

## **The prosody of Elliptical Constructions in Brazilian Portuguese: an Experimental study**

*Lilian Teixeira de Sousa<sup>a</sup>*

### ABSTRACT

Ellipsis phenomena are studied according to two conflicting hypotheses: the semantic approach, which claims that the identification of the ellipsis-antecedent is semantic; and the syntactic approach, which argues in favor of a structural identification between ellipsis and its antecedent. Alternative analyses have argued that there are different types of ellipsis, some of them licensed by information structure, especially topic and focus. In this paper, in order to test the hypotheses presented above, I realized a prosodic study of elliptical sentences produced by 12 female native speakers of BP between 20 and 35 years old. The test consisted of five sentences to be completed by the participants plus 28 images containing two scenes; in each scene there was at least one different item (action, complement or subject). The results showed an interesting pattern. In the case of ellipsis, the given information was generally deaccentuated, while the contrasted information (action, complement or subject) were marked intonationally by High (H) or Low-High (LH) contour. If we take into account that contrasted items are moved to the left periphery, leaving a trace in their original position, then we can deduce that in all these cases there are deaccentuated syntactic structures.

KEYWORDS: ellipsis; intonation; information structure

### RESUMO

Os fenômenos de elipse são estudados a partir de duas hipóteses conflitantes: A hipótese semântica, que defende que a identificação elipse-antecedente é de natureza semântica, não sendo necessário propor a existência de estrutura sintática; e a hipótese sintática, que argumenta a favor da existência de identificação estrutural entre a elipse e o antecedente. Teorias alternativas têm relacionado condições de licenciamento de elipse a questões de estrutura informacional, especialmente considerando os conceitos de foco e tópico. Neste artigo, como forma de testar as hipóteses acima, realizou-se um estudo prosódico de sentenças elípticas produzidas por 12 falantes do PB do sexo feminino e com idade entre 20 e 35 anos. O teste consistiu de cinco sentenças para serem completadas pelos participantes e 28 imagens contendo duas cenas; em cada cena havia pelo menos um item diferente (ação, objeto ou sujeito). Os resultados mostraram um padrão interessante. No caso de elipse, a informação dada foi geralmente desacentuada, enquanto a informação contrastada (ação, objeto ou sujeito) foi entoacionalmente marcada por contorno alto (H) ou baixo-alto (LH). Se considerarmos que itens contrastivos são movidos para a periferia à esquerda, deixando um traço na posição original, então, pode-se deduzir que nesses casos há estrutura sintática desacentuada.

PALAVRAS-CHAVE: elipse; entonação; estrutura informacional

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<sup>a</sup> Universidade Federal da Bahia, [liliantsousa@gmail.com](mailto:liliantsousa@gmail.com)

## Introduction

Ellipsis phenomena, or the omission of some element of a sentence recoverable in context, are usually understood according to one of two conflicting hypotheses: the semantic hypothesis, which argues that ellipsis-antecedent identification is semantic in nature (HARDT, 1993, HARDT & ROMERO, 2004, LOBECK, 1995); and the syntactic hypothesis, which argues for the existence of structural identification between the ellipsis and the antecedent (TANCREDI, 1992, CHOMSKY; LASNIK, 1993). Both approaches present consistent arguments, but which do not always cover all the cases analyzed, which has led to the emergence of alternative theories relating ellipsis licensing conditions to questions of informational structure, especially considering the concepts of focus and topic (WINKLER, 2005, KEHLER, 2000). One way or another, both approaches recognize issues of an informational nature as fundamental to the licensing of some types of ellipsis. Brazilian Portuguese (BP), on the other hand, presents interesting specificities with regards to the prosodic and structural creation of focus, which can be an important object of analysis of elliptical structures, leading in turn to a greater understanding of the syntactic or semantic nature of the ellipsis. Thus, the study described in this article has the objective of verifying the existence of a syntactic structure or pro-forms in ellipsis-containing constructions in BP. To this end, I carried out experiments involving intonational aspects of these structures in recordings made with 12 speakers, female<sup>1</sup>, aged between 18 and 35 years, all from the metropolitan region of Belo Horizonte in the state of Minas Gerais.

This article is organized as follows: in section 1, Ellipsis and Grammar Theory, I present the main theoretical studies of the phenomenon of the ellipsis. In section 2, I describe the research methodology. In section 3, the results obtained are described. Finally, the final remarks are presented in section 4.

### 1. Ellipsis and Grammar Theory

The study of interfaces between the subcomponents of grammar has recently occupied an important place among generative studies, whether in the syntax-semantics, syntax-phonology or phonology-language processing interfaces, or in intonation-discourse structure, among others. The main question guiding such work is in understanding the grammatical mechanisms involved in the derivation of phenomena that relate to these

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<sup>1</sup> I recorded only female speakers because their F0 pattern are more regular than male speakers.

subcomponents and in the way these subcomponents relate to one another. Accordingly, ellipsis phenomena appear as a broad field of analysis, since the licensing of the ellipsis may result from various subcomponents of grammar, depending on the theoretical model adopted.

The phenomenon of the ellipsis involves restrictions and licensing conditions, such as the need for identifying the ellipsis with its antecedent. The nature of this identification, however, has been marked by disagreement over which component is directly involved. Semantic analyses argue that ellipsis-antecedent identification is of a strictly semantic nature, whereas the more syntactically-oriented analyses argue in favor of a structural identification condition for the licensing of the ellipsis.

The lack of consensus in this matter stems mainly from the lack of uniformity in the restrictions on the occurrence of ellipses. The approach of structural identification, for example, is based on the impossibility of the ellipsis when no formal identification is made between the preceding frame and the elided structure:

- (1) \*The incident was reported by the driver, and the pedestrian did too [report the incident] Ex. (6) Kertz (2010)

To Sag (1976), the fact that the ellipsis is precluded in contexts where the voice of the antecedent sentence does not match that of the sentence with the ellipsis is evidence for the need for structural identification, as shown in example (1) above. However, even when there is no symmetry in voice between the antecedent frame and the frame of the ellipsis, in some cases, the ellipsis is possible:

- (2) This problem was to have been looked into, but obviously nobody did  
Ex. (24) Kehler (2000)

Examples like the one shown above are often used by supporters of the semantic hypothesis against the need for structural identification in ellipsis licensing. In an attempt to solve this impasse, semanticists such as Kehler (2000) attribute the restriction of the ellipsis to discourse coherence. For Kehler, inferential processes of coherence are sensitive to syntactic structure. Syntacticists, on the other hand, often come to a gradual acceptance of certain contexts of ellipsis. Either way, the impasse remains.

The main consequence of the choice of either approach is the understanding of how these structures are generated and which grammar components are relevant; while the syntactic approach raises the Phonological Reduction Hypothesis (TANCREDI 1992, CHOMSKY; LASNIK 1993, LASNIK 1999), the semantic approach argues for the existence of pro-forms (HARDT 1993, HARDT; ROMERO 2004, LOBECK 1995). For those who advocates the first proposal, elliptical sentences are formed by PF (Phonological Form) component rules, which phonologically delete the redundant information. As for the second proposal, it assumes that there are pro-forms to be derived essentially as empty pronouns generated at the base, there being, therefore, no internal syntactic structure. Both approaches have important consequences for grammar theory, because if there is a grammatical structure in the context of an ellipsis, one must assume that there are unuttered phrases and cores; otherwise, the syntax comes down to what is heard.

A central argument in the distinction between the two approaches is the possibility of extraction to outside the field of the ellipsis. If extraction is possible, it is believed that there is sufficient syntactic structure to host the feature; on the other hand, if extraction is impossible, the hypothesis is that it lacks syntactic structure, that is, that a pro-form is present.

Among the studies taking the syntactic approach, I highlight the work of Tancredi (1992) and Merchant (2001, 2008). For Tancredi, the ellipsis comprises an interface phenomenon involving PF and LF (Logical Form); the claim is that the elided element is not really deleted, but rather not pronounced, that is, it is suppressed in PF. Merchant (2001), analyzing cases of sluicing (IP ellipsis), suggests that the licensing of the ellipsis is given by checking an E constituent in a head to head relationship, causing the deletion in PF. This E constituent, in the author's claim, is related to the Focus Condition, in which an IP can be deleted if it is given (*e-given*). In the author's definition:

- (3) An expression *X* is *e-given* iff *X* has a salient antecedent *A* and, modulo existential type-shifting,
- a. *A* entails  $E\text{-clo}(X)$ , and
  - b. *X* entails  $E\text{-clo}(A)$

Thus, in Merchant's hypothesis, IP (Inflectional Phrase) or VP (Verbal Phrase) ellipsis ensures that an IP or VP can only be deleted if it is given. In later works, Merchant (2008) deals with issues of structural identification and argues that no parallelism between the antecedent and the target is allowed to depend on the level at which the deletion occurs; if the deletion targets a node below VoiceP, VP is not marked for VoiceP and the parallelism is not allowed.

Recent studies have associated the non-uniformity of the identification data between the antecedent and the elided structure with restrictions of information structure such as, for example, a requirement of topic/comment parallelism.

One way or another, both the syntactic and the semantic approaches associate ellipsis with informational structure. One group assumes that anaphoric rules take place in the semantic/pragmatic component and interacts directly with PF without reference to syntax. The other group assumes that the rules for movement of topic and focus, as well as anaphoric interpretation, anaphoric deaccentuation and particularly conditions of accessibility and identity over the ellipsis, occur in the informational structure-syntax interface, with the immediate effect of silence in PF. However, a third hypothesis, supported by Winkler (2005), integrates these two positions. According to the author, the ellipsis is an interface phenomenon that results from complex interactions between core grammatical components and the component of information structure. The idea is that the result of interpretation is marked in the form of traces on the respective phase, which is sent to the PF. PF derives phonological structures, phase by phase. Thus, in the case of ellipses, PF derives silence instead of phonological structures.

Kertz (2010) also associates ellipses to information structure. For the author, both syntactic and semantic models of the ellipsis reveal that it is characterized by different focus structures. In data involving non-parallelism in terms of voice, for example, she notes that the target subject is in focus and is interpreted contrastively with the passive agent of the preceding sentence.

(4) The driver reported the incident, and AN ONLOOKER<sub>loc</sub> did too

(5) #The incident was reported by the driver, and AN ONLOOKER<sub>loc</sub> did too

Exs. (57) e (58) Kertz (2010)

According to the author, the stress on *an onlooker* suggests the occurrence of focus and leads to the interpretation of contrast with *the driver*. In other cases of

unacceptability in structures lacking parallelism, the focus falls on the auxiliary verb, evoking contrast of tense, aspect, mood, polarity, or a combination of both, which is evidenced by the occurrence of a more prominent pitch accent over this item. Thus, the author argues that the (lack of) parallelism between the elided structure and the antecedent structure is actually related to the focus structure and not just the syntactic structure or discursive coherence.

Kertz's (2010) analysis approaches, in a way, the work of Tancredi (1992) and Rooth (1993), by linking the licensing of the ellipsis to focus. For these authors, the ellipsis phenomenon is related to the syntax-phonology interface with a deaccentuation effect, as observed in studies on the effects of focus on prosody, in which pitch accents occur on the item in focus with the deaccentuation of the remaining propositional content. In Kertz's hypothesis, however, the reduction in acceptability in cases of non-syntactic parallelism is not related to the syntax *per se*, but rather the lack of topic/comment parallelism in a contrastive topic structure.

Although many types of ellipsis exist, sluicing (cf. (6)) and VP ellipsis (cf. (7)), for their similarity with regard to questions of discourse, are the most often dealt with types when it comes to analysis which aims at verifying the semantic or syntactic approach.

(6) John can play something, but I don't know what

(7) John can play the guitar and Mary can, too

In the two above examples, there is the need for some equivalent antecedent to be the object of some kind of parallelism. In the hybrid approach, however, the distinction between the different types of ellipsis plays a major role. According to Winkler (2005), for example, VP ellipsis is the result of passing through the first derivational cycle, as per Chomsky (2005), while stripping (8) and gapping (9) are the result of passing through two derivational cycles.

(8) John can play the guitar, {and Mary, too/and Mary as well/but not Mary}  
John can play the guitar better than Mary

(9) John can play the guitar, and Mary the violin  
John can play the guitar better than Mary the violin

This division into two classes of ellipsis is related to two different concepts of focus: informational and contrastive focus, with the occurrence of various computational processes in the grammar.

In Winkler's model (2005), the syntactic theory of information structure is crucial in the surface derivation of semantic interpretations, i.e., the information structure is considered a central subcomponent of LF, separating structures which do not require shifting from those requiring movement operations; only the latter would have an effect on the superficial semantic interpretation. Thus, syntax and information structure form the core component of grammar, working in parallel with the other components. The two cycles discussed comprise the derivation process in phases, in which cycle 1 operates automatically on the lowest stage sent to LF and which allocates the informational focus *in situ*, while cycle 2 checks the phase for displaced material.

With regard to the PF interface, the silence in the location of the ellipsis, in this model, is the result of a cost-effective division of labor between the phonological, semantic and pragmatic components for discourse-bound ellipsis (DBE), and between the syntactic and semantic components for the derivation of the sentence-bound ellipsis (SBE). The sentence-bound ellipsis is one that does not involve contrast--the focused element remains *in situ*; the discourse-bound ellipsis, on the other hand, is one that involves contrast, the focused element being elevated to a position higher up in the structure, Spec-FocP. The presence or absence of contrastive interpretation is crucial to distinguish between the two types of ellipsis. If the element must be moved to a higher position in which it checks its feature [+contrastive], it must leave traces in intermediate positions. This leads us to believe that, in this case, there is a syntactic structure sufficient to encompass those traces.

Brazilian Portuguese seems to provide interesting data regarding the role of the information structure in ellipsis licensing. Note the data set below:

- (10) a. \*O acidente deveria ter sido reportado pelo motorista, mas ele não  
           the accident should have been reported by-the driver, but did not  
           [reportou o acidente]  
           [reported the acidente]
- b. O acidente deveria ter sido reportado pelo motorista, mas ele não  
           the accident should have been reported by-the driver, but he not

reportou

reported

‘The accident should have been reported by the driver, but he did not report’

In the above data, the negative item in the second sentence makes up the new information. Thus, the *não*, despite being the only new information, cannot occur without the presence of the verb, as can be observed in the data (10a-b). However, if the "subject-denial" set is interpreted as contrastive information, the *não* (*not*) can occur in isolation, as shown in the example below:

- (11) Dois pedestres foram feridos no acidente, mas o motorista não [foi ferido]  
 two pedestrians were injured in-the accident, but the driver not (was injured)  
 ‘Two pedestrians were injured in the accident, but the driver not [get hurt]’

Intuitively, the distinction between sentences (10) and (11) is in the contrastive interpretation observed in (11) but not in (10). In Teixeira de Sousa (2012), analyzing the negative structures [Neg VP], [Neg VP Neg] and [VP Neg], I argued that there are in BP three different lexical items with the same morphological form: 1) *não*<sub>1</sub>, a sentential negation marker which always occurs in the pre-verbal position and which can be reduced to *num*; 2) *não*<sub>2</sub>, present in the final position in the sentence in [Neg VP Neg] structures, which acts as a variable over time indicating the negation of a proposition; and 3) *não*<sub>3</sub> [VP Neg] structures, which functions as an external negation, analyzed in contrastive focus. In the analysis, *não*<sub>1</sub> in both [Neg VP] and [Neg VP Neg] structures has characteristics of a clitic, requiring a verb as host, while *não*<sub>3</sub>, of contrastive focus, would be phonologically independent. According to this hypothesis, it may be said that while in (10) the structure is not contrastive and the negative element is the semantic negation *não*<sub>1</sub>, in (11) we have the presence of the contrastive item *não*<sub>3</sub>. This explanation is also supported in the work of Namiutti (2008). According to the author, in elliptical constructions such as in (10), the *não* cannot be reduced to *num*, and the presence of a tonal accent is essential:

- (12) a. \* Dois pedestres foram feridos no acidente, mas o motorista *num*  
 two pedestrians were injured in-the accident, but the driver not
- b. Dois pedestres foram feridos no acidente, mas o motorista *não*  
 two pedestrians were injured in-the accident, but the driver not  
 ‘Two pedestrians were injured in the accident, but the driver not’

If this interpretation of the data in (10) and (11) is correct, the distinction of acceptability in the two cases may indicate either that we have two different structures, which serves as evidence for the interpretation that there is structure in elliptical sentences; or that there is structure in one case but not the other, as in the hybrid approach.

Another interesting question concerns the derivation of these structures. In Teixeira de Sousa (2012), considering the phase hypothesis (CHOMSKY 2005, 2008), I argued different negative items have scope over different elements of the structure, or rather, they are derived at different stages. The *não<sub>1</sub>* would have scope over the *vP* phase, *não<sub>2</sub>* over the TP in the CP phase, and *não<sub>3</sub>* over the item moved to the periphery to the left of the CP phase. The distinction between the structures in the phase hypothesis is still in accordance with the work of Winkler (2005). The author derives the ellipsis from a grammatical system in which syntactic derivation and interpretation occur in parallel. In this model, different types of ellipsis are derived by differing processes involving two cycles: the semantic and pragmatic components interact with the functional cycle, becoming essential for the derivation of discourse-bound ellipsis (DBE), while the syntactic-semantic interface is relevant to the sentence-bound ellipsis (SBE). This proposal deals with two different types of focus, the contrastive and the informational, with different operational processes in the grammar. The location of the informational focus would be in cycle 1, according to the *in-situ* hypothesis, while the location of the contrastive focus is in cycle 2, as explained by the dislocation hypothesis. In this sense, while the informational structural function of the SBE is to isolate the contrastive focus (narrow), the informational structural function of the DBE is to mark the elliptical material as anaphoric or given. Thus, when there is displacement, the constituent that is moved is interpreted as a focus/contrastive topic, and the location of the ellipsis needs syntactic representation; when there is no motion involved, as in the cases of VP ellipsis and VP-anaphora, the construction is explained by the pro forma feature.

Another important point about BP with respect to ellipsis is explored by Namiutti (2008). The author, taking up the work of Cyrino (1997) on the evidence for a syntax-prosody relationship in the regularity of accentuation proposed by João de Barros<sup>2</sup>, who wrote the first grammar of the Portuguese language, argues in favor of the hypothesis of obligatory accentuation in elliptical constructions in BP. For this, as in cases (13) and (14), in addition to the presence of the *não* and the article for licensing the ellipsis, the pitch accent is also essential.

- c. O João agrediu o Pedro, mas o Paulo **não**  
 the João assaulted the Pedro, but the Paulo not  
 ‘João assaulted Pedro, but **not** Paulo’
- d. Esses são **ôs** que peço  
 these are those that ask-1P  
 ‘These are **those** I ask for’ (NP elided *os cadernos (the notebooks)*)  
 Ex. (39) and (41) Namiuti (2008)

To Namiuti, both the negation and the determiner cannot be prosodically deficient in cases of ellipsis, because these carry the accent of the phonological phrase. Such behavior would be opposite to that observed in non-elliptical constructions, in which the negative item and the determiner cannot carry tonal accent, as in sentences like “O Pedro *não* comeu.” (“Pedro *did not* eat”) and “A Ana comeu *a maçã*” (“Ana ate *the apple*”), since the lexical head of the phonological phrases *did not eat* and *the apple* are, respectively, the verb ‘eat’ and the NP ‘apple’. Although Namiuti has not performed any experimental study to test her hypothesis, her intuition, if proven, would demonstrate the role of PF in the licensing of the ellipsis in BP.

In the next section, I move on to the research methodology and, following that, the analysis of the results of corpus data.

<sup>2</sup> “Diálogo da Viciosa Vergonha” (DVV), “Diálogo em Louvor da Nossa Linguagem” (DLNL) e “Gramática da Língua Portuguesa” (GLP).

## 2. Methodology

I propose the survey and analysis of various types of ellipsis in BP in an attempt to verify the role of information structure in the licensing process. With this, I seek to answer the following questions:

- i. Is there prosodic evidence in favor of the deletion and/or pro-form hypothesis?
- ii. Is there a relationship between the informational role of the elements that make up the ellipsis and the acceptability restrictions?
- iii. If there is an influence of the informational structure on the restriction of certain cases of ellipsis, what is the role of this component?
- iv. What is the role of the PF component in the licensing of ellipsis?

Considering the above questions, I undertook to conduct a study of cases of ellipsis in BP, analyzing experimental data. The guiding hypothesis was that different ellipsis licensing conditions are related to the presence of syntactic structure or pro-forms, as advocated by the hybrid proposal. In order to test this hypothesis, since the information structure tends to be supermarked in the intonation production of sentences, I chose to perform acoustic analysis of elliptical sentences, trying to find different patterns of prosodic realization.

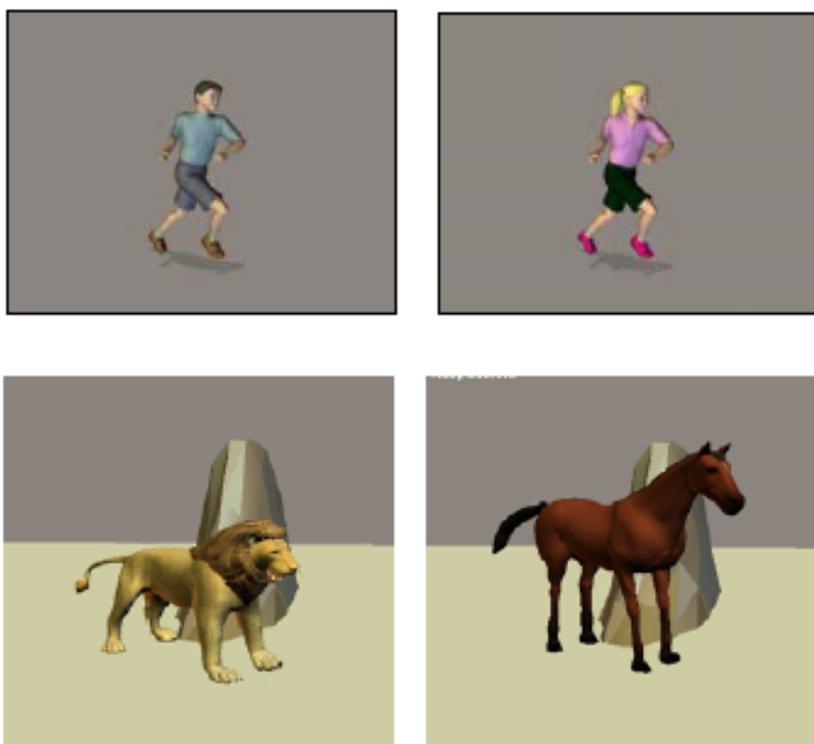
### 2.1. The Sample: Description

The data that comprise the corpus used in this study consist of recordings collected through controlled tests conducted with 12 female respondents aged between 18 and 35, all natives of the metropolitan region of Belo Horizonte/MG.

The recordings were made in a soundproof booth located in the Language Faculty of the Federal University of Minas Gerais (FALE/UFMG). The equipment and tools used for this task were an MXL model 8900 unidirectional microphone and the recording software Audacity 1.3 beta. The speakers remained seated during the recording, with microphones fixed near their mouths. Data were recorded directly into the computer through the program Audacity 1.3 beta and analyzed with the software *Praat* (Boersma, Weenink, 2010 version 5.2.11).

## 2.2. Methods and Procedures

The first stage consisted in gathering sentences that were complete and/or contained elided elements. Since my goal was to investigate the relationship between information structure and the occurrence of ellipsis, I turned to the Information Structure Reference Manual, produced by researchers at the University of Potsdam in Germany. I took from this manual some images specially created by researchers at the aforementioned university for studies involving information structure. The images, for the most part, were selected to make up a frame with two scenes, and between the first and second scene there was always a change; if, for example, in the first scene a girl was sitting, in the second there might be a boy in the same position (contrast of the subject). In some pictures, however, there was only one scene with two or more characters performing the same action with different objects; for example, there might be a scene in which a woman eats an apple and then a man eats a banana (contrast of the object). These images served to produce a situation in which it was possible to clearly distinguish between given and new elements and the relationship of contrast between one scene and another. See some of the images used:





The experiment devised for this study was structured as follows: initially, 28 images were selected from those collected in the reference manual and were laid out in a PowerPoint file, one at a time. Of these, six were not specifically related to information structure, but rather passivity versus agency, and were chosen to serve as distractions. The remaining 22 images were used in two situations in the experiment. Initially, I showed the images to the respondents, one at a time, and I asked the respondents to describe them; then, the respondents answered questions. With this process, I expected that the participants would use more complete sentences in the first case and more sentences with ellipses in the second. The informants acted as expected most of the time and produced more complete sentences in the first case and more sentences with ellipses in the second. With this, I was able to collect, for each image, either complete sentences or sentences with ellipses produced by the same speaker, which allowed us to perform a comparative analysis. In addition to the images, I selected phrases, complete and containing ellipses, to be read by the informants. The goal was to collect some VP ellipsis data, given that, in a pilot study, I found that the structure of the experiment, in using contrast elements, would lead to the production of a greater number of IP ellipses.

At the end of the experiment, I analyzed a total of 696 sentences, 372 complete and 324 with VP and IP ellipses.

Considering what the theory predicts with regards to information structure and movement of constituents in general and, in particular, in BP, I defined as IP ellipsis every sentence that did not present any verbal structure in the elliptical construction, and as VP ellipsis those in which only the lexical verb was not pronounced. Thus, even those sentences in which the object of the sentence appeared were considered IP

ellipses, due to the function of contrastive focus observed in the context, given that items marked by the feature [+contrast] are moved to a higher position in the syntactic structure, namely Spec-FocP. For example, we drew from the data the examples below for each of these two types of ellipsis:

- Stripping*
- Na primeira imagem, a menina está correndo e, na segunda, o menino.  
in-the first picture the girl is running and in-the second the boy  
'In the first picture, the girl is running, and, in the second, the boy.'
  - O João é simpático com todas as pessoas e a Maria também.  
the João is friendly with all the people and the Maria too  
'João is friendly with everyone and Maria too.'
- Gapping*
- A Ana tinha comido uma maçã e o Pedro uma banana.  
the Ana had eaten an apple and the Pedro a banana  
'Ana had eaten an apple and Pedro a banana.'
- VP ellipsis
- Ontem ele não tinha lido o artigo, mas hoje já tinha.  
yesterday he not had read the article but today already had  
'Yesterday he had not read the article, but today he had.'
  - O carro foi atribuído à Maria, mas os outros prêmios não foram.  
the car was awarded to Maria but the other prizes not were  
'The car was awarded to Maria, but the other prizes were not.'

In all recordings, the sentences were segmented into V-V units, from the start of a vowel to the beginning of the immediate following vowel. This choice was motivated by the observation of many scholars (DOGIL; BRAUN 1988, WONG; SCHREINER 2003, among others) of the relevance of CV transition both for the production and for the perception of speech. Also according to Barbosa (2006), all articulating and acoustic events that are candidate points of anchoring are located in the vicinity of the acoustic *onset* of a vowel.

### 2.3. Acoustic analysis

In prosody studies, it is common to assert that certain speech events such as focused constituents may find acoustic correlates, either through the establishment of breaks to separate statements, or through the production of emphasis on some constituent to highlight it, etc. Considering our hypothesis that there are differences in prosodic realization of elliptical structures in BP representing informational focus or contrastive focus, I went on to investigate the intonational characteristics of these structures. To this end, I conducted an experiment with the objective of describing the intonational characteristics of elliptical structures and relating them to the information structure.

In prosodic phonology (Cf. SELKIRK, 1984, 1995, NESPOR, VOGEL 1986), the prosodic structure underlying a sentence is hierarchically organized, the phonological segments are grouped into syllables ( $\sigma$ ), syllables into feet ( $\Sigma$ ), feet into prosodic words ( $\omega$ ), prosodic words into phonological phrases (P), phonological phrases into intonational phrases (I), and those last into utterances (U).

The units of prosodic hierarchy are defined based on mapping rules of syntactic XPs for the prosodic structure. In languages, per Selkirk (1984), phonological phrases are prosodic entities that are derived from syntactic XPs. Many prosodic domains are derived from syntactic XPs and are classified as phonological phrases (P). Selkirk (1984) establishes, then, the XP mapping Condition for P:

*XP-to-P Mapping Condition*

Mapping constraints relate XPs to phonological phrases, but do not relate XPs to other prosodic entities.

The theory of Selkirk (1995) on syntax-prosody mapping holds that the syntax determines the location of prosodic boundaries, which means that each head of a phonological phrase carries a pitch accent, while the information structure affects the location of the pitch accent. In the case of focus, for example, the element on which it falls carries a pitch accent, which consequently leads to the formation of a prosodic phrase with focus element as its head.

Féry & Ishihara (2010), on the other hand, propose a syntax and prosody interaction representation model that distinguishes phenomena such as prosodic phrasing mapped from syntax and the effects of information structure on prosody as

changes in the f0 register. So while in a sentence of broad focus (when the whole sentence is new information) prosodic boundaries are established according to the syntax; in the case of information structure (focus-given, for example), there would be no modification of borders, but rather a change in pitch record. So for Féry & Ishihara (2010), focus and givenness affect the F0 scale in certain prosodic domains, but do not directly affect the prosodic phrasing. The authors assume, as Truckenbrodt (1995) does, that focus is realized by prosodic prominence:

*Focus Prominence*

Focus is realized by prominence in the focal area.

The prosodic domain of the focus as expressed in (2) corresponds to its semantic scope, meaning that it is in its domain that the focus is interpreted and receives prosodic prominence. Thus, the domain contains the focused element and identifies the relevant presupposed information for the semantic interpretation of focus. It is a formal feature F that marks the focus and determines its scope. Thus, we see that the notion of givenness is also important for Féry & Ishihara's approach, which adopts the Schwarzschild (1999) hypothesis on the free allocation of F-marking. The authors present two restrictions, one stating that given information is un-F-marked, and another restricting to a minimum the number of F-markings:

- a. GIVEN: A constituent that is not F-marked is given.
- b. AvoidF: Do not F-mark.

Complementing the work of Schwarzschild, Féry & Ishihara hold that given elements are G(iven)-marked. This distinction is necessary because, according to Féry & Samek-Lodovici (2006), given constituents, when not focused, are deaccentuated:

*Deaccentuate-Given*

A given phrase is not prosodically prominent.

In Féry & Ishihara's hypothesis, then, information structure does not manipulate the boundaries of prosodic phrases, but does change the pitch registers, expanding or narrowing them. The effect of pitch accent manipulation is, according to the authors, the increase or reduction of height compared to the unmarked situation, considering its

status of focus or givenness. In the case of focus, the trend is to increase the topline, since the identification of a constituent as given causes the lowering of the topline of a given domain. The difference of this approach with respect to the others is that the relationship between the different parts of the sentence is modified, so the information structure would cause changes in the scale of the whole sentence rather than targeting only the most prominent accent pitch.

Since prosody appears to be an important feature for both the definition of prosodic boundaries and the marking of information structure, I undertook to carry out an acoustic analysis in order to verify features indicating prominence. The acoustic analysis was performed based on certain acoustic parameters considered in the analysis of emphasis, namely: breaks, melodic contour and initial and final F0 values.

### *Intonational analysis*

In intonational phonology, intonation has its own phonological organization, interpreted as discrete sequences of tonal events realized by the  $f_0$  curve. These events are essentially of two types: *pitch* accents and edge tones. To Ladd (1996), pitch accents are elements of intonational contour and serve as indicators of syllabic prominence, since they need to be associated with lexically stressed syllables, though they do not constitute syllabic prominence in themselves. Edge tones, on the other hand, mark the boundaries between the domains of melodic contours. Thus, the decomposition of intonation contours occurs in a sequence of tonal events, namely high (H) or low (L) targets associated with lexically stressed syllables (tonic syllables) or phrase boundaries.

The ToBI annotation system was developed initially for English and later adapted for other languages. For Brazilian Portuguese, in addition to ToBI, there is the DaTo (Dinamical Tones of Brazilian Portuguese) annotation system. This annotation system proposed by Lucente (2012) describes Focus in intonation according to the concept of dynamic contours, holding melodic intonation contours, the range of tonal variation and the specific alignment between the curve and the linguistic material to be melodic primordials. Given that the DaTo has been specially developed for Brazilian Portuguese, I chose to adopt it in my analysis.

Intonation contours in this system are specified by a static target, while the pitch accent is associated with the lexically stressed syllable of a prominent word. The gamut of tonal variations, on the other hand, delimits the pitch interval in which a target is implemented, considering the value of the target and the range of variation. The specific

alignment, central to this approach, is established, considering the existence of synchrony between movements that produce  $f_0$  and articulatory movements that generate the spectral patterns.

Table 1 below shows DaTo notation with respect to the theory of intonational phonology:

<b>ToBI</b>	<b>DaTo</b>
<i>Pitch accent</i>	<i>Level contours</i>
L *	L
H*	H
	<i>Dynamic Contours</i>
L+H*	LH
L*+H	>LH vLH
H+!H*	LHL HLH
H+L*	HL
H*+L	>HL vHL
<i>Prasal Accents</i>	
L- H-	
<i>Edge Tones</i>	<i>Edge Tones</i>
L%	L
H%	H

Source: Lucente (2012)

Lucente (2012) divides the types of boundaries marking focus into ascending tones (LH, >LH, HLH), descending tones (HL, >HL, LHL) and edge tones (H, L). Regarding ascending tones, she holds that the descent of  $f_0$  within syllables preceding the lexically accentuated syllable (mandatory for the realization of the subsequent movement of ascent) was interpreted by listeners as a change in the degree of focus, becoming thus less emphatic after the rise and more emphatic as the amplitude of the fall increases. The deaccentuation of syllables in a post-focal position also shows that the perception of focus is also associated with the opposition that occurs in unaccentuated syllables after the focus. Thus, the LH contour is presented as the default

tone, most frequent in realizing narrow focus; >LH corresponds to the same function but more emphatic; and HLH may be associated with contrast focus.

Still among the rising contours, Lucente (2012) adds vLH. This contour, called compressed rising, marks narrow focus between two peaks of  $f_0$  where there is no space for, or physiological possibility of, achieving a higher pitch.

On the descending contours, it is said that, although they share a default movement (smooth rise of  $f_0$ ), the alignment of these contours does not occur in a unified manner; HL, and >HL share the same characteristics, >HL coming late relative to the descent of  $f_0$ ; LHL, on the other hand, has a milder contour declination pattern, triggered by several factors, including number of syllables.

Now that the methods and procedures used in the research have been described, I move on to analysis of the data and presentation of results.

### 3. Results collected

As described in previous sections, the intonational study of sentences with ellipses can contribute to studies on the subject. Considering the theories of ellipsis, I expected a pitch accent and deaccentuation to occur in elliptical structures that expressed contrast and standard prosodic realization in structures that corresponded to informational focus. This is also in accordance with experimental studies of phonology. Under Selkirk's (1995) theory, in syntax-prosody mapping, syntax determines the location of prosodic boundaries, which means that each phonological phrase head carries a pitch accent. Information structure, on the other hand, affects the location of the pitch accent when there is focus; for example, the element on which focus falls carries a pitch accent, which consequently leads to the formation of a prosodic phrase with the focal element as its head. This latter case describes exactly what Namiuti (2008) says regarding elliptical structures with negations or pronouns in BP, as shown in the previous section.

Féry & Ishihara (2010), like Selkirk, associate prosody and information structure; however, they put forth a model of representation of interactions between syntax and prosody that distinguishes phenomena such as mapping from syntax to prosodic phrasing and effects of information structure on prosody as changes in  $f_0$  register. For these authors, prosodic effects of syntactic structure and information structure should be treated separately.

With respect to the prosodic effects of syntactic structure, Féry & Ishihara hold that the syntactic structure is mapped in prosody through prosodic phrasing, this

phrasing being recursive. In the case of sentences with broad focus, the formation of prosodic phrases and tonal pattern depend entirely on the morpho-phonological structure. While prosodic phrases have heads in the form of abstract positions, such as the realization of pitch accent, prosodic heads are not necessarily performed with pitch accents and can be expressed by duration, intensity or completely different parameters such as tonal and segmental changes. Thus, it is observed that the prosodic heads have correlates in metrical or hierarchical prosodic structure. This relevance of the different levels of phrasing is treated in the literature in different ways, such as, for example, phonological phrases and intermediate phrases or accent domains and rhythmic groups.

In my analysis, as described in the methodology section, I observed mainly breaks and intonational contours, as these are the main indicators of prosodic edges and prominence. To identify possible changes in intonation in the analyzed sentences, I considered the intonation pattern of neutral and focused sentences in BP, as described in the autosegmentally based work developed by Tenani (2002) and Fernandes (2007). According to these authors, the main feature of neutral sentences in BP is the presence of tones associated with phonological words. According to Fernandes, there is the presence of a HL pitch accent associated with the head of the last phonological phrase of the prosodic phrase, accompanied by a low edge tone (L). With respect to the presence/absence of a pitch accent, Fernandes noted that focused elements have the same pitch accent as they have in a neutral context, whereas sentences with focused subjects have no tones associated with phonological words, the accent prominence being associated with the right edge of the P, which contains the focused subject.

An analysis of the selected parameters revealed an interesting pattern. Recalling that the corpus was made up of both complete sentences and ellipses, I observed that complete sentences and those with gapping showed the same pattern of intonation. Sometimes, I observed the occurrence of a break to the right of the contrasted element; however, regardless of whether there was a break, the contrasted item was intonationally marked with focus contour in all data.

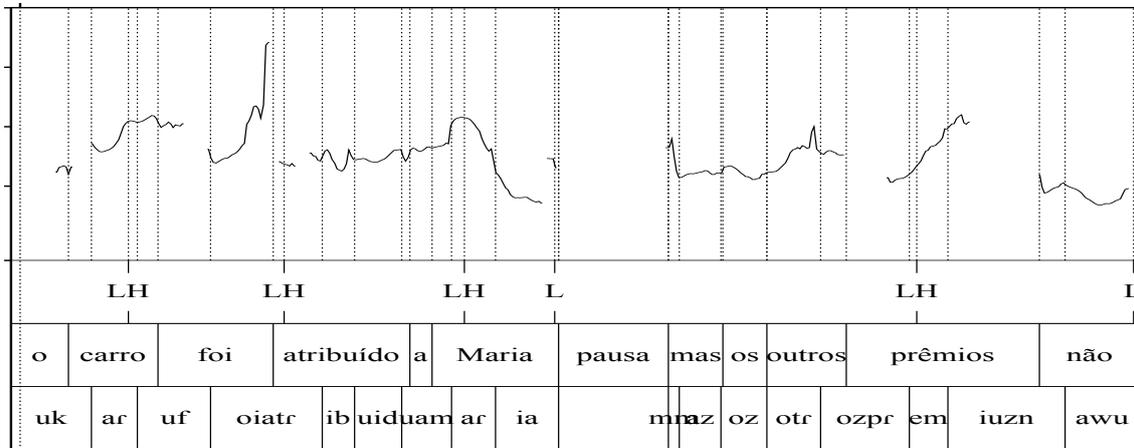
Figure 1 below illustrates a case of contrast in the action, induced by an image in which the two scenes are distinguished by the subject of the action, in the first case kicking a ball and in the second throwing it upwards.







deaccentuation of propositional content. This same pattern was observed in other cases of stripping, as illustrated in Figure 5 below.



Fi. 5. Intonation pattern of neutral sentences with LH contour on all phonological phrases.

As we can see, the default intonation in cases of stripping is what is expected in neutral sentences, where there is tonal marking of all phonological phrases and low edge tones at the end of each utterance. This fact is unexpected, since both stripping and gapping would be the result of undergoing the same derivational cycle, according to the hybrid hypothesis. One possible way to explain this distinction is to suppose that in the case of stripping, the element that remains in the elided structure functions as a pro-form, an item that takes up the semantic content from the first sentence. This assumption takes into account the fact that this type of structure almost always includes the presence of items such as "also" and "no", which are not present in the "matrix" sentence and which seem to have the function of taking up the polarity of the previous sentence. Specifically on the "no", as mentioned, because it bears a focus function and it is not the result of movement, but of an external merge in the CP area. If this is correct, then, still taking the hybrid approach, since there is no movement, there is also no need to propose the existence of a syntactic structure. One possible problem for this analysis is the absence, in some cases, of the focalizing items "also" and "no."

Another example of the occurrence of stripping is shown below. The only difference is in the presence of high contour (H) over the "no." As there is no tone over the contrasting subject, it can be said that the subject and the focus marker are in the same phonological phrase.

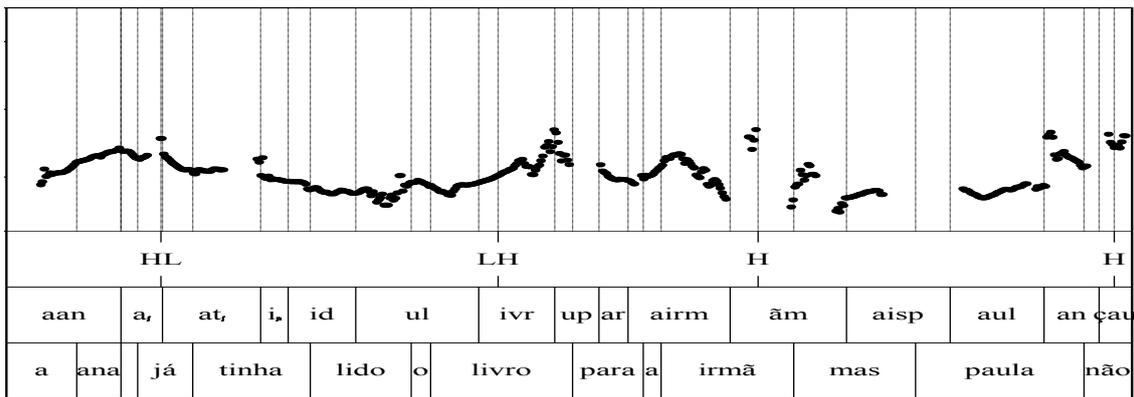


Fig. 6. Presence of tones over the phonological phrases of the first sentence and the "no" in the second.

The most interesting question regarding the data analyzed so far is that the focus contour appears over the contrasted item, which invariably occurs in the final position of the sentence. The main distinction between those pairs of complete sentences and gapping, on the one hand, and stripping, on the other, is the occurrence of deaccentuation in the former case but not the latter. Since deaccentuation happens both in complete sentences and in cases of gapping, it seemed consistent to interpret that, for this latter type of ellipsis, there is indeed a non-pronounced syntactic structure. Another argument in favor of this hypothesis is the relationship between interpretation and linear ordering; if the object is always interpreted contrastively and appears soon after the contrastive topic without the presence of a verbal structure, it is possible to conclude that this ordering is the result of the subject's movement to the topic and the object into the focus. If there is movement, there are necessarily traces occupying intermediate positions.

Also, the data on complete sentences seem to point in that direction. As described in the methodology section, the images used in the experiment induced the interpretation of contrast between one element in two scenes. So when I asked the informants to describe the images, many produced complete sentences. These statements, however, proved to be highly relevant to our analysis. Almost every time that informants produced complete sentences, they produced pauses between the item in focus and the rest of the sentence. Note the figure below:

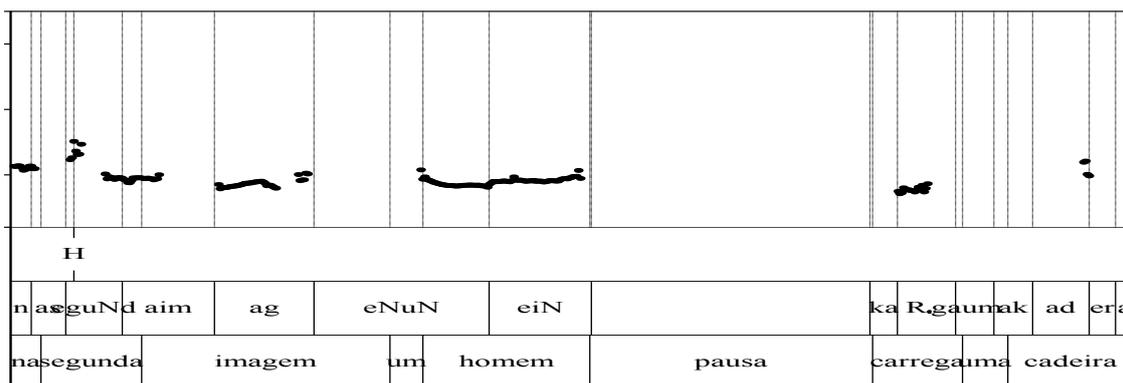


Fig. 7. Presence of a pause immediately after the contrasting item.

In the image that induced the production of the above sentence, there was a first scene in which a woman was carrying a chair and another in which a man was carrying the same chair. The informant, in describing the image, said: “na primeira imagem, uma mulher carrega uma cadeira e, na segunda imagem, um homem carrega uma cadeira”. (“In the first image, a woman carries a chair and, in the second image, a man carries a chair.”) Interestingly, when producing the second sentence, the speaker produced a pause between the subject that comprised the new information through the contrast between the scenes, and the rest of the sentence. The pause, which as I have stated was fairly frequent in the data, establishes the edge of a phrase; thus, it could be said that the subject of this sentence, “man” is not in the IP specifier position, but rather in the focus position. If this interpretation is correct, again, we have an item that needed to be moved, having to leave a trace in the initial position (i.e, Spec-IP) so that it can be interpreted also as the subject of the sentence. As seen in the above data, in all cases of ellipsis produced in those contexts, there was focus contour over the new item with respect to the previous sentence. If there is contour indicative of focus on the item not elided in the sentences with ellipsis produced by informants, then it is possible to apply the same analysis on the complete sentences and say that this item is in a focal position, and, in this case, I have necessarily to say that there is an unaccentuated syntactic structure in these constructions. If this is correct, I discard, at least in part, the semantic hypothesis.

As we have seen, the syntactic hypothesis cannot cover all of the possibilities of occurrence of ellipsis. For this reason, some authors defend the hybrid hypothesis. According to the latter, syntactic structure is present in some

cases and not in others. The idea is that a syntactic structure is only present in cases where it is necessary, i.e., those cases where there is movement of a constituent. To Winkler (2005), this difference is related to the different types of ellipsis: IP ellipsis would present a syntactic structure, since it involves movement of the constituent into focus; meanwhile, VP ellipsis would be better explained by the pro-form, as it does not obviate movement.

In the corpus collected by me, there were few clear data on VP focus; most occurred in data from read sentences, so I do not have sufficient evidence to make assertions in this regard. However, in most data, I observed the following prosodic structure: on the one hand, focus contour occurs over the new element, which does not necessarily occur in the sentence final position, as in cases of IP ellipsis; on the other hand, it presents edge pitches, as illustrated in Figure 8 below.

Thus, the VP ellipsis data, unlike those with IP ellipsis, do not suggest the interpretation that there was movement of a constituent, and, as predicted by the hybrid hypothesis, they can be analyzed as instances of pro-forms. The verification of this analysis, however, would require the collection of more VP ellipsis data.

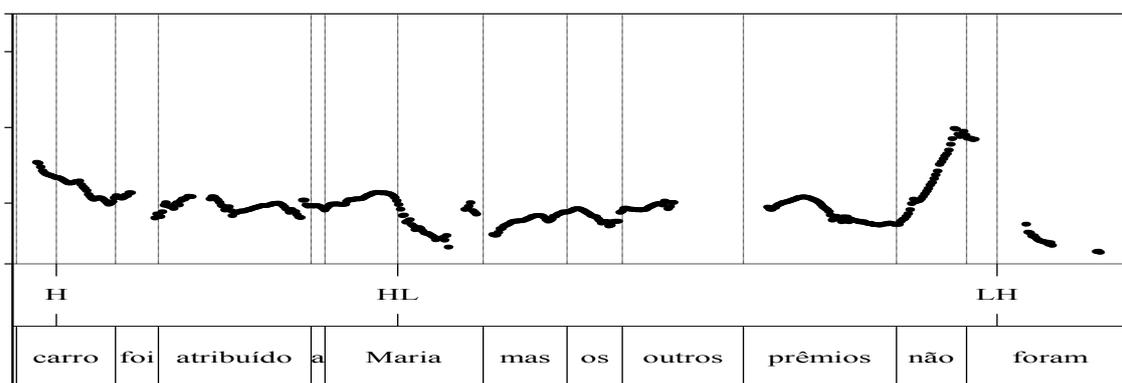


Fig. 8. Presence of pitch accent in the phonological phrases and LH contour in new information.

Although there are few VP ellipsis data, it is still interesting to note that, as in the cases of stripping, there was no deaccentuation of propositional content. If we can really consider deaccentuation a strong indication of the presence of unpronounced

syntactic structure, then these data are a further indication that, in the case of VP ellipsis, there really is no syntactic structure, but rather pro-forms.

In the analysis developed in this study, we saw that there are prosodic differences between the different types of ellipsis. On the one hand, we have the cases of gapping, which behave similarly to the pairs of complete sentences analyzed, i.e., in both cases, there was deaccentuation of propositional content and the presence of focus contour on the contrasting item. On the other hand, I observed that, in the cases of stripping and VP ellipsis, deaccentuation does not occur, the tones remaining on the phonological phrases. Thus, I propose that there is movement of phrases, with a consequent presence of syntactic structure in the gapping data and a presence of pro-forms in cases of stripping and VP ellipsis.

As stated, the VP ellipsis data in the corpus were few, being insufficient to support statements about this kind of ellipsis. I also emphasize that there are no studies that specifically deal with the prosodic behavior of pro-forms in linguistic sentences. I may predict, however, that these items do not cause syntactic restructuring, since they are typically concatenated in the position in which they are uttered. In this case, I reaffirm the proposition that there are no syntactic structures in stripping and VP ellipsis data.

The hypothesis that I reach at the end of our study is very close to what is proposed by the hybrid hypothesis, with the presence of syntactic structure in some types of ellipsis and pro-forms in others. Unlike the hybrid case, however, I suggest that there is a structure in cases of gapping and proforms in cases of stripping and VP ellipsis, which raises a problem in the formal treatment of such structures. In the hybrid hypothesis, the difference between IP ellipsis, referred to here as *stripping* and *gapping*, and VP ellipsis is in the undergoing of two or one derivational cycles, respectively. This explanation, however, does not account for the cases discussed here, since I distinguished the types of IP ellipsis, suggesting that in one case there is structure, and in the other there isn't. If my analysis is correct, it is necessary, then, to propose another way to derive these different types of ellipsis. Such an analysis would be extremely relevant, but beyond the scope of this study. Thus, I conclude with the belief that I have brought forth important issues for studies involving ellipsis in BP, emphasizing that there is still much to be studied on this topic.

#### 4. Final remarks

My purpose in this study was to perform an acoustic analysis of sentences with ellipsis in BP as a way to verify the relationship between informational structure and licensing. Another objective was to determine which hypothesis, semantic or syntactic, better predicted BP data. As I have seen, there are differences in the prosodic structure depending on the type of ellipsis; namely, there is deaccentuation and the presence of focal contour of the contrasting item in cases of gapping and neutral intonation marking with focusing contour of the new element in cases of stripping and VP ellipsis.

From the results of the analysis, I propose that there is enough syntactic structure to cover the traces left by the items moved in gapping data and the presence of pro-forms in cases of stripping and VP ellipsis. Although this proposal resembles the hybrid hypothesis, it differs from the latter by distinguishing between stripping and gapping, which raises problems for the derivation of the difference between the different types of ellipsis. If for the hybrid hypothesis the difference is due to the undergoing of one or two derivational cycles, in our case, the distinction should be otherwise, given that stripping and gapping both undergo two derivational cycles.

Finally, I conclude that this study raised interesting questions that should be observed in future studies on ellipsis in BP. An important development was the establishment of an experiment that also considered the occurrence of pro-forms.

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