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**Psych verbs: The behavior of the ObjExp verbs
in Brazilian Portuguese**

Abstract: Psychological verbs, especially Object Experiencer verbs, are widely discussed in the linguistic literature because of their peculiar syntactic and semantic properties. Two main issues regarding Object-Experiencer verbs are often raised: their aspectual nature and an alternation process (with the experiencer in subject position). This article analyzes Brazilian Portuguese Object Experiencer verbs, focusing on these issues. Based on a study of 170 verbs, we claim that Object Experiencer verbs constitute a verb class whose members describe a complex stage-level state in which a stimulus state activates (in a causative relation) a mental state in an experiencer. In addition, we argue that Object-Experiencer verbs appear in an inverse form: the experiencer as subject, and the stimulus as oblique. We claim that such an inverse form does not result from the causative alternation. In the inverse structure, different from an inchoative form of a change-of-state verb, both arguments are strongly preferable, and the verbs still denote a stative situation. We also provide a representation for the event structure of those verbs, using predicate decomposition, that is associated with their syntactic properties.

Keywords: alternation; Brazilian Portuguese; causative states; event structure; psych verbs

1 Introduction

Psychological verbs, or simply psych verbs, are characterized as describing a situation in which a participant, which bears the experiencer thematic role, holds a certain psychological state in relation to another participant, which is commonly assumed to bear a theme role. Psych verbs are broadly discussed in the literature and were already investigated in English (Arad 1998a, and 1998b; Cervel 2015; Grimshaw 1990; Pesetsky 1995; Postal 1971; Van Valin and LaPolla 1997), Spanish (Marín and McNally 2005, and 2011), Finnish (Pylkkänen 2000), Polish (Biały 2005; Rozwadowska and Bondaruk 2019), French (Legendre 1989; Ruwet 1972), Italian (Belletti and Rizzi 1988), European Portuguese (Mendes 2004), Brazilian Portuguese (Cançado 1995, and 2012; Cançado and Franchi 1999), Japanese (Iwata 1995), Greek (Alexiadou and Anagnostopoulou 2020), German (Marelj 2013; Temme 2018), among many other languages, and also in crosslinguistic perspectives (Alexiadou and Iordăchioaia 2014; Cheung and Larson 2015;

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Kailuweit 2015; Landau 2010; Talmy 1985; Verhoeven 2014).

One of the interesting facts about the behavior of the broad class of psych verbs is that the experiencer can be subject, as in *John fears Mary*, or object, as in *Mary frightens John*. The first type of psych verbs, the Subject Experiencer verbs, or SubjExp verbs in short, following Pesetsky's (1995) terminology, present a transitive configuration, in which the experiencer (the subject) is in a psychological state in relation to the theme (the direct object). Other examples are *desire, love, hate*. These verbs do not pose many problems for linguistic analysis and are analyzed as simple stative verbs. The second type, the Object Experiencer verbs, ObjExp verbs in short, present a basic transitive configuration, in which the theme (the subject) causes a psychological state in the experiencer (the direct object). Other examples are *worry, bother, annoy*. Differently from SubjExp verbs, ObjExp verbs pose important problems for linguistic analysis.

First of all, ObjExp verbs are expressed in distinct and unsystematic ways across languages (Croft 2012; Landau 2010; Talmy 1985), and the main issues raised in the literature about these verbs relate to event structure and argument realization. In relation to event structure, a main question regarding these verbs is what is their aspectual nature: whether they are stative, eventive and/or agentive. Arad (1998a, 1998b), for example, argues that verbs such as *worry* and *concern* are stative, verbs such as *surprise* are agentive and eventive, and verbs such as *frighten* are ambiguous between stative, eventive and agentive readings. Alexiadou and Iordăchioaia (2014) point out that verbs such as *îngrijora* 'worry' and *apokardiono* 'depress', in Romanian and Greek respectively, are ambiguous between stative and eventive/agentive readings, and verbs such as *a mira* 'surprise', in Romanian, are stative. Biały (2005) and Rozwadowska and Bondaruk (2019) argue that in Polish, verbs such as *martwić* 'worry', *przygnębiać* 'depress' and *dziwić* 'surprise' are stative, while verbs such as *irytować* 'irritate' and *straszyć* 'scare' are eventive/agentive.

Besides, in some languages (as Greek, Romanian, Polish, Spanish, and Brazilian Portuguese, for instance), these verbs can have variable argument realization. Despite being ObjExp verbs, they are able to occur in a structure with the experiencer argument in subject position (and the theme argument in an oblique position, marked by a preposition). Some authors associate this phenomenon to the causative alternation, the intransitive inchoative form of a transitive causative verb (Alexiadou and Iordăchioaia 2014; Biały 2005; Cançado 2012). Examples in (1) are from Greek:

- (1) a. *Ta nea enohlisan ti Maria.*
the news annoyed.ACT the Mary.ACC
'The News annoyed Mary.'
- b. *I Maria enolithike me ta nea.*
the Mary annoyed.NACT with the news
'Mary got annoyed with the news.'
- (Alexiadou and Iordăchioaia 2014: 63)

Focusing on these two issues regarding event structure properties and argument realization, we present a detailed analysis of ObjExp verbs in Brazilian Portuguese (henceforth BP), taking as a fundamental hypothesis that:

- ObjExp verbs constitute an independent verb class in BP, since their specific event structure properties are relevant to their argument realization.

Our analysis is based on a preliminary study of the more general group of psych verbs in BP, presented in Cançado (1995). We develop this preliminary study for 170 BP ObjExp verbs, in about 1020 sentences that show their semantic and syntactic properties. Based on the examination of this body of data, we make two main claims that support our hypothesis:

- (i) BP ObjExp verbs describe complex states.

We propose that BP ObjExp verbs are stative, with a stage-level interpretation. However, these verbs are also causative, denoting a specific type of internal causative relation between a theme (or more specifically, a *stimulus*), and an experiencer. Thus, we claim that ObjExp in BP are *complex states* comprised of two *substates* (following Pylkkänen 2000) related by an internal causation. To highlight this stative complex nature, we propose an argument structure representation for these verbs in terms of predicate decomposition. The sentence in (2) illustrates the basic structure of BP ObjExp verbs:

- (2) *A arrogância do filho preocupou a mãe.* [Stimulus, Experiencer]
the arrogance of.the son worried the mother
'The son's arrogance worried his mother.'

- (ii) The inverse form of ObjExp verbs in BP does not result from the causative alternation.

ObjExp verbs in some languages, including BP, occur in a structure with the experiencer in subject position (which we call "inverse form"). Although some authors argue that the inverse form is the result of the causative alternation, we claim that this is not the case in BP. The inverse form is due to the complex stative nature of BP ObjExp verbs, and has different properties from an inchoative sentence. The sentence in (3) exemplifies the inverse form of BP ObjExp verbs:

- (3) *A mãe se preocupou com a arrogância*
the mother REFL worried with the arrogance
do filho. [Experiencer, Stimulus]
of.the son
'The mother got worried by the son's arrogance.'

Our account differs from previous analyses of ObjExp verbs both in our proposal for the

aspectual nature of these verbs and in our explanation for the inversion process. We emphasize that a difference between BP and the other languages cited above is that all 170 verbs in our data present a stative interpretation (complex states with stage-level interpretation), even though few among them (12 verbs) also present agentive and eventive readings. It means that we do not claim, as in the general literature pointed out above, that some ObjExp verbs describe states and others describe events. Also, the inverse form is a systematic and productive process that occurs with all 170 analyzed verbs and has specific properties that distinguish it from the causative alternation.

The paper is organized as follows. In Section 2, we describe the theoretical perspective assumed in our analysis as well as the nature of the analyzed data. In Section 3, we investigate the event structure of BP ObjExp verbs, arguing that they describe complex states. In Section 4, we explain the inverse form and provide evidence that such a structure is not the result of the causative alternation. Section 5 closes the paper with our final considerations.

2 Verb classes and BP linguistic data

As we start our analysis from the hypothesis that ObjExp verbs constitute a verb class in BP, we shall first explain what is considered to be a verb class in our approach. We follow the view that verb classes derive from the strong correlation between verbal semantics and syntactic structure. Such strong correlation can be observed, for example, in the behavior of change-of-state verbs, such as *break*, which occur in the causative alternation, in contrast to verbs that do not describe changes of state, such as *hit*, and cannot alternate in the same way.

- (4) a. *John broke the stick.*
b. *The stick broke.*
- (5) a. *John hit the tree (with a rock).*
b. **The tree hit.*
- (Fillmore 2003 [1970]: 126–128)

Based on these correlations, Fillmore (1970) has stipulated that specific semantic properties of verbs determine syntactic structure. Thenceforth, several linguists, more specifically lexical semanticists, have focused on the study of semantic determination over syntax (Grimshaw 2005; Koenig and Davis 2006; Levin 1993; Levin and Rappaport Hovav 2005). The basic assumption behind this approach is that verbal items that share the same syntactic behavior are grouped into classes that are semantically defined. Verbs that belong to the same class, thus, share the same syntactic argument realization, and also the same types of meaning components (Cançado et al. 2013; Levin 1993).

According to this assumption, not all types of semantic properties of verbs define verb classes. As verb classes derive from the correlation between semantics and syntax, semantic properties that define verb classes are those that impact syntactic structure, more

specifically argument realization (including basic transitivity and argument alternations). Grimshaw (2005) shows that English color verbs (*paint, color, bleach, redden, etc.*), for example, cannot be grouped together in a single class, as color verbs do not have a coherent syntactic behavior, despite sharing meaning components. Other types of semantic properties of these verbs can be associated with argument realization, such as action, manner, and change of state. Agentive manner verbs, such as *paint*, behave like other agentive manner verbs not related to color, such as *write, draw* and others. These verbs are transitive and occur in the unspecified object alternation (exemplified in (6b)), but they do not occur in the causative alternation (as can be observed in (6c)).

- (6) a. *John painted/wrote/drew that piece.*
b. *John painted/wrote/drew for six hours.*
c. **The piece painted/wrote/drew.*

Differently, change-of-state verbs related to color, such as *redden*, behave like other change-of-state verbs not related to color, such as *bruise, hurt* and others. These verbs are transitive and cannot occur in the unspecified object alternation (as can be observed in (7b)), but they do occur in the causative alternation (exemplified in (7c)), just like the verb *break* in (4).

- (7) a. *The hot sun reddened/hurt/bruised the girls' skin.*
b. **The hot sun reddened/hurt/bruised for six hours.*
c. *The girls' skin reddened/hurt/bruised.*

As the examples above illustrate, semantic properties that define verb classes are those that relate to concepts such as agentivity, manner, causation, and change of state. Such properties are assumed to be related to event structure (Croft 2012; Levin and Rappaport Hovav 2005). Event structure comprises a complex combination of semantic properties, so the members of a verb class take the same number of arguments, assign the same semantic roles to those arguments, and have the same lexical aspect. Accordingly, our methodology for verbal classification is based on the relation between the event structure of verbs and their argument realization.

Following this path, we take Cançado's (1995) list of ObjExp verbs as the starting point of our analysis, together with some properties and sample sentences provided. Cançado's (1995) seminal study on BP psych verbs had already shown that this broad group of verbs can be divided into distinct classes. Her work presents an extensive list of BP ObjExp verbs along with many examples of their argument realization properties.¹ The robustness of Cançado's (1995) data can be identified by the source used. The verbs were collected from Borba (1990), a grammatical dictionary of BP verbs. This dictionary presents, besides the possible meanings of a verbal item, the argument realization

¹ Although relying on Cançado's verb list and on the properties presented for the classification of ObjExp verbs, we diverge from this work in the analysis of the event structure of these verbs and their inverse form.

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properties of each lexical entry (basic transitivity, thematic roles and argument alternations), which are exemplified by sentences collected from an extensive corpus of written texts. A sample of the list of analyzed verbs is presented in (8).²

(8) *Aborrecer* ‘annoy’, *Acalmar* ‘calm down’, *Alegrar* ‘cheer up’, *Amedrontar* ‘scare’, *Angustiar* ‘distress’, *Assustar* ‘frighten’, *Comover* ‘move’, *Consolar* ‘comfort’, *Constranger* ‘embarrass’, *Decepcionar* ‘disappoint’, *Deprimir* ‘depress’, *Emocionar* ‘move’, *Empolgar* ‘thrill’, *Encantar* ‘delight’, *Enfezar* ‘infuriate’, *Enfurecer* ‘infuriate’, *Entristecer* ‘sadden’, *Enraivecer* ‘infuriate’, *Entediar* ‘bore’, *Entristecer* ‘sadden’, *Fascinar* ‘fascinate’, *Frustrar* ‘frustrate’, *Horrorizar* ‘horrify’, *Importunar* ‘annoy’, *Impressionar* ‘impress’, *Incomodar* ‘annoy’, *Irritar* ‘annoy’, *Magoar* ‘hurt (feelings)’, *Maravilhar* ‘amaze’, *Oprimir* ‘oppress’, *Perturbar* ‘annoy’, *Preocupar* ‘worry’, *Reconfortar* ‘comfort’, *Sossegar* ‘calm down’, *Tranquilizar* ‘calm down’...

In (9) and (10), we show a sample of the sentences that illustrate some of the properties of ObjExp verbs.

- (9) a. *A insistência do filho aborreceu a mãe.* (transitive form)
the insistence of.the son annoyed the mother
‘The son’s insistence annoyed the mother.’
- b. *A mãe se aborreceu com a insistência do filho.* (inverse form)
the mother REFL annoyed with the insistence of.the son
‘The mother got annoyed by the son’s insistence.’
- c. *A mãe está aborrecida com a insistência do filho.* (stative passive)
the mother is annoyed with the insistence of.the son
‘The mother is annoyed by the son’s insistence.’
- (10) a. *O jeito agressivo do candidato surpreendia os eleitores a cada dia.* (transitive form)
day
‘The candidate’s aggressive manner surprised voters every day.’

² Belletti and Rizzi (1988) propose a bipartite classification of Italian ObjExp verbs: the *preocupare* ‘worry’ class, with an accusative experiencer, and the *piacere* ‘please’ class, with a dative experiencer. In BP, there are also a few verbs which present a dative preposition heading the experiencer argument. However, in most cases, these verbs also occur without a preposition, and they show the same properties of other ObjExp verbs:

- i. *O tema interessou (a) o estudante.*
the subject interested (to) the student
‘The subject was interesting for the student.’

Other examples are *atrair (a)* ‘attract (to)’, *agradar (a)* ‘please (to)’ etc. We argue that these verbs belong to same class as *preocupar* ‘worry’, since they share the same properties of ObjExp verbs.

- b. *Os eleitores se surpreendiam com o jeito agressivo do candidato.* (inverse form)
the voters REFL surprised with the way aggressive of.the candidate
'Voters got surprised by the candidate's aggressive manner.'
- c. *Os eleitores estão surpresos com o jeito agressivo do candidato.* (stative passive)
the voters are surprised with the way aggressive of.the candidate
'Voters are surprised by the candidate's aggressive manner.'

Examples in (a) show that these verbs can occur in a simple transitive form; examples in (b) show the structure we call here the inverse form, in which these verbs occur with the experiencer in subject position, the stimulus as a PP headed by *com* 'with', and are also marked with the reflexive pronoun *se*; examples in (c), in turn, show that BP ObjExp verbs allow a stative passivization (*estar+participle*). As we will see below, these properties are specific to this class and crucial in distinguishing them both from SubjExp verbs and change-of-state verbs.³

Cançado's (1995) data, although not extracted from corpora, present attested examples from written texts, corroborated by the intuitive linguistic knowledge of native speakers. An advantage of this type of methodology is that a dictionary brings a more comprehensive list of the verbs in a language, allowing one to work with a more complete list of members in a verb class. A search in corpora would only present the verbs used in a specific context, not reflecting the full range of verbs in the analyzed class. However, once one has a complete list of verbs, corpora can provide valuable information about their argument realization properties. Thus, in our work, the sentences related to each verb in the list presented by Cançado (1995) are complemented by corpora examples taken from *Corpus do Português* (Davies 2016),⁴ *Linguateca* (Santos 2009),⁵ and also, from searches on *Google*. Examples from corpora are shown in (11)-(13).

- (11) a. *O mesmo problema preocupou Leibniz (1646-1716), (...)*
the same problem worried Leibniz (1646-1716)
'The same problem worried Leibniz.'
(Found on *Corpus do Português*)
- b. *Lula se preocupou muito com as populações de baixa renda.*
Lula REFL worried very with the populations of low income
'Lula was very concerned about low-income populations.'
(Found on *Corpus do Português*)

³ The complete list of verbs, together with examples for each verb and property, can be found at <http://verboweb.lettras.ufmg.br/>.

⁴ <https://www.corpusdoportugues.org/>

⁵ <https://www.linguateca.pt/>

- (12) a. *A possibilidade de ouvir críticas de uma multidão de leitores*
the possibility of hear criticism of a crowd of readers
angustiou Parker (...)
distressed Parker
'The possibility of hearing criticism from a crowd of readers distressed Parker.'
(Found on *Linguatca*)
- b. *Este professor sempre se angustiou com os problemas pessoais*
this teacher always REFL distressed with the problems personals
dos alunos (...)
of.the students
'This teacher has always been distressed by students' personal problems.'
(Found on *Linguatca*)
- (13) a. *A pandemia entristeceu o país pelas centenas de milhares de*
the pandemic saddened the country for.the hundreds of thousands of
pessoas que se foram.
people that REFL went
'The pandemic saddened the country for the hundreds of thousands of people who
have gone.'
(Found on Google)⁶
- b. *Moisés se entristeceu com o pecado de seu povo.*
Moisés REFL saddened with the sin of his people
'Moses got sad about the sins of his people.'
(Found on Google)⁷

Based on the analysis of the data described above and on evidence to be presented in the next sections, we argue that ObjExp verbs constitute a verb class since their event structure properties determine their argument realization: they denote a complex stage-level state and present an inverse form, which is not a result of the causative alternation.

3 The event structure of BP ObjExp verbs

In BP, as in many other languages, ObjExp verbs occur in basic transitive sentences, presenting a specific thematic structure, with stimulus subject and experiencer object, as the examples below illustrate:

⁶ <https://www.correiobraziliense.com.br/opiniao/2021/09/4948673-com-negociacao-tudo-e-possivel.html>.
(Accessed 24 January 2022)

⁷ <https://pleno.news/fe/homens-e-mulheres-da-biblia-que-passaram-pela-depressao.html>.
(Accessed 24 January 2022)

- (14) a. *A partida do filho preocupou/angustiou/entristeceu a mãe.*
the departure of.the son worried/distressed/saddened the mother
'The son's departure worried/distressed/saddened his mother.'
b. *preocupar/angustiar/entristecer*: {Stimulus, Experiencer}

As previously argued, ObjExp verbs mainly differ from SubjExp verbs in the syntactic realization of the experiencer argument. While SubjExp verbs have an experiencer subject in a basic transitive sentence, ObjExp verbs, as shown in (14), have an experiencer object in the basic form.⁸ Many authors assume that causation is the main property that distinguishes ObjExp verbs from SubjExp verbs, and it is the factor that determines the realization of the stimulus argument in subject position (Alexiadou and Iordăchioaia 2014; Arad 1998a, 1998b; Biały 2005; Grafmiller 2013; Grimshaw 1990; Iwata 1995; Jackendoff 2009; Pesetsky 1995; Pustejovsky 1995; Pylkkänen 2000). The basic idea behind a causative analysis is that the stimulus argument causes an emotional state in the experiencer argument in ObjExp verbs. In contrast, SubjExp verbs denote a state in which an experiencer argument is in an emotional state in relation to a target argument.⁹

Some authors point out, however, that the causation component of the semantics of ObjExp verbs is not of the same type as the causation component of change-of-state verbs. More specifically, Van Valin and LaPolla (1997), Arad (1998a, 1998b), Pylkkänen (2000), Biały (2005) argue that, even if some of these verbs establish a causal relation between their arguments, they still describe a stative situation. They argue that stativity and causation are not incompatible notions in the semantics of a verb, although causative predicates are usually associated to an aspectually uniform class, the accomplishment verbs, as proposed originally by Dowty (1979). For Pylkkänen (2000), for instance, causative verbs can be stative when the causally related situations are both perceived as states. As a result, we have a complex state decomposable into two substates and, consequently, a stage-level interpretation, since these predicates lack the inference of temporal persistence, as pointed out by Marín and McNally (2005). Pylkkänen (2000) shows that some psych verbs in Finnish evidence the existence of this complex stative semantic structure. Following this line of thought, we argue that BP ObjExp verbs also validate such proposal. As follows, we show that these verbs are stative, with a stage-level interpretation, and are also causative.

3.1 Stativity

As we have shown, previous analyses for ObjExp verbs in different languages have raised the question of which is the aspectual type of these verbs. Some ObjExp verbs are analyzed as dynamic telic predicates, others as statives, and others even as having

⁸ Following Haspelmath's (1993) argumentation, we assume that verbs can have a basic and a derived form. Generally, the morphologically marked construction is derived from a basic event structure organization. BP ObjExp verbs show both forms.

⁹ The assumption of a causative component in ObjExp verbs goes against important proposals such as Belletti and Rizzi's (1988) unaccusative analysis and Landau's (2010) locative approach.

ambiguous aspectual interpretation (Alexiadou and Iordăchioaia 2014; Arad 1998a, and 1998b; Biały 2005; Pyłkkänen 2000; Rozwadowska and Bondaruk 2019). In the case of BP, we argue that all ObjExp verbs describe states, even though very few among them also present agentive and eventive readings, in a polysemous interpretation.¹⁰ This section is devoted to providing evidence for this claim.

First of all, evidence for the stative nature of BP ObjExp verbs can be provided by aspectual tests, which highlight properties such as telicity/atelicity and dynamicity/stativity (Dowty 1979; Vendler 1967). Traditionally, a stative situation does not have a result, that is, a stative verb does not show a telic behavior. Besides, the absence of dynamicity is used to distinguish stative verbs from other aspectual types (Marín and McNally 2005). We demonstrate these properties below.

As pointed out by Marín and McNally (2005), the generalization that atelic verbs cannot be combined with *in x time* adverbial expressions, but must accept adverbials like *for x time*, as they lack a final result or telic point, is well established. In accordance with our claim, BP ObjExp verbs occur freely with *for x time* but do not accept *in x time* adverbials.

- (15) *A partida do filho preocupou/angustiou/entristeceu a mãe*
 the departure of.the son worried/distressed/saddened the mother
por alguns dias/??? em poucos dias.
 for some days/ in few days
 ‘The son’s departure worried/distressed/saddened the mother for a few days/??? in a few days.’

As change-of-state verbs describe telic events, they are naturally compatible with *in x time* adverbial expressions. Thus, the examples in (15) further demonstrate that ObjExp verbs in BP are not change-of-state verbs. However, this test does not eliminate the possibility of classifying ObjExp verbs as other types of dynamic verbs, since activity verbs such as *abraçar* ‘hug’ and *correr* ‘run’ also accept *for x time* expressions.

As pointed out by Rozwadowska and Bondaruk (2019), there is a lot of controversy concerning the consistency of many stativity tests. Consequently, the authors suggest, following Maienborn (2019), that a more appropriate linguistic test for non-dynamicity is its incompatibility with the predicate *to happen*: verbs that denote stativity are not happenings in the world, unlike dynamic verbs (Dowty 1979; Van Valin 2005). Based on these assumptions, we propose that only dynamic verbs can be combined with aspectual expressions denoting that the situation is about to happen. Activity verbs, as *abraçar* ‘hug’ and *correr* ‘run’, form acceptable sentences with the expression *estar para* ‘to be about to’. In contrast, SubjExp verbs as *amar* ‘love’ and *detestar* ‘hate’, which are recognized to be states, do not combine with the expression.

¹⁰ For the 170 analyzed verbs, we provide examples of sentences illustrating the stative reading, and also, we provide examples of 12 verbs which present polysemous readings. See <http://verboweb.lettras.ufmg.br/>.

- (16) *Um ano entretanto passou e ainda estou para abraçar o Bruno.*¹¹
one year however passed and yet am to hug the Bruno
'A year has passed in the meantime and I am still about to hug Bruno.'
- (17) *O dono do carro baixa o vidro e eu já estava para correr (...)*¹²
the owner.of.the car lowers the glass and I already was to
correr (...)¹²
run
'The owner of the car rolls down the window and I was about to run.'
- (18) ??? *O rapaz ainda estava para amar/detestar a atual namorada.*
the boy yet was to love/hate the current girlfriend

The behavior of ObjExp verbs in combination with *estar para* 'be about to' is the same as the behavior of SubjExp verbs, as can be observed in example (19), for the verbs *preocupar* 'worry' *angustiar* 'distress' and *entristecer* 'sadden'. This behavior indicates that BP ObjExp verbs denote a stative situation, not a happening in the word.

- (19) ??? *A partida do filho estava para preocupar/ angustiar/ entristecer a mãe.*
the departure of.the son was to worry/ distress/
entristecer a mãe.
sadden the mother

In view of the evidence provided above, we conclude that BP ObjExp verbs describe stative situations, that is, atelic and non-dynamic situations, as confirmed by the aspectual tests. However, as proposed by Pylkkänen (2000) for Finnish (and also, to some extent, by Marín and McNally, 2005 for Spanish), these ObjExp verbs do not denote the same type of state as SubjExp verbs like *temer* 'fear' do: SubjExp verbs are individual-level predicates and ObjExp behave as stage-level predicates.

3.1.1 The stage-level interpretation

Following Pylkkänen's (2000) initial ideas, we argue that PB SubjExp and BP ObjExp verbs differ in the type of state they describe. Pylkkänen (2000) points out that Finnish ObjExp verbs which have a stative interpretation are stage-level predicates, as they describe temporally bounded states. Differently, SubjExp verbs are interpreted as individual-level predicates, as they describe more permanent states, temporally unbounded. The same is true for BP, since in this language ObjExp verbs behave as stage-level predicates and SubjExp verbs behave as individual-level predicates.

The distinction between these types of states was first introduced by Carlson (1982) and later developed by Chierchia (1995) and Kratzer (1995). According to the authors, stage-level predicates are properties of an interval, while individual-level predicates are

¹¹ <https://www.facebook.com/LuisFilipeBorges/photos/a.401815969853/10158338061934854/?type=3>. (Accessed 20 October 2020)

¹² <https://mobile.wattpad.com/1133505555-the-past--Chapter-Fourteen> (Accessed 24 January 2022).

properties of an individual. So, stage-level predicates are temporally bounded by the interval to which the property described by the predicate applies. Consequently, they can freely occur with temporal adverbial expressions, such as *every day* and *yesterday* (episodic contexts). Individual-level predicates, on the other hand, are properties of individuals. Thus, they hold at all time intervals in which the individual exists. Because they are not temporally bounded, individual-level predicates cannot occur with temporal adverbial expressions such as *every day* and *yesterday*. Also, to better illustrate this difference, Marín and McNally (2005) propose that stage-level predicates lack the inference of temporal persistence, contrarily to individual-level predicates.

As examples in (20) and (21) illustrate, BP ObjExp verbs behave as stage-level predicates because they freely combine with expressions such as *todos os dias* ‘every day’ and *ontem* ‘yesterday’. BP SubjExp verbs, in (22), as in Finnish, behave as individual-level predicates.

(20) a. *Essa é a nossa maior prioridade, algo que nos preocupa*
 this is the our biggest priority something that us worries
todos os dias.¹³

every the days

‘This is our highest priority, something that worries us every day.’

b. *Enquanto você me entristece todos os dias (...)*¹⁴

while you me saddens every the days

‘While you make me sad every day (...)’

(21) a. *Flamengo ontem me preocupou (...)*¹⁵

Flamengo yesterday me worried

‘Yesterday Flamengo worried me (...)’

b. *Ontem essa notícia me entristeceu (...)*¹⁶

yesterday this news me saddened

‘Yesterday this news saddened me (...)’

(22) a. ??? *O João ama/detesta a Maria todos os dias.*

the João loves/hates the Maria every the days

b. ??? *Ontem, o João amou/detestou a Maria.*

yesterday the João loved/hated the Maria

¹³ <https://www.thyssenkrupp-brazil.com/empresa/sustentabilidade/colaboradores/saude-e-seguran%25c3%25a7a-ocupacional>. (Accessed 24 January 2022)

¹⁴ <https://ms-my.facebook.com/login/?next=https%3A%2F%2Fms-my.facebook.com%2Fbetesilviadelima%2Fposts%2F502030276558431%2F>. (Accessed 24 January 2022).

¹⁵ <https://diariodofla.com.br/flamengo-ontem-me-preocupou-diz-comentarista-sobre-empate-com-o-cuiaba/> (Accessed 25 January 2022)

¹⁶ <https://ms-my.facebook.com/Saber-em-Sa%C3%BAde-110730963591128/> (Accessed 25 January, 2022)

The examples in (20) shows that BP ObjExp verbs freely combine with the expression *todos os dias* ‘every day’; on the other hand, sentences with SubjExp verbs in (22a) are odd when combined with the same expression. The same behavior can be observed in relation to the expression *ontem* ‘yesterday’: the sentences with ObjExp verbs in (21) show that these verbs occur naturally with that temporal expression (episodic context), in contrast with SubjExp verbs in (22b), which do not accept combination with the same expression.

These occurrences indicate, thus, the different types of stativity presented by the two verb classes. BP ObjExp verbs are stage-level predicates,¹⁷ and BP SubjExp verbs are individual-level predicates.

This aspectual difference is crucial for explaining the distinct argument realizations of both classes. As we discussed before, many authors assume that causation is the property that distinguishes the two types of psych verbs, and motivates the occurrence of the stimulus in subject position in ObjExp verbs. Individual-level psych verbs describe the inherent and possibly permanent psychological state of an individual in relation to a target. This type of psychological state is a property of an individual, the experiencer, which is expressed in subject position. Stage-level psych verbs, differently, describe the psychological state of an individual at a specific time interval, depending on the existence of a specific stimulus, a cause, to that psychological state, which must occur in subject position, since it is higher in a thematic hierarchy: Causer > Experiencer (Pesetsky 1995).

The stage-level interpretation of ObjExp verbs is due to the fact that, as Arad (1998a, 1998b) argues, the psychological state is only active while the stimulus that causes it is also active. Thus, these states are temporally bounded, and they last as long as their causing stimulus lasts. As these states are not inherent states of the experiencers, but temporally bounded and dependent on a causing stimulus, they are interpreted as stage-level, as the diagnostic tests show. This explains the causal nature of these verbs pointed out by some authors for other languages, in opposition to SubjExp verbs, interpreted as individual-level predicates. ObjExp verbs are causative, as the psychological property of the experiencer only holds while the stimulus also holds. SubjExp verbs are not causative, as the psychological property of the experiencer holds for the entire lifetime of the individual and does not depend on any particular stimulus.

Causation, however, is assumed to be a property of dynamic verbs. Since Dowty (1979), the causation component of the meaning of verbs is associated with the link between two subevents and also with the accomplishment lexical aspect. In the next section, we follow Pylkkänen (2000) in assuming the dissociation between dynamicity

¹⁷ Marín and McNally (2005) assume for Spanish that the reflexive ObjExp verbs (and perhaps the nonreflexive variants) constitute a proper subclass of stage-level predicates, since they manifest specific temporal properties, differently from what is propose by Arad (1998) and Pylkkänen (2000). We argue that BP ObjExp verbs behave more closely to what is proposed by these latter authors. It seems that Spanish behaves differently from BP (although they are closely related), because some of the tests proposed by Marín and McNally (2005) for Spanish do not hold in our BP examples.

and causation and we propose that BP ObjExp verbs are both stage-level stative and causative.

3.2 Internal Causation

Pylkkänen (2000) assumes that stativity and causation are not incompatible notions in the semantics of a verb. So, in her view, causative verbs can be stative when the causally related situations are both perceived as states, in which case the complex state has a stage-level interpretation. She argues that only individual-level predicates are truly incompatible with causation. Based on her analysis, we propose that BP ObjExp verbs describe a causal relation between two substates. Until this point, we have given evidence that these verbs are stage-level stative predicates. In this section, we show that they are complex states, composed of two substates that are causally related. We also show that causation is directly related to the stage-level nature of these verbs.

To show that stage-level psych states are compatible with causation, we first turn to a brief analysis of psych predicates composed by the copulas *ser* and *estar* in BP, both translated as ‘be’. The copula *ser* is used to describe more permanent states, and *estar* is used to describe more temporary states. In the literature, *ser* is usually associated with individual-level predicates, and *estar* is usually associated with stage-level predicates (Marín 2010). The interesting observation is that sentences composed of *estar* and a psych adjective accept a causal adjunction, while the same type of structure with the copula *ser* does not.

- (23) *O João está feliz com a chegada da Maria.*
the João is happy with the arrival of.the Maria
‘João is happy with Maria’s arrival.’
- (24) **O João é feliz com a chegada da Maria.*
the João is happy with the arrival of.the Maria.

As *estar* can be considered to be an overt mark of the stage-level state aspectual category, the example in (23) is evidence that this type of state is compatible with a causal component. In contrast, *ser* can be considered to be an overt mark of the individual-level state aspectual category. Thus, the example in (24) is evidence that this type of state is not compatible with a causal component, as Pylkkänen (2000) argues. This fact can be related to both types of psych verbs. ObjExp verbs, which are stage-level states, have a cause as part of their argument structure: a stimulus causes a mental state in the experiencer. SubjExp verbs, which are individual-level states, do not establish this causal relation: an experiencer has a mental state in relation to a target.

The presence of a causation relation between stimulus and experiencer arguments in the semantics of BP ObjExp verbs can also be evidenced by complex paraphrases, as proposed by Pinker (1989), Parsons (1990) and Merelj (2013). The authors argue that recurrent paraphrases in recurrent groups of verbs are indications of the semantic content

of these items. As verbs are complex semantic elements (Dowty 1979; Levin and Rappaport Hovav 2005; Wunderlich 2012), their meaning can also be expressed through complex periphrastic expressions. So, to show that ObjExp verbs are causative, we can associate sentences with these verbs to causative paraphrases; (25a) and (25b) are paraphrases, i.e., they are true in the same conditions and mutually entail each other:

- (25) a. *A partida do filho preocupou/angustiou/entristeceu a mãe.*
the departure of.the son worried/distressed/saddened the mother
'The son's departure worried/distressed/saddened his mother.'
- b. *A partida do filho causou a preocupação/a angústia/a tristeza da mãe.*
the departure of.the son caused the concern/the anguish/the sadness of.the mother
'The son's departure caused his mother's concern/anguish/sadness.'

Contrastively, the same type of paraphrases is not possible with SubjExp verbs, which do not describe a causal relation between the arguments:

- (26) a. *João ama a Maria.*
João loves the Mary
'João loves Maria.'
- b. *Maria causou o amor do João.*
Mary caused the love of.the João
'Maria caused João's love.'
- c. *Maria é o alvo do amor de João.*
Maria is the target of.the love of João
'Maria is the target of João's love.'

A sentence such as (26a) does not entail (26b), but the correct paraphrase for it is (26c). The same causative periphrastic form is allowed in Finnish for ObjExp verbs, and forbidden for SubjExp verbs, as shown by Pylkkänen (2000).

Thus, in light of this type of behavior, we claim that BP ObjExp verbs are stage-level states that establish a causal relation between stimulus and experiencer. However, we shall remark that this stative causal relation has a peculiar behavior, different from an eventive causal relation. BP ObjExp verbs do not describe a change-of-state occurring immediately after a causer event, but the causer is a state interpreted as the perception of the stimulus by the experiencer. So, the mental state of the experiencer is interpreted as holding only for as long as the state of perception also holds. This can be seen as a type of "internal causation".

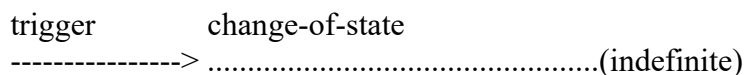
Levin and Rappaport (1995: 90–98), based on Smith (1970), make a distinction between internally vs. externally caused events: "an externally caused event is conceptualized as brought about an external cause with immediate control over the event;

an internally caused event is conceptualized as arising from inherent properties of the entity participating in this event. These properties are “responsible” for the event”. Although Levin and Rappaport Hovav (1995) do not mention psych verbs, we can extend this analysis for ObjExp verbs, since the causer is interpreted as a perception of the experiencer, an inherent property of this participant.

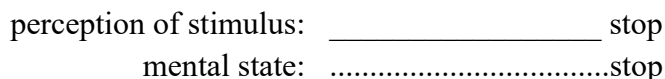
A similar argumentation is found in Arad (1998a, 1998b) for English, Pylkkänen (2000) for Finnish, and Biały (2005) for Polish. Arad (1998a, 1998b) argues that some ObjExp verbs in English have a stative interpretation. In this stative interpretation, a stimulus causes the activation of a psychological state in the experiencer, but not a change. This means that the causal relation is established between two states. The causer state is a stimulus that activates a psychological state in an experiencer. The experiencer’s mental state depends on the stimulus state to be active, thus causer and causee states are temporally simultaneous.

Arad (1998a, 1998b) makes an analogy that illustrates very well the situation of an activated psychological state on the stative reading: imagine someone who is allergic to cats and starts sneezing every time a cat is around. The same occurs when a situation or the thought about a situation triggers a specific psychological state on an experiencer: there is a psychological state inactive in a person’s mind which gets activated every time they perceive or even think about the specific situation. From this point of view, there is no change-of-state in the experiencer, but only the activation of an existent state. The following schemas, adapted from Arad (1998b: 5), illustrate this distinction:

(27) a. Eventive causative verbs:



b. Stative ObjExp verbs:



The schemas represent two types of causation: the eventive, or external, causation (of verbs like *break*), and the stative, or internal, causation (of verbs like *worry*). With eventive verbs, illustrated in (27a), a trigger causes a change of state in someone/something. The change happens immediately after the trigger situation or action ends; once this change starts, the trigger no longer has a participation in the event. With stative ObjExp verbs, illustrated in (27b), a trigger activates an existent state in someone simultaneously, that is, this state ceases only when that stimulus stops. There is, thus, an activation of a state, but not a change of state.

The type of stative causation in (27b) is also proposed by Biały (2005) for some ObjExp verbs in Polish. The author argues that the situation described by verbs such as *martwić* ‘worry’ is not of the same kind as that of other stative verbs, as SubjExp verbs. Rather, these types of ObjExp verbs describe a causal relation in which the psychological state holds whenever the causing situation is present. The author calls this relation

“generic causation”. Pylkkänen (2000) also assumes the causation between states, as we have shown. Some Finnish ObjExp verbs describe a stimulus causing a mental state in the experiencer. The mental state is held as long as the perception of the stimulus is active. This relation is temporally bounded, which leads to a stage-level interpretation of these verbs, in opposition to the individual-level interpretation of SubjExp verbs (which are stative, but not causative).

We may note that even if a noun describing a human is placed in subject position of sentences with strictly stative ObjExp verbs, as in the sentence *o filho preocupou a mãe* ‘the son worried his mother’), it can never be interpreted as an agent. Note that in that sentence, *o filho* ‘the son’ is interpreted as ‘a thought about the son in the mother’s mind’, and not as a volitional agent who does something to their mother. Smith (1970) states, with examples of psych events, that the mental state can only come about if the experiencer “allows” it to, because the experiencer has some control over the eventuality. McKoon and Macfarland (2000), in an analysis of change-of-state verbs, show that internal causation essentially impacts the choice of transitive subject; and Alexiadou (2014), similarly to Arad (2005), proposes that the subject of internally caused verbs is generated internally to the vP, while agents are located in the spec position of VoiceP. This proposal shows that this type of subject is more “internal” to the eventuality and depends on the nature of the root. Yet, Grimshaw (1990) also argues that the stimulus of mental state structure is not a real external argument.

The possibility of *irrealis* modalization on the stimulus argument is an empirical observation that demonstrates the special character of the internal causation present in the semantics of ObjExp verbs. The stimulus argument is a perception caused and held simultaneously in the experiencer, and not an actual subevent that causes and temporally antecedes a change of state. The causer in ObjExp verbs, the stimulus, may not be happening in the real world, but it is a thought inside the experiencer’s mind. In a change-of-state event, the result subevent begins immediately after the ceasing of the causer subevent. Consequently, the causer must refer to an actual happening, a *realis* situation, temporally antecedent to the change of state. For that, causer arguments of change-of-state verbs cannot receive *irrealis* modalizers, as shown in (28). Stimulus arguments of ObjExp verbs, however, can, as indicated in (29)–(30).

(28) **A possibilidade de cair uma chuva de granizo quebrou/abriu as janelas.*
 the possibility of fall a rain of hail broke/opened the windows

(29) *A possibilidade de se tornar apenas um instrumento de marketing preocupou ativistas*
 the possibility of REFL become only a instrument of marketing
 worried activists
 ‘The possibility of it becoming a simple marketing device worried the activists.’
 (Found on *Corpus do Português*)

- (30) *E essa possibilidade de não ter nem o pouco me atormenta,*
and this possibility of not have nor the little me torments
me entristece.
me saddens
'And this possibility of not having the minimum torments me, saddens me.'
(Found on *Corpus do Português*)

The modal expressions of possibility in the stimulus arguments, shown in (29) and (30), indicate that a causer event did not happen, but just the thought about something is enough to trigger, not a change of state, but the activation of a psychological state of worry/distress/sadness in the experiencer. The stimulus of BP ObjExp verbs is temporally simultaneous to the mental experience, it is connected to the experiencer, being part of their thoughts.¹⁸

In view of the argumentation provided in this section, we confirm our first claim: BP ObjExp verbs describe a situation composed of two substates related by internal causation, resulting in a complex stage-level state. As this is a specific property of the event structure of those verbs, we argue that they constitute a verb class, that differs from SubjExp verbs in relation to the internal causative component and the type of state denoted. The specific characteristic of the event structure of ObjExp verbs can be captured by a lexical semantic representation, in terms of a predicate decomposition metalanguage, as we show in Section 3.4. But, before we go further, we first discuss the polysemous occurrences with BP ObjExp verbs, which is a subject much discussed in the literature.

3.3 Polysemous occurrences

In the same way as in other languages studied in the literature, we may note that a few BP ObjExp verbs (12 out of 170 in the analyzed data) can also have agentive and eventive readings, e.g., *assustar* 'frighten', *acalmar* 'calm down', etc. with agent (31a) or causer (31b) subjects:

- (31) a. *O menino travesso assustou/amedrontou o cachorro por querer.*
the boy mischievous frightened/scared the dog for will
'The mischievous boy intentionally frightened/scared the dog.'
b. *O disparo da arma assustou/amedrontou o cachorro.*
the firing of.the gun frightened/scared the dog
'The gunfire frightened/scared the dog.'

¹⁸ Our analysis for BP ObjExp verbs diverges from Marín and McNally's (2005) analysis of reflexive psychological verbs in Spanish: the authors argue that there is no temporal coextensiveness condition between the perception of the stimulus and the existence of the mental state. We show evidence that BP ObjExp verbs behave differently.

In (31a), an agent acts intentionally and causes a change-of-state in someone or even in some animal; and in (31b), an event causes a change-of-state in someone or even in some animal. Both sentences describe an external causal relation between two subevents not completely simultaneous, in which a result subevent immediately follows someone's action or a causer subevent. The result is that the dog gets frightened or scared, temporally after the boy's action and the gunfire; we could even say that this result is physically perceived on the dog's facial expression, bodily reaction etc.

Other verbs which behave as *assustar* 'frighten' and *amedrontar* 'scare' are:

- (32) *acalmar* 'calm down', *alegrar* 'cheer up', *aporrinhar* 'annoy', *atazanar* 'annoy', *atemorizar* 'scare', *aterrorizar* 'terrorize', *consolar* 'comfort', *distrair* 'distract', *entreter* 'entertain', *tranquilizar* 'calm down'

But, as we have already pointed out, these verbs also have a stative reading, like all other BP ObjExp verbs. In (33), we show an example of *assustar* 'frighten' in the stative reading. Note that, as we have shown, the stimulus argument is the possibility of a happening, an *irrealis* eventuality, not an actual event. In contrast, (34), a sentence with the same verb in the eventive reading, does not allow the causer argument to be an *irrealis* eventuality, as expected.

- (33) *a possibilidade de ele assumir os Bombeiros já os assustou.*
the possibility of he take.over the firemen already them frightened
'The possibility for him to take over the fireman administration frightened them already.'

(Found on *Corpus do Português*)

- (34) **A possibilidade da arma disparar assustou o cachorro.*
the possibility of.the gun fire frightened the dog

In (33), there is no change-of-state as a consequence of a causer subevent; the situation described by the subject argument has not even happened, but the thought about its possible occurrence causes, internally, the activation of a psychological state of fright of an experiencer participant. It is interesting to note that non-human cannot hold this activated mental state, as shown in (34). This means that in the stative reading, the object must refer to a human being, capable of holding a mental state. In the eventive readings, however, the experience seems to be more physical and punctual, which allows the occurrence of a dog as a patient, and an agent or causer as subject.

Recalling Smith's (1970) argumentation, in examples of psych events, the mental state can only come about if the experiencer "allows" it to, because the experiencer has some control over the situation. This restricts the type of subject in the transitive form, blocking an agent to be subject of these verb types. Contrarily, change-of-state verbs do not have a controlling experiencer, but a patient, which allows them to have an agent or a causer subject.

Thus, we assume that the eventive interpretations of these 12 ObjExp verbs are a case of polysemy and that these verbs, in the eventive interpretation, have the same properties of change-of-state verbs such as *quebrar* ‘break’. As pointed out by Arad (1998), if an ObjExp verb has an agentive reading, all the “psych properties” attributed to it disappear. As also proposed by Gonzalez (2022), assuming a feature approach, the change-of-state feature ([+/-change-of-state]) distinguishes stative and eventive readings of polysemous ObjExp verbs. ObjExp verbs are [- change-of-state] in the stative reading, but [+ change-of-state] in the eventive reading.

3.4 Lexical semantic representation

Following Dowty (1979), Levin and Rappaport Hovav (2005), Wunderlich (2012), and many others, we assume that verbs are compositional in the sense that their meaning is built from a group of smaller semantic components, traditionally considered to be primitive predicates. According to Levin and Rappaport Hovav (2005), Croft (2012), and Pustejovsky and Batiukova (2019), components that make up the meaning of verbs and that are responsible for the structuring of arguments in syntax are the event structure properties. Event structure comprises information about event complexity and the relations between subevents and participants. In line with this assumption, we propose to represent the meaning of the BP ObjExp verbs using the predicate decomposition metalanguage, following Rappaport Hovav and Levin (1998) and Cançado et al. (2013). This representation can highlight the complexity of the state described by the ObjExp verb class, its substates, and the relationship between them. These are the properties that are relevant for argument realization. From those primitive components, following Dowty (1979) and Jackendoff (1990), other non-primitive properties can be derived, such as the thematic roles and the aspectual classification.

Recall we have argued that BP ObjExp verbs are complex states, following Pylkkänen (2000). This means that these verbs are composed of two substates related by internal causation. These semantic properties can be transparently represented by a predicate decomposition structure. We follow very closely the structure proposed by Biały (2005) for stative ObjExp verbs in Polish, although the author does not make explicit the psychological state component and the type of cause. The structure we propose represents both properties of ObjExp verbs, the psychological state component and the internal causation component. We propose, thus, that BP ObjExp verbs have the following lexical semantic structure:

(35) *ObjExp* v: [[X STATE] CAUSE_{internal} [Y <PsychSTATE>]]

CAUSE_{internal} is a two-argument predicate, which takes as arguments the stimulus and the psychological state - it indicates a simultaneous causal relation, in which the psych state holds as long as the stimulus also holds - the internal character of the causation relation indicates that the stimulus is internal to the experiencer, in the sense that it can be a

thought, an inherent property, and also in the sense that the experience has some type of control over it. The first substate is formed by [X STATE], i.e., the predicate STATE, which takes a single argument, the variable X. The second substate is [Y <PsychSTATE>], i.e., it contains the predicate <PsychSTATE>, which is also the root and takes the variable Y as argument. Each verb has its own specific root, but all roots belong to the same ontological type PsychSTATE (a state of psychological nature). The root does not determine general properties of argument realization but specifies the meanings of individual verbs.

(36) *Preocupar* ‘worry’: [[X STATE] CAUSE_{internal} [Y <PREOCUPADO ‘worried’>]]

(37) *Angustiar* ‘distress’: [[X STATE] CAUSE_{internal} [Y <ANGUSTIADO ‘distressed’>]]

(38) *Entristecer* ‘sadden’: [[X STATE] CAUSE_{internal} [Y <TRISTE ‘sad’>]]

As we have pointed out, both the thematic structure and the aspectual classification can be derived from this representation. The Experiencer role is assigned to the argument of the psychological substate (<PsychSTATE>); thus, Y, the direct object of ObjExp verbs, is an experiencer (in the structure Y is the argument of a psychological state). And the substate which is the first argument of CAUSE_{internal} in a causal relation is a Stimulus. Thus [X STATE], the subject of ObjExp verbs, is a stimulus and always denotes properties – not individuals. Substates cannot be agents and the fact that both causer and causee are stative accounts for the temporal simultaneity of stimulus and psychological state in the experiencer. The stimulus of BP ObjExp verbs is temporally simultaneous to the mental experience, it is connected to the experiencer, being part of his/her thoughts. The aspectual classification of these verbs can also be derived from this structure. Despite the presence of a CAUSE predicate, traditionally linked to accomplishments (Dowty 1979), the relationship between two substates – specified here as CAUSE_{internal} – can only derive a complex stage-level state (Pylkkänen 2000).

As a final remark, this structure differs from the representation of change-of-state verbs in three respects. A first distinction is the type of the predicate CAUSE, which in change-of-state verbs is external and accepts an event or an agent as its argument. Second, the first argument of the predicate indicating the causal relation in the change-of-state verbs’ structure is not stative, but eventive or agentive, and is usually represented by [X ACT_(volition)]. And, finally, the second subevent of change-of-state verbs is also eventive and is represented by a structure with the predicate BECOME, which indicates a telic change to a final result state. The root of these verbs is also stative. However, it is the result state of a BECOME predicate and describes physical states, rather than psychological states. Thus, differently from ObjExp verbs, there is an external caused relation between two subevents.

(39) *Change-of-state v*: [[X ACT_(volition)] CAUSE [BECOME Y <ResultSTATE>]]

(Adapted from Rappaport Hovav and Levin 1998: 108)

We argue that the semantics of ObjExp verbs, represented in the structure in (35), accounts for the syntactic behavior of this class. In Section 4, we explore further the relationship between event structure and syntactic properties of BP ObjExp verbs.

4 The inverse form of ObjExp verbs in BP

One interesting property of BP ObjExp verbs is that they can occur in an inverse form, with the experiencer in subject position, marked by the reflexive clitic *se*, and the stimulus in an oblique position, marked by the preposition *com* ‘with’. We assume, following Haspelmath (1993), that *se* is a reflexive marker in the language, and, although it has a number of different functions, such as marking reflexives, middles and inchoatives, it indicates that the marked construction is an inversion of the original event structure organization. This pattern is very regular: it occurs with all 170 ObjExp verbs. (40) exemplifies the basic form of these verbs; (41) illustrates the inverse form.

- (40) a. *A partida do filho preocupou/angustiou/entristeceu a mãe.*
the departure of.the son worried/distressed/saddened the mother
‘The son’s departure worried/distressed/saddened his mother.’
b. *v*: {Stimulus, Experiencer}
- (41) a. *A mãe se preocupou/angustiou/entristeceu com a partida do filho.*
the mother REFL worried/distressed/saddened with the departure
of.the son
‘The mother got worried about/distressed by/sad about her son’s departure.’
b. *v*: {Experiencer, Stimulus}

As can be observed in (41a), the inverse form is similar to the inchoative form of change-of-state verbs, as in the sentence *a taça de cristal se quebrou com o grito da soprano* ‘the crystal glass broke from the soprano’s shout’. In both structures, the object of the transitive appears in subject position marked with the reflexive *se* and the object of the transitive appears in oblique position, headed by *com* ‘with’. But we argue that the phenomena are not the same.

Before we go further in our analysis, let us compare the behavior of other languages in relation to this inverse form. Alexiadou and Iordăchioaia (2014) argue that in Greek and Romanian there is an alternate form with many ObjExp verbs, which shows the same morphological marks of a canonical causative alternation and has a systematic behavior. Greek regularly uses non-active morphology and marks causers with the preposition *me* ‘with’ in non-psych and psych verbs’ alternated forms, as in (42). Romanian employs reflexive morphology and the preposition *de la* ‘from’ for causer arguments in the derived form, as in (43).

- (42) a. *Ta nea enohlisan ti Maria.*
the news annoyed.ACT the Mary.ACC
'The News annoyed Mary.'
- b. *I Maria enohlithike me ta nea.*
the Mary annoyed.NACT with the news
'Mary got annoyed with the news.'
- (43) a. *Știrile au enervat-o pe Maria.*
news.the have annoyed-her ACC Mary
'The news annoyed Mary.'
- b. *Maria s-a enervat de la/*de către știri.*
Mary RF-has annoyed of at/*by news
'Mary got annoyed with/*by the news.'
- (Alexiadou and Iordăchioaia 2014: 63)

Based on this type of data, the authors conclude that the alternation with ObjExp verbs in these languages is a sub-case of the causative alternation, which occurs with change-of-state verbs, i.e., this kind of ObjExp verbs belongs to the change-of-state verb class.

Nonetheless, Alexiadou and Iordăchioaia (2014) point out that few ObjExp verbs in both languages do not present the causative alternation and they associate this behavior to their stative aspectual nature. For the stative ObjExp verbs, two alternate sentences exist, but the authors propose that this is not the causative alternation; rather, these examples are few idiosyncratic alternate forms that are available in the languages. In these cases, the target of an alternated verb is introduced by different markers: in Greek by *de* 'of' or *ja* 'about', not marking a causer, while in Romanian several prepositions can appear, depending on the verb.

This analysis is, in part, similar to Pesetsky's (1995: 57) analysis for English.

- (44) *The television set worried John.* {Causer, Experiencer}
(45) *John worried about the television set.* {Experiencer, Subject Matter}
(Pesetsky 1995:57)

The author argues that the two alternate sentences above have different meanings and different argument structures: in (44), the DP *the television set* bears a causer thematic role, and that is a simply causal relationship between the television set and some state of worry. In (45), the television set is the subject matter of the emotion, and it is a stative sentence. To confirm this assumption, the author argues that the truth conditions of these alternate sentences are distinct:

- (46) *John worried about the television set, but the television set did not worry John.* (contradiction)
(47) *The television set worried John, but John did not worry about the television set.* (noncontradiction)

In (46), whenever John thinks about the television set, he activates his “worry state”. So, it is contradictory to affirm this sentence because whatever is the nature of John’s specific worry (the TV might catch fire, or it is hanging too insecurely and can fall), the television set is the subject matter of his emotion. Pesetsky (1995) also affirms that this psych-verb type is stative and has an unaccusative syntactic structure, similar to *appeal to*, which he calls genuine unaccusative ObjExp verbs. In (47), the author argues that it is sufficient that the television set causes John to experience worry, but the subject matter of his thoughts while experiencing worry could have nothing to do with the television set. Giving the author’s example: John could be a detective and sees the television set in a suspect’s living room; this causes a chain of worries in him, for example, “What would a completely blind man be doing with a fancy color television?”. In this case, he is not worrying about the television set, but it just causes worries about other matters. Assuming that interpretation, (47) is not contradictory, and, according to Pesetsky (1995), the sentence is just a transitive causative one, where *the television set* is a causer, the result is not concomitant with the trigger situation and the sentence cannot have a stative reading. Therefore, for the author, in (46) and (47), we have two distinct psych-verb meanings, with two distinct thematic structures, presenting distinct syntactic structures. Besides, he argues that each specific verb appears with a different preposition in the alternated form - *worry about*, *bore with*, etc. -, which is evidence that these occurrences are not systematic, but few idiosyncratic alternate forms available in the language, as also shown by Marelj (2013), in contrasting English with other languages.

Rozwadowska and Bondaruk (2019) propose a different analysis for Polish (in opposition to the causative alternation proposed by Biały [2005]). The authors show that the stative ObjExp verbs have an alternate form, which presents the reflexive clitic *się* and an obligatory post-verbal DP marked with instrumental case inflection, as shown in (48b). When the instrumental DP is missing, the sentence becomes ungrammatical. This DP functions as a complement of these verbs and represents a target, not a causer. As a consequence, the alternate form cannot be the result of the causative alternation. Evidence is that the instrumental DP cannot be replaced by *od*-PPs, as in (48c); *od* ‘from’ typically introduces the causer argument in the inchoative form of change-of-state verbs.

- (48) a. *Matematyka/Maria interesuje Marka.*
 maths.NOM/Mary.NOM interests.IMPERF Mark.ACC
 ‘Maths interests Mark.’
- b. *Marek interesuje się *(matematyką)/(Marią).*
 Mark.NOM interests.IMPERF REFL maths.INSTR/Mary.INSTR
 ‘Mark is interested in maths/in Mary.’
- c. **Marek interesuje się (od matematyki)/(od Marii).*
 Mark.NOM interests.IMPERF REFL from maths/ from Mary
 ‘*Mark is interested from maths/from Mary.’
- (Rozwadowska and Bondaruk 2019: 83)

Looking at BP ObjExp verbs, we have a different picture from English, Greek and Romanian, and somewhat similar to Polish. The phenomenon in our data is very regular: all 170 analyzed BP verbs show the inverse form, in a systematic pattern.¹⁹ Considering this systematicity, the existence of a distinct ObjExp verb for each alternate form, proposed by Pesetsky (1995) for English, cannot be assumed for BP. Also, we argue that in BP the process is not the result of the causative alternation, as proposed by Alexiadou and Iordăchioaia's (2014) for Greek and Romanian. This statement goes in the same direction as Rozwadowska and Bondaruk's (2019) analysis of Polish ObjExp verbs. The argument headed by the preposition *com* 'with' in BP inverse forms cannot be omitted most of the time, like the case of the instrumental DPs in Polish. So, we claim that the inverse form in BP is not the causative alternation. As follows, we present evidence for this claim.

Compare the sentences:

- (49) a. *O grito da soprano quebrou a taça de cristal.*
the shout of.the soprano broke the glass of crystal
'The soprano's shout broke the crystal glass.'
- b. *A taça de cristal (se) quebrou (com o grito da soprano).*
the glass of crystal REFL broke with the shout of.the soprano
'The crystal glass broke from the soprano's shout.'
- (50) a. *A partida do filho preocupou/ angustiou/entristeceu a mãe.*
the departure of.the son worried/ distressed/saddened the mother
'The son's departure worried/distressed/saddened his mother.'
- b. *A mãe se preocupou/angustiou/entristeceu com a partida do filho.*
the mother REFL worried/distressed/saddened with the departure of.the son
'The mother got worried about/distressed by/sad about her son's departure.'

In (49), we present an example of the causative alternation; in (50), we show an example of the inverse form of ObjExp verbs. Despite similarities in form (the presence of the clitic *se* and the transitive object in subject position), the two phenomena have important distinctions. A first important distinction is the occurrence of the argument in oblique position, marked by *com* 'with'. As many authors argue, the intransitive form derived from the causative alternation has no external causer argument (Haspelmath 1993; Horvath and Siloni 2011, and 2013). The causer can only optionally appear in adjunction. However, in the inverse form of ObjExp verbs, the presence of the stimulus is strongly preferable. In cases where the stimulus is not present, it has to be recovered in context, or interpreted as an implicit prototypical argument. Thus, we propose that, in (50b), there is

¹⁹ For the 170 analyzed verbs, we provide examples that illustrate the inverse form: <http://verboweb.lettras.ufmg.br/>

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an inversion of the thematic and syntactic structures of ObjExp verbs, but both perspectives maintain the same two arguments, and the same causative relation.

This difference between the alternation of change-of-state verbs and the inverse form of ObjExp verbs is also shown in the related forms of stative passives. Change-of-state verbs rarely occur with the causer argument in these structures, whereas for ObjExp verbs, the presence of the stimulus is possible and highly preferable.

- (51) *A taça de cristal está quebrada (??? com o grito da soprano).*
the glass of crystal is broken with the shout of.the soprano
'The crystal glass is/got broken (by the soprano's shout).'
- (52) *A mãe está preocupada/angustiada/ entristecida (com a partida do filho).*
the mother is worried/ distressed / sad with the
departure of.the son
'The mother is/got worried about/distressed by/sad about her son's departure.'

These facts can be confirmed by a quantitative comparison in data from *Corpus do Português*. For such comparison, we have examined the number of occurrences of the PP headed by *com* 'with' with the 10 most frequent ObjExp verbs and with the 10 most frequent change-of-state verbs in the corpus (considering only BP data). Three contexts were taken into account: stative passive forms of both ObjExp verbs and change-of-state verbs, inverse forms of ObjExp verbs, and inchoative forms of change-of-state verbs. The verbs examined are listed in (53), and the values found for the number of occurrences of the PP headed by *com* 'with' in the data are shown in Table 1.

- (53) ObjExp verbs: *angustiar* 'distress', *chatear* 'upset', *comover* 'move', *contrariar* 'displease', *decepcionar* 'disappoint', *deslumbrar* 'dazzle', *frustrar* 'frustrate', *irritar* 'annoy', *magoar* 'hurt', and *preocupar* 'worry'.
Change-of-state verbs: *quebrar* 'break', *ativar* 'activate', *consolidar* 'reinforce', *danificar* 'damage', *manchar* 'stain', *consagrar* 'establish', *fechar* 'close', *romper* 'break', *poluir* 'pollute', and *trancar* 'lock'.

Below, we show the results.

Table 1: Occurrences of PPs headed by *com* ‘with’ with ObjExp verbs and change-of-state verbs

SE + simple past (inverse and inchoative forms)	+PP	- PP	Total
ObjExp verbs	1.364 verbs (65,23%)	727 verbs (34,77%)	2.091 verbs
Change-of-state verbs	81 verbs (3,88%)	2.012 verbs (96,12%)	2.093 verbs
estar ‘be’ + participle (stative passive)	+ PP	- PP	Total
ObjExp verbs	1.449 verbs (71,52%)	577 verbs (28,48%)	2.026 verbs
Change-of-state verbs	63 verbs (4,15%)	1.455 verbs (95,85%)	1.518 verbs

The results presented in Table 1 indicate that the inverse form ([SE + simple past]) of ObjExp verbs occurs with a PP argument in the vast majority of cases (65.23%). This is a much greater percentage than the occurrence of causer PPs in the inchoative form ([SE + simple past]) of change-of-state verbs (3,87%). These numbers recur in the analysis of the stative passive form ([*estar* ‘be’ + participle]). In this structure, ObjExp verbs occur with a PP argument in 71.52% of the cases, while change-of-state verbs occur with a causer PP in only 4,15% of the times. These results give strong evidence for the difference in behavior in relation to the presence of a PP headed by *com* ‘with’ in both classes.

The percentual presented in Table 1 clearly distinguishes ObjExp verbs and change-of-state verbs and strongly evidences that the stimulus of ObjExp verbs tends to occur in the inverse and stative passive forms. To additionally confirm the relevance of such results, we have applied the chi-square test to calculate the p-value. We found a $p < 0,00001$, which denies the null hypothesis and confirms our hypothesis that the presence of the PP headed by *com* ‘with’ in the analyzed contexts is sensitive to the semantic distinctions between the classes of verbs.²⁰

Another important distinction between the inverse form of ObjExp verbs and the inchoative form of the causative alternation relies on aspectual and event structure properties. While inchoatives describe a telic change of state in a patient, without an external force, the inverse sentences with ObjExp verbs are stative. The same aspectual behavior is found in the inverse form of Spanish ObjExp verbs, such as *aburrirse* ‘bore’, according to Marín and McNally (2005, 2011). The authors argue that the inverse form

²⁰ This quantitative comparison can be found at: <https://osf.io/heus5>.

of ObjExp verbs in Spanish (named the reflexive psychological verbs) are a special subclass of stative predicates which they call “bounded state predicates”.

To demonstrate this stative nature, we apply once more the aspectual tests explained in Section 3. First, in (54), we show that these inverse forms, as states, accept adverbials like *for x times* and cannot be combined with *in x time*; second, we show, in (55), that they cannot occur with the expression *estar para* ‘to be about to’.

- (54) *A mãe se preocupou/angustiou/entristeceu com a partida do filho por muitos dias/??? em muitos segundos.*
 the mother REFL worried/distressed/saddened with the departure of.the son for many days/ in many seconds
 ‘The mother got worried about/distressed by/sad about her son’s departure for many days.’
- (55) *??? A mãe estava para se preocupar/angustiar/entristecer com a partida do filho.*
 the mother was to REFL worry/ distress / sadden with the departure of.the son

Thus, based on the evidence provided in this section, we conclude that the inverse form of BP ObjExp verbs is not a result of the causative alternation, as the case of change-of-state verbs.

Still, differently from Rozwadowska and Bondaruk’s (2019) analysis for Polish, we claim that the inverse form of BP ObjExp verbs entails a causative relation between stimulus and experiencer arguments, just like the basic form. Evidence for this claim is the stage-level interpretation of the inverse form, which can also be confirmed by the tests provided in Section 3. BP ObjExp verbs in the inverse form also freely combine with expressions such as *todos os dias* ‘every day’ and *ontem* ‘yesterday’.

- (56) *A presidente Dilma Rousseff disse nesta quinta-feira que se preocupa todos os dias com a inflação.*²¹
 the president Dilma Rousseff said in.this Thursday that REFL worries every the days with the inflation
 ‘President Dilma Rousseff said this Thursday that she worries about inflation every day.’
- (57) *Na tarde de ontem, Sheron Menezes se angustiou com o jogo entre Brasil e Chile (...).*²²
 in.the afternoon of yesterday Sheron Menezes REFL distressed with the match between Brazil and Chile

²¹ <https://oglobo.globo.com/politica/dilma-diz-que-se-preocupa-com-inflacao-desemprego-todos-os-dias-1-17249738>. (Accessed 25 January 2022)

²² <https://www.ofuxico.com.br/noticias/sheron-menezes-passeia-com-o-noivo-e-seus-cachorros/> (Accessed 25 January 2022)

‘Yesterday afternoon, Sharon Menezzes got distressed by the match between Brazil and Chile (...)’

Recalling our previous argumentation, the psychological state is only active while the stimulus that causes it is also active. The interpretation of the psychological state as stage-level is due to this causative nature of ObjExp verbs. Therefore, even in the inverse form, ObjExp verbs still entail a causative relation.

The high number of occurrences of the stimulus in corpus data, shown in Table 1, is also evidence for the causative analysis of the inverse form. And, as we have shown, in the inverse form of BP ObjExp verbs, the stimulus argument receives the same preposition as the cause argument in inchoative sentences: *com* ‘with’. According to Croft (2012), prepositions equivalent to *com* in different languages mark the antecedent oblique, a participant that causally precedes the transitive object in the event structure.

Additional evidence for the causal relation in inverse structures can also be given by the same type of paraphrases presented in Section 3; (58a) and (58b) are paraphrases. They are true in the same conditions and mutually entail each other:

- (58) a. *A mãe se preocupou/ angustiou/entristeceu com a partida do filho.*
the mother REFL worried/ distressed/saddened with the departure of.the son
‘The mother got worried about/distressed by/sad about her son’s departure.’
- b. *A partida do filho causou a preocupação/angústia/ tristeza da mãe.*
the departure of.the son caused the worriedness/distress/sadness of.the mother
‘The son’s departure caused the mother’s worriedness/distress/sadness.’

Hence, the inverse form of ObjExp verbs in BP, as the basic form, also describes a complex stage-level state, with two substates causally related. Consequently, both forms of ObjExp verbs present the same aspect, and the same thematic roles. The inverse sentences only differ from their counterparts in the perspective they present for the situation: in basic sentences, it is described from the perspective of the stimulus, and in inverse forms it is described from the point of view of the mental experience.

The systematic nature of the inversion in BP presents a problem for current proposals in the literature, which analyze the phenomenon as an idiosyncrasy, such as Pesetsky (1995). Also, the specific properties we have shown motivate an analysis that does not assume these forms as the result of the causative alternation. All these facts indicate the need for an approach to the phenomenon that would take into account the specific properties of the event structure of ObjExp verbs which are relevant for syntax.

Our claim is that the complex stative nature of these verbs can also explain their occurrence in the inverse form. As a complex state describes a situation in which causer and causee are states temporally simultaneous and dependent (the stimulus argument is not a happening in the world but a thought inside the experiencer's mind), the situation can be viewed from both perspectives, according to which substate is portrayed in the sentence as the starting point of the situation. Besides, for the stimulus and the experiencer to be so tightly entangled, both arguments must necessarily be present in the inverse form (and also in stative passive forms, as we have shown).

The analysis presented in this section provides evidence for our second claim: the inverse form of ObjExp verbs does not result from the causative alternation. Also based on the evidence presented in this section, we can confirm our initial hypothesis: ObjExp verbs in BP constitute a verb class, independent from SubjExp verbs and from change-of-state verbs. ObjExp verbs, as we have shown, present a specific event structure, a stage-level state, composed of two substates related by internal causation, where a stimulus state causally activates a psychological state. These semantic properties explain their specific argument realization properties: the inverse form and the related stative passives, which all maintain the two arguments of the verbs.

5 Final considerations

In this paper, we presented a study of Brazilian Portuguese (BP) ObjExp verbs, considering two main issues raised in the literature: their aspectual nature and the alternate form with the experiencer argument in subject position. We raised the hypothesis that ObjExp verbs are an independent verb class.

In respect to their aspectual nature, we have claimed that BP ObjExp verbs describe complex stage-level states. Differently from what is normally assumed in linguistic literature, this analysis corroborates Pylkkänen's (2000) proposal about the existence of causative states. We have shown that BP ObjExp verbs are stative, but they have a stage-level interpretation, which distinguishes them from SubjExp verbs, which are individual-level states. The stage-level interpretation is directly associated with the causal component in the semantics of ObjExp verbs. We argue that, as the experiencer's mental state depends on a stimulus to be active, these psychological states are interpreted as stage-level. Following this argumentation, we propose that BP ObjExp verbs are both stative and causative. However, the causation relation in stative predicates differs from the typical causation of change-of-state verbs, as it is a relation between simultaneous states, in which one is only active while the other is also active. This property can be associated with a type of internal causation. To represent the event structure properties of BP ObjExp verbs, we have proposed a predicate decomposition structure, which makes transparent the causal relation between two states. Also, differently from current analyses for other languages, we have shown that all BP ObjExp verbs have a stative interpretation,

although a few verbs can present an additional eventive interpretation, in a polysemous reading.

Turning to the alternate form of these verbs (which we call the inverse form), we claimed that it is not the result of the causative alternation. We have shown that all ObjExp verbs appear in an inverse form, with the experiencer in subject position and the stimulus headed by *com* ‘with’ in an oblique position. We argue that this inverse structure is not the result of the causative alternation, and cannot be attributed to idiosyncratic properties of specific verbs, for its systematic nature. We propose that such inversion is in fact related to the complex stative nature of ObjExp verbs. As a complex situation, the complex state can be viewed from two different perspectives, and because the stimulus is a state in the experiencer’s mind, and not a happening in the world, stimulus and experiencer are tightly entangled, and both arguments are present in the inverse form. This analysis is also different from current approaches to the alternation of ObjExp verbs in other languages.

Based on the evidence provided by a thorough analysis of 170 BP ObjExp verbs and their specific syntactic properties (in about 1020 sentences), we have confirmed our initial hypotheses: ObjExp verbs in BP should be considered a verb class, independent of SubjExp verbs and change-of-state verbs. ObjExp verbs have specific event structure properties and syntactic argument realization properties, which justifies their status of verb class.

We conclude by noting that our results contribute to current research in the following points:

- The proposal of a separate class of ObjExp verbs is relevant for the explanation of specific properties of these verbs, normally assumed as problematic in the literature, namely, their aspectual characteristics and their argument realization properties (subject type and inversion). It is important that they constitute a single class because they have unique properties, not shared with change-of-state verbs and SubjExp verbs, as we have shown. In terms of use, the proposal of a distinct class can explain, for instance, the difference in frequency of use of causer PPs with ObjExp verbs in comparison with change-of-state verbs, as we have shown. In terms of language acquisition, we cannot make further predictions, but we believe that our study can be taken as a basis for the analysis of hypothetically specific patterns in the acquisition of this class.
- Our study also provides a finer analysis of types of argument alternation, showing that, despite surface similarities, two types of structure arise from different linguistic phenomena. Thus, our research also contributes to a finer look into the causative alternation, assumed by many authors to occur with ObjExp verbs.
- Finally, in relation to the crosslinguistic understanding of psych verbs, we have shown that there are specific properties of this class in BP that cannot be explained solely in light of analyses that take other languages into consideration, not even

closely related languages, such as Spanish. Our study reinforces the importance of intra-linguistic studies in lexical semantics, as the same type of situation in the world can be conceptualized and lexicalized in different ways in different languages, as Levin and Rappaport Hovav (1995) point out.

Appendix: abbreviations for example glosses

ACT: Active morphology

NACT: nonactive morphology

ACC: accusative case

REFL/RF: reflexive pronoun

NOM: nominative case

IMPERF: imperfective

INSTR: instrumental case

Data availability statement: The data underlying this study may be found at <http://verboweb.letras.ufmg.br/> and <https://osf.io/heus5>.

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