MAIN\ CLAUSE}$
A casa da Bárbara foi totalmente decorada pelos amigos do seu irmão.
'Barbara's house was totally decorated by her brother's friends.'

2.1.3. Procedures

Participants received an access link from a teacher or one of the researchers and the task was performed in the classroom through the *SurveyGizmo*® platform. To proceed with the task, it was required to agree to the informed consent terms and fill out a form with demographic and linguistic data. The twelve experimental items and the twenty-four fillers were presented in an acceptability judgment questionnaire divided in two lists (A and B). The experimental items in the "NoClit" conditions that were seen in List A were viewed in the "Clit" conditions in List B, and vice versa (within-subjects design). The fillers were the same on both lists. The sentences were presented in a random order to each participant. Participants were asked to judge the acceptability of the sentences in the questionnaire by checking one of the numerical descriptors 1 to 7 placed beneath

each sentence (1 = "not acceptable"; 7 = "totally acceptable"). The verbal descriptors "not acceptable" and "totally acceptable" were also written in the two ends of the scale. Written instructions were given to the participants. The sentences were presented one by one in the center of the screen and it was not possible to skip back or forward to other stimuli during the experiment. To proceed to the next sentence, a response to the stimulus displayed on the screen was required. The participants were advised about the average time to perform the task (approximately 10 minutes after filling in the forms, according to our pre-tests) and unaware regarding the number of sentences in the questionnaire.

Although we are aware of the inherent subjectivity of responses obtained through scales such as the one we used, we believe that this measure suits the purposes of the present study. Despite the controversies surrounding methodological and data analysis issues, the use of *n*-point scales to collect linguistic acceptability judgment has proved to be rather informative and has been widely employed (e.g., Myers 2009; Schütze & Sprouse 2013; Sprouse, Schütze & Almeida 2013; Weskott & Fanselow 2011). We were interested in obtaining some insight into the degree of acceptability of the constructions examined rather than including them in the categories 'acceptable' or 'unacceptable'. We were also interested in giving the participants a possible neutral option by using an odd number. This way, we left a middle point in the scale instead to force them to express a definitive judgment one way or the other, although we have not explicitly defined this point as a "I do not know" option.

2.2. Results

The data were analyzed in the R statistics software, version 3.5.1 (R Core Team 2018) through generalized linear mixed models using the MCMCglmm package (Hadfield 2010) that is suitable for ordinal data. The approach used in this package fits multi-response generalized linear mixed models using Markov chain Monte Carlo techniques, which update the fixed and random effects as a single block, "resulting in better mixing properties and shorter chain lengths than other strategies" (Hadfield 2010: 14). The experimental factors — Topic Function[4] with two levels (High-Exp and Low-Goal) and Clitic with two levels (Clitic and No-Clitic) — and the interactions between them were entered as fixed effects into the model, using effect coding, that is, the intercept represents the grand median (the initial median, with no effect of the factors) and fixed effects compare the levels of the factor to each other. The median was used as the localization measure since the response variable is ordinal and was treated as such rather than an interval scale. Participants and items were included in the model as random effects. The results are shown in **Table 1**.

Table 1: Study 1 – Generalized linear mixed model fitted by using Markov chain Monte Carlo techniques (Hadfield 2010) with ordinal family.

	Coefficient	Lower bound (CI 95%)	Upper bound (CI 95%)	pMCMC
Function_Exp	1.075	0.626	1.444	<0.001***
Clitic_NoClit	0.125	−0.059	0.354	0.240
Function_Exp:Clitic_NoClit	−0.218	−0.471	0.013	0.090.

Response ~ Function*Clitic, random = ~Participant + Item, data = Est1, verbose = FALSE, family = "ordinal". Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1.

[4] Here, by 'Topic Function' we mean the theta-role of the DP in preverbal position.

The data from Study 1 revealed a significant effect for the "Function" factor ($p < 0.001$). In the "dative-Experiencers" sentences higher median overall values were observed when compared to the "dative-Goals" sentences. The range of values for this difference is between 0.626 and 1.444 (CI 95%). There was no significant difference between the levels of "Clitic" factor – Clitic vs. No-clitic sentences ($p = 0.240$). There were also no significant interactions between the "Function" and "Clitic" factors using $\alpha = 0.05$ as usual. However, if we consider $\alpha = 0.1$ the negative interaction corresponds to a median decrease of 0.218 in the responses of the "dative-Experiencers" (in relation to the overall responses). Thus, if there is a significant increase in the median response, this can be explained from the "dative-Goal" level. This can be easily seen in **Figure 1** below. The mean (dots) in "dative-Goal" is higher in the "No-Clitic" condition than in the "Clitic" condition and in the "dative-Experiencers" the pattern is the inverse.

The contrast between the "dative-Goal" and "dative-Experiencer" structures, shown above, can clearly be seen from **Figure 2**, below. The distribution of the answers at each of the seven points of the scale reveals that at the extreme points, the pattern of responses for both types of sentences is reversed. At point 1 of the scale (not acceptable), the highest percentage of the total answers is in the "Goal" condition (71.5%) and, inversely, at point 7 of the scale (totally acceptable), the highest percentage is observed in the "Experiencer" condition (70.4%). The rates at point 6 reach 80.2%.

In addition to the statistical approach described above for ordinal data, we also fitted a linear mixed model with Gaussian family by using MCMCglmm package. We also used the lmer function with the lme4 package (Bates et al. 2015). This last approach was previously used for acceptability judgment data (e.g., Bader 2018). The results of **Table 2** and **Table 3** are like those shown in **Table 1** (i.e., the results were the same order of size as the earlier analysis and matched the conclusions).

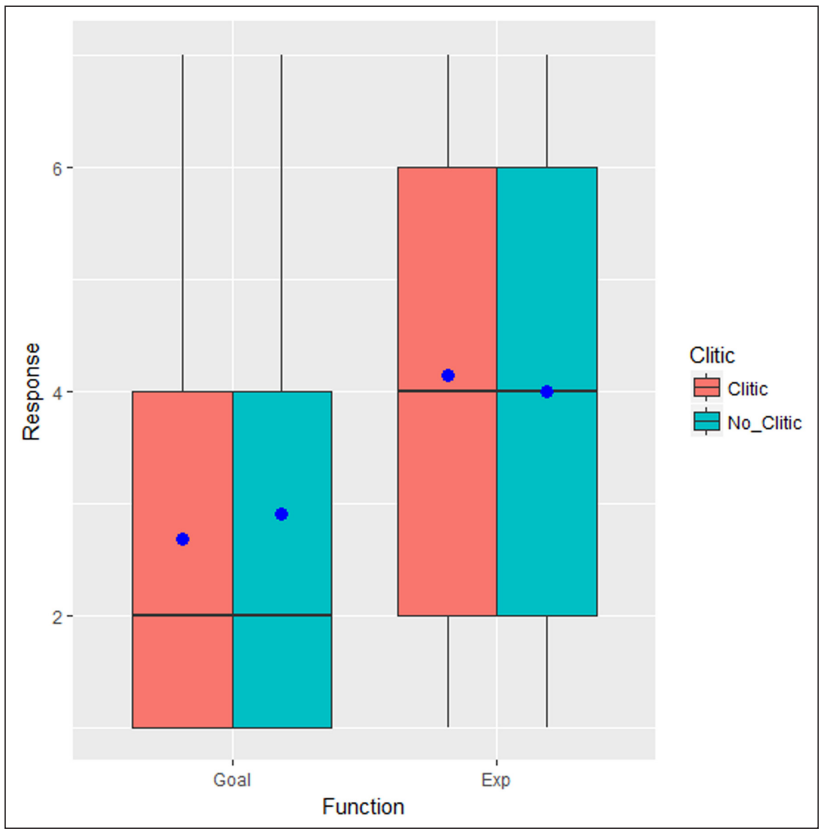

Figure 1: Mean and Median acceptability ratings on a scale from 1 to 7 for Study 1.

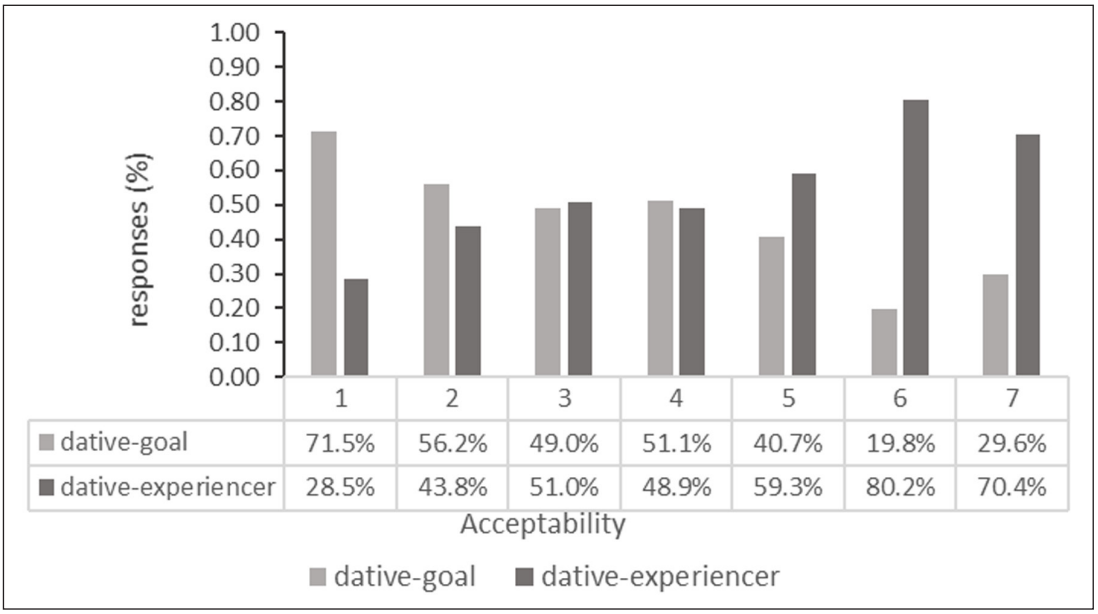

Figure 2: Distribution of acceptability ratings on a 7-point Likert scale in the Study 1 (1 = 'not acceptable'; '7 = totally acceptable').

Table 2: Study 1 – Generalized linear mixed model fitted by using Markov chain Monte Carlo techniques (Hadfield 2010) with Gaussian family.

	Coefficient	Lower bound (CI 95%)	Upper bound (CI 95%)	*p*MCMC
Function_Exp	1.450	0.907	1.925	<0.001***
Clitic_NoClit	0.204	−0.070	0.474	0.172
Function_Exp:Clitic_NoClit	−0.334	−0.742	0.042	0.100.

Response ~ Function*Clitic, random = ~Participant + Item, data = Est1, verbose = FALSE, family = "gaussian". Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1.

Table 3: Study 1 – Generalized linear mixed model fitted by using lmer function in the lme4 package (with Gaussian family).

	Coefficient	Std.Error	*t*-value	*p*-value
Function_Exp	1.447	0.250	5.791	<0.001***
Clitic_NoClit	0.210	0.141	1.487	0.137
Function_Exp:Clitic_NoClit	−0.343	0.200	−1.715	0.087

Response ~ Function*Clitic, random = ~Participant + Item, data = Est1, verbose = FALSE, family = "gaussian". Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1.

2.3. Discussion

These results confirm that, irrespective of the presence of the clitic, dative Experiencers differ from dative Goals. The latter yield lower ratings. Even though the clitic factor was not statistically significant, an interesting pattern emerges from the data. While the presence of the clitic contributes to lower acceptability rates with dative Goals, dative Experiencers display the opposite pattern.

These observations are in line with the findings by Belletti & Rizzi (1988) on Italian. These authors discussed evidence that dative Experiencers in preverbal position differ

from standard left-dislocated objects and argued that they are quirky subjects. One piece of evidence discussed by Belletti & Rizzi (1988) concerns the peculiar behavior of the clitic with these pre-verbal datives. We review this evidence next.

It is a well-known fact that negative QPs cannot be CLLDed (cf. [26b]). When fronted, they must leave a gap in argument position:

(26) a. Não contes a ninguém o que me disseste.
not tell.IMP.2SG to no one the what me tell.PAST.2SG
'Don't tell anyone what you have told me.'

b. *A ninguém lhe contes o que me disseste.
to no one to.him.CL.DAT.3SG tell.IMP.2SG the what me tell.PAST.2SG

c. A ninguém$_i$ contes [-]$_i$ o que me disseste!
to no one tell.IMP.2SG the what me tell.PAST.2SG
'Don't tell anyone what you have told me.'

Contrasts such as these fall naturally under an approach to CLLD that assumes that CLLDed topics are base-generated directly in place. The dislocated DP introduces an entity and the comment contains an 'open' position (a pronominal category) satisfied by the entity referred to by the dislocated DP. Since negative QPs are incapable of picking up a referent, they cannot be CLLDed. Thus, fronting of a nonreferring expression is only possible through movement, in which case it leaves a gap (cf. [26c]).

Interestingly, as originally noted by Belletti & Rizzi (1988), dative Experiencers in preverbal position display a different pattern. In particular, in this case, a non-referential QP is not incompatible with a doubling clitic. This is illustrated by the following examples, which were attested on the web:

(27) a. É que agora a ninguém lhe apetece escrever.[5]
it.is that now to no one CL.DAT.3SG feels.like write.INF
'The thing is that now no one feels like writing.'

b. … e a ninguém lhe interessa despender verba em
… and to no one CL.DAT.3SG interests spend.INF money in
actividades que resultem em desconforto[6]
activities that result.PRES.3PL in discomfort
'… and no one is interested in spending money in activities that may result in discomfort.'

A search in Google for the sequence "*a ninguém lhe*" retrieves a number of examples of this kind and all of them contain stative psychological predicates. This indicates that the status of the clitic that doubles dative Experiencers in preverbal position is different from that of the clitic that doubles left-dislocated Goals.

Belletti & Rizzi (1988) and subsequent works on the topic argue that the case of Experiencers is not structural and is rather "lexicaly" marked, or inherent. If so, then one can think of the clitic in (27) as a case marker rather than a pronominal category. In the case of CLLDed Goals, by contrast, the doubling clitic has the status of a pronominal category. Since, in the case of dative Experiencers, the clitic is (or can be) a mere case marker, no problem arises when it co-occurs with a fronted negative QP. Under this account, the inverse pattern obtained in our test results regarding the effect of the presence

[5] Retrieved from https://www.cvalsassina.pt/images/docs/ano-2015-2016/Exposicao_Mia_Couto_Melhores_frases.pdf Consulted on 18-6-2020.

[6] Retrieved from https://funchalnoticias.net/2020/03/04/aviacao-mundial-padece-com-o-covid-19 Consulted on 18-6-2020.

of the clitic is no longer surprising, in view of the different status of the clitic in each case. Setting the dative Experiencers case aside, the experimental results indeed show that the presence of the clitic contributes to lower acceptability ratings.

These observations support the thesis that preverbal dative Experiencers do not behave exactly like standard dislocated objects. However, as pointed out by Gutiérrez-Bravo (2006) for similar data in Spanish, it doesn't necessarily follow from this that these dative Experiencers are quirky subjects.

The term "quirky subject" was originally applied to oblique arguments in Icelandic that behave like surface subjects in every relevant aspect. It was then extended to Italian and Spanish dative Experiencers (Belletti & Rizzi 1988; Masullo 1993). However, Gutiérrez-Bravo (2006) shows that Spanish preverbal dative Experiencers lack the crucial properties that characterize Icelandic quirky subjects. The author discusses three properties that uniquely characterize quirky subjects in Icelandic. These properties were identified by Sigurðsson (2004) as distinguishing Icelandic quirky subjects from the non-subject preverbal obliques of German (cf. also Zaenen, Maling & Thráinsson 1985). Gutiérrez-Bravo (2006) shows that Spanish has none of these properties, so it is not like Icelandic, but like German, which does not have quirky subjects. In what follows we show that EP patterns with Spanish and not with Icelandic.

The first property concerns person agreement. Icelandic quirky subjects block person agreement between the verb and the nominative argument (Sigurðsson 2004). Thus, 1st and 2nd person agreement in (28a, b) is impossible:

(28) a. *Ég veit að honum líkum við
I know.1sg that him.DAT like.1PL we.NOM

b. *Ég veit að honum líkid þið
I know.1sg that him.DAT like.2PL you.PL.NOM

c. Ég veit að honum líka þeir
I know.1sg that him.DAT like.3PL they.NOM
'I know that he likes them'

EP behaves like Spanish (and German) and unlike Icelandic (we refer the reader to Gutierrez-Bravo (2006) for the Spanish data):

(29) Ao Pedro agrado eu/ agradas tu /agradamos nós
to.the Pedro please.PRES.1SG I please.PRES.2SG you please.PRES.2SG us
'I/you/we please Pedro.'

The second property concerns Conjunction Reduction, as in (30), where a nominative subject is coreferential with a deleted dative in the second conjunct.

(30) Ég hafði mikið að gera og __ var samt ekki
I.NOM had much to do.INF and *e*.DAT be.PAST.3SG still not
hjálpað
help.PAST.3SG
'I had much to do and was nonetheless not helped.'

Conjunction reduction with a dative Experiencer verb is impossible in EP (just like in Spanish, as originally pointed out by Masullo 1993):

(31) *Ela adora cães e __ agradam cavalos
she love.PRES.3SG dogs and please.PRES.3PL horses

The third defining property of quirky subjecthood is that quirks can be controllees in infinitival clauses.

(32) Hún vonast til að *PRO* leiðast ekki bókin
she hope.PRES.3SG that for PRO-DAT bore.INF not the.book.NOM
'She hopes not to find the book boring.'

As originally noted by Masullo (1993), Spanish preverbal datives do not have this property. Likewise, in the example below, the null subject of the infinitival clause cannot be a dative Experiencer controlled by the matrix subject:

(33) *Ela espera *ec*.DAT agradar a matemática.NOM
she hope.PRES.3SG please.INF the mathematics

This paradigm shows that preverbal dative Experiencers do not have the behavior of quirky subjects in Icelandic.

Coming back to our experiment, the assumption that preverbal datives are subjects in EP would predict that the status of our test sentences with an intervening dative Experiencer should be no different from that of (2a), repeated here as (34), with a preverbal subject.

(34) Já li os artigos que aquela revista não quis
already read.PAST.1SG the articles that that journal not want.PAST.3SG
publicar.
publish.INF
'I have already read the articles that that journal didn't want to publish.'

However, this prediction is not quite confirmed given that speakers' ratings of the sentences with pre-verbal dative Experiencers are not exactly optimal, with ratings ranging from 1 to 7 and no detectable difference with respect to preverbal Goals in the middle points of the scale (cf. **Figure 2**). Therefore, these preverbal datives do not quite pattern with preverbal subjects either.

One other fact that constitutes an argument against a quirky subject analysis of these dative Experiencers is the observation that, within the Romance languages, only the null subject languages have been argued to have quirky dative subjects. As noted by Landau (2009: 89–90), French doesn't allow "quirky" dative Experiencers: "Preverbal datives in French are always dislocated (as topic or focus) and cannot switch with the nominative DP."

(35) a. Cette musique plaît à Marie.
this music please.PRES.3SG to Marie
'This music pleases Marie.'

b. *À Marie plait cette musique.

This fact is surprising on a quirky subject analysis. If the preverbal dative Experiencers that are found in EP, Italian and Spanish were quirky subjects, it is not at all clear why they should be absent from French, a closely related language. Belletti & Rizzi (1988) claim that this is due to the fact that, in French, nominative case cannot be assigned to the right. However, the construction know as Stylistic Inversion displays nominative subjects in postverbal position:

(36) Je me demande quand est venue Marie.
I me ask.PRES.1SG when is come Marie
'I wonder when Marie came.'

If, on the other hand, preverbal dative Experiencers are topics in all of these languages, the issue doesn't arise. Since, in a null-subject language, Spec,TP doesn't need to be overtly filled and the grammatical subject may be post-verbal (cf. [37]), a sentence with a topic Experiencer and a postverbal subject will always have the appearance of a sentence with a quirky subject (cf. [38]). This is not so in French, where the EPP forces overt subject movement to SPec-TP.

(37) a. Agrada-me isso.
please.pres.3SG-CL.DAT.1SG that
'That pleases me.'

b. Apetece-me um gelado.
crave.pres.3SG-CL.DAT.1SG an ice-cream
'I am craving an ice-cream'

(38) a. Ao Pedro agrada(-lhe) isso
to.the Pedro please.PRES.3SG-(CL.DAT.1SG) that
'That pleases Pedro.'

b. Ao Pedro apetece (-lhe) um gelado.
to.the Pedro crave.PRES.3SG - (CL.DAT.1SG) an ice-cream
'Pedro is craving an ice-cream'

Landau (2009) proposes that Experiencers denote mental locations and that constructions with preverbal dative Experiencers are instances of locative inversion, which induces presentational focus on the postverbal DP. However, in English locative inversion constructions, the inverted locative blocks extraction, so a straightforward extension of the locative inversion analysis to our case is of no help. In fact, Landau (2009) argues that locatives in English locative inversion are subjects that must move to topic position because PPs cannot be subjects in English. According to him, the availability of quirky subjects in Italian and Spanish allows for Experiencer datives to raise to Spec-TP and stay there. However, there is actually no independent evidence that PPs can be subjects in EP (on Spanish, see the discussion in Gutiérrez-Bravo, 2006). Since a quirky subject analysis of preverbal dative Experiencers in EP (or Spanish, for that matter) is problematic, for the reasons stated above, we do not adopt this analysis. We note, however, that, in a null subject language, topicalization of a dative Experiencer argument will in reality have the same interpretative effect as locative inversion. The dative Experiencer in topic position is assigned prominence and, since the grammatical subject may stay in situ, to the right of V raised to T, it will be the most deeply embedded constituent and hence be assigned information focus (=presentational focus).

Dative Experiencer arguments differ from dative Goals or direct objects in two ways: they are assigned inherent case and, in the base, they are projected higher than the nominative argument (the Theme). Thus, on second inspection, there is actually no reason to expect that dative Experiencer topics should pattern exactly like lower object topics. In fact, the rejection of a topic analysis of preverbal dative experiencers is grounded on the assumption that all left-dislocated topics are expected to pattern alike with regard to extraction. However, this assumption is factually wrong. Barbosa & De Cat (2019) carried out a study designed to determine how native speakers of French rate examples with different types of CLLDed topics embedded within the domain of wh-movement. Test items contained relative clauses and indirect questions. The syntactic position of the intervenor was manipulated so that it was either a canonical subject (39), a dislocated subject (40), a dislocated object (41) or an adjunct (42) (Barbosa & De Cat 2019: 4):

(39) J'habite la rue où Nicolas refuse de se parquer
I live the street where Nicolas refuses to REFL park
'I live in the street Nicolas refuses to park his car in.'

(40) Voici les médailles que, les athlètes, ils sont fiers d'avoir
here are the medals that the athletes they are proud to'have
remportées.
won
'These are the medals the athletes are proud to have won.'

(41) Voici les athlètes qui, les médailles d'or, les ont remportées.
here are the athletes that the médals of'gold them have won
'These are the medals that the athletes are proud to have won.'

(42) Elle a un chien qui, le soir, se transforme en chat.
she has a dog that the evening REFL transforms into cat
'She has a dog that turns into a cat in the evenings.'

Stimuli were presented orally, and each test item was preceded by a short context. An ordinal regression analysis revealed a consistent picture, of which we highlight the following conclusions:

(43) *French: intervenor effects in wh-movement structures* (Barbosa & De Cat 2019)
The strongest predictor of Intervenor effect is the position of the intervenor:
- Dislocated objects are significantly more disruptive of wh-chains than dislocated subjects, adjuncts or subjects.
- Subjects and adjuncts are less disruptive of wh-chains than dislocated subjects.

These results show that embedding a dislocated subject within a wh-movement domain yields better results than embedding a dislocated object, regardless of the type of structure (i. e., relative clause or indirect question). Unsurprisingly, there is a partition between dislocated subjects, on the one hand, and adjuncts or subjects, on the other. However, the significant split between subjects and objects within the group of structures involving CLLD is something that, to our knowledge, has never been noticed before. This subject/object asymmetry indicates that height of the base position associated with the topic matters in determining whether it may or may not appear within the domain of wh-movement.

These data also argue against an analysis that attempts to explain this subject/object asymmetry by claiming that subject clitics are agreement markers, in which case the fronted DP is a subject rather than a CLLDed Topic (Culberston 2010). The fact that subjects are less disruptive of wh-chains than CLLDed subjects would remain unexplained under an agreement marker analysis of subject clitics.[7]

This subject object asymmetry could be attributed to the particular status of subjects as natural topics. Since subjects are natural topics, subject CLLD is less marked that object

[7] Such an analysis has also been shown to be untenable for a number of reasons (De Cat 2005). In particular, non-referential quantified phrases are incompatible with a coindexed subject clitic:

(i) a. *Quelqu'un il vient.
someone he comes

b. Quelqu'un vient.
someone comes
'Someone is coming.'

CLLD.[8] This kind of explanation, however, would require the additional proviso that only marked topics block wh-extraction, a non-trivial matter. Here we will pursue an alternative explanation.

A close look at the configurations involved in (40) versus (41) reveals that they differ from each other in the way the scopes of the wh-item and the topic interact. Schematically, (40) corresponds to the structure shown in (44a) and (41), to the structure shown in (44b).

(44) a. Op_i *que* les athlètes$_k$ ils$_k$ sont fiers d'avoir remportées [-]$_i$

'…that the athletes, they are proud to have won.'

b. *qui*$_i$ les médailles d'or$_k$ [-]$_i$ les$_k$ ont remportées [-]$_k$

'…that the gold medals they won.'

While (44a) involves nested dependencies, (44b) involves intersecting dependencies.

With this much as background let us now reconsider the configurations involved in our EP study. Examples (23a,b) and (23c,d), reproduced here as (45a) and (45b), respectively, also differ from each other in the way the scopes of the wh-item and the topic interact. While (45a), with a dative Experiencers topic, displays nested dependencies (45b), (46a) exhibits intersecting dependencies (46b):

(45) a. Vi a casa Op_i que, à Maria$_k$, mais (lhe$_k$)
saw.1SG the house that to.the Mary more (CL.DAT.3SG)
convém [-]$_k$ comprar [-]$_i$
is.convenient buy.INF
'I saw the house that is more convenient for Maria to buy.'

b. Op_i Topic$_k$ (cl$_k$) [-]$_k$ … [-]$_i$

(46) a. Já li a mensagem que, ao diretor, tanto
already read.PAST.1SG the message that, to.the director, so
lhe querem enviar ainda hoje.
CL.DAT.3SG want.PRES.3 PL send.INF still today
'I already read the message that they want so much to send to the director today.'

b. Op_i Topic$_k$ (cl$_k$) [-]$_i$ [-]$_k$

We thus observe that the EP data are consistent with the French data. In both cases, we find a similar pattern: the structures that involve nesting dependencies are rated significantly higher than those that display intersecting dependencies.

In fact, nested dependencies have been argued to be favoured over crossing dependencies quite generally (Bach 1977; Baker 1977; Fodor 1978; Kaplan 1973). The following typical examples in (47) and (48) where wh-movement and Tough-movement are both applied, are illustrative:

(47) [Which violin]$_k$ is [this sonata]$_i$ easy to play t$_i$ on t$_k$?

[8] In the French *corpora* of child directed speech studied by De Cat (2007) an impressive 86% of the total of dislocated DPs and pronouns found are cases of subject dislocation.

(48) *[Which sonata]$_i$ is [this violin]$_k$ easy to play t_i on t_k

Baker (1977: 63) explicitly stated this constraint in terms of processing:

(49) a. As a sentence is processed from left to right, a prospective tenant [=filler] *y* is more current than a prospective tenant x if y occurs to the right of *x*.

b. A prospective filler is assigned to the first unoccupied address [=gap] for which it is the most current of the eligible prospective tenants.

Fodor (1978) formulated the constraint as an anti-ambiguity parsing strategy:

(50) Nested Dependency Constraint (Fodor 1978: 448)
If there are two or more filler-gap dependencies in the same sentence, their scopes may not intersect if either disjoint or nested dependencies are compatible with the well-formedness conditions of the language.

Finally, Pesetsky (1982: 309) reaffirmed this condition in the form of a syntactic constraint on A'-movement:

(51) Path Containment Condition (PCC) (Pesetsky 1982: 309)
If two paths overlap, one must contain the other.

Pesetsky shows that the generalization in (51) has broad empirical scope.[9] In order to verify whether the no crossing constraint is indeed operative in these structures, a second grammaticality judgment task was designed. The goal of this study was to test for the two types of dependencies, crossing *versus* nesting.

3. Study 2

3.1. Method

3.1.1. Rationale

The experimental items created for this experiment consisted again in relative clauses containing topicalization/left-dislocation constructions. This time, however, the function of the topic was held constant and we manipulated the height of the base position of the relative operator. In (52) and (53) the topic is a direct object. These sentences differ from each other with respect to the position occupied by the trace of the wh-operator: it may be a subject (52) or a dative Goal (53). As shown in (52b), (53b), the wh-subject condition displays crossing dependencies while the wh-dative condition exhibits nested dependencies.

(52) Wh-subject

a. Esse é o editor [*Op*$_i$ que, os teus artigos$_k$, nunca [-]$_i$ (os$_k$)
that is the editor that the your articles never (CL.DAT.3PL$_k$)
quis publicar [-]$_k$ nessa revista].
want.PAST.3SG publish.INF in.that journal
'That is the editor that never wanted to publish your articles in that journal.'

b. *Op*$_i$ que os teus artigos$_k$ nunca [-]$_i$ (**os**$_k$) quis publicar [-]$_k$ nessa revista.

[9] The only exception to this pattern are multiple wh-questions in Bulgarian, where there is a preference for crossing over nesting (Rudin 1988). These cases, however, involve movement to multiple Spec positions (two wh-phrases check their wh-features against the same head). Richards (2001) argued that, in this particular case, the higher wh-phrase moves first and then a special operation (*Tucking in*) moves the lower wh and places it in a lower Spec. Tucking in, however, is assumed to apply only when two wh-phrases check their features against the same head, which is clearly different from the examples discussed by Pesetsky (1982).

(53) Wh-dative

a. Esse é o revisor a quem$_k$, os teus textos$_i$, já (os)
that is the referee to whom$_k$ the your texts$_i$, already (cl.DAT.3PL)
tentei enviar [-]$_i$ [-]$_k$ várias vezes.
try.PAST.1SG send.inf several times
'That is the referee to whom, your texts, I have already tried to send several times.'

b. a quem$_i$ os teus textos$_{k,}$ já (os$_k$) tentei enviar [-]$_k$ [-]$_i$

In the examples above, the clitic associated with the lower verb appears attached to the superordinate verbs *querer* 'want' and *tentar* 'try'. These are cases of clitic climbing, an indication that restructuring has taken place. This means that the finite verb and the infinitival verb form a derived complex predicate. However, nothing crucial hinges on this. The cases of subject extraction involve crossing dependencies while the cases of the dative extraction exhibit nesting dependencies.

3.1.2. Participants

Sixty undergraduate and postgraduate students from University of Minho participated in Experiment 2 on a voluntary basis (average age 23,6, SD = 8,25; 49 females, 11 male). All participants were native speakers of European Portuguese, naive regarding the purpose of the experiment and reported not speaking any other language at home.

3.1.3. Materials

This experiment crossed the factors *Wh-height* and *Clitic* in a 2 × 2 factorial design. Wh-height was either "Wh-subject" or "Wh-dative". Clitic was either presence or absence of the resumptive direct object clitic: "Clitic" *vs* "No-Clitic". The experimental items were mixed with the same twenty-four fillers used in the previous study (see (25 a–c), above). An example item for each of the four experimental conditions is shown in (54a–d):

(54) Experimental conditions (Study 2)

a. Wh-subject and clitic present (WhSub-Clit)
Esse é o editor que, os teus artigos, nunca os
that is the editor that the your articles never CL.DAT.3SG
quis publicar nessa revista.
want.PAST.3SG publish.INF in.that journal
'That is the editor that never wanted to publish your articles in that journal.'

b. Wh-subject and clitic present (WhSub-NoClit)
Esse é o editor que, os teus artigos, nunca quis
that is the editor that the your articles never want.PAST.3SG
publicar nessa revista.
publish.INF in.that journa
'That is the editor that never wanted to publish your articles in that journal.'

c. Wh-dative and clitic present (WhDat-Clit)
Esse é o revisor a quem, os teus textos, já **os**
that is the referee to whom the your texts already CL.DAT.3SG
tentei enviar. várias vezes
try.PAST.1SG send.inf several times
'That is the referee who I have already tried to send your texts to several times.'

d. Wh-dative and clitic absent (WhDat-NoClit)
Esse é o revisor a quem, os teus textos, já tentei
that is the referee to whom the your texts already try.PAST.1SG
enviar várias vezes.
send.INF several times
'That is the referee who I have already tried to send your texts to several times.'

3.1.4. Procedures

The same procedures described for the Study 1 were used in this experiment, except for the platform where it was implemented; this time, the Google Forms was used.

3.2. Results

The same statistical approach described for Study 1 was used to analyze the results of this experiment. The data revealed a significant effect for the "Wh-height" factor ($p = 0.006$). In the "Wh-dative" sentences higher median overall values were observed when compared to the "Wh-subject" sentences. The interval for this difference is between 0.084 and 1.100 (CI 95%). This time, however, there was a significant difference between "Clitic" vs. "No-clitic" sentences ($p < 0.001$); the "No-clitic" sentences received significantly higher rates compared to those in which the clitic was present ($p = 0.012$). There were no significant interactions between the "Wh-height" and "Clitic" factors ($\alpha = 0.05$; $p = 0.510$). The results are shown in **Table 4**.

The pattern of responses represented by the means and the medians can be seen in **Figure 3**. Note that for both "Wh-dative" and "Wh-subject" the mean in the "No-Clitic" condition is higher than in the "Clitic" condition.

The overall acceptability rates of the experimental stimuli were low. A higher percentage of responses at the lowest points of the scale (1–3: Wh-dative, 58.6%; Wh-subject, 70%) than in the highest points (5–7: Wh-dative, 26.7%; Wh-subject, 15%) was observed. At the midpoint (4) the response rate was 14.7% for the dative conditions and 15% for the Wh-subject conditions.

Nonetheless, similarly to the previous study, the distribution of the answers at each of the seven points of the scale reveals that at the extreme points, the pattern of responses for both types of sentences is reversed (**Figure 4**, below). At point 1 of the scale (not acceptable), the highest percentage of the total answers is in the "Wh-subject" condition (65.5%) and, inversely, at point 7 of the scale (totally acceptable), the highest percentage is observed in the "Wh-dative" (64.4%) condition.

As in Study 1, we also used a linear mixed model with Gaussian family by using MCMC method (**Table 5**) and the lmer function with the lme4 package (**Table 6**). Again, the results were similar to those observed when using the MCMC with ordinal family (cf. **Table 4**).

Table 4: Study 2 – Generalized linear mixed model fitted by using Markov chain Monte Carlo techniques (Hadfield 2010) with ordinal family.

	Coefficient	Lower bound (CI 95%)	Upper bound (CI 95%)	pMCMC
Wh-height_Dat	0.633	0.084	1.100	0.006**
Clitic_NoClit	−0.302	−0.471	−0.146	<0.001***
Wh-height_Dat:Clitic_NoClit	0.044	−0.209	−0.242	0.510

Response ~ Wh-heigt*Clitic, random = ~Participant + Item, data = Est2, verbose = FALSE, family = "ordinal". Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1.

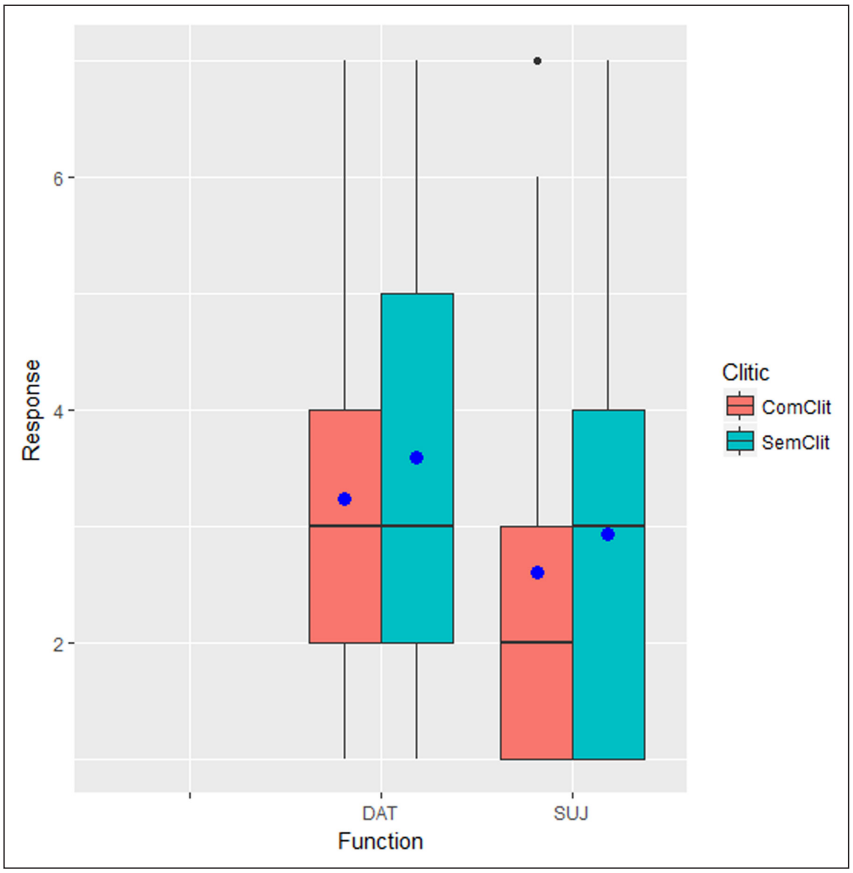

Figure 3: Mean and Median acceptability ratings on a scale from 1 to 7 for Study 2.

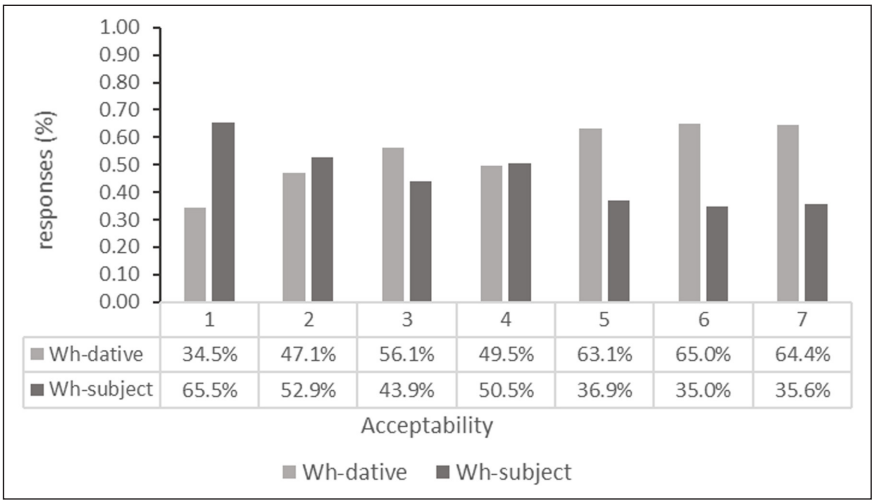

Figure 4: Distribution of acceptability ratings on a 7-point Likert scale in the Study 1 (1 = 'not acceptable'; '7 = totally acceptable').

3.3. Discussion

The results of this study indicate that there is a statistically significant preference for dative relative clauses over subject relative clauses containing an object topic. We consider these findings particularly striking in light of the well-known observation that, in head initial languages quite generally, subject relative clauses are preferred over object relative clauses on a number of different measures (Ford 1983; Frauenfelder, Segui & Mehler 1980).

Table 5: Study 2 – Generalized linear mixed model fitted by using Markov chain Monte Carlo techniques (Hadfield 2010) with Gaussian family.

	Coefficient	Lower bound (CI 95%)	Upper bound (CI 95%)	pMCMC
Wh-height_Dat	0,657	0,096	1,201	0,020*
Clitic_NoClit	−0,331	−0,580	−0,088	0,006**
Wh-height_Dat:Clitic_NoClit	−0,016	−0,354	0,322	0,936

Response ~ Wh-heigt*Clitic, random = ~Participant + Item, data = Est2, verbose = FALSE, family = "gaussian". Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1.

Table 6: Study 2 – Generalized linear mixed model fitted by using lmer function in the lme4 package (with Gaussian family).

	Coefficient	Std.Error	*t*-value	*p*-value
Wh-height_Dat	0,633	0,266	2,385	0,033*
Clitic_NoClit	−0,356	0,129	2,762	0,006**
Wh-height_Dat:Clitic_NoClit	−0,278	0,182	−0,153	0,879

Response ~ Wh-heigt*Clitic, random = ~Participant + Item, data = Est2, verbose = FALSE, family = "gaussian". Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1.

Compared to Study 1, the results of this study show a more marked concentration of the ratings at the lowest points of the scale, suggesting greater consistency among participants in their judgments than that seen in Study 1. Yet another result that is different from the previous study is that the clitic factor is statistically significant, with the presence of the clitic contributing to lower ratings in both conditions.

We start by noting that this preference for embedding a topic within the domain of a wh-dative chain over a wh-subject chain is consistent with the French judgments reported by Rizzi (1997: 306):

(55) French Indirect questions

a. Wh-dative

? Je ne sais pas à qui_i, ton livre, je_k pourrais le_k
I not know.1SG NEG to whom your book I could. 1SG it
donner $[-]_k$ $[-]_i$
give.INF
'I don't know to whom I could give your book.'

b. Wh-subject

*? Je ne sais pas qui_i, ton $livre_k$, $[-]_i$ pourrait l'_k acheter $[-]_k$
I not know.1SG NEG who your book could.3SG it buy.INF
'I don't know who, your book, t could buy it.'

(56) French relative clauses

a. Wh-dative

?Un homme à qui_i, ton $livre_k$, je pourrais le_k donner $[-]_k$ $[-]_i$
a man to whom .your book I could.1SG it give
'A man to whom I could give your book'

b. Wh-subject

*/?Un homm qui_i, ton $livre_k$, $[-]_i$ pourrait l'_k acheter $[-]_k$
a man who your book could.3SG it buy.INF.
'A man who could buy your book.'

Recall that, for Rizzi (1997; 2004) topics do not count as intervenors in a wh-movement chain. This asymmetry between wh-subject and wh-dative chains is rather due to the ECP. The ECP requires that traces be properly head-governed. A trace in complement position is properly head-governed (by the verb), but a trace in subject position normally is not, unless C is turned into a governor by agreeing with the wh-subject. This is why the agreeing form of C (*qui*) must be used in cases of subject extraction in French. Under the assumption that topics are introduced by a Topic head, the representation of an example such as (55b) is as follows (Rizzi 1997: 307):

(57) Je ne sais pas [qui C [ton livre Top … [*t* pourrait …]]]

According to Rizzi, even if C is turned into a governor via agreement, it is too far away to license the subject trace due to the intervening Top head, a standard case of relativized minimality. Therefore, the structure is ruled out as an ECP violation. (55a), by contrast, is a mere subjacency violation.

This ECP-based account predicts that structures comparable to (55b) and (56b) should be fine in a null-subject language such as EP. As is well-known, many null subject languages lack *that*-trace effects, as shown in (56) for EP:

(58) Quem achas que vai faltar à aula?
Who think.2SG that go.3SG miss.INF to.the class
'Who do you think will miss class?'

The grammaticality of examples such as (58) has been attributed to the fact that the null subject languages may avail themselves of a strategy that is unavailable in English or French, namely extraction from post-verbal position, which is head governed by V raised to T (Raposo 1992). In view of this, the ECP-based account predicts that the EP counterparts to (55b) and (56b) should be fine. However, this prediction is not confirmed. Our study shows that structures comparable to (56b) are not judged as acceptable in EP and that the contrast between (56a, b) is replicated in EP. Therefore, the ECP-based account cannot be right.

Additional evidence against an ECP-based account of the contrasts in (55), (56) comes from the observation of French examples with wh-adjuncts and embedded CLLD, such as the following, which are taken from Barbosa & De Cat (2019: 4)

(59) a. Je me demande quand, ton patron, il va nous inviter
I REFL wonder when you boss he will us invite
'I wonder when your boss will invite you.'

b. ???Tu sais quand, le voleur, on l' a surpris [-] ?
you know when the robber one him have surprised
'Do you know when the thief got caught?'

In the acceptability judgement elicitation task carried out by Barbosa & De Cat (2019), native speakers of French judged (59b) worse than (59a). On a scale of 1 to 10, mean acceptance rating for the intervening CLLDed object condition was around 4, whereas mean acceptance rating for the intervening CLLDed subject condition was above 7.5 (Barbosa & De Cat 2019: 8). This difference between subject CLLD and object CLLD is not expected under an ECP based account. Adjunct traces must be properly governed. Therefore, if the Top head is what prevents proper government of the adjunct trace in (59b), (59a) should be just as bad, contrary to fact.

On the other hand, a close look at (59a,b) shows that these examples differ from each other in the way the two dependencies interact. If we assume that the trace of the temporal adjunct occupies a position that is lower than the subject, but higher than the object (Cinque 1999; Laenzlinger 1988), then (59a) involves nesting (60a) and (59b) displays crossing (60b) A-bar dependencies:

(60) a. *quand*$_{\mathbf{i}}$ ton patron$_{k}$ il$_{k}$ va nous inviter [-]$_{i}$

b. *quand*$_{\mathbf{i}}$ le voleur$_{k}$ on l'$_{k}$ a surpris [-]$_{i}$ [-]$_{\mathbf{k}}$

A similar account carries over to the contrasts in (55) and (56). (55a, 56a) display nesting dependencies while (55b, 56b) exhibit crossing dependencies. Thus, in all of the multiple dependency constructions examined the illicit examples involve crossing dependencies while the others involve nesting dependencies. We therefore conclude that a restriction against crossing dependencies is operative in these constructions, with one important qualification. The restriction against crossing only applies to configurations in which the topic appears to the right of the wh-phrase, i.e., not in cases like (61), in which the topic precedes the wh-constituent (this holds independently of the presence of the clitic).

(61) Ao Pedro$_{i}$ [o que]$_{k}$ (lhe$_{i}$) interessa [-]$_{i}$ mais comprar [-]$_{k}$?
to.the Pedro the what (CL.DAT.3SG) interests [-]$_{i}$ more to.buy.INF
'What is it that is in Peter's best interest to buy?'

(61) involves crossing dependencies and yet it is acceptable. Moreover, the constraint also doesn't apply to dependencies established between different topics. In general, there are no ordering restrictions on multiple topics, regardless of whether they are CLLDed (62) or simply topicalized (63).

(62) CLLD

a. Esse livro$_{i}$, ao João$_{k}$, não lho posso dar [-]$_{i}$ [-]$_{\mathbf{k}}$
that book to.the João not CL.DAT.3SG + ACC.3SG can.1SG give.INF
'That book, to John, I can't give it to him.'

b. Ao João$_{k}$ esse livro$_{i}$ não lho posso dar [-]$_{i}$ [-]$_{\mathbf{k}}$
to.the João that book not CL.DAT.3SG + ACC.3SG can.1SG give.INF
'To John, that book, I can't give it to him.'

(63) Topicalization

a. Esse livro$_{i}$, ao João$_{k}$, não posso dar [-]$_{i}$ [-]$_{\mathbf{k}}$
that book to.the João not can.1SG give.INF
'That book, to John, I can't give.'

b. Ao João$_{k}$, esse livro$_{i}$, não posso dar [-]$_{i}$ [-]$_{\mathbf{k}}$
to.the João that book not. can.1SG give.INF
'To John, that book, I can't give.'

This suggests that the constraint in question should be restricted to apply to chains created by wh-movement. The following descriptive generalization adequately captures the patterns observed:

(64) A wh filler-gap dependency may tolerate a topic in its scope iff the full topic-(cl)-gap dependency is contained within the domain of the wh-filler gap dependency.

As argued in Barbosa & De Cat (2019), it is not clear how to derive (64) from any familiar syntactic constraint. On the one hand, the fact that topics are not subject to the no-crossing constraint is consistent with the idea that they are base-generated in place (Anagnostopoulou 1997; De Cat 2007; Dermidache 1992; Raposo 1998).[10]

However, if topics are base-generated in place, one cannot appeal to a constraint on movement, such as Pesetsky's Path Containment Condition or any of its current instantiations, such as the Minimal Link Condition, to rule out the cases that do not fall under (64). Conversely, if we do assume that CLLD involves movement and that (64) is derived from a ban on intersecting movement operations, then (61), (62a) and (63a) are predicted to be ruled out, contrary to fact. In other words, we have no explanation for why the ban on intersecting dependencies applies whenever the wh-constituent precedes the Topic and not when the reverse order obtains. For these reasons, we will explore an account of (64) that doesn't rely on principles of narrow syntax.

A purely syntactic account of the relevant contrasts faces yet one additional challenge. While full DPs are disruptive of wh-chains in crossing configurations, pronouns are not. In other words, CLLDed pronouns appear to be exempt from (64). In the study by Barbosa & De Cat (2019: 21) on French, 1st and 2nd person pronouns are accepted as intervenors even when the clitic they are associated with is not a subject. Thus, examples such as (65) received a very high acceptability score:

(65) Voilà le bateau qui, moi, m'a toujours fait rêver.
here the boat that, me, CL.1SG-has always made dream
'Here is the boat that has always made me dream.'

Structurally, (65) is similar to (56b). In our study on EP, we didn't include pronouns, but a cursory search in Google retrieves a number of examples of subject relative clauses containing a CLLDed pronoun (66a–d):

(66) a. Castigada será a **Turquia** pela **decisão** do líder que a
punished be.FUT.3SG the Turkey for.the decision of.the leader that to
ele lhe sucede
him CL.DAT.3SG succeeds
'Turkey will be punished for the decision of the leader who will succeed him.'[11]

b. … ,mantendo-se, no entanto, as dívidas **que a ele lhe**
keeping-REFL however the debts that to him CL.DAT.3SG
sobrevivem.
survive
'…, keeping, however, the debts that have survived him.'

c. As palavras foram uma surpresa para mim, são palavras bonitas que
the words were a surprise to me, are words nice that
a mim não me fazem diferente
to me not CL.DAT.1SG make different
'The words were a surprise for me, they are nice words that don't make me different (…)'[12]

These examples have precisely the same structure of (54a), which was rejected by our subjects.

[10] Raposo (1998) argues that in EP, the topic is base-generated in place. What moves is a null operator.
[11] Retrieved from www.tcpdf.org Consulted on 26/04/2018.
[12] Retrieved from https://www.ligarunning.pt/noticias/details.php?id=2512054&s=r Consulted on 26/04/2018.

One might speculate that the peculiar behavior of pronouns is due to Clitic Doubling. In effect, in French as well as EP, direct and indirect object strong pronouns are necessarily clitic doubled. However, it is not possible to deny that the pronoun is left-dislocated in these examples, given that it appears in the left-periphery. Configurationally, there are no differences between the structures containing CLLDed pronouns and structures containing non-pronominal CLLDed constituents.

Another possibility would be to attempt to derive the exceptional behavior of pronouns from the fact that they posssess the feature Person, which is not present in full fledged DPs. This approach, however, would only work under a minimality account of the deviance of (54a, b). A minimality account, however, would assign the same status to (54a, b) and (54c, d), contrary to fact. This is why we believe that (64) is not amenable to explanation on the basis of syntax alone.

On the other hand, there is some indication that (64) could be fruitfully investigated as deriving from processing constraints. In fact, two aspects of our data that are problematic for a purely syntactic account — the fact that the restriction against intersecting paths applies to wh-movement chains and not to topic-chains; the fact that CLLDed pronouns are exempt — are better understood when (64) is considered from a processing perspective.

Intuitive judgements of acceptability are known to be affected by processing difficulties (Frazier 1985; Gibson 1998; 2000; Kimball 1973; Miller & Chomsky 1963; Vasishth et al. 2010; Yngve 1960). Multiple center-embedded sentences are one example of structures which are judged unacceptable by virtue of a processing overload effect. Sentences with one level of embedding are judged as being grammatical (67a), while additional levels of embedding are rated ungrammatical and unacceptable (67b).

(67) a. The reporter [who the senator attacked] disliked the editor
(Gibson 2000: 100)

b. # The reporter [who the senator [who John met] attacked] disliked the editor.
(Gibson 2000: 96)

The contrast above shows that processing overload may affect intuitive judgments of acceptability. Processing overload has been attributed to limitations of the computational resources of the language processor. It is now a well-established fact that dependencies of the kind investigated in this paper consume a certain amount of processing resources (Gibson 1998; 2000; Fiebach, Schlesewsky & Friederici 2002; King & Just 1991). In particular, it has been demonstrated that, once a filler is encountered, comprehenders anticipate the location of potential gap sites and attempt to construct dependencies in advance of information about the gap position, a phenomenon that came to be known as *active dependency* formation (Crain & Fodor 1985; Frazier & Clifton 1989).

In addition, several electrophysiological studies have provided evidence of the memory cost of keeping an open dependency. In a study of Event-Related Potentials (ERPs) registered during the processing of subject and object questions, Kluender & Kutas (1993) found that object questions elicited a larger left anterior negativity (LAN) at the filler and gap positions. Similar findings were obtained by Fiebach, Schlesewsky & Friederici (2002). In this study, ERPs were recorded while participants processed case-unambiguous German subject and object wh-questions with either a long or short distance between the wh-filler and its gap. A sustained LAN was observed for object questions with long filler-gap distance but not for short object questions. The authors interpreted the sustained negativity as reflecting working memory processes required for maintaining the displaced object in memory. A second effect that was found was a broadly distributed positivity

elicited for object as opposed to subject wh-questions at the second NP for both short and long object-wh-questions. Parietal positivity, also termed P600, has been observed in response to increased integration difficulty (Kaan et al. 2000), so Fiebach, Schlesewsky & Friederici (2002: 268) interpreted this effect as a reflection of the difficulty of local integration processes associated with the gap position in the sentence.

Building on these results, Felser, Clahsen & Münte (2003) recorded ERPs during the processing of unambiguous German sentences containing different types of filler-gap dependency: topicalization constructions and wh-questions. Both topicalization constructions and wh-questions were found to elicit a LAN prior to the processing of the subcategorizing verb. At the subcategorizing verb, sentences containing a wh-dependency produced a parietal positivity (P600). Topicalization structures did not produce this effect. These results constitute further evidence for the notion of separable parsing processes, with memory-based processes being manifested in terms of LAN, and the relative difficulty of integrating the filler with its subcategorizer manifested as P600. The fact that the size of the observed LAN was not influenced by the type of filler suggests that the working memory cost induced by processing filler-gap dependencies is independent of the type of syntactic dependency involved. Integration cost is influenced by the type of the filler-gap: displaced wh-phrases are more costly than topicalized elements. According to Felser, Clahsen & Münte (2003), integration cost is higher in the wh-movement condition because in addition to semantically integrating the filler with its subcategorizer, an operator variable dependency must be upheld at the same time for the sentence to be assigned the correct interpretation.

These findings are relevant for our purposes, because they constitute evidence that there is a difference in integration cost between topic fillers and wh-fillers. If (64) is related to processing constraints and if the integration costs of topic dependencies are lower than those incurred by displaced wh-phrases, it is no longer surprising that (64) should apply to wh-dependencies and not to topic-(cl)-gap dependencies (note that topics introduce a referent in discourse; wh-operators introduce operator variable dependencies).

The second fact that we considered problematic for a syntactic account of (64) concerns the difference between pronominal and phrasal intervenors. This effect, however, is unsurprising from the point of view of processing. Indeed, a similar asymmetry between pronouns and full DPs has been observed in a variety of phenomena in the literature on language processing. In the case of center-embedded sentences, for example, their intelligibility is increased if the subject of the most embedded relative clause is a pronoun, as in (68a) rather than a full DP, as in (68b) (cf. Bever 1970; Gibson 1998; 2000; Warren & Gibson 2002).

(68) a. # The reporter [who the senator [who John met] attacked] disliked the editor. (Gibson 2000: 100)

b. The reporter [who the senator [who I met] attacked] disliked the editor. (Gibson 2000: 96)

Warren & Gibson (2002) carried out a judgment task evaluating how sentences like (iiib) compared to their counterparts with first and second person pronouns in the most deeply embedded subject position. They found that the latter were rated significantly higher in acceptability than the former. Different accounts of this contrast can be found in the literature on processing complexity, but all of them converge on the idea that pronoun intervenors are less disruptive of structural integration of a non-local dependent than full DPs. Therefore, we take the difference between pronominal and phrasal intervenors as

evidence in favor of the idea that structural integration cost is the key factor affecting wh-chains containing intervening topic fillers.

For these reasons, we believe that deriving (64) from the processing integration cost of wh-fillers is a promising line of approach. Viewed from a processing perspective, generalization (64) amounts to the claim that maintaining an incomplete (topic) dependency while processing a wh filler-gap dependency is costly for the human processor. By contrast, if the topic filler-gap dependency is complete by the time the wh-gap is encountered, performing the integration of the wh-gap is easier.

One result of the present study that would receive a natural explanation on these grounds is the variable effect of the presence of the clitic in the different studies. In the case of Study 1, our results indicate that the factor "clitic" was not statistically significant. However, a close look at **Figure 1** shows that the mean in the dative-Goal context is higher in the "No-Clitic" condition than in the "Clitic" condition. In Study 2, the factor "clitic" was statistically significant. In both cases, the presence of the clitic contributed to lower ratings.

In a series of experiments on the online processing of CLLD constructions in Spanish, Pablos (2006) provides evidence that left-dislocated topic fillers are reactivated at the clitic, before the verb is encountered. Pablos (2006) acknowledges that, even though the topic is reactivated by the clitic in preverbal position, it is stored and maintained as an incomplete dependent until its subcategorizer (or associated gap) is encountered. If this is true, then by reactivating the representation of the topic, the presence of the clitic immediately before the verbal complex has the effect of bringing the topic to the focus of attention. By hypothesis, this increases the interfering effect of the topic on retrieval and integration of the wh-filler, particularly in those contexts in which the gap associated with the topic and the gap associated with wh-phrase are coarguments (the dative Goal cases of Study 1 and the test items of Study 2).

We conclude by observing that we do not claim to have reached an explanatory account of the patterns obtained. We established an empirical generalization and we formulated a hypothesis thus laying out the ground for further research on the online processing of multiple dependency constructions in the left-periphery.

4. Conclusions

In his paper, we have focused on intervention effects created by embedding a complement topic within the domain of wh-movement. We have presented the results of two experimental studies in Portuguese designed to determine the effect of two independent factors: height of the base position associated with the topic relative to the base position of the wh-gap and presence *versus* absence of a resumptive clitic (i.e., topicalization *versus* CLLD). Our results, combined with the results of (Barbosa & De Cat 2019) on French, provided some evidence that the following generalization obtains:

(69) A wh-movement dependency may tolerate a topicalized or CLLDed constituent in its scope iff the full topic-(cl)-gap dependency is contained within the scope of the wh-filler gap dependency.

This generalization suggests that a version of the no crossing constraint (Fodor 1978) holds in these configurations. However, one peculiar aspect of (69) is that the no crossing constraint doesn't hold in configurations in which the topic/CLLDed constituent precedes the wh-filler. Moreover, constructions containing pronouns appear to be exempt from (69). These two properties taken together argue against a purely syntactic account of (69), but are fully compatible with an approach that attempts to derive (69) from processing constraints. Viewed from a parsing perspective, the generalization is equivalent to

the claim that maintaining an active filler in the course of processing a wh-filler gap dependency is costly for the human processor. Our hypothesis is the following: if, at the point of retrieval of a wh-filler, an active topic (i.e., a displaced topic looking to be integrated with its subcategorizer) intervenes between the wh-gap and the wh-filler, the amount of cognitive resources required to retrieve and integrate the wh-filler in the representation raises to a threshold that results in perception of unacceptability. Thus, this paper adds to an approach that acknowledges the role of cognitive constraints on perceptions of acceptability (Kluender & Kutas 1993; Hofmeister & Sag 2010; Miller & Chomsky 1963).

As seems clear, this hypothesis needs to be tested against online measures, so the next step is to study the processing of these constructions in real time.

Additional File

The additional file for this article can be found as follows:

- **Appendix.** Stimuli used in Studies 1 and 2. DOI: https://doi.org/10.5334/jpl.229.s1

Acknowledgements

The first, second and third authors were partially supported by the Centre for the Humanities of the University of Minho. The second author received support from the "Fundação para a Ciência e a Tecnologia" (FCT-CEECIND/04331/2017) for part of this work. The fourth and fifth authors were partially supported by the Research Centre of Mathematics of the University of Minho with the Portuguese Funds from the "Fundação para a Ciência e a Tecnologia" (Project UID/MAT/00013/2013).

Competing Interests

The authors have no competing interests to declare.

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Further Funding

The first, second and third authors were also financed by national funds through FCT-Fundação para a Ciência e a Tecnologia, I.P., under the project UIDB/00305/2020.).

How to cite this article: Barbosa, P., Lourenço-Gomes, M. d. C., Araújo, S., Castro, C., & Athayde, E. (2020). Constraints on multiple dependencies in the left-periphery in European Portuguese. *Journal of Portuguese Linguistics,* 19: 11, pp. 1–33. DOI: https://doi.org/10.5334/jpl.229

Submitted: 22 August 2019 **Accepted:** 30 July 2020 **Published:** 02 November 2020

]u[*Journal of Portuguese Linguistics* is a peer-reviewed open access journal published by Ubiquity Press.

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