An eye-tracking study on the syntax of post-verbal *why* in Brazilian Portuguese

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Rizzi (2001) proposes, in order to explain the different syntactic behavior of *perché* (*why*) in relation to argumental WH-phrases and low WH adverbs, that *perché* in matrix contexts is externally merged in the left periphery (in Spec,IntP). Furthermore, it is well known that embedded WH questions can be ambiguous as to the scope of the wh-element, as the examples in Italian (1) and English (2) show (adapted from SHLONSKY; SOARE, 2011):

(1) Perché hai detto che è partito?   (2) Why did you say that Daniel left?

The sentences (1) and (2) can be interpreted, with the matrix reading, as a question on the reason the interlocutor said something (*pro* (2nd person); and *you*, respectively). In the embedded reading, the question may refer to the reason that the subject of the embedded sentence left (the reference of *pro* and *Daniel,* respectively). According to Rizzi (2001), in the embedded interpretation, *perché/why* involves movement. In order to ensure low scope, the WH is generated in the Spec,IntP of the embedded clause and, successively, goes to Spec,FocP of the matrix clause. These analyses are illustrated in their relevant aspects in (3) and (4), respectively.

(3) [$_{ForceP}$ [$_{IntP}$ **why** … did ... [$_{IP}$ you say [that ... … [$_{IP}$ Daniel left …   [matrix reading]

(4) [$_{ForceP}$ [$_{FocusP}$ **why$_i$** … did ... [$_{IP}$ you say [that... [$_{IntP}$ **t$_i$**… Daniel left … [embedded reading]
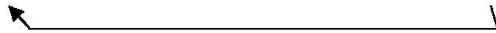
In successive work, Shlonsky and Soare (2011) assume, under the Criterial Freezing Principle, that *why* and its counterparts in some languages are generated in the Spec of ReasonP, a non- criterial projection located lower than IntP. In the matrix reading, *perché/why* moves from Spec,ReasonP to Spec,IntP, as in (5). As for long distance movement, they propose that *perché/why* moves from the embedded Spec,ReasonP to the matrix Spec,WhP, as in (6).

(5) ... IntP > TopP > FocP > WhP > ReasonP ...   (SHLOSNKY; SOARE, 2011, p. 663)
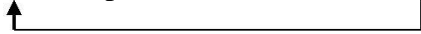
(6) [Force… WhP ... FinP... … [IP$_{matrix}$ … ... [ForceP ... ... [ReasonP ... ... [IP$_{embedded}$

In order to determine the precise position of ReasonP (i.e. the base position of elements such as *perché* and *why*), Shlonsky and Soare make use of data with negation, as illustrated in (7) (adapted from RIZZI, 2001):

(7) a. Why didn't Geraldine fix her bike?   b. *How didn't Geraldine fix her bike?

As we can see in (7a), *why* is not sensitive to negation, in contrast to *how* in (7b). According to Shlonsky and Soare, the agrammaticality of (7b) is due to a violation of Relativized Minimality (RIZZI, 1990) induced by the intervention of the negation, as shown in (8a). Therefore, they conclude that the chain formed in (7a) has its tail above NegP, as shown in (8b).
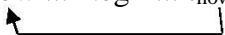
(8) a. how ... NegP ... t$_{how}$ b. why ... t$_{why}$... NegP

Considering the literature on high adverbial WH-questions such as *why* and *perché*, Brazilian Portuguese (BP) presents interesting data: in BP, WH-phrases may usually appear either in the left periphery or in a post-verbal position (cf. MIOTO, 2001):

(9) a. Por que o Paulo viajou?   b. O Paulo viajou   por quê?

   'Why did Paul travel?'   'Why did Paul travel?'

Regarding sentences with *por que* (*why*) in CP, it is observed that they can have both a matrix and embedded reading. Thus, both sentences (11a-b) can be answers to the question in (10).

(10) Por que o Paulo disse que a Maria chegou tarde?
   'Why did Paul say that Maria arrived late?'

(11) a. O Paulo disse que a Maria chegou tarde porque ele é um fofoqueiro.
   'Paul said that Maria arrived late because he is a gossipmonger.'
   b. O Paulo disse que a Maria chegou porque ela perdeu o ônibus.
   'Paul said that Maria arrived late because she missed the bus.'

As in English and Italian, BP *por que* (*why*) in the left periphery has a high external merge position. As shown in (12a), *por que* in the left periphery, is insensitive to negation, which means that the tail of its chain is above NegP, as illustrated in the structure in (13a). In contrast, *como* in (12b) with a manner adverb reading is not possible, as the structure in (13b) reveals. The possibility of structures like (9b) suggests that, in BP, there may be a lower external merge position for *por que*, different from the high ReasonP position proposed by Shlonsky and Soare (2011).

(12) a. Por que o Paulo não viajou? (13) a. Por que ... t_{porque} ... **NegP**
   'Why didn't Paul travel?'   b. *Como o Paulo não viajou?
   b. Como ... **NegP** ... t_{como}
   'How didn't Paul travel?'

The present work aimed to investigate the syntactic derivation of the post-verbal *por que* in BP, considering the enable/reason reading (cf. REINHART, 2003 apud TSAI, 2008). In order to investigate this phenomenon, two eye-tracking experiments were carried out. We compared questions with the post-verbal *por que* involving an embedded sentence and a negation in the matrix sentence with sentences formed by *por que* in the left periphery with the same syntactic pattern. The two experiments have a 2x2 design, where the factors Negation in the matrix sentence (*yes* x *no*) and Reading (*matrix* x *embedded*) were manipulated. The difference between the two experiments is the position of *por que* (*why*), which is in the left periphery or in a final position. Thus, we tested sentences like the following:

Experiment I (*Por que* in post verbal position)

(13) a: A Maria não disse que a corrente do guincho quebrou por quê?
"Didn't Mary say that the winch chain broke why?"
b: Porque ela julgou irrelevante falar.
   "Because she thought it irrelevant to speak."
c: Porque ela oxidou toda.
   "Because it is rusted."
(14) a: A Maria disse que a corrente do guincho quebrou por quê?
"Did Mary say that the winch chain broke why?"
b: Porque ela julgou relevante falar.
   "Because she thought it irrelevant to speak."
c: Porque ela oxidou toda.
   "Because it is rusted."

Experiment II (*Por que* in the left periphery)

(15) a: Por que a Maria não disse que a corrente do guincho quebrou?
"Why didn't Mary say that the winch chain broke?"
b: Porque ela julgou irrelevante falar.
   "Because she thought it irrelevant to speak."
c: Porque ela oxidou toda.
   "Because it is rusted."
(16) a: Por que a Maria disse que a corrente do guincho quebrou?
"Why did Mary say that the winch chain broke?"
b: Porque ela julgou relevante falar.
   "Because she thought it irrelevant to speak."
c: Porque ela oxidou toda.
   "Because it is rusted."

The results of the experiments demonstrate a higher processing cost in the re-reading of the questions in contexts like (13c) and (15c), where there is a negation in the matrix clause and *por que* (in the left periphery or in the post-verbal position) is interpreted in the scope of the embedded clause. This led us to the following conclusion: post-verbal *por que* in BP is, in fact, the same as the one in the left periphery. It is merged in a high position in the clausal structure, above NegP, and is moved to the left periphery. Subsequently, there is a remnant

movement of IP to a Top projection above *por que*, along the lines of Poletto & Pollock (2015).

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