

Syntactic Constraints and Medial Wh-questions in Child Brazilian Portuguese

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The production of long-distance Wh-questions by young children has been extensively investigated in several languages and new discoveries have been found in recent years, as I will discuss below. The relevant aspect is that children sometimes produce these questions in a non-adult way, adding Wh-phrases in medial position, as in the examples below:

- (1) a. What do you think who took the bunny?
b. Who do you think who was really good?

For some researchers, these productions would lend support to the view that there is something innate – independent of experience – driving children’s behavior. Previous studies have taken these productions as evidence for Universal Grammar, as children seem to be producing sentences that are not present in their input, but are possible in other languages of the world.

This paper brings new data on this issue, exploring children’s production of long-distance Wh-question in Brazilian Portuguese. However, our data will show that children’s productions cannot be taken as evidence that they are producing structures that are possible in other languages of the world.

The paper is organized as follows. In section 1, I present the main characteristics of the non-adult-like Wh-questions produced by children in different languages of the world. In section 2, I present some of the main hypotheses that try to account for children’s productions as being generated by their grammars. Section 3 discusses islands effects in long-distance Wh-questions in adult German. Section 4 discusses the experiment conducted with children acquiring Brazilian Portuguese. Section 5 is the conclusion.

1. Long-Distance Wh-questions in Child Languages

Long-distance Wh-questions have been investigated in several child languages: English, Dutch, French, Spanish, Brazilian Portuguese, German,

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among others.¹ In these languages, 3- to 6-year-olds have been shown to produce adult-like long distance WH-questions, as shown below:

- (2) a. What do you think kids eat on Halloween? (R 4;6)
 b. Which animal do you think runs very fast? (L 4;11)

Along with adult-like questions, children have also produced non-adult-like questions, which I will call ‘medial Wh-questions’, such as the ones in (1) above and the examples below:

- (3) a. What do you think where the girl was walking?
 b. Who do you think who kissed the boy?
 c. What do you think what toy they were playing?
 d. Which kid do you think who got him out of the water?

These structures are found not only in English, but also in other child languages. The examples that follow show medial Wh-questions produced in child Spanish, French and Dutch:

(4) Child Spanish (data from Gutiérrez Mangado (2006)):

- a. ¿Dónde crees dónde ha ido el niño?
 where think where has gone the boy
 ‘Where do you think the boy went?’
- b. ¿Tú qué crees qué chicha há comprado la planta?
 you what think what girl has bought the plant
 ‘What girl do you think bought the plant?’

(5) Child French (data from Jakubowicz & Strik (2008)):

- a. Où Lala a dit où le poisson nage?
 where Lala has said where the fish swims
 ‘Where did Lala say that the fish is swimming?’
- b. Qu’est-ce que Billy a dit qui boit de l’eau?
 what is it that Billy has said who drinks water
 ‘Who did Billy say is drinking water?’

¹ In Brazilian Portuguese, see Grolla, Liter & Lidz 2020. In Dutch, see Jakubowicz & Strik 2008; van Kampen 2009. In English, see de Villiers, de Villiers & Roeper 2011, de Villiers, Roeper & Vainikka 1990; Grolla & Lidz 2018; McDaniel, Chiu, Maxfield 1995; Thornton 1990; 1995; among others. In French, see Demirdache & Oiry 2008; Jakubowicz 2004; Jakubowicz & Strik 2008; Oiry 2006; Oiry & Demirdache 2006; Strik 2009. In German, see Lutken 2021. In Spanish, see Gutiérrez Mangado 2006.

(6) Child Dutch (data from van Kampen (2009)):

- a. Op wie denk je op wie Sarah verliefd is?
with who think you with who Sarah in love is?
'With whom do you think Sarah is in love?'
- b. Welk cadeau denk je wat ik geef?
which present think you what I give?
'Which present do you think I will give?'

In all these productions, there is a Wh-element in medial position and another one in the left periphery of the sentence. The respective adult languages children are acquiring do not allow this type of construction.

As the examples illustrate, these medial Wh-questions might have different configurations: they can have a Wh-phrase or a Wh-word in medial position and/or in matrix [Spec, CP], and the Wh-elements appearing in matrix [Spec, CP] and in medial position might be identical or not.

2. Explaining Children's Medial Wh-questions

The majority of accounts put forth to explain these medial Wh-questions have somehow related these constructions to Wh-questions found in adult languages like German, Frisian, Hindi, Hungarian, among others, where two types of Wh-questions (besides the usual long-distance ones found in English) are observed: Wh-copy and partial Wh-movement questions.

In Wh-copy constructions, such as in (7) below, there is a Wh-word in the matrix [Spec, CP] and an identical one in the embedded [Spec, CP]. In partial Wh-movement constructions, such as in (8) below, the Wh-element in the matrix [Spec, CP] is an unmarked Wh-phrase usually used to question over propositions (e.g. *was* in German, *kyaa* in Hindi), while the Wh-element in the embedded [Spec, CP] may be any ordinary Wh-phrase. Possible answers to the question always specify values for the embedded Wh-phrase (data from Frisian taken from Hiemstra 1986 and data from German taken from Klepp 2002):

(7) Wh-copy

- a. Wêr tinkst wêr't se wennet? (Frisian)
where think-you where-Comp she lives
- b. Wo denkst du wo sie wohnt? (German)
where think you where she lives
- 'Where do you think she lives?'

(8) Partial Wh-movement

- a. Wat tinkst wêr't se wennet? (Frisian)
 what think-you where-Comp she lives
- b. Was denkst du wo sie wohnt? (German)
 what think you where she lives
 'Where do you think she lives?'
- c. Was glaubte Miró [welches Bild Picasso t gemalt hatte]? (German)
 what believed M. which picture Picasso t painted had
 'Which picture did Miró think Picasso had painted?'

Given the availability of these constructions in some of the adult languages of the world, it could be hypothesized that children's productions shown in (3)-(6) reflect a stage in their grammars, being grammatically licit (Thornton (1990), McDaniel, Chiu & Maxfield (1995), de Villiers & Roeper (2011)). If this were the case, these medial questions should not be considered performance errors.

Thornton (1990) assumes that the Wh-elements appearing in medial position are located in C^0 and not in intermediate [Spec, CP]. These productions would indicate the child's attempt to fill that position to express agreement. The problem is that they still do not know which lexical items can express agreement in C^0 in English, and end up inserting items such as Wh-words and Wh-phrases in that position. This explanation cannot be easily extended to languages such as Brazilian Portuguese and Spanish, where the complementizer position is always filled by the same lexical element.

McDaniel, Chiu & Maxfield (1995), in turn, propose that the adult grammars that allow medial constructions do not have the [pred] feature of Rizzi (1990), which differentiates the specifier of relative clauses from other [Spec, CPs]. Children would be born with the parameter set in this value and later, if they are acquiring a language like English, they would change to a value that specifies a grammar that includes the [pred] feature. This would be the explanation of these authors for how children stop producing and interpreting such medial questions.

This type of account postulates that medial Wh-questions are a reflection of children's immature grammar, that somehow change over time to the child's target grammar. It faces the problem of explaining the rate of medial question productions usually found in experimental studies. In general, children in these experimental tasks produce both medial Wh-questions and adult-like Wh-questions, with the production of medial questions being around 10% of all long-distance Wh-questions. If they were in a developmental stage where these constructions are generated by their grammar, they should produce only this type of question.

Another problem with this approach is that children's productions do not always resemble what is found in the adult languages displaying Wh-copying or

partial Wh-movement. Previous studies have uncovered constructions that would be illicit in these adult languages.

For example, children produce long-distance Wh-questions with a Wh-phrase in matrix [Spec, CP], something not found in adult languages displaying Wh-copy and partial Wh-movement (examples (9)a and b taken from Thornton (1995), example (9)c is repeated from (6) above):

- (9) a. Which animal do you think what really says 'woof woof'?
 b. Which mouse do you think who the cat chased?
 c. Welk cadeau denk je wat ik geef?
 which present think you what I give?
 'Which present do you think I will give?'

Another aspect that distinguishes children's medial questions from what is found in adult languages is that children accept medial questions in infinitives, which is not possible in Hungarian and German, for example (McDaniel et al 1995). Children also interpret both tensed clauses and infinitives as medial constructions (de Villiers et al 1990).

Finally, children also produce medial questions with a specific Wh-phrase in matrix [Spec, CP] (data from a pilot study in BrP with 4- and 5-year-olds), like 'how' or 'where'. As observed above, in adult languages displaying partial Wh-movement constructions, the Wh-word appearing in the matrix [Spec, CP] is an unmarked Wh-phrase usually used to question over propositions:

- (10) a. Como você acha onde a fada e o fantasma se beijaram? (LS, 5;2)
 how you think where the fairy and the ghost kissed
 'How/where do you think the fairy and the ghost kissed?'
- b. Onde você acha que quem abraçou o pirata? (DG, 4;3)
 where you think that who hugged the pirate
 'Who do you think hugged the pirate?'

These facts indicate that children are not following the rules of the adult languages where Wh-copying and partial Wh-movement are found. If they were obeying their rules or the principles of UG, they should not produce structures that are ungrammatical in these adult languages.

3. Island Contexts

In this paper, I present a new study which tries to deepen our understanding of these medial constructions in child languages. In order to do so, I will explore some of the contexts where partial Wh-movement and Wh-copy constructions are not allowed in German.

Partial Wh-movement and Wh-copy constructions differ from full Wh-movement questions with respect to island effects (Muller (1997), Cheng (2000),

among others). Partial Wh-movement and Wh-copy are more restricted, being sensitive to negative islands, factive islands, subject islands and complex NP constraints.

In what follows, we will focus on negative and factive islands. Observe the German examples below:

(11) Negative Island

- a. Wen glaubst du nicht, dass sie liebt? (Reis (2000))
 whom believe you not, that she loves
 ‘Who don’t you think that she loves?’
- b. *Wen glaubst du nicht, wen sie liebt? (Reis (2000))
 whom believe you not whom she loves
- c. ??Wen glaubst du nicht, dass Hans getroffen hat? (Müller (1997))
 whom think you not that Hans met has
 ‘Who don’t you think that Hans met?’
- d. *Was glaubst du nicht wen (dass) Hans getroffen hat? (Müller (1997))
 wat think you not whom that Hans met has

Example (11)a is a negative long-distance Wh-question: it shows that the question is well-formed if the Wh-word is moved from the object position in the embedded clause to the matrix [Spec, CP] having the overt complementizer ‘dass’ in the embedded C⁰. The question becomes ungrammatical in (11)b, where a copy of the Wh-word is pronounced in the embedded [Spec, CP]. A parallel is drawn in the case of partial Wh-movement, shown in (11)c and (11)d. (11)c is a negative long-distance Wh-question and is more acceptable than (11)d, a partial Wh-movement question with negation.

In the examples below, it is shown that long-distance Wh-questions are possible with factive verbs (as in (12)a and (12)c), but they become ungrammatical in Wh-copy ((12)b) and in partial Wh-movement ((12)d) constructions:

(12) Factive Island

- a. Wen bewies sie, dass Fritz liebt? (Fanselow & Mahajan (2000))
 who proved she that Fritz loves
 ‘Who did she prove that Fritz loves?’
- b. *Wen bewies sie, wen Fritz liebt? (Fanselow & Mahajan (2000))
 Who proved she who Fritz loves

- c. Wen_i weisst du t_i dass sie wirklich liebt? (Müller & Sternefeld (1996))
 who know you that she really loves
 ‘Who do you know that she really loves?’
- d. *Was weisst du wen_i (dass) sie wirklich liebt? (Müller & Sternefeld (1996))
 What know you who that she really loves?

These examples show that Wh-copy and partial Wh-movement are more constrained than full Wh-movement in German. If children’s medial Wh-questions reflect a grammatical stage in their development, they should be constrained in such a way as to not produce structures that violate the negative and factive islands. This is what we explore in the next section.

4. Experimental Study

Given the existence of negative and factive islands in the languages displaying partial Wh-movement and Wh-copy questions, we would like to test the following hypothesis. If children’s medial questions are constrained by the same UG mechanisms that constraints Wh-copy and partial Wh-movement in adult languages (as claimed by McDaniel et al (1995) for example), they will not produce medial questions in factive and in negative contexts.

Subjects. In order to test this hypothesis, we conducted an experiment with children acquiring Brazilian Portuguese. Twenty-one children between 4;3 and 5;11 years of age were tested.

Method. The experiment was an elicited production task (Thornton 1990), where children interacted with a puppet, having to ask him questions about the stories they heard from the experimenter.

Materials. There were three conditions in the experiment:

CONTROL: Long-distance Wh-questions with the verb ‘*achar*’ (think)

NEG: Wh-questions with negation on matrix clause

FACT: Wh-questions with factive verb ‘*saber*’ (know)

There were 4 questions for each condition, totalizing 12 Wh-questions. All of the items of a condition were presented in a block, having the following sequence: 4 questions for the CONTROL condition, followed by the 4 questions for NEG condition, followed by the 4 questions for FACT condition. Each condition followed a specific script and children were instructed to ask questions to a puppet named Lillo about what he thought happened in each story.

For the CONTROL condition, children heard a story about a hugging competition, where different characters hugged other characters. In the end, the experimenter whispered to the child: “We saw that it was the ghost that the fairy hugged, right? But Lillo doesn’t know that! Let’s ask him who he thinks!” The child, then, was expected to ask:

- (13) Quem você acha que a fada abraçou?
 who you think that the fairy hugged
 ‘Who do you think that the fairy hugged?’

Three more questions were elicited in this way. Following the CONTROL condition, the negative condition started. The experimenter told the children a story about some friends that arrived in their home very hungry. They state what they would like to eat and what they would not like to eat; and the ways they would eat something (mashed bananas, but not chopped bananas). One of the characters, Lola, said that she would eat ants, but she would not eat flies. The clown said that he would eat cookies, but he would not eat bananas. Other characters also said what they would like and what they would not like. The experimenter then whispered to the child: “We saw that the clown wouldn’t eat bananas, right? He’d eat cookies, but not bananas. But Lillo doesn’t know that! Let’s ask him what he doesn’t think!” The expected question was:

- (14) O que você não acha que o palhaço vai comer?
 what you not think that the clown will eat
 ‘What don’t you think that the clown will eat?’

Three more questions were elicited for this condition and then the factive condition followed. The experimenter told a story about different vehicles and who drove each of them. After the story, the puppet would say: “you have asked me a lot of questions and I got many of them right. So now I’ll tell you a bunch of stuff that I know! For example, I know that someone drove the motor boat!”. Then, the experimenter whispered to the child: “wow, we know that it was Pocoyo who drove the motor boat, right? I wonder if he really knows that. Let’s ask him who he knows!”, and the expected question was:

- (15) Quem você sabe que dirigiu a lancha?
 who you know that drove the motor-boat
 ‘Who do you know (for a fact) drove the motor boat?’

Results. This method was very effective in eliciting long-distance Wh-questions. Table 1 presents the number of questions produced by condition, separated in 3 categories: adult-like, medial and with the second Wh *in situ*:

Table 1: Production of long-distance Wh-questions by condition (N = 21)

Condition	Adult-like Questions	Medial Questions	Second Wh <i>In situ</i>	Total
CONTROL	66	7	4	77
NEG	70	6	3	79
FACT	61	14	2	77
Total	197	27	9	233

In total, 233 long-distance Wh-questions were produced, and 27 of them were medial Wh-questions. The rate of medial question production is comparable to what has been found in previous studies, revolving around 10% of all Wh-questions. These medial questions were produced by 8 children.

As can be seen in the table, children produced medial Wh-constructions in all 3 conditions, violating the island restrictions discussed above. Leaving aside for the moment the data in the column ‘second Wh *in situ*’, we have that 77 long-distance Wh-questions were produced in the control condition, 66 of them were adult-like and 7 were medial questions. For the negative condition, 76 long-distance Wh-questions were produced, 70 of them were adult-like and 6 were medial questions. Finally, for the factive condition, 75 long-distance Wh-questions were produced, 61 of them were adult-like and 14 had a medial Wh-element.

A Chi-square Test was conducted and it was not statistically significant ($X^2(2, N=21) = 4.96, p = .083$), indicating that the production of medial questions was similar in all 3 conditions.

In the examples below, some of children’s productions are shown:

(16) Children’s medial productions by condition

- a. CTRL: Quem você acha quem abraçou a fada? (4;3)
 who you think who hugged the fairy
 ‘Who do you think hugged the fairy?’
- b. NEG: Quem você não acha quem não gosta de formiga? (5;11)
 who you not think who not like of ants
 ‘Who don’t you think likes ants?’
- c. FACT: Quem você sabe quem andou no barco? (5;8)
 who you know who drove the boat
 ‘Who do you know drove the boat?’

In order to explore children’s productions more deeply, we will present children’s productions by syntactic position. We start with the subject position, which was the position where most of the medial Wh-questions were produced. 18 out of the 27 medial questions were subject questions:

(17) Subject:

- a. Quem você acha quem achou a comidinha?
 who you think who found the food-diminutive
 ‘Who do you think found the little food?’
- b. O que você não acha que quem comeu a banana?
 what you not think that who ate the banana
 ‘Who don’t you think ate the banana?’
- c. O que você sabe quem dirigiu o ônibus?
 what you know who drove the bus
 ‘Who do you know drove the bus?’

Adverb medial questions were also produced: 9 out of the 27 medial questions were adverb questions:

(18) Adverb (onde ‘where’):

- a. Onde você acha que onde o pirata e a Stephany beijou?
 where you think that where the pirate and the Stephany kissed
 ‘Where do you think that the pirate and Stephanie kissed?’
- b. Onde você sabe onde o soldado parou o trenzinho pra irmã dela?
 where you know where the soldier parked the train-little for-the sister of-her
 ‘Where do you know the soldier parked the little train for her sister?’

(19) Adverb (como ‘how’):

- a. Como você acha onde a fada e o fantasma se beijaram?
 how you think where the fairy and the ghost SELF kissed
 ‘Where do you think the fairy and the ghost kissed each other?’
- b. Como você sabe como o Pocoyo andou no barco?
 how you know how the Pocoyo rode in-the boat
 ‘How do you know Pocoyo rode the boat?’

We turn now to the productions shown in table 1 as ‘second Wh *in situ*’. The data shown in (17)-(19) above, for subject and adverb positions, have the second Wh-phrase of the question pronounced in medial position, presumably in the embedded [Spec, CP]. However, all of the object questions have the second Wh-word pronounced *in situ*. Children produced 9 long-distance Wh-questions with the second Wh left *in situ*. They were produced in all 3 conditions, as shown in table 1 and illustrated below:

(20) Object:

- a. CTRL: Quem você acha que a fada abraçou quem?
 who you think that the fairy hugged who
 ‘Who do you think that the fairy hugged?’
- b. NEG: Como você não acha que o de calça azul comeu o quê?
 how you not think that the pants blue ate what
 ‘What don’t you think that the one with blue pants ate?’
- c. FACT: Quem você sabe que o Dr. Barata dirigiu o quê?
 who you know that the dr Potato drove what
 ‘What do you know that dr Potato drove?’

These cases are particularly interesting, if we consider a restriction found in German. Felser (2003) discusses the examples below which illustrate the fact that Wh-copy cannot have the second Wh-phrase *in situ* ((21)a). If the Wh-word is moved to the embedded [Spec, CP], the sentence is acceptable ((21)b):

- (21) a. *Wovon glaubst du dass sie wovon träum?
 of.what believe you that she of.what dreams
- b. Wovon glaubst du, wovon sie träum?
 of.what believe you of.what she dreams
- ‘What do you believe that she dreams of?’

Fanselow & Mahajan (2000) show that the same restriction is found in partial Wh-movement constructions:

- (22) a. *was glaubst du dass Maria wen sah
 what believe you that Mary who saw
- b. was glaubst du wen Maria t sah?
 what believe you who Mary t saw
- ‘Who do you believe that Mary saw?’

Thus, besides producing medial Wh-questions in contexts where they violate island restrictions, children acquiring Brazilian Portuguese also violate this restriction on Wh-*in-situ*.

The data presented in this section shows that 3- to 6-year-old children acquiring Brazilian Portuguese are able to produce long-distance Wh-questions in an adult-like fashion. The data also show that these children produce medial Wh-questions in negative and factive contexts, and these structures might have the second Wh-phrase left *in situ*. All of these cases constitute violations of restrictions found in one of the adult languages where Wh-copy and partial Wh-movement are found.

5. Discussion

The results discussed in the previous section weaken proposals claiming that children's medial questions are constrained by the same syntactic restrictions operating in adult languages, such as German. If they were, children would not produce medial questions in negative and factive islands or leave the second Wh-phrase *in situ*. These productions lead me to conclude that children's non-adult medial questions are not a reflection of UG and are not due to immature grammatical knowledge.

New proposals have emerged which try to explain children's non-adult medial questions as being due to performance factors. Grolla & Lidz (2018) and Liter, Grolla & Lidz (in press) proposed that children's errors are due to their immature executive functions, more specifically, inhibition control. Their analysis adopts Dell's (1986) model of speech production. In his system, the items that get pronounced are the ones with high activation levels. Once a word is pronounced, its activation level decreases to zero. In the case of long-distance dependencies, such as long distance Wh-questions, these authors observe that the Wh-word that is pronounced in the matrix [Spec, CP] cannot have its activation level decreased, as it will be accessed again when it establishes a relation with the verb in the embedded clause. Adults are able to keep the high-activated Wh-word in memory without pronouncing it again, but children, who have lower inhibition control capacity, might not. Grolla & Lidz (2018) and Liter, Grolla & Lidz (in press) have discovered that English-acquiring children who produced medial Wh-questions in their study also have lower inhibition control capacity. The same association was found for children acquiring Brazilian Portuguese (Grolla, Liter & Lidz (2020)).

Lutken, Legendre & Omaki (2020) also resort to a performance account, attributing medial Wh-questions to children's immature sentence production mechanisms coupled with memory limitations. They propose that in long-distance filler-gap dependencies there is reactivation of the Wh-phrase at the embedded clause boundary. Adults can reactivate the Wh-phrase covertly, but children might not be able to do so and end up producing the Wh-phrase overtly to strengthen their memory representation of the filler-gap dependency. They have found that the children who produced medial Wh-questions in their elicited-production study did not interpret questions with a Wh-word in intermediate [Spec, CP] as medial questions.

These studies are enriching our knowledge of the phenomenon, bringing new facts to light and proposing new ways to explain these productions. Most importantly, they clearly indicate that children's difficulties are not related to their grammars, but are most probably due to their immature performance systems.

The data presented in this paper brings new corroborating evidence, from a different linguistic population (and an understudied language), to this type of account.

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