Verbal Alternations in Brazilian Portuguese: a Lexical Semantic Approach[1]

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Abstract

This paper discusses two types of verbal alternation in Brazilian Portuguese that have the same profiled syntactic structure, but differ in their semantic representations and in their lexical syntactic structures. The first case is: 'O dentista extraiu o dente do João' (The dentist extracted John's tooth), alternating with 'O João extraiu o dente' (João extracted his tooth). We can interpret the alternate sentence as: João had someone extract his tooth. The second case is: 'Alguém quebrou o braço do João' (Someone broke John's arm), alternating with 'João quebrou o braço' (João broke his arm). We can interpret the alternate sentence as: João is the possessor of the arm that suffers the break. Based on a more fine-grained approach of thematic roles (Dowty, 1991), and based on a semantic representation of the events encoded by these verbs (Levin & Rappaport, 2005), I show here that these two forms have different interpretations due to different lexical semantic properties. Besides, these lexical semantic differences, encoded in the root elements of the verbs, are responsible for projecting distinct lexical syntactic structures, according to Hale & Keyser (2002)'s proposal.

1. Introduction

In Brazilian Portuguese (hereafter BP), there are two kinds of verbal alternations that are very productive and still need to be further investigated[1]. It is commonly assumed that the agent is the most prominent thematic role in relation to others, as it is located in the subject position. For instance, the verb *extract* has an agent and a patient in its argument structure and the agent is located in the subject position. This structure is usual in many languages:

(1) The dentist extracted John's tooth.

However, if we want to give prominence to the possessor inside the complex DP, patient of the action, many languages use auxiliary verbs and/or clitics to do this verbal alternation:

(2) John *had* his tooth extracted. (English)
(3) Juan *se* saco el diente. (Spanish)
Juan himself extracted the tooth
(4) Jean *s'est fait* arracher une dent. (French)
Jean himself made extract one tooth
(5) Gianni *si è fatto* estrarre un dente. (Italian)
Gianni himself made extract one tooth

Differently, in BP, if we want to place this possessor in the subject position, we do not use clitics or auxiliary verbs in the alternate marked form, but we simply alternate the form [DP1 V [DP2 of DP3]] with [DP3 V DP2], as shown by the examples:

(6) a. O dentista extraiu o dente do *João*.[2]
the dentist extracted the tooth of João
'The dentist extracted John's tooth.'
b. *O João* extraiu o dente.[3]
João extracted the tooth
'John had his tooth extracted.'

There is still another kind of sentence, very similar to the examples above, which, at first glance, could be analyzed as the same phenomenon as (6):

(7) a. Alguém quebrou o braço d*o João*.
someone broke the arm of John
'Someone broke John's arm.'
b. *O João* quebrou o braço.
João broke the arm
'João broke his arm.'

Syntactically, the form [DP1 V [DP2 of DP3]] alternates with [DP3 V DP2]; semantically, the thematic role of DP3, in the complement of the preposition position of the basic form is the same as the thematic role of DP3, in the subject position of the alternate form. This alternation, called "involuntary interpretation with X's body part" by Levin (1993), is also possible in English, with no morphological marking (see Chomsky 1981, Levin 1993 and Wierzbicka 1988), as it occurs in BP. In Spanish, for example, we also have these alternating sentences, but there is a reflexive *se* in the alternate form:

(8) a. Alguien rompió el brazo de Juan.
'Someone broke Juan's arm.'
b. Juan *se* rompió el brazo.
'Juan broke his arm.'

Based on these examples, one should conclude that examples in (6) and (7) illustrate the same phenomenon in BP. Some studies about Brazilian Portuguese show these alternations as being the same phenomena (Camacho 2003, Everett 1986, Perini 2008 and Pontes 1986): the alternation of an agent with a possessor in the subject position. Nevertheless, the possessors, in both alternate sentences, have a specific semantic distinction between them, which allows different interpretations. The sentence in (6b) can be interpreted as (and it is the most usual occurrence):

(9) João had someone extract his tooth.

The sentence in (7b) cannot have the same interpretation:

(10) João had someone break his arm.

Therefore, the aim of this paper is to show the nature and the differences between these two alternations and the constraints involved in these alternation processes. In section 1, I show the facts in BP and draw the differences between these alternations. In section 2, I sketch a more fine grained approach of thematic roles, based on primitive predicates proposed by Levin & Rappaport (2005) and based on Dowty's lexical entailments (1989, 1991). In section 3, I present the semantic analysis of the two alternations and the conditions that allow these occurrences in BP. In section 4, I propose a structural analysis of these two alternations, within a Lexical-Syntax level, as proposed by Hale & Keyser (2002). In section 5, I make some final considerations.

1. The facts in BP: differences between *extrair o dente* and *quebrar o braço*

Besides the different interpretations of the examples in (6b) and (7b), other distinct properties distinguish those two verbal classes. Let us examine the facts in BP.

1.1 The presence of the agent as an adjunct

The alternate sentence in (6b) accepts an agent in adjunct position and this sentence can be paraphrased as (11b):

(11) a. O João extraiu o dente com o dentista.
João extracted the tooth with the dentist
'João had his tooth extracted by the dentist.'
b. O João fez o dentista extrair seu dente.
'João had the dentist extract his tooth.'

Differently, the example in (7b) does not admit the agent in adjunct position and cannot have the same type of interpretation as the example in (11b):

(12) a. *O João quebrou o braço com alguém.
João broke the arm with someone

1.2 The subjects of the alternate sentences

The subject of the alternate sentence in (6b) does not allow a composition with an adjunct that annuls control or volition over the event:

(13) *O João extraiu o dente com o dentista sem querer/acidentalmente.
João extracted the tooth with the dentist not deliberately/ accidentally

On the other hand, the sentence in (7b) accepts this kind of adjunction:

(14) O João quebrou o braço sem querer/acidentalmente.
João broke the arm not deliberately /accidentally
'João broke his arm accidentally.'

These facts lead us to conclude, preliminarily, that the subject of example in (6b) has some kind of agentivity, and here it can be interpreted as if an indirect agent permits another agent to act in his place. This linguistic phenomenon allows both agents to be present in the sentence.

The alternate sentence in (7b) shows that the possessor, located in the subject position, is necessarily bound with the argument located in the object position, and it can have an affected reading.

1.3 Inanimate subjects in the alternate sentences

Sentences of the type in (6b) cannot have inanimate subjects, contrary to sentences of the type in (7b)[4]:

(15) a. O João extraiu o ponteiro do relógio.
João extracted the hand of the clock
'João had the clock's hand extracted.'
b. *O relógio extraiu o ponteiro.
the clock extracted the hand
(16) a. O João quebrou o ponteiro do relógio.
João broke the hand of the clock
'João broke the clock's hand.'
b. O relógio quebrou o ponteiro.
the clock broke its hand

This constraint is expected if we assume that the alternate form in (6b) has some sort of agentivity in the argument in the subject position; a DP denoting an inanimate entity in this position is, therefore, semantically incompatible.

1.4 The syntactic distinctions of the subjects

Let us examine the syntax of the alternations. Superficially, that is to say, in the "profiled" syntactic form as termed by Hale & Keyser (2002), the structures of both alternations are the same. However, if we look further, we can remark some differences in the behavior of these types of verbs. See the examples:

(17) a. The dentist extracts John's tooth.
b. *John's tooth extracts.
(18) a. Someone broke John's arm.
b. John's arm broke.

Hale & Keyser (2002) propose that the difference between verbs that undergo causative-inchoative alternation and verbs that do not allow the alternate intransitive form lies in the semantic components of their root elements. The root component of alternating verbs requires a specifier, in the projection of their lexical syntax, while the root element of the non-alternating verbs does not project a specifier. These properties account for the possibility of inchoative alternation. Thus, I will explore further these assumptions in order to give a structural explanation for the alternations studied here, assuming that, even if in the profiled syntactic form these two verb types have the same structure, they project different syntactic configurations, at the lexical syntactic level.

1.5 Insertion of an argument in the subject position

Finally, the example in (6b) allows the insertion of another argument, annulling the co-reference of possessor and possessed present in the alternate final form [DP3 V DP2]. The sentence in (7b) does not allow this insertion:

(19) a. A mãe extraiu o dente do filho com melhor dentista da cidade.
the mother extracted the tooth of the son with the best dentist of the city
'The mother had the best dentist in the city extract her son's tooth.'
(20) a.??A mãe quebrou o braço do João com o melhor médico da cidade.
the mother broke the arm of João with the best doctor in the city
b. *A mãe quebrou o ponteiro do relógio com o melhor relojoeiro da cidade.
the mother broke the hand of the clock with the best watchmaker of the city

1.6 Preliminary descriptions

Based on the facts, I propose that the linguistic phenomena shown in (6) and (7) are distinct and that these phenomena are types of verbal alternations. In (6b), I assume descriptively that such an alternate sentence has an indirect agent[5], the possessor in DP3, which licenses the agent of the basic sentence to perform the action. If the possessor in DP3 is in co-reference with DP2, the syntactic configuration is:

(21) [DP1 V [DP2 of DP3]] alternating with [$DP3_i$ V $DP2_i$ (with DP1)]

However, as shown in (19), the insertion of another argument in the alternate form is also possible:

(22) [DP1 V [DP2 of DP3]] alternating with [DP4 V [DP2 of DP3] (with DP1)]

We can observe that the configuration in (21) is only a reflexive form of the configuration in (22). See the possible interpretations for examples in (21) and (22), respectively in (23) and (24):

(23) [[DP3 CAUSE] [DP1 V [DP2 of DP3]]]
(24) [[DP4 CAUSE] [DP1 V [DP2 of DP3]]]

Hence, I assume that the alternation shown in (6) has the structure in (24) as its general structure, although the reflexive alternation in (21) is much more used in BP. Examples such as (19) demand certain contexts that I will explore further. I will call this type of alternation "agent-possessor alternation".

The alternation presented in (7) has a possessor of an affected object that can be located in its original position, inside the complex DP, complement of the basic form of the verb; or the possessor can be located in the subject position of the alternate form of the verb:

(25) [DP1 V [DP2 of DP3] alternating with [$DP3_i$ V $DP2_i$]

I will call this alternation "body-possessor alternation".

1.7 BP data

Therefore, in BP we have some verbs that accept an alternation between an agent and a possessor as shown by structures: [DP1 V [DP2 of DP3]] alternating with [$DP3_i$ V $DP2_i$] or [DP4 V [DP2 of DP3]]. The interpretation for the (b) sentences and (c) sentences below can be: [[$DP4_{(i)}$ CAUSE] [DP1 V [DP2 of $DP3_{(i)}$]]] (where DP4 and DP3 can denote the same entity). In all the examples, we can insert an agent as adjunct, we can insert a distinct indirect agent[6], but we cannot have an adjunct that expresses no control:

(26) a. O funcionário xerocou o artigo do João.
'The employee photocopied João's paper.'
b. João xerocou o artigo (com o funcionário) *acidentalmente.
João photocopied the paper (with the employee) accidentally
'João had his paper photocopied (by the employee) deliberately.'
c. O estudante xerocou o artigo do professor (com o funcionário) *acidentalmente.
the student photocopied the paper of the teacher (with the employee) accidentally

(27) a. O rapaz lavou o carro de Maria.
'The boy washed Maria's car.'
b. Maria lavou o carro (com o rapaz) *acidentalmente.
Maria washed the car (with the boy) accidentally
'Maria had her car washed (by the boy) deliberately.'
c. O empregado lavou o carro da Maria (com o rapaz)*acidentalmente.
the employee washed the car of Maria (with the boy) accidentally

(28) a. O médico operou o nariz do João.
'The doctor operated on João's nose.'
b. O João operou o nariz (com o médico) *acidentalmente.
Dr. João operated the nose (with the doctor) accidentally
'Dr. João had his nose operated on (by the doctor) deliberately.'
c. A mãe operou o nariz do filho (com o melhor médico)*acidentalmente.
the mother operated the nose of son (with the best doctor) accidentally

(29) a. O cabeleireiro cortou o cabelo de João.
'The hairdresser cut João's hair.'
b. João cortou o cabelo (com o cabeleireiro) *acidentalmente[7].
João cut the hair (with the hairdresser) accidentally
'João had his hair cut (by the hairdresser) deliberately.'
c. A mãe cortou o cabelo do filho (com o cabeleireiro) *acidentalmente.
the mother cut the hair of the son (with the hairdresser) accidentally

(30) a. A corretora vendeu a casa da família.
'The real estate broker sold the family's house.'
b. A família vendeu a casa (com a corretora) *acidentalmente.
the family sold the house (with the real estate broker) accidentally
'The family had her house sold (by the real estate broker) deliberately.'
c. Maria vendeu a casa da família (com a corretora) *acidentalmente.
Maria sold the house of the family (with the real estate broker) accidentally

This alternation is very productive in BP. Some other agentive verbs that permit this alternation form are:

(31) afiar 'sharpen', anestesiar 'anesthetize', limpar 'clean'; consertar 'fix', decorar 'decorate (a house)', demolir 'demolish', construir 'build', esterelizar 'sterilize', fotografar 'photograph', gravar 'record', pintar 'paint', radiografar 'radiograph', retirar 'remove', remover 'remove'...

At this point, we might just assume that agentive verbs accept this kind of alternation. Nonetheless, some agentive verbs do not accept the agent-possessor alternation:

(32) a. João leu/analisou o artigo do professor.
'João read/analyzed the teacher´s paper.'

b. *O professor analisou o artigo (com o João). (in a reading in which João did it in the professor's place).
the teacher read/analyze the paper (with João)

(33) a. Maria comeu o peito da galinha.
'Maria ate the chicken's breast.'
b. *A galinha comeu o peito (com a Maria).
the chicken ate the breast (with Maria)

(34) a. O João escreveu o discurso do presidente.
'João wrote the speech of the president.'
b. *O presidente escreveu o discurso (com o João). (in a reading in which João did it in the president's place).

Therefore, it is necessary to investigate the conditions that permit the agent-possessor alternation to occur.

The body-possessor alternation is also very productive in BP and has similar examples in English, if the relation in [DP2 of DP3] is that between body and part possession. Notice that, differently from the agent-possessor alternation examples, the sentence below do not accept an agent as adjunct and do accept a modifier that expresses no volition or control over the event, as in the (b) sentence:

(35) a. Alguém quebrou o pescoço/ o braço/ a perna do João.
'Someone broke João's neck/arm/leg.'
b. O João quebrou o pescoço/o braço/a perna (*com alguém) acidentalmente.
'João broke his neck/arm/leg (*by someone) accidentally.'

Nevertheless, BP has some examples in which this relationship is between an object and its part, which is not found in English. In these examples, a cause or instrument must appear as adjunct:

(36) a. Um prego furou o pneu do carro.
the nail punctured the tire of the car
'The nail punctured the car tire.'
b. O carro furou o pneu (com um prego).
the car punctured the tire (with a nail)
'The car had its tire punctured by a nail.'

(37) a. A chuva estragou o ponteiro do relógio.
the rain ruined the hand of the clock
'The rain ruined the clock hand.'
b. O relógio estragou o ponteiro (com a chuva).
the clock ruined the hand (with the rain)
'The clock had its hand ruined by the rain.'

(38) a. O menino rachou a tampa do pote.
'The boy split the pot lid.'
b. O pote rachou a tampa (*com o menino).
the pot split the lid (with the boy)
'The pot had its lid split.'

Other causative verbs that allow this alternation form are:

(39) apagar 'put out', apodrecer 'rot', arranhar 'scratch', arruinar 'ruin', arrebentar 'break', cortar 'hurt', contundir 'bruise', desbotar 'discolor', destruir 'destroy', machucar 'hurt', queimar 'burn', rasgar 'tear', torcer ' twist', trincar 'crack' …

However, some causative verbs do not allow this alternation:

(40) a. A tempestade derrubou a raiz da árvore.
'The storm uprooted the tree root.'

b. *A árvore derrubou a raiz.
the tree uprooted the root

(41) a. A ventania carregou a porta da casa.
'The wind carried the door house.'
b. *A casa carregou a porta.
the house carried the door

(42) a. A beleza do rapaz conquistou o coração de Maria.
'The boy's good looks won Maria's heart.'
b. *Maria conquistou o coração.
Maria won the heart

(43) a. O menino arrancou a folha do caderno.
'The boy tore the note pad sheet.'
b. *O caderno arrancou a folha.
the note pad tore the sheet

To conclude this section, we can remark that these two alternations involve different interpretations for their possessors and different types of verbs. Hence, a more specific analysis of the properties involved in these thematic roles is required. Assuming general labels as possessors and agents will not clarify the specificities that seem to be crucial to these phenomena. In the next section, I propose a more fine-grained approach to thematic roles to deal with these specificities.

2. Defining thematic roles

Many lexical semanticists have explored the idea that the semantic determinants of argument realization derive from decomposing semantic roles, that is, the meanings of verbs themselves are decomposed into more basic elements, as assumed, for example, by Jackendoff (1983, 1990), Van Valin & LaPolla (1997), Van Valin (2005), Croft (1990), Levin & Rappaport (1995, 2005), Rappaport & Levin (1988) and Wunderlich (2000), among others. As stated by Levin & Rappaport (2005, p.69), "Predicate Decomposition is a representation of meaning formulated in terms of primitive predicates chosen to represent components of meaning that recurs across significant sets of verbs". Since verbs individuate and name events, we can assume that theories of predicate decomposition are also theories of event types. For example, verbs like *extract* and *break* would be represented as in (44):

(44) a. *extract*: [[x ACT] CAUSE [y BECOME <*EXTRACT*>]]
b. *break*: [[x ACT] CAUSE [y BECOME <*BREAK*>]]

Levin & Rappaport (2005) assume that the event encoded by those verbs is "an externally caused event". These events are conceptualized as brought about by an external cause with immediate control over the event. The core verbs lexicalizing externally caused events are change-of-state verbs, such as *break* and *extract*. On the other hand, verbs that encode internally caused events are conceptualized as arising from inherent properties of the entity participating in this event. These properties are responsible for the event; no external force is required. Prototypical examples of such verbs are *sing* and *dance*, which have an agentive argument with a self-controlled body acting volitionally.

As I have shown, the predicate representations of both classes will not be specific enough to make a distinction between them, which is the aim of my analysis; both verb classes will be classified as verbs that encode externally caused events and they will have the same predicate representation. Consequently, analyzing these alternations in a predicate decomposition representation will not be helpful. Nevertheless, I will show further that using these predicates as semantic primitives and using the distinction between externally caused event and internally caused event will be useful to establish the properties involved in the alternations studied here.

Another approach has been widely discussed and adopted in the literature: Dowty's entailment proposal (1989, 1991). Dowty understands that thematic roles are not semantic primitives but are defined in terms of entailments of a predicate, that is, a thematic role is a cluster of entailments about an argument position that are shared by some verbs. He suggests that there are two basic proto-roles: Proto-agent and Proto-patient, each of which would contain specific lists of entailments. The number of entailments an argument has pertaining to a specific proto-role will classify it as a Proto-agent or a Proto-patient. Some arguments will be

more typical and involve a greater number of specific entailments; others will be more marginal. Dowty (1991, pp. 572-573) proposes that only two proto-roles, the agent and the patient, need to be recognized with respect to argument selection of a verb.

The Agent Proto-role has the following contributing properties[8]:

- volitional involvement in the event or state;
- sentience (and/or perception);
- causing an event or change of state in another participant;
- movement (relative to the position of another participant).

The Patient Proto-role has the contributing properties:

- undergoes change of state;
- incremental theme;
- causally affected by another participant;
- stationary relative to movement of another participant.

Let us analyze the verbs *extract* and *break*, using Dowty's proposal. For the argument in subject position, both verbs entail the Proto-agent entailment: causing a change of state in another participant. For the argument in object position, both verbs entail the Proto-patient entailments: undergoes change of state and causally affected by another participant. Consequently, the semantic representation of the verbs will be the same, so this approach also fails to distinguish between *extract* and *break* verbs. But, as pointed out by Dowty, labels such Agent and Patient Proto-roles are enough for the purposes of subject and object selection. However, languages have other generalizations involving argument realization that refer to narrower semantic categories; this seems to be the case of the verbal alternations investigated here.

I will not go further in discussing other analyses for thematic roles in the literature[9] because it is not relevant to the proposal presented here. I will use in my analysis some of the approaches mentioned above. As stated by Levin & Rappaport (2005), the semantic content of primitive predicates can most likely be translated into entailments similar to those that Dowty uses in his proto-roles. Following this assumption, I will adapt both approaches for my purposes.

I borrow from Dowty and from the lexical semanticists cited above the idea that thematic roles are a derived notion, composed by semantic primitive properties. To establish these properties, I use Dowty's proposal, stating that an individual thematic role is a set of lexical entailments assigned to an argument by a predicate. The argument in complement position receives, as thematic role, a cluster of lexical entailments of the lexical predicate (V, P, A or N). For example, the thematic role of the argument in complement position of the verb *break* is a list of properties entailed by the verb: to be affected, to undergo change of state, to be broken, etc.

Yet, following to a certain extent Chomsky (1981) and Marantz (1984), I assume that the argument in subject position receives its thematic role from the entailments of the whole VP. For example, in BP, the VP [*quebrar o vaso 'break the vase'*] entails for its argument in subject position: to cause a change of state in another participant, to be the breaker. Nevertheless, if we have VPs like [*quebrar a cabeça 'think hard about something'*], [*quebrar a cara 'be disappointed'*], the entailments will be different. Besides, I do not assume the fuzzy nature of Dowty's proposal because, as I have shown above, the kind of verbal alternation that I discuss here has to do with specific semantic properties and not with general proto-roles[10]. Thus, I have to stipulate specific semantic properties in order to classify the verbs *extract* and *break* in distinct semantic classes.

As Dowty (1989) observes, defining thematic roles as I proposed gives us an intersection of *any set* of entailments of individual thematic roles. As a result, we can have an enormous list of entailments, and, consequently, an enormous list of semantic properties. However, my proposal here is to show the relevant entailments for these verbal alternations in BP. To do this, I use the primitive predicates from the predicate decomposition approach and the list of entailments proposed by Dowty[11].

It is important to emphasize that, in my proposal, the list and the type of thematic roles are not relevant; a thematic role is a set of properties that can be combined in many ways, with no specific label, that is assigned to one argument, maintaining the assumption of the Theta-criterion. On the other hand, the semantic primitive properties that compose thematic roles have grammatical relevance and the list of these properties is limited. By assuming this compositional nature, we can eliminate what Dowty (1991, pp. 553-555) calls "role fragmentation", the subdivision of a single role into multiple roles. Here, a thematic role keeps its uniqueness, but its semantic content can be composed in many ways by some delimited properties. For example, in the sentence *John run*, we can assign one sole thematic role to the DP *John*, which is a set of lexical entailments from the VP [*to run*]: volitional involvement in the event, causing an event, movement, and undergoing

change of state (or place) (a proto-patient property); these four properties are the thematic role assigned to the argument in subject position of the sentence. Moreover, we can have properties usually associated only with "patients" assigned to "agents". Another example would be the sentence: *John writes a letter*. The thematic role assigned to *John* by the entailments of the VP [*to write a letter*] could be this set of properties: volitional involvement in the event and causing a change of state in another participant (if we assume that resultatives also suffer a change of state); these two properties are its thematic role. As we can see, if we just assume a label like "agent" to define a thematic role, in these two examples we would have two types of agents[12], which would be a problem of subdivision of a single role into a multiple role, as pointed out by Dowty and many others. Hence, the flexible nature of this approach can be useful to solve some problems involving thematic role assignment.

2.1 The semantic properties

As assumed by most linguists, the concept of cause is crucial to the relation of semantic and argument realization. Therefore, cause is the first grammatically relevant property that I take for granted. Based, in part, on Levin & Rappaport (2005), I propose that some causative verbs can be decomposed into primitive predicates, such as (45) below, where *x* can be an external force, like an agent, or an instrument or an eventuality; *y* is the entity affected; and *V* is an idiosyncratic element of meaning, a root, related directly to the verb:

(45) *v* : [[x (ACT)] CAUSE [y BECOME < *V*>]]

This semantic representation differs from Levin & Rappaport´s by proposing a more specific representation of verbs that encode externally caused events (see example in (44)). I propose that some verbs of this type have the predicate *ACT* represented only optionally, because if *x* is the volitional agent of the action, this is not inherently marked in the verb, but only marked in the sentence, by the adjunction of a modifier:

(46) a. John kills the chicken.
b. John kills the chicken deliberately.

Since John's volitional action is not marked inherently in the verb *kill*, the sentence in (46a) does not entail that John acted deliberately; we can only infer necessarily that he is the trigger of the event. However, in (46b), the interpretation that *John* is a volitional agent comes from the adjunction. That is why I propose the optional predicate *ACT* in the representation.

As I want to list the primitive properties that can be combined into a cluster of properties that compose thematic roles, first, I adopt the notion of cause as a semantic primitive; then, I associate this predicate with Dowty's entailments: *causing an event or change of state in another participant*. Hence, if in a sentence like [DP1 $_{VP}$[V DP2]], VP entails for DP1 the property - *causing an event or change of state in another participant*- we can affirm that cause is one of the properties of the thematic role assigned to DP1, where the thematic role is P_n (DP1). See the example:

(47) João/the hammer/the earthquake broke the window.

The VP [*to break the window*] entails the cause property for *João/the hammer/the earthquake*. Note that, assuming this, I do not propose that the thematic role of these arguments is cause; I propose that cause is one of the properties that can be associated, by VP entailments, to the argument in subject position. Consequently, the cause property can be present in various types of thematic roles, usually named in the literature as "agent", or "immediate cause" or "effector" or even "instrument".

In addition, observe these sentences:

(48) John murdered the assassin.
(49) John bought a house.

The semantic representation of the sentences in (48) and (49) will include necessarily the predicate *ACT*, because the deliberate action of *John* is inherently marked in the verb and will be classified as another type of

verb that encodes an externally caused event; there is an external force causing the event, with immediate control over it:

(50) *v*: [[x ACT] CAUSE [y BECOME <*V*>]]

Correlating this representation with Dowty's entailments, we can assume that the VP [*to murder the assassin*] entails for *John* the cause property; but also that the VP entails for *John* the property - *volitional involvement in the event* - , which I name "volition". Volition is associated with the primitive predicate *ACT* and it is the second relevant property analyzed here. The argument *x* causes the event, but *x* also has volition in causing it. So, if in a sentence like [DP1 $_{VP}$[V DP2]], VP entails for DP1 the property -*causing a change of state in another participant* -, we can affirm that cause is one of the properties of its thematic role: P_n (DP1). Furthermore, if in a sentence like [DP1 $_{VP}$ [V DP2]], VP entails for DP1 the property - *volitional involvement in the event* -, we can affirm that volition is one of the properties of the thematic role assigned to DP1. Thus, we can affirm that the thematic role P_n (DP1) is a cluster of the properties: cause and volition (among other non-grammatically relevant properties).

The third relevant property that I list is already explicit in the semantic representation in (50): [*y become* <*V*>]. I associate the predicate *become* with Dowty's entailments : it undergoes change of state and it is causally affected by another participant. I name this property "affected". For example, in (47), the V - *to break* - entails for the argument DP2 that it undergoes change of state and is causally affected by another participant; hence, among all the properties entailed for DP2 by V, we can affirm that affected is one of the properties of the thematic role assigned to DP2. Besides, I follow Levin & Rappaport's (2005, p.72) assumption, which differentiates verbs that encode an externally caused change of state and verbs that encode an externally caused change of location. I propose the following structures for both occurrences:

(51) *v* : [[x (ACT)] CAUSE [y BECOME <*STATE*>]]
(52) *v* : [[x (ACT)] CAUSE [y BECOME IN <*PLACE* >]]

Let us examine now verbs that encode an internally caused event. Levin & Rappaport (1995, p.94) propose that a verb like *laugh* encode an internally caused event and has an inherently monadic predicate; its predicate representation is:

(53) [x *PREDICATE*]

Contrary to that representation, I assume the hypothesis of Radford (1997) about unergative verbs. Radford proposes that the only real monadic predicates are the unaccusatives, verbs that have just one argument that behaves syntactically like a complement. Unergative verbs, included *laugh*, actually have an implicit argument:

(54) He laughs (a good laugh)
(55) He sings (a beautiful song).
(56) John reads (a book).
(57) John eats (an apple).

The meaning of these verbs shows common inherent properties of the entity participating in the event. These properties are responsible for the event, with a self-controlled body acting volitionally; no external force is required. On the other hand, these verbs have also in common that their arguments in the subject position are affected, somehow, by the action. Let us compare the subjects of verbs denoting externally caused events with subjects of verbs denoting internally caused events. As proposed by Levin & Rappaport (2005), verbs denoting externally caused event have a complex event structure, with two subevents. We can affirm that the result of the second subevent does not affect the subject of the first subevent. For example, we can divide the sentence *John broke the vase* in two subevents. The result – *a broken vase* – does not cause any change of state in *John*. However, in the sentence *John ate an apple*, the result – *an eaten apple* - causes a change of state in John, because this process occurs within John. I will not discuss here the event structure of these types of verbs; I just want to propose that verbs denoting internally caused events also denote the affectedness of their argument in subject position. Borrowing the primitive predicate AFFECTED from Jackendoff (1990), I propose the following semantic representation for verbs that encode an internally caused event:

(58) *v*: [[x ACT] CAUSE [x BE AFFECTED BY <*V*>] (& [y BE or BECOME AT STATE <*V*>)]]

Translating these predicates into Dowty's entailments, I assume that the thematic role of DP1, *John*, is the cluster of entailments from the VP [*to eat an apple*]. This means that P_n (DP1) is a cluster of the properties: cause, volition and affected.

The fourth relevant property for my analysis here derives from the semantic representation of the state verbs, proposed by Van Valin (2005). The author proposes that state verbs that have two arguments can be list as pure location, perception, cognition, desire, possession, among others. We can define the thematic relations of these two arguments in terms of logical structure argument positions. Therefore, verbs of possession can have as a logical structure [HAVE (x, y)], where the thematic role of *x* is a possessor and the thematic role of *y* is a possessed. I extend this proposal for the relations between [DP1 of DP2]: if the preposition *of* establishes a relation of possession between DP1 and DP2, this entails a property of possessed for the thematic role of DP1 and a property possessor for the thematic role of DP2.

Adopting the thematic role analysis in terms of entailments, associated with the analysis of event types that are encoded by some verbs, I can propose a semantic analysis for verbal alternation phenomena studied here. I think that the advantage of connecting these approaches can be illustrated in two ways. First, dealing with a predicate decomposition of the verbs can capture the generalization about the event types, grammatically relevant, and can capture the primitive predicates assumed by most linguists, as a limited inventory of relevant properties of the language. Besides, the event structure representation can also capture the idiosyncratic element of a verb's meaning. Therefore, individual verb meanings are represented by primitive predicates together with an idiosyncratic element of the meaning. The idea that the idiosyncratic information should be distinguished from the primitive predicates is now widely accepted. Adopting this idiosyncratic element in my analysis makes possible to establish a connection with Hale & Keyser (2002)'s proposal, which adopt the concept of a verb root element to give a theoretical explanation for lexical syntactic structures of types of verbs.

The second point is the advantage of using Dowty's entailments. The argument position in a predicate decomposition analysis may correspond to a thematic role, in a coarse-grained size. But, for the alternations studied here, we need a finer grain-size definition of thematic roles. Thus, correlating the primitive predicates with more specific semantic properties can give us this fine-grained size approach, without losing the advantages of a predicate decomposition analysis. Moreover, the definition of thematic role proposed also eliminates the "reified" nature of Dowty's proposal, that is, thematic roles are not present in the grammatical representation of the sentence, nor does any grammatical process refer to them (see Davis & Koening 2000, p.74 and Van Valin 1999, pp. 386-387). In my proposal, thematic roles are actually assigned to a verb's argument, allowing rules of grammar to refer to them.

3. The semantic analysis

3.1 The semantic representation of basic sentences

Let us repeat the examples in (6) and (7), in the examples in (59) and (60), respectively:

(59) a. O dentista extraiu o dente do João.
'The dentist extracted John's tooth.'
b. O João$_i$ extraiu o$_i$ dente.
'John had the dentist extract his tooth.'

(60) a. Alguém quebrou o braço do João.
'Someone broke John's arm.'
b. O João$_i$ quebrou o$_i$ braço.
'João broke his arm.'

The examples above show the same profiled syntactic structures [DP1 V [DP2 of DP3]] alternating with [DP3$_i$ V DP2$_i$]. However, the semantic representations of sentence in (59a) shown in (61), and the sentence in (60a) shown in (62) differs:

(61) a. *v*: [[x ACT] CAUSE [y BECOME <*V*>]]
b. *v*: [[x (ACT)] CAUSE [y BECOME <*V*>]] deliberately

(62) *v*: [[x (ACT)] CAUSE [y BECOME <*V*>]] (deliberately)

The basic sentence of the agent-possessor alternation, represented semantically in (61), has a verb that encodes an externally caused event, with an inherent agent or an agentive interpretation, necessarily. On the other hand, the basic sentence of body-possessor alternation, represented semantically in (62), does not need to have necessarily an agentive interpretation, although the sentence also has a verb that encodes an externally caused event. These semantic representations lead us to propose the thematic structure in (63), for sentence in (59a), and the thematic structure in (64), for sentence in (60a):

(63) {cause/volition , affected}
(64) {cause (volition), affected}

Based on these representations, we can trace the constraints on the basic sentences that block the occurrence of these alternations. The examples below show that, if the VP in the agent-possessor basic sentence (or VP plus adjunct) does not entail volition for its subject, the alternation is not permitted:

(65) a. O cabeleireiro cortou o cabelo do João acidentalmente.
'The hairdresser cut João's hair accidentally.'
b. *O João cortou o cabelo (com o cabeleireiro) acidentalmente.
João cut the hair (with the hairdresser) accidentally
(66) a. O rapaz lavou o carro da Maria acidentalmente.
'The boy washed Maria's car accidentally.'
b. *A Maria lavou o carro (com o rapaz) acidentalmente.
Maria washed the car (with the boy) accidentally

In contrast, if the verb of the body-possessor basic sentence entails volition for its subject, that is to say, if the verb encodes externally caused events that are inherently agentive, this alternation fails, as it is represented in (62):

(67) a. O médico operou o braço do João.
'The doctor operated on João's arm.'
b. *O João operou o braço acidentalmente.
João operated on the nose accidentally
(68) a. A enfermeira radiografou o dedo da Maria.
'The nurse x-rayed Maria's finger.'
b. *A Maria radiografou o dedo acidentalmente.
Maria x-rayed the finger accidentally

Moreover, this first condition interdicts basic sentences with verbs denoting internally caused events to undergo the agent-possessor alternation. This means that the argument in subject position in the basic sentence cannot bear the thematic role: {cause/volition/affected}. In the examples below, the (b) sentences cannot have an interpretation in which DP1 is the agent of V and DP3 is the possessor that allows the action:

(69) a. João comeu o peito do frango.
'João ate the ckicken's breast.'
b. *O frango comeu o peito (com o João).
the chicken ate the breast (with João)
(70) a. João bebeu o vinho do padre.
'João drank the priest's wine.'
b. *O padre bebeu o vinho (com João).
the priest drank the wine (with João)
(71) a. João mastigou a bala do menino.
'João chewed the boy's candy.'
b. *O menino mastigou a bala (com o João).
the boy chewed the candy (with João)

Finally, even if the verbs in both basic sentences encode a change of state for their arguments in object position, the phrase [DP2 of DP3], the verb cannot encode a change of location for that argument. This means that the basic sentence cannot have the following semantic representations:

(72) a. *v*: [[x ACT] CAUSE [y BECOME IN <*PLACE*>]]
b. *v*: [[x (ACT)] CAUSE [y BECOME IN <*PLACE*>]] deliberately
(73) *v* : [[x (ACT)] CAUSE [y BECOME IN < *PLACE*>]] (deliberately).

The examples below suggest that this is true for agent-possessor alternation:

(74) a. O João carregou o livro da Maria.
'João carried Maria's book.'
b. *A Maria carregou o livro (com o João).
Maria carried the book (with João)
(75) a. O João empurrou o carrinho do menino.
'João pushed the little boy's car.'
b. *O menino empurrou o carrinho (com o João.)
the boy pushed the little car (with João)

Also this seems to be true for the body-possessor alternation:

(76) a. O vento balançou as pétalas da flor.
'The wind shook the flower petals.'
b. *A flor balançou as pétalas.
the flower shook the petals
(77) a. A chuva arrastou o tronco da árvore.
'The rain dragged the tree trunk.'
b. *A árvore arrastou o tronco.
the tree dragged the trunk

Thus, the main conditions involved in these alternation occurrences are associated with the lexical nature of the verbs. Both alternating type of verbs shares one condition: they cannot encode movement. However, they differ in the following ways: the basic sentence of the agent-possessor alternation must have a verb that encodes an externally caused event with an inherent agent or an agentive interpretation (not affected), while the basic sentence of the body-possessor alternation must have a verb that encodes an externally caused event, not necessarily agentive.

But, even if we reach these conditions, there are still other constraints blocking these alternations, related to the specific nature of the possession relation denoted by the argument, the phrase [DP2 of DP3], located in object position.

3.2 The possessor relation

The argument, [DP2 of DP3], in the agent-possessor basic sentence must encode a possession relation, which presents the following thematic structure: {possessed, possessor}; consequently, DP3 always denotes a person. This would be expected, because the possessor in the basic sentence is the indirect agent in the alternate sentence, therefore, DP3 could only denote a person:

(78) a. O dentista extraiu o dente de leite.
'The dentist extracted the baby tooth.'
b. *O leite extraiu o dente (com o dentista).
the milk extracted the tooth (with the dentist)

On the other hand, the body-possessor alternation must also have a possession relation, but this possession must be an inalienable possession relation between body and part, as shown in the contrast of the examples in (79) and (80). Differently, the possessor relation established by the agent-possessor alternation does not need to be inalienable, as the examples in (81) and (82):

(79) a. A queda quebrou o braço do João.
the fall broke the arm of João
b. João quebrou o braço com a queda.
João broke the arm with the fall
(80) a. O acidente estragou o carro da Maria.
the accident ruined the car of Maria
b. *A Maria estragou o carro com o acidente.
Maria ruined the car with the accident
(81) a. Aquele rapaz pintou a casa do João.
that boy painted the house of João
b. O João pintou a casa com aquele rapaz.
João painted the house with that boy
(82) a. A costureira fez o vestido da Maria.
the dressmaker made the dress of Maria
b. A Maria fez o vestido com a costureira.
Maria made the dress with the dressmaker

We observe in BP that this inalienable relation can also be extended to objects, in a body-part metaphoric construction. We have such pairs, as in (36) to (38): *carro/pneu* (*car/tire*), *relógio/ponteiro* (*clock/hand*), *pote/tampa* (*pot/lid*). In these pairs, I would say that the relation between these two objects is inalienable; the second object is an intrinsic part of the first. Therefore, I propose that if we interpret the object-part relation as a body-part metaphoric relation, under adequate conditions, this alternation is possible in BP. See other examples:

(83) a. A chuva estragou a porta da casa.
'The rain ruined the door of the house.'
b. A casa estragou a porta.
the house ruined the door
(84) a. A tempestade quebrou os galhos da árvore.
'The storm broke the branches of the tree.'
b. A árvore quebrou os galhos.
the tree broke the brunches
(85) a. O tempo desbotou as paredes da igreja.
'Time discolored the walls of the church.'
b. A igreja desbotou as paredes.
the church discolored the walls
(86) a. O menino quebrou o pé da mesa.
'The boy broke the table foot.'
b. A mesa quebrou o pé.
the table broke the foot

More examples of pairs like these are:

(87) árvore/folha 'tree/leaf', árvore/raiz 'tree/root', cadeira/braço 'chair/arm', cadeira/encosto 'chair/back', flor/pétala 'flower/petal', violão/corda, guitar/string', piano/tecla, piano/key' …

Finally, it is important to point out that, although some authors assume that a family relationship is a kind of inalienable possession, the possession relation denoted by both alternations cannot be extended to this kind of relationship. In the (b) sentences, only an agentive reading is possible:

(88) a. O João assassinou/matou/alimentou a filha da Maria.
'John murdered/killed/fed Maria's daughter.'
b. *Maria assassinou/matou/alimentou a filha (com o João).
Maria murdered/killed/fed the daughter (with John)

(89) a. O João machucou/arranhou/ o bebê da Maria.
'João hurt/scratched Maria's baby.'
b. *Maria machucou/arranhou o bebê.
Maria hurt/scratched the baby

In conclusion, both alternating basic sentences must have an argument in object position that denotes a possession relation, but not of the type of a family relationship. Additionally, the possessor relation of the body-possessor alternation must be exclusively inalienable.

3.3 The semantic representation of the alternate sentences

As already shown, if we compare the two final alternate sentences, they show the same profiled syntactic structure:

(90) a. O João$_i$ extraiu o$_i$ dente (com o dentista).
João extracted the tooth (with the dentist)
b. O João$_i$ quebrou o$_i$ braço (com a queda).
João broke the arm (with the fall)
(91) [DP3$_i$ V DP2$_i$]

However, there are semantic distinctions in the interpretation of the sentences above (not if the interpretation is that of an agentive event). The agent-possessor alternate sentence, in (90a), and the body-possessor alternate sentence in (90b) can be represented in terms of primitive predicates, respectively, as:

(92) *extrair*: [[z$_i$ ACT] CAUSE [[x ACT]] CAUSE [y$_i$ BECOME <*EXTRAIR*>]]]
(93) *break*: [y BECOME < *BREAK*>]]

Yet, the alternate sentence of the agent-possessor alternation admits the insertion of another argument, and we still have an interpretation that an indirect agent licenses another agent to do something for a third person, even though these sentences are less frequent. This could be represented as [DP4$_i$ V [DP2 of DP3$_i$]:

(94) A mãe$_i$ cortou o cabelo do$_i$ filho (com o cabeleireiro) deliberadamente/*acidentalmente.
the mother cut the hair of the son with the hairdresser deliberately/accidentally

Besides, these sentences seem more acceptable if there is a familiar relationship between DP3 and DP4; if this relationship is not present, the sentences seem very odd:

(95)???A Maria extraiu o dente do José com o dentista.
Maria extracted the tooth of José with the dentist
(96)???O João cortou o cabelo do José com o cabeleireiro.
João cut the hair of José with the hairdresser
(97) ???O José lavou o carro da Maria com o lavador de carros.
José washed the car of Maria with the boy washer of the car

We can note that sentences in (95) to (97) have the same semantic structure, in terms of primitive predicates, like the predicate shown in (92): [[z$_i$ ACT] CAUSE [[x ACT]] CAUSE [y$_i$ BECOME <*STATE*>]]]. If we maintain the familiar relationship between *z* and *y*, we can insert recursively more arguments, such as [DP2 of DP3 of DP4 of …]:

(98) A mãe$_i$ cortou o cabelo da amiga de sua$_i$ filha com o cabeleireiro deliberadamente.
the mother cut the hair of the friend of her daughter with the hairdresser deliberately

Evidently, these last sentences are much less used, although they are grammatical.

3.4 Conclusions about the semantics of the alternations

After comparing the properties analyzed above, we can see that the main difference between the alternations is the nature of the lexical-semantics of the verb, which is what ultimately seems to be the reason behind the possibility of existing one alternation or the other. As the semantic representations of both alternations are distinct, we could expect that these verbs also project different syntactic structures. And, since in the profiled syntactic form, these differences do not show up, they must appear in another level. Thus, to propose a structural analysis, which can predict these occurrences, I will assume an intermediate level, between sentential syntax and semantic representation, the Lexical Syntactic level, proposed by Hale & Keyser (2002). Although I use frameworks that assume different notions of argument structure, it seems compatible to propose this intermediate level, assuming that what Hale & Keyser term semantic notions or features of the lexical semantics of individual items can be correlated to the semantic representation given here. Thus, I assume that these semantic distinction features will make the alternations structurally distinct.

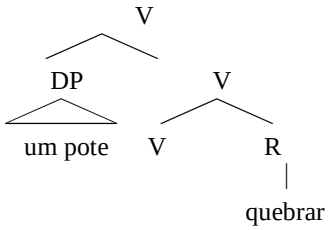
4. The l-syntax

For Hale & Keyser (2002), argument structure is the syntactic configuration projected by a lexical item. It is the system of structural relations established between heads and their arguments within the syntactic structures projected by nuclear items. This postulation delimits that the behavior of lexical items is due to structural relations. Besides, lexical items, such as verbs, have two components: (i) the categorical signature V and (ii) the root component, a core lexical item comprising the correct phonological matrix and the correct semantic structure. There are certain aspects of the meanings of the root elements that can be considered the interface relation between semantics and argument structure. Thus, I will explore the lexical semantic analysis proposed here related with the lexical syntactic analysis proposed by Hale & Keyser (2002), to show the structural differences between these alternations. Let us take two examples, with *quebrar* and *extrair* verbs:

(99) a. João quebrou um pote.
João broke a pot
b. Um pote quebrou.
a pot broke
(100) a. O dentista extraiu um dente.
the dentist extracted a tooth
b.*Um dente extraiu.
a tooth extracted

Hale &Keyser (2002 - hereafter H&K) propose that verbs of the type *quebrar* consist of two structural elements: a root (R) and a verbal host (V). The verbal component takes a complement, realized as the root. The root contains the semantic and the phonological features. The root component of this type of verb requires a specifier, projecting an argument structure, as shown in (101):

(101)

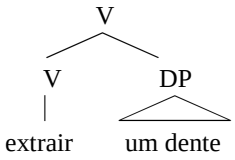


This is an essential feature of the root (R= quebrar), accounting for the canonical causative-inchoative alternation, specific of these type of verbs.

On the other hand, there are some verb roots that do not require a specifier, therefore the verb cannot project a specifier. Thus, this root properties account for the ill-formedness of causative-inchoative alternation, as it is the case of verbs of the type *extrair*. The verbs that head these projections share a certain property, characteristic of the argument structure type they represent: they take a complement and the structure they project does not include a specifier. These verbs are assumed to be monadic, in relation to the

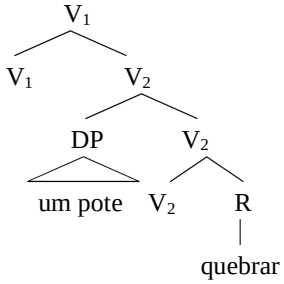
arguments (complements and specifiers) that must appear internal to the lexical configuration associated with a lexical item. In sentencial syntax, these verbs are ordinarily dyadic, so they have subject and object:

(102)



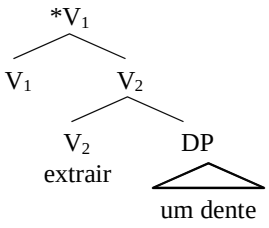
Transitivization of verbs of the type *quebrar* is in principle automatic, by virtue of the complement relation. The transitive structure in (99a) results from the combination, via Merge, of the structure in (101) and a verbal nucleus V, as in (103):

(103)



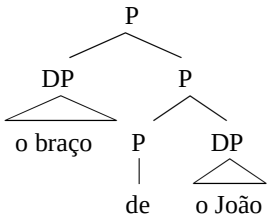
Transitivization of verbs of the type *extrair* is impossible because there is no internal argument, in specifier position, to be licensed by V_1, assuming that to be a requirement for convergence, as shown in (105):

(104)



This follows from the nature of the root (extrair), which does not force the verb to project a specifier. However, our sentences are not exactly of the type in (99) and (100). They are more complex, presenting a complement, [DP of DP]. For H&K, every preposition has an essential and inherent lexical character of head and requires a complement and a specifier, having a dyadic l-syntax, that is to say, the structural configuration defined by a head that projects two internal arguments positions, according with its elemental lexical properties:

(105)



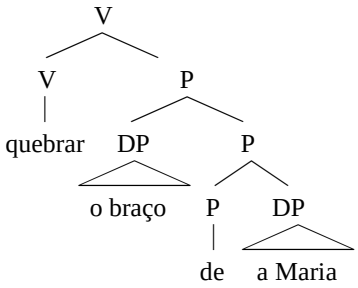
Thus, the syntactic argument structure assumed in (105), permitting the specifier and the complement positions, defines an entirely local structure corresponding to the birelational character of prepositions. As it is well assumed, prepositions are prototypically birelational, since they specify a relation between two entities, in our case, a possession relation.

Now, we are in conditions to propose the argument structures of the two alternations. Let us repeat here the body-possessor alternation:

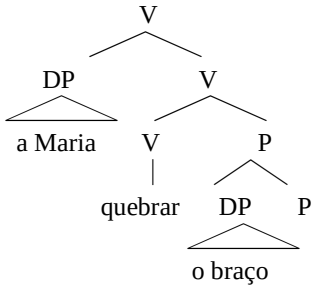
(106) a. O acidente quebrou o braço de João.
the accident broke the arm of João
b. João quebrou o braço.
João broke the arm

The two alternate sentences are defined by the operation of Merge (Chomsky, 1995). Following H&K, the alternant sentences in (106) result from "immediate gratification" of the specifier requirement of P, as shown in (107a); and the other alternate variant results from "delayed gratification" on that requirement, as shown in (107b):

(107) a.



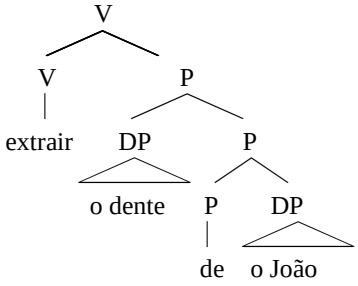
b.



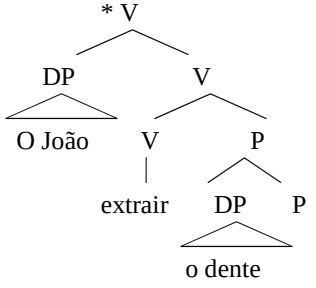
In (107), we have the variant forms, projecting two internal arguments in the l-syntax, binding by a possession relation, presented in P.

However, the agent-possessor alternation differs from body-possessor alternation in its l-syntax, as can be observed in (108):

(108) a.



b.



The DP, *o João*, can only be raised to an external argument, in the sentential syntax, because the root element of *extrair* does not project a specifier position in l-syntax. The presence of P maintains the possession relation between DPs.

Concluding, the difference between these two verbs lies in the semantic components of their root elements. This difference might be termed the "manner factor" inherent in the semantics of the root. Following H&K, we can propose that verbs of the type *quebrar* can be termed *patient-manner* because they include, perhaps in their lexical-encyclopedic entries, an adverbial semantic "feature" that identifies the physical motion, distribution, dispersal, or attitude of the entity denoted by the argument (the "patient") occupying the specifier position in the P-projection that functions as their complement. They are verbs alternating types in their l-syntax, because the lexical semantic adverbial feature is associated with an internal argument. Thus, the alternate form [DP V DP] of the body-possessor alternation has two internal arguments, despite their profiled syntax.

By contrast, verbs of the type *extrair* might be termed *agent-manner* verbs because they include an adverbial feature that describes the action of the entity denoted by their external argument, in the sentential syntax: to "extract X of Y" requires an "agent" who executes the gestures that, in accordance with the lexical encyclopedic entry, are necessary in performing the action. This prevents the l-syntax of *extrair* verbs to have two internal arguments: the agent-manner adverbial feature, presented in its root element, must be correctly associated with an external argument. So, the DP, *o João*, can only be an external argument in the sentencial syntax.

This proposal is completely compatible with the semantic representation given for the verbs of the types *extrair* and *quebrar*, in (109) and (110), respectively, where <*V*> are the root elements, (a) sentences are the semantic representation of the basic sentences, and (b) sentences are the semantic representation of the alternate sentences:

(109) a. [[x ACT] CAUSE [y BECOME <*EXTRAIR*>]]
b. [[z_i ACT] CAUSE [[x ACT]] CAUSE [y_i BECOME <*EXTRAIR*>]]]
(110) a. [[x (ACT)] CAUSE [y BECOME <*QUEBRAR*>]]
b. [y BECOME < *QUEBRAR*>]]

To participate in the agent-possessor alternation, the semantic representation of *extrair* must have an inherent agent as in (109). This is compatible with the adverbial feature "agent-manner", presented in these verb root elements, which predicts that this type of verb must have an external argument to bind its agent-manner feature. Besides, the possibility of insertion of another agent, recursively, in the subject position of the agent-possessor alternate sentence may be evidence that this argument cannot be a projection of V, in its l-syntax.

The semantic representation in (110) is also compatible with the adverbial patient-manner feature, which predicts that the l-syntax of the verbs of the type *break* has two internal arguments in its alternate form, because the alternation can present a causative interpretation in its basic sentence, but can only have an affected ("patient") interpretation in its alternate form.

5. Final Considerations

I have shown here that there are two types of verbal alternation in BP that have the same profiled form, but are different in their semantic representation and in their l-syntax structures. The first alternation has as a basic sentence - '*O dentista extraiu o dente do João 'The dentist extracted John's tooth* - alternating with - *O João extraiu o dente 'João extracted his tooth'*. We can interpret the alternate sentence as: João had someone extract his tooth. I call this alternation "agent-possessor alternation". I call the second alternation "body-possessor alternation" and its basic sentence is: *Alguém quebrou o braço do João* '*Someone broke John's arm'* - alternating with - *João quebrou o braço 'João broke his arm'*. We can interpret the alternate sentence as: João is the possessor of the arm that suffers a process of breaking.

Analyzing the data, I have shown the differences between these two linguistic phenomena. The main conditions that allow these alternations occur are due to the lexical nature of the verbs. Both alternating type of verbs shares one condition: they cannot encode movement. However, they differ, semantically, in the following ways: the basic sentence of the agent-possessor alternation must have a verb that encodes an externally caused event with an inherent agent or an agentive interpretation (not affected), while the basic sentence of the body-possessor alternation must have a verb that encodes an externally caused event (not

necessarily agentive). Moreover, both alternating basic sentences must have an argument in object position that denotes a possession relation, but not of the type of a family relationship. Additionally, the possessor relation of the body-possessor alternation must be exclusively inalienable.

These semantic distinctions are responsible for different syntactic projections, at the l-syntax representation, proposed by Hale &Keyser (2002). The root element of the verb type *quebrar* forces the verb to project a specifier position, while the nature of the root element of the verb type *extrair* does not force the verb to project a specifier. These different projections are due to what H&K term "manner factor" inherent in the semantics of the verb roots. Verbs of the type *quebrar* has, in its root element, an adverbial semantic feature - affectedness - associating the argument with the specifier position in their l-syntax. Thus, the alternate form [DP3 V DP2] of the body-possessor argument structure has two internal arguments, despite their profiled syntactic form. By contrast, verbs of the type *extrair* include an adverbial feature that describes the action of the entity denoted by their external argument, in the sentential syntax. This prevents the l-syntax of the verb *extrair* to have two internal arguments: there must be an external argument in the sentential syntax to bind the agent-manner feature of the verb root element. Consequently, the alternate form [DP3 V DP2] has, actually, an external argument.

Concluding, the proposal presented here shows some innovations in relation to the frameworks, on which this work is based: Levin & Rappaport (2005), Dowty (1991) and Hale & Keyser (2002). By adopting a connection between the lexical semantic approaches, the proposal keeps the generalization about the event types and the primitive predicates, keeps the distinction of the idiosyncratic meaning of individual verbs present in their root elements, and can also give a fine-grained analysis of thematic roles, in terms of lexical entailments, without losing the correlation between thematic roles and grammar. Besides, by using the individual meaning of the verb root element in the predicate decomposition, the proposal can establish a bridge between a lexical semantic representation and a lexical syntactic representation of the verbs analyzed.

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Notes

1 See Pontes (1986), Everett (1986), Camacho (2003) and Perini (2008).

2 In standard BP, proper names are preceded by the definite article; as this is not relevant in this analysis, I will just gloss proper names with no article.

3 Sentence in (6b) can also have an agentive interpretation: *John extracted his own tooth*. However, this interpretation, pragmatically excluded in most situations, is not the alternate form; it is the agentive reflexive use of the verb *extract.* The same agentive reflexive interpretation is possible for example in (7b). Hereafter, I will not refer to this agentive interpretation.

4 Although in English, an animate subject is possible in this type of alternation, an inanimate subject is not possible.

5 This indirect agent can be compared to *iniciative*, term used by Cruse (1973) or *initiator*, term used by Halliday (1967), for the subject property of sentences like: *The warder marched the prisoners across the yard*.

6 I emphasize again that all the (b) sentences have an agentive reading, not relevant for this analysis.

7 As pointed out by a reviewer, some English dialects present sentences such as, *I cut my hair* (in a patient reading). However, my claim here is that this type of alternation, with no marked form, is very productive in BP with many other agentive verbs, which does not seem to be the case for most languages.

8 I do not list the property of independency of the event, because Dowty is unsure whether this belongs to the discourse dimension of subjecthood rather than the semantic dimension, and this discussion is not relevant here.

9 There are localist approaches such as Jackendoff's (1972, 1976, 1983, 1990), Anderson (1971) and Van Voorst (1993); there are also aspectual approaches such as Dowty (1979), Tenny (1994), Vendler (1967) and Verkuyl (1989, 1993); there are also causal approaches, such as Croft (1990), DeLancey (1984), Talmy (1976, 1988); among others.

10 We can compare, in some sense, Dowty's proto-roles and Van Valin's macro-roles Actor and Undergoer, although RRG (Role and Reference Grammar)'s macro-roles are assigned to a verb's arguments, in terms of predicate decomposition, allowing rules of grammar to refer to them.

11 The relevance for grammar of these primitive semantic properties has also been empirically investigated, for many verbal classes in BP, presenting more than 1200 verb examples (Berg 2005, Cançado 1995, Cançado 2005, Cançado 2009, Ciríaco 2007, Corrêa 2005, Damasceno 2006, Godoy 2008, Moreira 2000, Silva 2002, Wenceslau 2003 - these works and BP data is available for download from www.letras.ufmg.br/marciacancado).

12 Cruse (1973), for instance, proposes that there are four types of agents: volitive, effective, initiative and agentive; each of these types display distinct syntactic behavior. Van Valin & Wilkins (1996) also point out the degree of agentiveness present in distinct classes of verbs. For BP, Cançado & Franchi (1999) shows that there are differences between agents, direct causes and indirect causes that are relevant grammatically.

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