

ON THE ACTUALITY ENTAILMENT OF SPANISH ROOT MODALS*

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ABSTRACT. This paper examines the actuality entailments of Spanish past perfective root modals. I will side with those authors who maintain that the phenomenon is syntactic. Nevertheless, the emphasis will not be on scope differences between projections, but on the fact that the root modal periphrasis is an example of restructuring structure. More precisely, I will claim that root modal periphrases may be included among the constructions with a *low* level of restructuring. This point of view will take me to propose that these periphrastic structures give rise to a complex event which behaves as a non-homogeneous predicate with regard to temporal-aspectual meaning.

Keywords: root modality, actuality entailment, restructuring, temporal-aspectual meaning

RESUMEN. Este artículo examina los entrañamientos de actualidad de los modales radicales combinados con el pasado perfectivo en español. Me sumaré a quienes sostienen que el fenómeno es sintáctico. Sin embargo, no pondré el énfasis en las diferencias de alcance entre proyecciones, sino en el hecho de que las perífrasis modales radicales son contextos de reestructuración. Más concretamente, defenderé que las perífrasis modales radicales pueden incluirse entre las construcciones con un nivel *bajo* de reestructuración. Este punto de vista me llevará a proponer que estas perífrasis dan lugar a un evento complejo que se comporta como un predicado no homogéneo con respecto a su significado temporo-aspectual.

Palabras clave. modalidad radical, entrañamiento de actualidad, reestructuración, significado temporo-aspectual

1. Introduction

Modal verbs such as Spanish *deber* (*de*) or *tener* (*que*), associated with the notion of necessity, and *poder*, associated with that of possibility, are said to be the expression of two types of modality: *epistemic* and *root modality*. In the former, the necessity or the possibility are related to the speaker's knowledge. In the latter, they are related to the circumstances that surround the main event and its participants.^{1,2} In this article I will just pay attention to root modality. The term *root* is attributed to Hoffmann (1966). It is normally used to encompass both *deontic* and *dynamic*

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¹ For the sake of simplicity, I will ignore *alethic* (also called *logical* or *metaphysical*) modality, which concerns analytic statements, that is, statements whose truth values are independent of experience.

² See, among many others, Sueur (1975, 1979, 1983), Lyons (1977), Kratzer (1981), Fleischman (1982), Perkins (1982), Palmer (1986), Brennan (1993), Bybee, Perkins & Pagliuca (1994), Kronning (1996, 2001), Le Querler (1996, 2001), Papafragou (1998a, 1998b), Vetter (2004), Portner (2009), Hacquard (2011), Mari (2015).

modality. Deontic modality is related to the notions of obligation and permission (see 1a). With dynamic modality, what makes possible or necessary the actualization of a determined state of affairs are certain circumstances, understood either as characteristics of an individual (see 1b) or as general conditions existing in the world (see 1c, d) (Palmer 1986: 102-103):

- (1) a. Los primeros niños llegarán a las 16:00, así que Juan debe
the:M.PL first:M.PL children arrive:FUT.3PL at the:F.PL 16:00, so Juan must:PRS.3SG
 haber llenado la piscina antes de comer.
have:INF fill:PST.PTCP the:F.SG pool before of eat:INF
 ‘The first children will arrive at 4:00 p.m., so Juan will have to get the pool full before lunch’
- b. Dado que es tan cabezota, Juan puede haber llenado la
give:PST.PTCP that be:PRS.3SG so headstrong Juan can:PRS.3SG have:INF fill:PST.PTCP the:F.SG
 piscina antes de que lleguen los niños.
pool before of that arrive:PRS.SBJV.3PL the:M.PL children
 ‘Given that he is so headstrong, Juan is able to have filled the pool before the children arrive’
- c. Aquí puede crecer cualquier cosa.
here can:PRS.3SG grow:INF any thing
 ‘Here, anything can grow’
- d. Debes salir ahora, si quieres coger el autobús.
must:PRS.2SG go.out:INF now if want:PRS.2SG catch:INF the:M.SG bus

I am interested in the responsibility that can be attributed to the perfective past meaning for the averidical nature of root modals to be cancelled. Let’s see. Bhatt (1999) is the first author in drawing attention to the ambiguity of the past verbal forms of the English ability modal *be able* (2). More precisely, *was/were able* could be paraphrased either as ‘managed to’ in examples as (3a), or as ‘had the ability to’ in examples as (3b):

- (2) John was able to eat five apples in an hour.
- (3) a. Yesterday, John was able to eat five apples in an hour (past episodic).
 b. In those days, John was able to eat five apples in an hour (past generic).
 [Bhatt (1999: 173); (314) and (315a,b)]

What is interesting is that the first paraphrasis allows the truth of the proposition embedded under the modal to be asserted. In other words, the non veridicality of modals notwithstanding (Giannakidou 1998), it is possible to claim that John ate five apples in an hour. Since Bhatt (1999), this effect is known as the *actuality entailment* of the ability modal, or as the *factual or implicative reading*.

In languages that distinguish between perfective and imperfective pasts, actuality entailments stem from the former (Bhatt 1999: 177). Spanish is one of those languages. In (4a) it can indeed be inferred that Juan ate five apples in an hour (see 4b). In (5a) it cannot (see 5b). The inference is an entailment. That is why it cannot be cancelled without contradiction (4c):^{3,4}

³ See Piñón (2009) for the consideration of the implicative reading of ability modals as a particular kind of inference: the *abduction*.

⁴ I ignore the *counterfactual* interpretation of (4a). If (4a) were interpreted as counterfactual, it would be equivalent to *Juan pudo haberse comido cinco manzanas en una hora* (‘Juan could have eaten five apples in an hour’). The inference would be the opposite: Juan did not eat five apples in an hour.

- (4) a. Juan pudo comer=se cinco manzanas en una hora,
Juan can.:PST.PFV.3SG eat:INF =SE five apples in one:F.SG hour
 ‘Juan managed to eat five apples in an hour’
 b. →Juan se=comió cinco manzanas en una hora.
Juan SE= eat:~PST.PFV.3SG five apples in one:F.SG hour
 ‘Juan ate five apples in an hour’
 c. #pero no lo hizo.
but not it:ACC do:~PST.PFV.3SG
 ‘but he did not do it’
- (5) a. Juan podía comer=se cinco manzanas en una hora.
Juan can.:PST.IPFV.3SG eat:INF =SE five apples in one:F.SG hour
 ‘Juan had the ability to eat five apples in an hour’
 b. ↗Juan se=comió cinco manzanas en una hora.
 ‘Juan ate five apples in an hour’
 c. pero no lo hizo.
but not it:ACC do:~PST.PFV.3SG
 ‘but he did not do it’

(6a) and (7a) show that the contrast between perfective and imperfective pasts is preserved with deontic modals:⁵

- (6) a. Juan pudo ir al cine (de.acuerdo con las órdenes de su padre).
Juan can.:PST.PFV.3SG go:INF to.the:M.SG cinema according with the:F.PL orders of his father
 ‘Juan was.PFV allowed by his father to go to the cinema’
 b. → Juan fue al cine.
Juan go:~PST.PFV.3SG to.the:M.SG cinema
 ‘Juan went to the cinema’
- (7) a. Juan podía ir al cine (de.acuerdo con las órdenes de su padre).
Juan can.:PST.IPFV.3SG go:INF to.the:M.SG cinema according with the:F.PL orders of his father
 ‘Juan was.IPFV allowed by his father to go to the cinema’
 b. ↗ Juan fue al cine.
Juan go:~PST.PFV.3SG to.the:M.SG cinema
 ‘Juan went to the cinema’

On the contrary, (8a) is the proof that implicative readings do not follow from epistemic modals, whatever be their morphology:

- (8) a. {Debió/ Debía} de llover cuando llegaron allí.⁶
must:~PST.PFV.3SG/must:~PST.IPFV.3SG of rain:INF when arrive:~PST.PFV.3PL there.
 ‘It must have rained/It must have been raining when they arrive there’
 b. ↗ Llovió /Llovía cuando llegaron allí.
rain:~PST.PFV.3SG /rain:~PST.IPFV.3SG when arrive:~PST.PFV.3PL there
 ‘It rained/It was raining when they arrived there’

⁵ For the same observation with respect to French modals, see Hacquard (2006, 2009). For English modals, see Homer (2011: 106): “A[ctuality]E[ntailment]s can occur with all root modals, including deontic ones (this fact is seldom acknowledged)”.

⁶ By means of the preposition *de* I distinguish between the epistemic (with *de*) and the root (without *de*) interpretation of the auxiliary *deber*. This distinction is made in standard European Spanish. Nonetheless, RAE & ASALE (2009: §28.6k; translation ACG) observe: “Because of its great extension in the Spanish-speaking world at all levels of language, the use of ‘*deber* + infinitive’ with the sense of conjecture or inferred probability cannot be considered incorrect. To express obligation, the variety without preposition is recommended”.

The examples (4)-(8) give rise to two fundamental questions.⁷ The first one is why implicative readings are constrained to root modals. Most of the works that I have consulted are devoted entirely to dynamic modals (Bhatt 1999; Mari & Martin 2008; Piñon 2009; Giannakidou & Staraki 2012). Nevertheless, more serious than ignoring deontic modals is the fact that the semantic distinctions those papers are based on cannot be extended to them. To put an example, in Mari & Martin (2008) it is maintained that dynamic modals are ambiguous between two interpretations: on the one hand, a *generic ability* reading, i.e., someone is said to be capable of something, even if the capacity has never been instantiated; on the other hand, an *action dependent ability* reading, i.e., someone is said to be capable of something because there has been at least one instance of verification. While the generic ability reading emerges with imperfective pasts, the action dependent ability one emerges with perfective pasts. Note that a parallel distinction cannot be applicable to deontic modals, and still there would be no reason why epistemic auxiliaries do not admit factual readings. Deontic modals are not ambiguous. Even if certain permissions or obligations could be considered generic, something like an *action dependent permission/obligation* reading would be contrary to fact: it would mean that it is necessary to do something, e.g., come back home after midnight, before getting permission or being compelled to do something.

The second question is two-faced: why are imperfective pasts an obstacle to implicative readings?, and why do perfective pasts make implicative readings possible? On the one hand, authors who have attempted to explain the different behavior of the imperfect past draw attention to its additional modal values of abituality or genericity (Bhatt 1999; Hacquard 2006, 2009). As it has been pointed out, however, this stance is untenable: the imperfective past of real implicative verbs (see 9a) does not impede actuality entailments (see 9b):

- (9) a. Juan siempre conseguía convencer =lo.
 Juan always managed:PST.IPFV.3SG *convince*:INF =him
 ‘Juan always managed to convince him’ (past generic)
 b. → Juan lo convencía.
 Juan him convinced:PST.IPFV.3SG
 ‘Juan convinced him’ (past generic)

On the other hand, authors who have focused on the perfective past propose that the implicative reading is the result of the coercion of the modal verb when it bears perfective past morphology (Borgonovo 2011; Homer 2011). It is often maintained that at the origin of the phenomenon of coercion there is some conflict between the semantic properties of a selector item (either a construction, a word, or a morpheme) and the semantic properties of an unexpected selected item (Lauwers & Willems 2011). The selector item would be the perfective morphology; the selected and unexpected item, the root modal. Root modals are said to be stative. States do not usually admit the temporal boundaries that the perfective morphology imposes to the verbal event. Thus, to amend the mismatch, non stative readings of the root auxiliary

⁷ The state of the art that follows is necessarily brief and incomplete for the sake of space. For papers that compare some proposals, see Piñon (2009), Mari (2015) and Hacquard (to appear). I leave out the pragmatic approach of Portner (2009), and the syntactic one of Piñon (2003). Portner considers the factual interpretation as an additional assertion speech act. According to Piñon: “the difference between ability *able* and opportunity *able* is a scopal one in the following sense: with ability *able*, tense takes scope over modality, whereas with opportunity *able*, modality takes scope over tense” (p. 338).

come out. The inchoative reading of Borgonovo (2011: 213) is an example. In that paper, a sentence like *Juan could escape* is proposed to be interpreted as ‘Juan became capable of escaping’. As before, at least one verification instance is needed in order to connect the factual entailment to the inchoative reading: someone cannot become capable of escaping until s/he has escaped. And that is, precisely, what cannot be extrapolated to deontic modals. The reason is the same as for the aforementioned analysis of the *action dependent ability* reading of the dynamic modal.

Homer (2011) starts from a questionable assumption: perfective aspect selects telic predicates, i.e., achievements and accomplishments. This means that both perfective states and activities are coerced. More specifically, an ACT operator is held responsible for, what is called, the *actualistic interpretation*. To my view, this approach is problematic for at least three reasons. The first one is its circularity: neither the number of operators nor the interpretations they are meant to give an account of are restricted in advance. There could be as many as necessary.

The second reason is that perfectivity is being taken as equivalent to culmination, but it shouldn’t be. To culminate is to reach the natural end, or *telos*, of a situation. Given that perfective aspect brings into focus the whole time of the verbal situation, it is true that with perfective telic predicates the culmination of the situation is asserted. It cannot be otherwise: the *telos* is part of it. However, there can be no culmination if the verbal situation does not include a natural end. That is what happens with perfective atelic predicates. Perfective aspect focuses on the whole time of the verbal situation, i.e., since it starts until it stops or it is interrupted.

Finally, I consider Homer’s (2011) approach problematic because it is not clear how the implicative reading is derived from the aspectual coercion in biclausal structures as the one headed by root modals. Consider (10). According to Homer, the perfective stative predicates of (10a) and (10b) give rise to a “reading whereby the existence of some pragmatically determined event is entailed” (p. 111): in (10a), the house was bought; in (10b), Jane took the train. The entailments result from aspectual coercion. The operator at play is ACT:

- (10) a. La maison a coûté 100 000 € (the house has cost €100,000).
 b. Jane a pu_{circ} prendre le train.
 [Homer (2011: 111); (18a) and (20a)]

Homer (2011: 109) assumes that root modals create biclausal structures. So, the syntax of (10b) should be different from the syntax of (10a). Nevertheless, the consequences of this position are not evaluated. More precisely, it would have been necessary to explain both what is the exact bounded interpretation that the coerced root modal gives rise to, and why the coercion of the modal would influence the interpretation of the infinitive.

To end this section, I want to draw attention to a last theoretical problem that is common to all the approaches just summarized. Perfective and imperfective aspect are dealt with as if these grammatical categories could not be kept apart from past tense. But they can, as we will see in section 3.2.1. Temporal and aspectual meanings can be combined in different ways. Therefore, the contribution of past tense to get actuality entailments should be considered as necessary as the contribution of perfective aspect. The proposals reviewed in the last pages seem to have taken no heed of it.

The aim of the present article is to provide an answer to the questions posed above, namely, why implicative readings are restricted to root modals; why are imperfective pasts an obstacle to implicative readings?, and why do perfective pasts make

implicative readings possible? My proposal is based on two postulates. The first one is that root modals are eventive, i.e., they denote situations that can be located on the timeline.⁸ Epistemic modals are not (Carrasco Gutiérrez 2018). Eventive predicates are under the scope of Tense and Aspect, and thus temporal-aspectual morphology has effect on their interpretation. My second postulate is that root modals are associated to a *goal-directed scenario* (Guéron 2015). In other words, they are part of a sort of syntactically derived telic predicate. Verbal periphrases are examples of restructuring contexts (Wurmbrand 2001). The hypothesis from which I proceed is that the restructuring structure which the root modal is a constituent of makes it possible that the event denoted by the auxiliary and the event denoted by the non-finite predicate become a non-homogeneous complex event. So, the root periphrasis behaves as a telic predicate with regard to grammatical aspect: with perfective morphology the culmination of the complex event is asserted; on the contrary, with imperfective morphology just the origin of the trajectory is brought into focus. The main advantage of this approach is that the actuality entailment is not understood as a result of the idiosyncratic meaning of dynamic modals.

The paper is organized as follows. In order to answer the first question that I am interested in, I will devote section 2 to briefly examine the syntax and semantics of epistemic and root modals. An answer to the other two questions will be provided in section 3, where I will present my analysis of the actuality entailments, and the evidence that support it. Section 4 summarizes the main conclusions.

2. Epistemic vs. Root modal

2.1. A question of scope

A root modal verb can never precede an epistemic auxiliary (Rivero 1976: 250; Tasmowski 1980: 45; Picallo 1985: 232-233, 1990: 294; Bosque 2000: 16; Wurmbrand 2001:185-186; RAE & ASALE 2009: §28.6e-g; Bravo 2015: 46, 2017: 49, among others). The contrast between the English paraphrases (11b,c) of the sentences in (12a) may serve as an illustration:

- (11) a. Debe (de) poder dormir todo el día.
 must.PRS.3SG (of) can.INF sleep.INF all the.M.SG day
 b. ‘According to the available evidence (I infer that), s/he is allowed to sleep the whole day’ √EP>ROOT
 c. ‘S/He is allowed to be possible that s/he sleeps the whole day’ #ROOT>EP

This observation, reflected in the restriction of linearization of (12) (Laca 2005:14), is the origin of a broad consensus: epistemic modal verbs are generated in higher positions than root modal verbs:

- (12) *ROOT MODAL > EPISTEMIC MODAL

The disagreement begins, however, when it comes to determining the positions of epistemic and deontic modals with respect to the syntactic projections related to temporal and aspectual values, i.e., T(ense) and Asp(ect), respectively. In the literature on English modal verbs, it is generally assumed that root modals are within the scope of T and Asp, whereas epistemic modals take scope over those functional

⁸ I will use the terms *event* and *situation* in a broad sense, that is, to make reference to the denotations of both dynamic and non-dynamic or stative predicates.

projections (Tasmowski 1980; Picallo 1985, 1990; Butler 2003; Stowell 2004; Werner 2005; Hacquard 2006, 2009; Zagona 2007; Ramchand 2012, among many others).⁹ This point of view is represented in Cinque's (1999) hierarchy (see 13). The reason to propose (13) is the fact that temporal-aspectual morphology seems to have semantic repercussion exclusively on root modals:¹⁰

- (13) CINQUE'S HIERARCHY (irrelevant projections omitted):
 Modal_{EPISTEMIC} > T > ASP > Modal_{ROOT}

By contrast, in the literature on languages different from English, especially those with rich inflectional systems, such as French and Spanish, I have found two different approaches. On the one hand, there are studies that assume Cinque's hierarchy and, consequently, maintain that the temporal-aspectual morphology that epistemic modals display is vacuous (Borgonovo & Cummins 2007; Borgonovo 2011). That means that temporal-aspectual morphology would not have any influence on their interpretation and, hence, that the speaker's conjectures would always be related to the utterance time. On the other hand, there are studies not based on Cinque's hierarchy that defend that T and Asp could take scope over epistemic modals (Eide 2002, 2003, 2011; Boogaart 2007; von Stechow and Gillies 2008; Martin 2011; Homer 2013; Mari 2015). Accordingly, temporal-aspectual morphology would not be vacuous: the speaker's conjectures could be placed before or after the utterance time.

In Carrasco Gutiérrez (2018), I collected evidence to assert that Spanish epistemic modals bear vacuous temporal-aspectual morphology and thus to side with those who affirm that they have semantic scope over Tense and Aspect. Notice that this proposal automatically allows us to explain why there are not actuality entailments with epistemic modals (see 8, above): actuality entailments can be expected just in case the modal display non vacuous temporal-aspectual morphology. Temporal-aspectual morphology will only have consequences for the interpretation of predicates that denote situations that can be located on the timeline. Epistemic auxiliaries do not denote situations, i.e., are non-eventive; but root auxiliaries do. This characteristic converts root modals into semi-lexical categories (Corver & van Riemsdijk 2001). That was my proposal in the aforementioned article. Next, I summarize two of the proofs on which it was based.

The first is the effect of modification by means of expressions like *otra vez* ('again') in structures consisting of more than one verb.¹¹ In (14a) and (15a) the expression *otra vez* appears before the auxiliary verbs of the progressive and modal periphrases; in (14b) and (15b), it is put after them. The idea is the following: if the periphrastic structures denote a single event, there will be no differences between the readings of (14a) and (14b), or between those of (15a) and (15b). On the contrary, if the periphrastic structures denote two events, the interpretations will not match:

⁹ Several studies which maintain that epistemic modals end up within the scope of a defective tense could also be included in this list of references. In Condoravdi (2002), for example, this defective tense would be the present, when the context is extensional, or a zero tense, when the context is intensional. See also Demirdache & Uribe-Etxebarria (2008a, 2008b) for the idea that there is an empty structural position above epistemic auxiliaries.

¹⁰ Although the approach I have adopted in this paper is formalist, in functionalist works such as Dik's (1989) epistemic operators are also conceived as more external than root operators.

¹¹ This is Napoli's (1981: 874) argument. See Wurmbrand (2001: 148 and following) for a review. Similar examples are also found in Bravo, García Fernández & Krivochen (2015: 93).

- (14) a. María otra.vez está llenando la piscina.
María again ESTAR:PRS.3SG fill:GER the:F.SG pool
 b. María está llenando la piscina otra.vez.
María ESTAR:PRS.3SG fill:GER the:F.SG pool again
 ‘María (again) is filling the pool (again)’
- (15) a. María otra.vez ha debido llenar la piscina.
María again have:PRS.3SG must:PST.PTCP fill:INF the:F.SG pool
 b. María ha debido llenar la piscina otra.vez.
María have:PRS.3SG must:PST.PTCP fill:INF the:F.SG pool again
 ‘María (again) had to fill the pool (again)’

Note that (14a) and (14b) are, indeed, interpreted in the same way. *Otra vez* generates the presupposition that the event denoted by the predicate it modifies has taken place before. In both sentences, it is the event of filling the pool. By contrast, the interpretations of (15a) and (15b) are different. In (15b), the event that is assumed to have taken place previously is again the event denoted by the main predicate, *llenar la piscina* (‘fill the pool’). But in (15a), what it is supposed to have happened before is Juan’s being forced or required to fill the pool. The latter option is completely natural, for example, in the context of a weekly assignment of chores: María is responsible, once more, for filling the pool. For the former to be natural, we could imagine María as responsible just for refilling an almost empty and dirty pool after a summer birthday party.

(16) demonstrates that the anteposition (16a) or postposition (16b) of the expression *otra vez* does not change the interpretation of the sentences with an epistemic modal (16c). This is to be expected if epistemic modals do not denote events:

- (16) a. María otra.vez ha debido de llenar la piscina.
María again have:PRS.3SG must:PST.PTCP of fill:INF the:F.SG pool
 b. María ha debido de llenar la piscina otra.vez.
María have:PRS.3SG must:PST.PTCP of fill:INF the:F.SG pool again
 c. ‘According to the available evidence (I infer that), Juan filled the pool again’

The second proof in favor of the eventive character of root modals is illustrated in (17): the root modal of a temporal clause can establish temporal relations with the verb of the matrix clause:

- (17) a. Cayeron las primeras gotas justo cuando Juan lavaba su coche,
fall:PST.PFV.3PL the:F.PL first:F.PL drops just when Juan clean:PST.IPFV.3SG his car
 ‘The first drops fell just when Juan was washing the car’
 b. Cayeron las primeras gotas justo cuando Juan debía lavar su coche,
fall:PST.PFV.3PL the:F.PL first:F.PL drops just when Juan must:PST.IPFV.3SG clean:INF his car
 ‘The first drops fell just when Juan had.IPFV to wash the car’
 c. así.que dejó que la lluvia hiciera el resto.
so let:PST.PFV.3SG that the:F.SG rain do:PST.IPFV.SBJV.3SG the:M.SG rest
 ‘so he let the rain do the rest’

Oversimplifying for brevity’s sake, in (17a), the time of the event of the matrix clause is included in the time of the event of the temporal clause headed by *cuando* (‘when’). Notice, however, that in (17b) the temporal relation of inclusion is established between the time of the event of the matrix clause and the time at which

the event of washing the car is regarded as necessary according to someone's duties. As the latter interval must precede the time of washing the car, it is possible to conceive a situation in which the event of washing did not happen because of the rain. This is the reason why (17c) could not be an appropriate continuation for (17b). It could, instead, be an adequate continuation for (17a), which presents the event of washing the car as ongoing.

The behavior of epistemic modals is completely different. Consider (18a). In (18a), the time of the event denoted by the matrix predicate *cayeron las primeras gotas* is included in the time of the event denoted by the embedded predicate *lavar su coche*. The event of washing the car, although a conjecture on the part of the speaker, is again presented as ongoing. That is why (18b) could be an appropriate continuation of (18a):

- (18) a. Cayeron las primeras gotas justo cuando Juan debía de lavar su coche,
fall:PST.PFV.3PL the:F.PL first:F.PL drops just when Juan must:PST.IPFV.3SG of clean:INF his car
 'The first drops fell just when Juan must have been washing the car'
 b. así.que dejó que la lluvia hiciera el resto.
so let:PST.PFV.3SG that the:F.SG rain do:PST.IPFV.SBJV.3SG the:M.SG rest
 'so he let the rain do the rest'

I close this section with a prediction based on the data of (15) and (17b): since root modals are eventive, it should be possible to independently locate on the timeline both the event denoted by the root modal and the event denoted by the main predicate of the periphrastic structure. (19) shows that this prediction is borne out. The adverb *ahora* ('now') contributes to place on the timeline the events denoted by the modal of the matrix clause *puedo* ('*can:PRS.ISG*') and the modal of the subordinate clause *debo* ('*must:PRS.ISG*'). *Mañana* ('tomorrow') places on the timeline the event denoted by *entregar el trabajo de Ciencias Sociales* ('turn in the work of Social Sciences'):

- (19) Ahora no puedo salir, que debo entregar mañana el
now not can:PRS.ISG go.out:INF that must:PRS.ISG turn.in:INF tomorrow the:M.SG
 trabajo de Ciencias Sociales.
paper of Sciences Social:PL
 'Now I cannot go out, because I must turn in the Social Sciences paper tomorrow'

The possibility of independent temporal modification of the infinitive suggests that there are projections of Tense and Aspect above the main predicate of the periphrasis, meaning that root modals are a part of biclausal structures.¹² Following Wurmbrand's (2001, 2014) typology (20), this implies that the structures with root modals may be included among the constructions with a *low* level of restructuring (21). In section 3.3, I will go into this idea in a little more depth:

- (20) *Degrees of restructuring (Wurmbrand 2001):*
 a. matrix V [CP [TP/wolIP [VP [VP]]]] no restructuring
 b. matrix V [TP/wolIP [VP [VP]]] "a little" restructuring
 c. matrix V [VP [VP]] "more" restructuring
 d. matrix V [VP] "most" restructuring

¹² Epistemic modals will be inserted into monoclausal structures. Actually, the possibility of conjugating this type of modal verbs in all verbal tenses suggests that they are integrated into the conjugation of Spanish, adding to the temporal-aspectual information of verbal forms the meaning that the speaker cannot make an absolute commitment to the truth of the proposition (Carrasco Gutiérrez 2018).

- e. *matrix V [TP/wollIP [VP]]] *truncation from the middle
 (Wurmbrand 2014: 424)
 (21) T> ASP> Modal_{ROOT} T> ASP>V

This subsection has been devoted to my first concern: the reason why past perfective epistemic modals do not give rise to actuality entailments. Epistemic modals are not eventive. Consequently, the temporal-aspectual morphology that they display has no effect on their interpretation. By contrast, temporal-aspectual morphology does influence the interpretation of root modals: they are eventive. Nonetheless, the eventive character of root modals is a necessary condition but it does not suffice to give rise to actuality entailments. We also need to pay attention to the semantics and syntax of the construction which root modals are a part of. That will be the aim of the next section.

3. (Im)perfectivity and the actuality entailment

3.1. A new scenario

In this section I return to the implicative reading of root modals. My approach will be based on Guéron’s (2015) idea that modal verbs are associated with a *goal-directed scenario*. Let’s see.

According to Guéron (2015), a goal-directed scenario is lexically determined by the content of the lexical verb and its complements (i.e., by a Vendlerian accomplishment or achievement predicate), but it may also be derived syntactically in a structure containing an auxiliary verb. The modal periphrasis is an example. The identification of a GOAL, that is: “a situation which is unrealized but realizable at the reference time” (p. 137), entails a *trajectory* leading to the goal, an *origin*, and a *means* of attaining the goal. Consider the example (6a), which I repeat below for simplicity. The non-finite predicate of (22) names the goal; the subject represents the means for reaching the eventive goal; and the modal verb introduces the trajectory:

- (22) Juan pudo ir al cine (de acuerdo con las órdenes de su padre).
Juan can.PST.PFV.3SG go:INF to.the.M.SG cinema according with the.F.PL orders of his father
 ‘Juan was.PFV allowed by his father to go to the cinema’

The modal verb is described as denoting a state of “heightened” anticipation whose origin is the speaker.^{13,14} More precisely, the sentence would describe: “a state of affairs at the Reference Time in which nothing is happening, but something could

¹³ The information about the *origin* is a bit confusing. On the one hand, it is defined as: “The origin of a modal trajectory may be intentional or inertial: Bill may order Mary to write a letter, or else the conventions of the Common Ground, say social courtesy, require it” (p. 134). On the other hand, it is identified with the speaker (p. 136):

in “Mary must write a letter,” Mary is presupposed as present in the discourse world from the beginning to the end of the modal goal-directed trajectory. If Mary is the means, then the origin of the modal trajectory must be the speaker; for a means must be accessible, and only the speaker has access to Mary.

¹⁴ Epistemic modals would be described in the same way (p. 136):

the goal of an epistemic trajectory is to establish the truth of a situation which may already exist at RT. The epistemic modal trajectory is not grounded in space and time but in the mind. The means of attaining the goal is the reasoning process of the speaker who thus functions as the origin of the trajectory...

The arguments displayed in Carrasco Gutiérrez (2018) and in subsection 2.1 prevent me from agreeing with this point of view.

happen. It implies that the Common Ground already contains the germ of a new state of affairs” (p. 138). According to the author, the modal construal only fits this goal-directed scenario if the verbal form is imperfective. The reason is that imperfective aspect allows the trajectory to be predicated of an open time interval. With perfective aspect, instead, the trajectory would be predicated of a closed or bounded time interval. Therefore: “Perfectivity is incompatible with modality, because it transforms what might otherwise have been construed as the goal of a temporal trajectory into the effect of a cause, in other words, a fact” (p. 138). That is to say, while in (23a), for example, we would be at the beginning of the trajectory, in (23b) we would be at the end. While in (23a) the truth of the prejacent proposition could not be asserted due to the fact that the situation denoted by *llenar la piscina* (‘fill the pool’) would have not reached its goal, in (23b) the goal would have been reached and, hence, the truth of the prejacent proposition could be asserted:

- (23) a. María tenía.que llenar la piscina.
María have:PST.IPFV.3SG.to fill:INF the:F.SG pool
 ‘María had.IPFV to fill the pool’
 b. María tuvo.que llenar la piscina.
María have:PST.PFV.3SG.to fill:INF the:F.SG pool
 ‘María had.PFV to fill the pool’

In my opinion, there are at least two drawbacks in the way Guéron exploits the idea that modals take part in a goal-directed scenario. The first one is to encompass both epistemic and root modals (see footnote 14). Observe that the statement that perfectivity is incompatible with averidicality is false if we take epistemic modals into consideration. The examples in (24) may be a proof: regardless of the aspectual content of the modal, the truth of the prejacent proposition cannot be asserted:

- (24) {Debió /Debía} de llover cuando llegaron allí. (=8a)
must:PST.PFV.3SG/must:PST.IPFV.3SG of rain:INF when arrive:PST.PFV.3PL there.
 ‘It must have rained/It must have been raining when they arrive there’

I will concentrate in root modality from now on. In (25)-(27) I provide an argument in favor of conceiving the root modal construal a goal-directed scenario. As it is wellknown, a sentence with a homogeneous predicate (namely, an activity or a state) bearing imperfective morphology (25a) entails a sentence with a perfective verbal form (25b). Homogeneous predicates have the *subinterval property*: “Subinterval verb phrases have the property that if they are the main verb phrase of a sentence which is true at some interval of time I, then the sentence is true at every subinterval of I including every moment of time in I” (Bennett & Partee 1972: 17). Thus, in (25) if Juan’s being happy is true at the time referred to by *entonces* (‘then’), it will also be possible to assert that he was happy at every moment of that interval:

- (25) a. Juan era feliz entonces.
Juan be:PST.IPFV.3SG happy then.
 ‘Juan was.IPFV happy then’
 b. →Juan fue feliz.
Juan be:PST.PFV.3SG happy
 ‘Juan was.PFV happy’

Achievements and accomplishments are not homogeneous predicates. That is why a sentence with an imperfective verbal form (26a) does not entail a sentence with a perfective verbal form (26b):¹⁵

- (26) a. *María llenaba la piscina.*
María fill :PST.IPFV.3SG the:F.SG pool
 ‘María was filling the pool’
 b. \nrightarrow *María llenó la piscina.*
María fill :PST.PFV.3SG the:F.SG pool
 ‘María filled the pool’

I will consider root modals as stative predicates (see section 3.2.2). What we would expect, then, is that a sentence with an imperfective root modal entailed a sentence with a perfective form of the auxiliary, as in (25). However, (27) shows that this prediction is not borne out.¹⁶ Putting it another way, (27) shows that regardless of the stativity of the root modal, the periphrasis behaves as a non-homogeneous predicate:

- (27) a. *La piscina tenía.que estar llena a las 16:00.*
the:F.SG pool have:PST.IPFV.3SG.to ESTAR:INF full at the:F.PL 16:00
 ‘The pool had.IPFV to be full at 4:00 p.m.’
 b. \nrightarrow *La piscina tuvo.que estar llena a las 16:00.*
the:F.SG pool have:PST.PFV.3SG.to ESTAR:INF full at the:F.PL 16:00
 ‘The pool had.PFV to be full at 4:00 p.m.’

The second drawback of Guéron’s (2015) approach concerns the claim that modal construal only fits the goal-directed scenario if the verbal form is imperfective. To be more precise, the fact that the imperfective aspect focuses on the beginning of the trajectory and perfective aspect on the end does not follow either from these meanings or from the actional properties of modal verbs.

Following Klein (1992, 1994), I assume that Aspect is a non-deictic grammatical category that joins two intervals: the Situation Time (TSIT), i.e., the whole time of the event denoted by the verbal predicate, and the Topic Time (TT), i.e., the time which is asserted in the sentence. If the aspectual meaning is perfective, TT includes TSIT (see 28a). This means that an assertion is being made on the entire event time.¹⁷ If the aspectual meaning is imperfective, TT is included in TSIT (see 28b). As a result, nothing can be asserted regarding the limits of the event, namely, when it begins or when it ends or when it stops or is interrupted:

- (28) a. *Debió/ Pudo:* ++ [+ - - - +] ++
must:PST.PFV.3SG /can:PST.PFV.3SG
 b. *Debía/ Podía:* ++ - - [- - - - -] - - + +
must:PST.IPFV.3SG /can:PST.IPFV.3SG
 - - - -: TSIT
 + + +: Time anterior or posterior to TSIT
 []: TT

¹⁵ This behavior is an expression of the *imperfective paradox* (Garey 1957; Dowty 1977, 1979).

¹⁶ I am not interested in the epistemic or the counterfactual readings of *La piscina tuvo que estar llena a las 16:00* (‘The pool had.PFV to be full at 4:00 p.m.’). Here and in the rest of the paper I will just consider deontic or dynamic readings.

¹⁷ The original definition of perfective aspect that can be found in Klein (1992: 537) is the following: ‘TT including end of TSit and beginning of time after TSit’. For the definition I adopt, see Smith (1991: 103). I take the diagram in (26a) from García Fernández (2000: 50).

In (28a) the necessity or possibility is predicated of a closed interval, whereas in (28b) it is predicated of an open interval. However, neither the open nor the closed character of the time interval should be an obstacle to link the necessity or possibility with a situation that is posterior and, thus, whose taking place is being put on hold. That is, precisely, what happens in a non-modal context, as illustrated in (29a,b). Observe that the continuation in (29c) does not render any of the sentences in (29a) and (29b) unacceptable:

- (29) a. Juan insistía en ir al cine,
Juan insist._{PST.IPFV.3SG} in go._{INF} to.the._{M.SG} cinema,
 ‘Juan was insisting on going to the cinema’
 b. Juan insistió varias veces en ir al cine,
Juan insist._{PST.PFV.3SG} several._{F.PL} times in go._{INF} to.the._{M.SG} cinema
 ‘Juan insisted on going to the cinema’
 c. pero no la convenció. Se=quedaron en casa.
but not her convince._{PST.PFV.3SG} SE=stay._{PST.PFV.3PL} at home
 ‘but he did not convinced her. They stayed at home’

But it is undeniable that if the interval brought into focus is bounded, the truth of the preajacent proposition in root modal construals can be asserted. So, taking Guéron’s intuition as a basis, my proposal to give an account of this unexpected result will be that the restructuring structure that the root modal heads allows the situation denoted by the auxiliary and the situation denoted by the embedded predicate to converge in a complex event at some level of grammatical representation (Picallo 1998: 191-192).¹⁸ That complex event behaves as the one denoted by a heterogeneous predicate with regard to aspectual meaning. The semantic details of the proposal are given in the next section.

3.2. On (im)perfective complex situations

3.2.1. The analysis

As in previous works, I will assume the typology of events of Moreno Cabrera (2003). This author distinguishes three basic types of situations: *states*, *processes* and *actions*. Briefly, states are relationships between either entities and properties (*attributive states*, 30a), or entities and locations (*locative states*, 30b):^{19,20}

- (30) a. ATTRIBUTIVE STATE: $\Sigma (\Upsilon, \Pi)$.
 Example: *La piscina está llena*, ‘The pool is full’
 b. LOCATIVE STATE: $\Sigma (\Upsilon, \Lambda)$.
 Example: *La piscina está allí*, ‘The pool is there’

¹⁸ So, the goal-directed scenario is not lexically determined, but derived syntactically. I believe the fact that the root modal and the infinitive are part and parcel of a restructuring structure to be a necessary condition to obtain the complex event I propose. However, it may not be a sufficient condition. That is, different restructuring structures could involve different relationships between predicates and events. This is a question that I cannot go into more deeply in this paper.

¹⁹ σ is the symbol for *situation*; Σ , for *state*; \wp , for *process*; \aleph , for *action*; Υ , for *entity*; Π , for *property*; Λ , for *location*; Φ and Θ are the symbols for both *property* and *location*.

²⁰ Consult Moreno Cabrera (2003: 171-198) for a critical review of the proposals by Dowty (1979), Jackendoff (1972, 1990), Levin & Rappaport Hovav (1995), Mateu Fontanals (1997), McCawley (1968), Pustejovsky (1991, 2000) and Van Valin & LaPolla (1997), among others.

Processes are defined as relations of transition between at least two states in which the same entity is involved:

$$(31) \quad \wp [\Sigma (\Upsilon, \Phi), \Sigma (\Upsilon, \Theta)]$$

The process in (32) is characterized by the fact that it lacks intermediate states between the *origin* or initial state ($\Sigma (\Upsilon, \Phi_{\text{origin}}) \Rightarrow$) and the *goal* or final state ($\Rightarrow \Sigma (\Upsilon, \Phi_{\text{goal}})$). The non-existence of intermediate states or, to put it another way, the relation of temporal contiguity between the initial and final states, is associated with the concept of instantaneousness in these processes:²¹

$$(32) \quad \Sigma (\Upsilon, \Phi_{\text{origin}}) \Rightarrow \Sigma (\Upsilon, \Phi_{\text{goal}})$$

Example: *marcar un gol*, ‘score a goal’

The processes in (33) are not instantaneous. They are characterized by the fact that they imply intermediate states, i.e., a *trajectory* (see the underlined part of the formulas below). There are non-instantaneous processes oriented toward the trajectory, as in (33a), and non-instantaneous processes not oriented toward the trajectory, as in (33b). The former do not have specific initial and final states, the latter do:

$$(33) \quad \text{a. } \Sigma (\Upsilon, \Phi_1) \Rightarrow \underline{\Sigma (\Upsilon, \Phi_2)} \Rightarrow \dots \Rightarrow \underline{\Sigma (\Upsilon, \Phi_{n-1})} \Rightarrow \Sigma (\Upsilon, \Phi_n)$$

Example: *correr por el parque*, ‘run through the park’

$$\text{b. } \Sigma (\Upsilon, \Phi_{\text{origin}}) \Rightarrow \underline{\Sigma (\Upsilon, \Phi_1)} \Rightarrow \dots \Rightarrow \underline{\Sigma (\Upsilon, \Phi_{\text{goal}-1})} \Rightarrow \Sigma (\Upsilon, \Phi_{\text{goal}})$$

Example: *La piscina se llenó*, ‘The pool was filled’

Finally, actions are considered relations of agentivity or causativity between processes and entities: an entity originates, controls or is responsible for the process:

$$(34) \quad \aleph (\Upsilon_{ij}, [\wp [\Sigma (\Upsilon_i, \Phi), \Sigma (\Upsilon_i, \Theta)]])$$

Moreno Cabrera’s states could be equated with Vendler’s states (1957); the processes oriented toward the trajectory, with activities; the telic processes, that is, those with specific initial and final states, correspond to accomplishments; and the instantaneous processes, with achievements. Actions inherit the aspectual structure of processes: *Juan marcó un gol* (‘Juan scored a goal’) would be an action of achievement; *Juan corrió por el parque* (‘Juan ran through the park’), an action of activity; and *Juan llenó la piscina* (‘Juan filled the pool’), an action of accomplishment (see Moreno Cabrera 2011: 10).

Coming back now to the root periphrasis, I propose that the situations denoted by the modal verb (σ_1) and the non-finite predicate (σ_2) semantically converge in a complex process:

$$(35) \quad \wp [\sigma_1, \sigma_2]^{22}$$

²¹ The arrow is another way to indicate the relation of transition between states. If it is used, the symbol \wp will be redundant.

²² I borrow the diagram from Moreno Cabrera (2003: 152-156). The aim of this author is to give an account of the subeventive structure of processes as the denoted by *construir una casa* (‘to build a house’).

Let's pay attention first to the situation denoted by the modal verb. I propose to consider this situation as an attributive state. The attribution can be *monovalent* or *polivalent*. In the first case, the property, represented by the predicates *necessary/possible*, is just related to the situation denoted by the non-finite predicate (see 36a). In the second case, that property is related both to the situation denoted by the non-finite predicate and to the entity represented by the subject of the sentence (see 36b):

- (36) a. MONOVALENT ATTRIBUTION: $\sigma_1 = \Sigma (\sigma_2, \Pi)$
 b. POLIVALENT ATTRIBUTION: $\sigma_1 = \Sigma (\Gamma, \sigma_2, \Pi)$

(36a,b) are my attempt to reflect the distinction between the so-called *non-directed* and *directed* interpretation of the root modal (Barbiers 1995: 144; Wurmbrand 1998: 254-255; Eide 2002: 20-22; Wårnsby 2006: 20-21; Schepper & Zwarts 2009: 257; Ramchand 2012: 21-22):

Root readings express modal forces like permission, obligation, ability, etc. In the directed interpretation, the subject is (directly) associated with a certain modal force (obligation in case of *must*) which is assigned by an outside source (i.e., somebody gave John the order to skate). Under the non-directed interpretation, the modal force is assigned to the whole proposition (i.e., somebody made a rule that says that John has to skate).
 Wurmbrand (1998: 254-255)

The directed interpretation has been made to depend on the existence of a thematic relationship between the subject of the sentence and the modal verb. That thematic relationship would be lacking when the interpretation is non-directed. Syntactically, the difference could be captured by means of a control (37b) or a raising structure (37a), respectively:^{23,24}

- (37) a. $\text{Aux}_{\text{deon}} [\text{VP DP } [V' \dots]]$
 b. $\text{DP}_{\text{grantee}} \text{Aux}_{\text{deon}} [\text{VP PRO } [V' \dots]]$
 [Schepper & Zwarts (2009: 261)]

In order not to stray off my current purposes now, I will return to the stativity of root modals in the following section. With regard to the situation denoted by the non-finite predicate, the following examples demonstrate that it could be a process (38a), an action (38b), or a state (38c):²⁵

²³ Wurmbrand (1998: 262-263) offers a more problematic solution. To her view, the subject would be generated under the scope of the modal verb regardless of whether the interpretation is non-directed or directed. Afterwards, the subject would move to the Specifier position of the modal phrase, where it would obtain its thematic role. The directed reading of the modal is made to depend on the subject being interpreted in its goal position; the non-directed reading, on the interpretation of the subject in its source position. Notice that this explanation goes against the *Thematic Criterion* (Chomsky 1981): in the directed interpretation of the root modal, the thematic role that the subject receives in its goal position would be added to the one it gets from the predicate headed by the infinitive in its source position. I find the same duplicity of theta-roles in the proposal of Guéron (2015: 135-136).

²⁴ For the differences between raising and control structures with root modals, see, among others, Picallo (1985), Barbiers (1995), Wurmbrand (1998, 2001), Bosque (2000), Eide (2002), Schepper & Zwarts (2009), Krivochen (2013), Mari (2015).

²⁵ Mari & Martin (2008) provide examples like (i) to assert that in French implicative readings cannot be obtained with stative predicates. The paralled example (ii) proves that both the counterfactual (iia) and the implicative reading (iib) are possible in Spanish:

- (38) a. La piscina PODER/DEBER [~~la piscina~~ llenarse].
 ‘The pool MUST:INF/CAN:INF be filled’
 $\sigma_2 = \neg \Sigma (\text{piscina, llena}) \Rightarrow , \dots, \Rightarrow \Sigma (\text{piscina, llena})$
 b. Juan_i PODER/DEBER [PRO_i llenar la piscina].
 ‘Juan MUST:INF/CAN:INF fill the pool’
 $\sigma_2 = \aleph (\text{Juan, } [\neg \Sigma (\text{piscina, llena}) \Rightarrow , \dots, \Rightarrow \Sigma (\text{piscina, llena})])$
 c. La piscina PODER/DEBER [~~la piscina~~ estar llena].
 ‘The pool MUST:INF/CAN:INF be full’
 $\Sigma (\text{piscina, llena})$

The diagram in (35) shows a process: the situation denoted by the modal verb and the situation denoted by the non-finite main predicate are connected by a transition relation. Namely, there is a change. Take the event of filling the pool in (38b). The diagram attempts to reflect the link between the event of filling the pool (σ_2) and a previous stage (σ_1) in which that situation would just be seen as possible or necessary according to certain rules, duties, characteristics of an individual or general conditions existing in the world.

It is important to remark, however, that (35) should not be taken as the representation of a subeventive structure like the prototypical ones in (30), (32) and (33). The process to which I refer in (35) has no existence outside the restructuring structure I am interested in. It is the semantic result of a particular syntactic relationship. More specifically, I will defend that the restructuring context allows the events denoted by the root modal and the infinitive to be interpreted as if they were the constituents of a complex process. This semantic construct makes the situation denoted by the non-finite predicate depend on the situation denoted by the modal verb in a particular way.²⁶ I agree with Guéron (2015) in that the former is a sort of goal with respect to the latter. Consequently, the periphrastic construction behaves as a telic predicate.

With perfective morphology the goal state of telic predicates is asserted. With imperfective morphology is not. Imperfective morphology focuses on the trajectory, the *previous stage* (Delfitto & Bertinetto 1995: 147; Smith 1991: 58), the *preliminary circumstances* (Kearns 2003). Consider examples (39) and (40). The Spanish *pretérito perfecto simple* (simple past) is a past perfective tense, i.e., TSIT should be understood as included in TT. Then, the verbal form *llenó* locates in the past the whole situation denoted by the predicate. In other words, (39) means that the pool went from being empty to being full. From now on, the shading will represent TSIT, and the square brackets, TT:

-
- (i) T’as pu._{PERF} avoir un repas gratuit, et tu ne t’es même pas levé!
You could.PERF have a meal for free, and you even didn’t get up!
 [Mari & Martin (2008: 6); example (8)]
- (ii) Pudieron disfrutar de un almuerzo gratuito;
 a. pero lo desaprovecharon. (COUNTERFACTUAL READING)
 ‘They could have had a meal for free; but they wasted the opportunity’
 b. se fueron muy agradecidos. (IMPLICATIVE READING)
 ‘They managed to have a meal for free. They left very grateful’

²⁶ I am conscious of the possible application of the concept of *force* of Copley & Harley (2010) to the structures I am analysing. I leave it for future research. To this respect, see the paper of Giannakidou & Staraki (2012) on the implicative reading of Greek root modals.

- (39) La piscina se=llenó.
the:F.SG pool SE=fill:PST.PFV.3SG
 ‘The pool was filled’
 $[-\Sigma (\text{piscina}, \text{llena}) \Rightarrow , \dots, \Rightarrow \Sigma (\text{piscina}, \text{llena})]$

On the other hand, the Spanish *pretérito imperfecto* is a past imperfective tense, i.e., TSIT should be understood as including TT. Then the verbal form *llenaba* does not locate in the past the whole situation denoted by the predicate. To my purposes, what is relevant is that the goal state cannot be asserted: the pool cannot be said to be full:

- (40) La piscina se=llenaba.
the:F.SG pool SE=fill:PST.IPFV.3SG
 ‘The pool was being filled’
 $-\Sigma (\text{piscina}, \text{llena}) [\Rightarrow , \dots, \Rightarrow] \Sigma (\text{piscina}, \text{llena})$

In the same way, I propose that whenever the periphrasis bears imperfective morphology, the situation denoted by the modal verb will be brought into focus (41a): the goal, i.e., the situation denoted by the non-finite main predicate, is not asserted. On the contrary, if the periphrasis displays perfective morphology, the focus will be on the whole complex event (41b). Thus, the goal will be asserted:

- (41) a. IMPERFECTIVE MORPHOLOGY: $[\sigma_1] \Rightarrow \sigma_2$
 b. PERFECTIVE MORPHOLOGY:²⁷ $[\sigma_1 \Rightarrow \sigma_2]$

Now, we need to go a step further. As mentioned in section 1, Tense and Aspect are separate grammatical categories that can be combined in different ways. The averidical nature of the root modal can only be cancelled, and, thus, actuality entailments can only be obtained if perfective morphology is combined with the temporal meaning of anteriority. I will briefly illustrate this point to finish this section.

²⁷ According to Mari & Martin (2008: 5), the implicative reading is not compulsory “when the context provides elements [...] helping to make clear that the circumstances (or the ability, the opportunity to reach the goal) are temporally bounded”. See (i):

- (i) Notre nouveau robot a même pu._{PERF} repaser les chemises à un stade bien précis de son développement. OK Mais on a supprimé cette fonction (qui n’a jamais été testée) pour des raisons de rentabilité.
Our new robot could.PERF even iron shirts at a particular stage of its development. But we suppressed this function (which was never tested) for rentability reasons.
 [Mari & Martin (2008: 5); example (7)]

I believe, on the contrary, that actuality entailments are compulsory. The reason is that both the time of the situation denoted by the modal verb and the time of the situation denoted by the non-finite main predicate are included in the TT, as these events constitute the complex situation focused on by perfective aspect. So, my prediction is that actuality entailments will not be impeded by durative expressions, whose function is to provide information about the extension of TT. The example (ii) shows that the prediction is borne out. I ignore the counterfactual reading:

- (ii) #Nuestro nuevo robot pudo incluso planchar camisas (en un estadio bien preciso de su desarrollo), pero no lo hizo.
 ‘Our new robot could.PFV even iron shirts at a particular stage of its development, but it did not do it’

Consider future tense. Future tense is said to be aspectually *neutral* (Smith 1991), i.e., it can be interpreted as perfective or as imperfective, depending on the context and the actional properties of the verbal predicate. The overlapping temporal relationship between the events of (42a) indicates that the future is interpreted as imperfective (see the *test of when*, in section 3.2.2). By contrast, the temporal relationship of succession in (42b) indicates that the future is interpreted as perfective:

- (42) a. Cuando llegue Juan, yo estaré en la oficina.
when arrive:PRS.SBJV.3SG Juan I ESTAR:FUT.1SG in the:F.SG office
 ‘When Juan will arrive, I will be at the office’
 b. Cuando llegue Juan, la piscina se=llenará.
when arrive:PRS.SBJV.3SG Juan the:F.SG pool SE=fill:FUT.3SG
 ‘When Juan will arrive, the pool will be filled’

(43a) behaves as (42b): the future is interpreted as perfective. However, perfectivity notwithstanding, actuality entailments cannot be obtained (43b):

- (43) a. Cuando llegue Juan, la piscina deberá llenar=se.
when arrive:PRS.SBJV.3SG Juan the:F.SG pool must:FUT.3SG fill:INF=SE
 ‘When Juan will arrive, the pool must be filled’
 b. → la piscina se=llenó.
the:F.SG pool SE=fill:PST.PFV.3SG
 ‘The pool was filled’

(44a) shows that we get the expected entailment (44b) only if future tense combines with the meaning of anteriority. Observe that the difference between (43a) and (44a) lies on the fact that in the latter the complex situation denoted by the periphrastic structure is understood as anterior or past with respect to another situation, i.e., the event of Juan’s being angry:

- (44) a. El jueves Juan estará enfadado porque tres días antes la piscina
the Thursday Juan ESTAR:FUT.3SG angry because three days before the:F.SG pool
 habrá tenido.que llenar=se.
have:FUT.3SG have.to:PST.PTCP fill:INF=SE
 ‘On Thursday Juan will be angry because the pool will have had to be filled three days before’
 b. → La piscina se llenó.
the:F.SG pool SE=fill:PST.PFV.3SG
 ‘The pool was filled’

I take (42) and (44) to claim that any attempt to explain how implicative readings are derived should take into account both the aspectual and the temporal meaning of root modals. On the one hand, the time of the whole complex situation syntactically generated in the restructuring structure should be aspectually brought into focus. On the other hand, TT should be anterior to another point in the timeline, so that the complex situation can be conceived as having taken place.

In support of the proposal put forward in this section, I will go deeper into the actional characterization of root modals. That is the aim of section 3.2.2. I will firstly demonstrate that the stativity of the root modal has grammatical consequences only if the modal state is focused on by imperfective morphology. Later, I will discuss evidence that show that the complex event to which the periphrastic structure gives rise to acts as a unit with regard to the selection properties of certain predicates.

3.2.2. Some evidence: on the stativity of root modals

It is not unusual to find the claim that modal verbs are stative (Eide 2003; Hacquard 2006; Boogaart 2007; Zagana 2007; Mari & Martin 2008; Borgonovo 2011; Homer 2011; Bravo 2015; Bravo, García Fernández & Krivochen 2015; Guéron 2015, among others). In Carrasco Gutiérrez (2018) I made a first remark: only root modals can be classified as stative. Epistemic modals do not even denote events. In what follows, we will be able to see that the structures with root modals do not respond homogeneously to the stativity tests that are handled in the literature.²⁸ Far from being a problem, that is precisely what can be expected, given that root modals are not syntactically isolated.

In this paper σ_1 is being conceived as a part of a semantically complex event that obtains in a restructuring construction. My prediction, then, is that the situation denoted by the root modal will only be visible, that is, its stativity will only have grammatical effects, as long as σ_1 is focused on by imperfective aspect (41a). The *test of the present tense* will serve to illustrate this point. That proof establishes that the most natural interpretation of the present tense of a stative predicate is that of overlapping with the utterance time (Vlach 1981a: 67; 1993: 239). The present is an imperfective tense. So, if we construct a sentence with the present tense of a root modal, σ_1 will be focused on. Since root modals are stative, we should get the aforementioned interpretation. (45) shows that the prediction is borne out (see the continuation in 45a). The non-overlapping interpretation is also possible (see the continuation in 45b), but additional information from the context would be necessary:

- (45) María debe llenar la piscina,
María must:PRS.3SG fill:INF the:F.SG pool
 ‘María must fill the pool’
 a. porque los invitados llegarán en cualquier momento.
because the:M.PL guests arrive:FUT.3PL at any moment
 ‘because the guests will arrive at any moment’
 b. siempre.que voy a ver=la.
whenever go:PRS.1SG to see her
 ‘whenever I go to visit her’

Next, I want to draw attention to the *test of when* and to the test of *al + infinitive*. According to the first proof, if a punctual expression modifies a perfective verbal form, a temporal relation of succession can be obtained: the time of the matrix event will be posterior to the time of the embedded event (46a). But if the punctual expression modifies an imperfective verbal form, the temporal relationship is one of overlapping (46b).²⁹ Clauses with achievement predicates headed by *when* are one of those punctual temporal expressions:

²⁸ For a detailed explanation of those tests, two previous works can be consulted: Carrasco Gutiérrez (2015; 2017).

²⁹ I adapt Michaelis’ (2011) test. The original proof was proposed by Vlach (1981a: 67; 1981b: 273). See also Vlach (1993: 239-240) and Moens (1987: 13), where the *accessibility test* of Vuyst (1983) is mentioned. The term *punctual temporal expression* is based on the term *adverbial complement of point* of García Fernández (2000). Those complements: “indicate with more or less precision the moment of the timeline in which the event is located” (p. 118; translation ACG). According to this author: “*when* establishes a simultaneity relationship between the time of the matrix event and the time of the embedded event [...] Sometimes, however, a succession reading can be obtained [...] the time of the matrix event follows the time of the embedded event; this possibility depends both on the actional properties of the predicates and their aspectual meanings” (pp. 255-256).

- (46) a. Cuando él salió.a.escena, las puertas se=abrieron.
when he come:PST.PFV.3SG .on.stage the:F.PL doors SE=open:PST.PFV.3PL
 ‘When he came on stage, the doors opened’
 b. Cuando él salió.a.escena, las puertas se=abrían.
when he come:PST.PFV.3SG .on.stage the:F.PL doors SE=open:PST.IPFV.3PL
 ‘When he came on stage, the doors were opening’

In the examples of (47) the matrix predicate is stative. (47a) is grammatical; (47b) is not. To fit in this context, the situation denoted by stative predicates that bear perfective morphology should be understood as ingressive (see Carrasco Gutiérrez 2017). Ingressive interpretations are hard to obtain with states:

- (47) a. Cuando él salió.a.escena, las puertas estaban abiertas.
when he come:PST.PFV.3SG .on.stage the:F.PL doors ESTAR:PST.IPFV.3PL open:F.PL
 ‘When he came on stage, the doors were.IPFV open’
 b. *Cuando él salió.a.escena, las puertas estuvieron abiertas.
when he come:PST.PFV.3SG .on.stage the:F.PL doors ESTAR:PST.PFV.3PL open:F.PL
 ‘When he came on stage, the doors were.PFV open’

According to my analysis, past perfective root modals should not render the sentence ungrammatical. Compare (48a) and (48b). In (48a) the expected overlapping relationship is obtained. In (48b), the time of the embedded event is anterior to the time of the matrix event:

- (48) a. Cuando él salió.a.escena, las puertas debían abrir=se.
when he come:PST.PFV.3SG .on.stage the:F.PL doors must:PST.IPFV.3PL open:INF=SE
 ‘When he came on stage, the doors must.IPFV open’
 b. Cuando él salió.a.escena, las puertas debieron abrir=se.
when he come:PST.PFV.3SG .on.stage the:F.PL doors must:PST.PFV.3PL open:INF=SE
 ‘When he came on stage, the doors must.PFV open’

(48b) does not prove that root modals denote states that are being interpreted as ingressive: (48b) does not brought into focus the beginning of the state of being necessary that the doors open. Once more, (48b) shows that perfective morphology focuses on the complex event that the situations denoted by the root modal and the non-finite main predicate give rise to. Thus, (48b) means that the doors opened after he came on stage.

Consider now the test of *al + infinitive*. Spanish clauses headed by *al + infinitive* can be interpreted either as temporal or as causal. The test establishes that the causal reading is compulsory with stative predicates (see García Fernández 2000: 283, and the references therein). The prediction is, then, that root modals will be excluded whenever those clauses are temporal. That is exactly what happens:

- (49) Al tener.que marchar=se al día siguiente, escribió una carta
to.the:M.SG have.to:INF leave:INF=SE to.the:M.SG day following write:PST.PFV.3SG a:F.SG letter
 a. #TEMPORAL INTERPRETATION:
 ‘When s/he must leave the following day, s/he wrote a letter’
 b. √CAUSAL INTERPRETATION:
 ‘As s/he must leave the following day, s/he wrote a letter’

We should realize, however, that the modal does not exhibit imperfective morphology. Therefore, before putting forward any conclusion it will be useful to consider parallel sentences as (50):

- (50) Al poder quitar la mancha de la alfombra, no le castigaron.
to.the:M.SG can:INF get:INF.out the:F.SG stain of the:F.SG carpet not him punish:PST.PFV.3PL
 a. #TEMPORAL INTERPRETATION:
 ‘When s/he managed to get the stain out of the carpet, they did not punish her/him’
 b. √CAUSAL INTERPRETATION:
 ‘As s/he managed to get the stain out of the carpet, they did not punish her/him’

In (50), it is possible to infer that the stain has been removed. Thus, a continuation like *but finally s/he didn’t get the stain out of the carpet* would render the example unacceptable. On the contrary, no actuality entailment follows from (49). As a result, the example can be extended by means of a sentence like *but finally s/he didn’t leave*. To my view, this contrast can only mean that what is being focused on is the time of a different situation: σ_1 in (49); $[\sigma_1, \sigma_2]$ in (50). What makes that possible is the aspectual meaning of the simple infinitive. The simple infinitive is *neutral* (Smith 1991), as the future tense. In other words, it can be interpreted as imperfective (as *tener que* in 49) or as perfective (as *poder* in 50).

In sum, the unacceptability of (49a) and (50a) should not be attributed to the stative character of the root modal: only in the former the situation denoted by the modal auxiliary is focused on. These examples prove that stativity is not a necessary condition for a predicate to be excluded from temporal clauses headed by *al+infinitive*.

To end this section, I will describe two tests in which root modals and stative predicates seem to go their separate ways: the *test of the progressive* <estar +gerund> *periphrasis* and the *test of non-epistemic perception*. <Estar + gerund> is a phasal periphrasis: it selects an internal state of the situation denoted by the non-finite predicate (Carrasco Gutiérrez 2017). The subeventive structure of the predicates it combines with needs to incorporate a trajectory, i.e., a series of intermediate states. The test points out to the incompatibility of stative predicates with the progressive periphrasis. The reason is that states lack subeventive structure: they are just the expression of the relationships between entities and properties or locations (see 30). Since they are stative, the test predicts that root modals should be incompatible with <estar +gerund>. But they are not:

- (51) a. No puede coger el teléfono: está teniendo que declarar.
not can:PRS.3SG take:INF the:M.SG phone ESTAR:PRS.3SG have:GER.to testify:INF
 ‘S/he cannot answer the phone: s/he is carrying out his duty to testify’
 b. Por fin, estoy pudiendo deshacer el nudo.
at.last ESTAR:PRS.1SG can:GER undo:INF the:M.SG knot
 ‘At least I am being capable of undoing the knot’

(51a,b) could cast doubt upon the stativity of root modals. But it is also possible to look at the examples in a different way. Namely, the internal state that the progressive periphrasis selects must be thought to be provided by the complex event denoted by the non-finite predicates under the auxiliary of the progressive periphrasis, i.e., *teniendo que declarar* (‘having to testify’) (51a) and *pudiendo deshacer el nudo* (‘being capable of undoing the knot’) (51b). In support of this approach, notice that examples (51a) and (51b) present the processes of testifying and undoing the knot as

ongoing processes, respectively. The former is connected to the necessity of the individual represented by the subject to obey the law. The latter, to certain ability or capacity.

The test of the progressive <estar +gerund> periphrasis has shown that the complex situation denoted by the modal periphrasis acts as a unit with respect to the subcategorisation properties of a selector predicate, so that the modal state is not syntactically accessible. The test of non-epistemic perception leads to the same result.³⁰

The following sentences illustrate a well-known observation: states can be embedded under a perception verb in finite clauses (52a), but they are excluded in non-finite ones (52b):³¹

- (52) a. *Vimos que la piscina estaba llena.*
see:PST.PFV.1PL that the:F.SG pool ESTAR:PST.IPFV.3SG full
 ‘We saw that the pool was full’
 b. **La vimos estar callada.*
her see:PST.PFV.1PL ESTAR:INF silent
 ‘We saw her be silent’

Verbs of perception are known to vary in meaning depending on the type of complement they occur with. The presence of non-finite clauses induces what is known as *non-epistemic* interpretation. This means that (52b) can only be understood as the direct physical perception of the event of she’s being silent. On the other hand, the presence of finite clauses induces what is known as *epistemic* interpretation.³² In the literature, this is supposed to mean that (52a) describe an inference, i.e., a conclusion the speaker arrived at on the basis of something which s/he perceived (see Felser 1999: 2-3).

Once again this proof apparently fails to test the stativity of root modals, as the unexpected grammaticality of (53) shows:³³

- (53) a. *Lo vimos tener.que declarar.*
him:FEM see:PST.PFV.1PL have:INF.to testify:INF
 ‘We saw him have.to testify’
 b. *Todos la vieron poder deshacer el nudo.*
everybody her see:PST.PFV.1PL can:INF undo:INF the:M.SG knot
 ‘They all saw her be ables to undo the knot’

As in (51), however, I believe that (53) is a new evidence to support the proposal that the state denoted by the modal cannot be independently selected by the matrix

³⁰ See García Fernández, Krivochen & Bravo (2017) for a different representation of the syntactic relationship between the auxiliary of the progressive periphrasis and the auxiliaries of root modal constructions.

³¹ See, among many others, Higginbotham (1983), Guasti (1993), Felser (1999), Rodríguez Espiñeira (2000), Gisborne (2010).

³² In English it is possible to find a full infinitive in the complement clause, that is, an infinitive accompanied by the infinitival marker *to*. Full infinitive states can be embedded under a perception verb. The interpretation we get is epistemic: *I saw them to be obnoxious. (I apprehended the fact that they were obnoxious.)* (Bolinger 1974: 66).

³³ I took the following example from <http://agoranews.es/2016/04/27/carlos-molina-tidart-he-visto-clientes-tener-que-cerrar-porque-google-cambia-unos> (29/97/2018): *He visto clientes tener que cerrar porque Google cambia unos términos*, ‘I saw customers have to close because Google changes a few terms’

predicate. The object of perception is the complex event denoted by the auxiliary and the non-finite predicate of the modal periphrasis.

In section 3.2, actuality entailments of root modals have been claimed to depend on the syntax of the periphrastic construction: root modal periphrases are examples of restructuring structures. More precisely, root modal periphrases may be included among the constructions with a low level of restructuring. As we know, that means that there would be Tense and Aspect projections below the root modal. In the last section of this paper I examine some consequences of this proposal.

3.3. Some observations on the projections of Tense and Aspect below root modals

I finish section 3 returning to the example (19), which I repeat below for simplicity (54a). Recall that independent temporal modification can be considered an argument for the existence of Tense and Aspect projections both above the modal verb and above the non-finite main predicate. The example (55a) points in the same direction. Note that by means of the compound infinitive of the periphrasis it is possible to express anteriority of the event of raining with respect to the final clause event. The structures in (54b) and (55b) are a schematic representation of the syntax I propose:

- (54) a. Ahora no puedo salir, que debo entregar mañana el trabajo
now not can.PRS.1SG go.out.INF, that must.PRS.1SG submit.INF tomorrow the.M.SG paper
 de Ciencias Sociales.
of Sciences Social.PL
 ‘Now I cannot go out, because I must turn in the Social Sciences paper tomorrow’
 b. Modal_{Root} [T V:INF ... [Asp V:INF ... [V° V:INF ...]]]]
- (55) a. Para detener el trasvase de junio debe haber llovido en abundancia
for stop.INF the.M.SG transfer of June must.PRS.3SG have.INF rain.PST.PTCP in abundance
 entre marzo y mayo.
between March and May
 b. Modal_{Root} [Aux have:INF ... [T V:PST.PTCP ... [Asp V:PST.PTCP ... [V° V:PST.PTCP ...]]]]

I am fully aware that the consequences of the syntax of the root modal periphrases I have being put forward deserve further investigation. Suffice it to make now two observations regarding (54b) and (55b). The first one is that the temporal projection above the non-finite predicate is non-deictic: non-finite verbal forms cannot locate the time of the situation focused on by Aspect, i.e., TT, on the timeline with respect of the speech time. The position of the TT with respect to the speech time is determined by the temporal-aspectual information of the modal verb. Besides, with root modals, the situation denoted by the non-finite predicate is always posterior to the situation denoted by the auxiliary.

The second observation concerns the Aspect projection. A projection of Aspect with scope just on the non-finite predicate involves that TT could make visible different parts of the time of σ_2 . TT could include TSIT, as in (56). That is what characterizes perfective aspect:

- (56) Debe llover/ haber llovido en abundancia entre marzo y mayo.
must.PRS.3SG rain.INF /have.INF rain.PST.PTCP in abundance between March and May
 ‘The rain has to fall/have fallen continuously between March and May’
 ++ [+ - - - +] ++
 - - - - : TSIT
 + + + : Time anterior or posterior to TSIT
 []: TT

TT could be included in the TSIT, as in (57). That is what characterizes imperfective aspect:

- (57) Puede estar en casa cuando él vuelva.
can:PRS.3SG ESTAR:INF at home when he come:PRS.SBJV.3SG.back
 ‘S/he is allowed to/can be at home when he comes back’
 ++ -- [- - - - -] - - + +

And finally, TT could even be included in the time of affairs that follows and is consequence of the event (58). That is what characterizes perfect aspect:³⁴

- (58) Tiene.que haber llenado ya la piscina a las 16:00.
have:PRS.3SG .to have:INF fill:PST.PTCP already the:F.SG pool at the:F.PL 16:00
 (‘S/he has to already have filled the pool at 4:00 p.m.’)
 - - - - - + + [+ + +] + +

As mentioned in section 3.2.2, the simple infinitive is aspectually *neutral* i.e., it can be interpreted as perfective or as imperfective. That would explain the readings that the diagrams of (56) and (57) attempt to reflect. The compound infinitive, by contrast, is ambiguous between a perfective (56) and a perfect (58) interpretation, as all the verbal forms constructed with *have + past participle*.

I conclude by remarking that the aspectual meanings illustrated in (56)-(58) should not be taken as sentence assertions, but as qualifications on the situation denoted by the non-finite main predicate. The kind of assertion that it is made in the sentence depends on the aspectual morphology on the modal verb. As we know, whenever the root modal displays imperfective morphology the focus is on σ_1 , i.e., the state denoted by the auxiliary. As a result, even if that state is located in the past, the situation denoted by the non-finite predicate cannot be inferred to have taken place:

- (59) a. Tenía.que haber llenado ya la piscina a las 16:00.
have:PST.IPFV.3SG.to have:INF fill:PST.PTCP already the:F.SG pool at the:F.PL 16:00
 ‘S/he had.IPFV to already have filled the pool at 4:00 p.m.’
 b. Pero no lo hizo.
but not it:ACC do:PST.PFV.3SG
 ‘But he did not do it’

On the contrary, whenever the root modal bears perfective morphology, the focus is on the the complex situation that is syntactically generated: $[\sigma_1, \sigma_2]$. Thus, an actuality entailment is obtained:

- (60) a. Tuvo.que haber llenado ya la piscina a las 16:00.
have:PST.PFV.3SG.to have:INF fill:PST.PTCP already the:F.SG pool at the:F.PL 16:00
 ‘S/he had.PFV to already have filled the pool at 4:00 p.m.’
 b. #Pero no lo hizo.
but not it:ACC do:PST.PFV.3SG
 ‘But he did not do it’

³⁴ I am intentionally being simplistic for brevity’s sake. See Carrasco Gutiérrez (2015) for an analysis of experiential and resultative perfects.

4. Main conclusions

In this paper the actuality entailments of Spanish root modals have been explored. I have departed from previous approaches in several ways. Firstly, I have demonstrated that the phenomenon is not restricted to dynamic modals. Both dynamic and deontic auxiliaries lead to actuality entailments. Secondly, the emphasis has not been placed on imperfective or perfective aspect, i.e., neither on the additional modal values of abituality or genericity of the former, nor on the coerced meanings supposedly imposed by the latter. Aspectual meaning cannot be the only explanation for the averidical nature of root modals to be cancelled. Temporal meaning should also be taken into account. Thirdly, I have paid attention to the particular configuration which root modals are a part of. Root modal periphrases constitute biclausal restructuring structures. Owing to space limitations, I have not illustrated the syntactic properties on which the phenomenon of restructuring is based. I have confined myself to assume that the restructuring structure gives rise to a complex predicate made up of the modal auxiliary and the non-finite main predicate. That derived construct behaves as a non-homogeneous predicate regarding grammatical aspect: imperfective aspect would focus on the time of the state denoted by the modal; perfective aspect, on the time of the whole situation denoted by the complex predicate. Finally, I have considered root modals as semilexical verbs denoting events. To my view, epistemic modals are instead non-eventive auxiliaries that are integrated into the structure which provides, compositionally, the temporal-aspectual information of sentences. I know that this standpoint doesn't conform to the one mostly defended, i.e., that there is a single entry for modal verbs. The consequences will be explored in future works.

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