

Modal and Temporal Aspects of Habituality

Nora Boneh and Edit Doron

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1. Introduction

In this paper, we explore the modal characteristics of habituality, and the relation of habituality to imperfectivity. We have already argued in previous work (Boneh and Doron 2008) for the existence of a habituality modal operator Hab which is independent of imperfective aspect. Here we defend this analysis further, in particular in the face of reductionist views such as Ferreira (2005), who treats Hab as reducible to imperfectivity of plural events, and Hacquard (2006), who treats imperfective aspect as reducible to modal operators such as Hab/Prog. The reductionist views of Ferreira and Hacquard seem natural for languages with *imparfait*-type morphology expressing both continuity and habituality, such as the Romance languages. For us, the existence of this type of morphology shows that it is indeed natural to present habituals as ongoing. Yet we do not believe in the reduction of Hab to imperfectivity, or vice-versa. Rather, we assume that the output of the modal operator Hab is the input to aspectual operators, normally the imperfective aspect, since Hab is stative, but not exclusively. We show that Hab can be the input to the perfective aspect as well. Thus, it is possible to separate habituality from imperfectivity.

The paper mainly discusses languages such as Hebrew, English, Polish, which lack perfective/imperfective viewpoint morphology, though they may encode verbal lexical aspect morphology (Polish), or other viewpoint aspectual morphology such as the progressive (English). In these languages, the output of Hab does not show a perfective/imperfective contrast, yet it is normally imperfective, just like the *imparfait* in the Romance languages, since the default viewpoint for states is the imperfective. Importantly, in these languages, a different viewpoint aspect is found, which we call *retrospective*, morphologically marked by past-tense auxiliaries such as *haya* in Hebrew, *used to* and *would* in English, and *zvykl* in Polish. We will show that retrospective habituals are aspectually complex in that they characterize an interval which is disjoint from a perspective time; as such they instantiate actualized habits, while nonetheless being modal, like the other habituals. This will lead us to the conclusion that habituality is primarily a modal category, which can only indirectly be characterized in aspectual terms.

The paper is organized as follows. The next section serves as a basis to the sections following it in presenting the perfective and imperfective aspectual operators and the tests used throughout the paper to distinguish between these aspects. Section 3 compares the Romance languages with Hebrew, English, and Polish. In the former languages, habituality is indeed imperfective by default, but it is not restricted semantically and morphologically to the imperfective aspect. In the latter languages too, we find an unmarked habitual form which is typically imperfective, but can also be interpreted perfectly. But these languages also feature a *retrospective* habitual, which conveys the termination of the habit, yet is exclusively

imperfective. Section 4 presents the aspectual properties of the retrospective habitual, and argues that it involves a complex aspect, assimilating it to the perfect tenses. Section 5 deals with the modal nature of habituality, showing that irrespective of aspect, all habitual forms are modal. We show that the fact that retrospective habituals are actualized does not contradict their modality. Section 6 proposes an analysis of habituals, showing how the parameters of modality and aspect interact to derive the various types of habituals presented in the previous sections. Section 7.1 supports our analysis by giving arguments for dissociating habituality from imperfective aspect and its subcomponents: progressive and plurality, as proposed by Ferreira 2005. Section 7.2 lends support to the modal part of the analysis by assimilating habituality to disposition. Section 8 is the conclusion.

2. Background: the perfective/imperfective aspectual operators

In discussing viewpoint aspect, we adopt the definition of the perfective/imperfective aspectual operators in Kratzer (1998):

- (1) Imp $\sim \rightarrow \lambda Q \lambda i \lambda w \exists e [Q(e,w) \ \& \ i \subseteq \tau(e)]$
- (2) Pfv $\sim \rightarrow \lambda Q \lambda i \lambda w \exists e [Q(e,w) \ \& \ \tau(e) \subseteq i]$

According to this definition, viewpoint aspect is a mapping from properties Q of an event e (either a dynamic event or a state) to those intervals i (*reference time*) which stand in particular inclusion relations to the *event time* $\tau(e)$, the time of e . In the imperfective aspect, reference time is included in event time, whereas the perfective viewpoint aspect specifies the reverse relation. For the simple aspects such as the ones defined in (1) and (2), the reference time is related directly to the speech time by tense. For complex aspects such as the perfect or the retrospective habitual we will define below, the reference time is related to an additional interval called *perspective time*, and it is the perspective time which is related to speech time by tense.

Various tests have been developed in the literature (Mittowch 1988, Smith 1991, Bonomi 1995, Lenci & Bertinetto 2000, among others) for the distinction between the perfective and imperfective aspects. Frame adverbials, such as *that year* or *in 1998*, which denote the reference time, are understood as included in the event time in the case of the imperfective aspect, but as including the time of the event in the case of the perfective aspect. Frame adverbials thus serve as a test which distinguishes these two viewpoint aspects; we will use this test below, e.g. in (3). A second test involves the adverbs *still* and *already*, which are acceptable with the imperfective but not with the perfective, since they imply that the event either started before the reference time, in the case of *still*, or continues beyond the reference time, in the case of *already*; we make use of this test e.g. in (4) below. A third test is based on modification by punctual *when*-clauses: the reference time of the main clause follows the *when*-clause, and therefore its event-time overlaps the *when*-clause, in the case of the imperfective aspect, whereas it follows it in the case of the perfective aspect; we will use this test in section 3.2 below, for example in (14). A fourth test which distinguishes perfective from imperfective aspect is co-occurrence with measure phrases, such as durational adverbials (e.g. *for*-adverbials) and iterative adverbials (e.g. *twice*), which are only possible with perfectives, not with imperfectives; this test too is used in section 3.2, in example (16).

3. Habituality and aspect

3.1 Perfective habituais in the Romance languages

In the Romance languages, habituality strongly correlates with imperfectivity. Perfective verb forms have been claimed not to allow a habitual reading (Lenci 1995, Lenci and Bertinetto 2000 for Italian). Here we review the arguments for this position and show that there are also perfective habituais in the Romance languages.

The interpretation of the perfective verb in (3a) is one where the events of going to the cinema with Maria occurred in 1998, i.e. the events are confined to the frame of the temporal adverb. This correlates with the natural interpretation of (3a) as involving a particular sequence of events rather than a habit. With the imperfective verb in (3b), it is completely open whether the events also occurred before and/or after the year 1998, and this naturally gives rise to an interpretation of habituality.

- (3) a. Nel 1998, Gianni è andato spesso al cinema con Maria.
In 1998, Gianni often went-PFV to the cinema with Maria
- b. Nel 1998, Gianni andava spesso al cinema con Maria.
In 1998, Gianni often went-IMP to the cinema with Maria

(Lenci and Bertinetto 2000: 16)

Accordingly, (4a) with the adverb *already* is anomalous because it implies that events confined to the year 1998 continued past that year. This adverb is not problematic with the imperfective verb in (4b) which allows these events to continue past the year 1998:

- (4) a. * Nel 1998, Gianni è già andato spesso al cinema con Maria.
In 1998, John already often went-PFV to the cinema with Mary.
- b. Nel 1998, Gianni andava già spesso al cinema con Maria.
In 1998, John already often went-IMP to the cinema with Mary.

(Lenci and Bertinetto 2000: 17)

A similar contrast has been observed in (5). The perfective verb form in (5a) is anomalous, since it may only express recurring events within the interval denoted by the temporal adverbial, yet a one-year interval cannot contain ten-year recurrences. (5b) shows that the imperfective is not restricted to the temporal interval denoted by the adverbial.

- (5) a. *? Nel 1998, gli abitanti di Pisa sono andati al mare una volta ogni dieci anni.
In 1998, the inhabitants of Pisa went-PFV to the beach once every ten years.
- b. Nel 1998, gli abitanti di Pisa andavano al mare una volta ogni dieci anni.
In 1998, the inhabitants of Pisa went-IMP to the beach once every ten years.

(Lenci and Bertinetto 2000: 22)

We claim that these arguments do not prove that perfective forms cannot be habitual, but rather that they can have both episodic and habitual readings, with the episodic being often more salient. (5a) is ungrammatical under both readings. The ungrammaticality of the habitual reading follows from the contradiction between the characterization of the habit as extending over a period longer than ten years, and the claim that this habit is contained in a one-year interval. In the episodic reading, the same contradiction holds between the ten-year gap separating the events in the sequence, and the claim that this gap was measured within a one-year interval.

A similar problem undermines the contrast provided by Lenci (1995):

- (6) Gianni fumava le Marlboro, ma quell'estate ha fumato le Chesterfield.
Gianni smoke-IMP Marlboro, but that summer he smoke-PFV Chesterfield
'Gianni used to smoke Marlboro, but that summer he smoked Chesterfield.'
(Lenci 1995:156 fn. 4)

According to Lenci, the imperfective verb in (6) predicates a characteristic property of Gianni, that of being a Marlboro smoker, while "The second clause (with a perfective tense) refers to a sequence of events of smoking Chesterfields which is however felt as closed and as a sort of exception to the standard habit of smoking Marlboros." (Lenci 1995: 156 fn. 4). But this interpretation is problematic. The perfective verb does not seem to predicate an accidental property, but rather a (temporary) habit. This can be seen by that fact that it supports counterfactuals (Dahl 1975): that summer, an event of Gianni smoking a cigarette was normally an event of him smoking a Chesterfield.

In the literature on French, there is disagreement about whether it is possible to find habituals in the perfective aspect (see Kleiber 1987, Boneh and Doron 2008a, for discussion). Yet there are natural examples, when the perfective verb is independently assumed to be habitual, e.g. by reference to professions:

- (7) Paul a travaillé chez Renault (pendant cinq ans). (Kleiber 1987: 215 (41))
Paul worked-PFV at Renault (for five years)

Another way to derive a habitual independently of the imperfective is through an adverbial denoting a long interval which is also inherently durational, such as an adverbial with *pendant* 'for' / 'during':¹

- (8) Paul est allé à la messe le dimanche pendant trente ans. (Kleiber 1987: 216 (45))
Paul went-PFV to church on Sunday for thirty years

Note that the perfective habituals in (7) and (8) pass Dahl's counterfactuality test, e.g. any occasion of Paul working would have normally been at *Renault*.

The existence of perfective habituals is also demonstrated by Filip and Carlson (1997). Accordingly, we will say that the output of the habitual operator can be the input both to imperfective and perfective aspect, though perfective aspect is often more naturally interpreted as episodic, i.e. simply as iterative. Habituals in the perfective aspect differ from imperfective habituals in that the habit is limited within the boundaries of a given time span.

3.2 Retrospective habituals: English, Hebrew and Polish

For languages such as English, Hebrew and Polish, it is even more problematic to assume that habituality is a subtype of imperfectivity. These languages do not mark perfective/imperfective viewpoint morphology, though they might encode lexical aspectual morphology (Polish), or other aspectual contrasts, such as progressive (English).

¹ In French, imperfective morphology does not force habituality, or iteration, even with an interval which is long relative to the length of the event: (cf. Labelle 2002)

- (i) L'année dernière, Jean se mariait. (Kleiber 1987: 168, citing Ducrot 1979 pp. 18-19)
Last year, Jean married-IMP

In English, imperfectivity is not marked as such, but it is expressed in the language in various ways: The progressive form has temporal properties that can be associated with imperfectivity, and the simple form is by default imperfective with stative VPs (which are not in general compatible with the progressive form). Stative VPs in the simple form can also be interpreted as perfective, on their non-default reading (cf. Smith 1991). Although progressive forms are aspectually imperfective, they are not the preferred form to express habituality. The simple form, on the other hand, is readily associated with habituality. Since habituals are stative, habitual simple forms, are imperfective by default, but can also be perfective, on the non-default reading.

In Modern Hebrew, verbs are not inflected by aspectual affixes. In particular, there is no marking of the perfective/imperfective distinction. We assume a default viewpoint aspect, which depends on lexical aspect, at least in the basic cases. Default aspect is perfective in the case of dynamic events, and imperfective in the case of states (cf. Boneh and Doron 2008). Thus, states pattern alike in Hebrew and in English, in that they are imperfective by default, yet they can be interpreted perfectively, on their non-default reading. This is true in particular for habitual states.

Polish is different in this respect. In Polish (as in other Slavic languages) states are not expressed with the perfective form, in accordance with the view that the Polish perfective is really lexical aspect and not viewpoint aspect as in the Romance languages. Perfective aspect thus cannot be used with habituals in Polish.

Regardless of the aspectual makeup of their verbal systems, the languages under discussion have more than one formal means to express habituality, a simple form in (9a-b), and a periphrastic form with a special auxiliary in (10a-b):

- (9) a. *Simple form* (episodic/habitual)
 yael **avd-a** ba-gina Hebrew
 Yael work.PAST-3SF in.the-garden
 ‘Yael **worked** in the garden.’ English
- b. Daniel **pracoval** v ogrodzie Polish
 Daniel work. IMPF.PAST.3SM in garden
 ‘Daniel **worked** in the garden.’
- (10) a. *Periphrastic form* (retrospective habitual)
 yael **hayt-a oved-et** ba-gina Hebrew
 Yael BE.PAST-3SF work-SF in.the-garden
 ‘Yael **used to / would work** in the garden.’ English
- b. Daniel **zvykl pracovač** v ogrodzie Polish
 Daniel use to.PFV.PAST.3SM work.IMPF.INF in garden
 ‘Daniel **used to / would work** in the garden.’

The periphrastic form in Hebrew is composed of the auxiliary verb *hyy* ‘be’ inflected for past tense, together with a participial form. In the Polish periphrastic forms, the auxiliary is the inflecting verb *zvykl* in the perfective, followed by the imperfective stem of the infinitive.

The most striking contrast between the simple and periphrastic forms in all the languages has to do with whether the habituality expressed is understood to hold at speech time or not. Unlike the simple form, the periphrastic one gives a retrospective view on the denoted state,

with an effect of a habitual which is felt to be cut off from speech time. This has been noted e.g. by Tagliamonte and Lawrence (2000) for English, and is shown here with the following attested example from Hebrew. The speaker, while reminiscing on past issues, comments on the impropriety of the periphrastic form on the grounds that it is not appropriate with a habit that is still current:

- (11) at zoxeret še-'ax-i **haya** **mefarmet** li et ha-maxšev?
 you remember-SF that-brother-my BE.PAST-3SM format-SM to-me ACC the-computer?
 ma ani omeret? ma pit'om "haya" – hu adayin!
 what I say-SF why *haya* – he still

'Do you remember that my brother **used to format** my computer? What am I saying?
 Not *used to* – he still does!

The retrospective view is typical of the periphrastic forms in general, whether they denote a habit, as in (11) above, or other states, as in (12).

- (12) a. horey-ha **gar-u** bi-yrušalayim, ve-hem 'adayin garim šam
 parents-her live.PAST-3P in-Jerusalem and-they still live there
 'Her parents lived in Jerusalem, and they still live there.'
 b. horey-ha **hay-u** **gar-im** bi-yrušalayim, # ve-hem 'adayin garim šam
 parents-her BE.PAST-3P live-PM in-Jerusalem and-they still live there
 'Her parents used to live in Jerusalem, #and they still live there.'

In (12a) the described state may or may not hold at speech time. But as the infelicity created by the addition of the second clause indicates, (12b) suggests that her parents no longer live in Jerusalem.

Typically, states described in the past tense, such as in (12a), do not exclude the state holding at speech time. This is so since, as mentioned above, the simple form is by default imperfective with stative VPs. As mentioned in section 2 above, past tense marks the precedence of the reference time (R) relative to the speech time (S), while the state itself overlaps R, but may still extend to overlap S as well. The question is why this overlap with S is not possible for the state described in 12b.

The question is all the more puzzling given that although the periphrastic form views the habit in retrospect, it does not reduce it to the perfective aspect, which is neutralized for states both in English and in Hebrew, as discussed above. The following example shows that both the periphrastic form and the simple one are imperfective in that both are compatible with a frame adverb that does not contain the habit, but is contained in it, unlike the corresponding perfective Italian example in (5) above:

- (13) a. be-1998, tošavey modi'in **halx-u** la-yam pa'am be-šaloš šanim
 in-1998, inhabitants Modi'in go.PAST-3P to-sea once in-three years
 'In 1998, the inhabitants of Modi'in went to the beach once every 3 years.'
 b. be-1998, tošavey modi'in **hay-u** **holx-im** la-yam pa'am be-šaloš šanim
 in-1998, inhabitants Modi'in BE.PAST-3P go-PM to-sea once in-three years
 'In 1998, the inhabitants of M. would/used to go to the beach once every 3 years.'

Furthermore, the two forms are typically imperfective in their aspectual properties when modified by punctual *when*-clauses; the habit in either case overlaps the time of the *when*-clause, rather than following the time of the *when*-clause.

- (14) a. kše-hikar-ti ota, ya'el **yašn-a** ba-yom ve **avd-a**
 when-meet.PAST-1S her, Yael sleep.PAST-3SF in.the-day and work.PAST-3SF
 ba-layla
 in.the-night
 'When I met her, Yael slept during the day and worked at night.'
- b. kše-hikar-ti ota, ya'el **hayt-a** **yešen-a** ba-yom ve **oved-et**
 when-meet.PAST-1S her, Yael HYY.PAST-3SF sleep-SF in.the-day and work-SF
 ba-layla
 in.the-night
 'When I met her, Yael would sleep during the day and work at night.'

In fact, additional examples show that the periphrastic habitual is actually more imperfective than the simple habitual. Unlike the periphrastic habitual, which like the progressive can only receive an imperfective reading, the simple habitual is imperfective by default, but this default can be overridden. First, the periphrastic habitual, like the progressive, can only be interpreted as imperfective by the frame-adverbial test: event time has to contain the time of the adverbial, and in particular it has to fill the interval denoted by the adverbial. The simple form, on the other hand, may also be interpreted perfectly, where the event time is a proper subpart of the adverbial time:

- (15) a. In the 80's, John was writing a book/living in the dormitories.
 b. In the 80's, John used to go to work by bus.
 c. In the 80's, John went to work by bus.

(15a) is not appropriate if John had finished his book in, say, 1984, and (15b) is likewise in appropriate if the habit of going to work by bus ended in 1984. But in (15c), going to work by bus could have ended in 1984.²

Similarly, the periphrastic habitual, like the progressive, does not allow modification by durational adverbials (16a-b), whereas the simple form in (16c) does (the same contrast holds for Hebrew):³

- (16) a. (Last year) # I was living in Mary's house for three months. (Mittwoch 1988: (108))
 b. (In the 80's) # I used to work in the garden for three years.
 (Boneh and Doron 2008: (24b))

² Some fuzziness of the boundaries is allowed both for the progressive and the periphrastic habitual. Though event-time must contain the interval denoted by the adverbials, the boundaries can be excluded. Thus Mittwoch 1988 notices that the sentence 'Last year/When I was in Boston, John was writing a book' can be continued by 'He finished it in November/a month before I left.' The same is true of the periphrastic habitual: 'In the 80's, John used to go to work by bus. In 1989, when he bought a car, he stopped going by bus.'

³ Though a durational adverbial cannot measure the length of the habit, it can measure the length of each episode. The latter reading is salient with *for three hours*:

- (i) In the 80's, I used to work in the garden for three hours. (Boneh and Doron 2008a: (24a))

c. (In the 80's,) I worked in the garden for three years.

(Boneh and Doron 2008: (22b))

Durational adverbs are perfectivizing devices (cf. Horrocks and Stavrou, this volume). Their infelicity in (16a-b) demonstrates that the latter can only be interpreted imperfectively. On the other hand, (16c) is felicitous since it can be interpreted perfectly (on the non-default reading).

We have shown that the periphrastic habitual, like the progressive, is imperfective, whereas the simple habitual can be interpreted perfectly (though this is not its default interpretation).

4. The nature of retrospective habituals

In the last section we showed that the retrospectivity of the periphrastic form, i.e. the disjointness of the habit from the speech time S, is compatible with its imperfectivity. This is an unexpected result, since disjointness from S is usually taken to be a characteristic of perfectivity (Comrie 1976, Smith 1991, among others). The question we face is how to account for the compatibility of these two seemingly contradictory properties. How can we explain the fact that the periphrastic habitual is perfective-like in the sense of being disjoint from speech-time, while at the same time being clearly imperfective.

We claim that the disjointness of the periphrastic habitual from S is actually not part of the semantics of this form, but arises as a conversational implicature. This is also the view of Comrie (1976) and Binnick (2005). Indeed, this implicature can be cancelled:

- (17) a. be-1990 le-ruti haya oto,
in-1990 to-Ruti BE.PAST-3SM car,
aval kvar az hi **hayt-a** **nosa'a-t** la-'avoda ba-otobus
but already then she BE.PAST-3SF go-3SF to-work by-bus
'Ruti had a car in 1990, but already back then she used to/would go to work by bus.'
- b. horey-ha **hay-u** **gar-im** bi-yrušalayim,
parents-her BE.PAST-3P live-PM in-Jerusalem,
ve-ani lo yode'a im hem 'adayin gar-im šam
and-I not know.PARTCP-SM if they still live-P there
'Her parents used to live in Jerusalem, and I don't know whether they still live there.'

The examples in (17) are compatible with the same (habitual) state holding at S, and thus demonstrate that the disjointness implicature can be cancelled.

Specifically, we claim that the disjointness implicature arises from the competition between the periphrastic habitual and a stronger form which entails that the habit continues until S. This stronger form is the present perfect in English, and the simple present form in Hebrew:

- (18) me'az ota tqufa ruti **nosa'a-t** la-'avoda ba-otobus
since that period Ruti go-3SF to-work by-bus
'Since that period, Ruti has gone to work by bus.'

The periphrastic habitual is weaker in that R, the time it refers to, is disjoint from S. The stronger form, the universal present perfect, is based on a reference time R which includes S. The stronger form thus entails the weaker form. Accordingly, the periphrastic habitual and the universal present perfect form an information scale. Asserting the weaker element of the scale gives rise to a scalar implicature (Horn 1989), according to which the stronger element is not true. Thus the competition between two habitual forms gives rise to the implicature that the habit does not continue until speech time.⁴

The contrast between the two forms is illustrated in (19), where R is explicitly claimed to stretch until S. In that case, the periphrastic habitual is strictly ruled out, as shown in (19b):

- (19) Ruti maxra et ha-oto šela be-1990.
 Ruti sold ACC the-car hers in-1990.
 Ruti sold her car in 1990.
- a. me-az ve-ad hayom, hi **nosa'a-t** la-'avoda ba-otobus
 from-them and-till today, she go-3F to-work by-bus
 'Since then, she has been going to work by bus.'
- b. *me-az ve-ad hayom, hi **hayt-a nosa'a-t** la-'avoda ba-otobus
 from-them and-till today, she BE.PAST-3F go-3F to-work by-bus
 '*Since then, she used to go to work by bus.'

The fact that the retrospective habitual and the universal present perfect can be viewed as scalar alternatives to each other indicates that the periphrastic habitual denotes a complex aspect, similarly to the perfect. Unlike simple aspects, which can be viewed as denoting a relation between a temporal interval and an event, complex aspects denote a relation between two temporal intervals and an event. An additional temporal interval for the interpretation of the perfect has been proposed by McCoard (1978), Kamp and Reyle (1993), Iatridou *et al.* (2001), Pancheva (2003), Pancheva and von Stechow (2004), Mittwoch (2008). This additional interval has been called P (Perspective time) by Kamp and Reyle (1993). In the unmarked case, P is identified with the speech time S, as we have done in our discussion so far, but in other cases, P may be disjoint from speech time.

Abstracting away from whether or not P overlaps S, the universal perfect is characterized by R including P, whereas in the retrospective habitual, R precedes P:

- (20) a. Universal Perfect
 -----(R-----)(p---)-----
- b. Retrospective Habitual
 -----(R-----)-----(p---)-----

A diagnostic for the precedence relation between R and P in the retrospective aspect is its incompatibility with the adverb *now*. Kamp and Reyle argue that the presence of *now* in a clause implies that the clause describes a state holding at P (*ibid.*: 596). Accordingly, it should not be possible to use *now* with the periphrastic past, where R must precede P. In the simple

⁴ The same argument does not show that the simple past and the simple present form a scale as well, since they are not based on temporal intervals included in one another. R of the simple past is disjoint from R of the present tense, i.e. from S.

past, on the other hand, it is possible to associate P with the time of some past propositional attitude, overlapping R. The following examples show that this is indeed the case:

- (21) a. Mary was very happy. She now went to work by bus.
b. Mary was very happy. *She now used to go to work by bus.⁵

Furthermore, the two habitual forms interact differently with respect to the sequence of tense (SOT) phenomenon in English, whereby stative past tense clauses embedded under the past tense have what has been called a ‘simultaneous reading’ (cf. e.g. Abusch 1988, Ogihara 1989). If we view SOT as stemming from the fact that, as suggested in Abusch (1997), the past tense morphology of the embedded clause may express the pastness of the embedded R with respect to S, while it overlaps P, we predict that only the simple form, but not the periphrastic form, gives rise to SOT:

- (22) a. John assured us that Mary played tennis twice a week. (SOT habitual reading)
b. John assured us that Mary used to play tennis twice a week. (not SOT)

According to our analysis, the past morphology of the periphrastic form expresses a relation between R and P which is independent of S, i.e. it does not actually express tense but aspect. What determines tense is the relation between P and S. But since the past form of the periphrastic form is morphologically a tense morpheme, we cannot reapply tense morphology to it, and so the periphrastic form cannot be inflected for tense. We suggest that this explains the fact mentioned in Boneh and Doron (2008) whereby periphrastic habitual forms in Hebrew (and English) are limited to past form, and do not occur in the present and the future forms.⁶

The parallelism between the retrospective habitual and the universal present perfect has provided us with an account for the disjointness implicature. Another common characteristic of these two aspects is that in both forms, R is an extended interval, which is not an instant. Together with the imperfective interpretation of the periphrastic habitual, the extended nature of R gives rise to the effect of the periphrastic form as "characterizing" a period of time, an effect which has been mentioned in literature (e.g. Comrie 1976).

To sum up so far, we have seen that both languages which mark the perfective/imperfective contrast, like the Romance languages, and languages which do not mark this contrast, use the

⁵ Here there is actually a split in English between *used to* and *would* habituais. Since *now* is attested with *would*-habituais, it appears that these are not retrospective, but rather R overlaps P (there might actually also be some non-retrospective uses of the Hebrew periphrastic form):

- (i) Any plan for the future depended on the term of the girl's life **now** ending, and neither could speak of that. Sometimes, though, the boy **would now** talk of the past. (Internet)

Similarly in a narrative. (iia) is possible, since the periphrastic form with *used to* requires that R precedes P, the time of writing the diary. But for the periphrastic form with *would*, R overlaps P, and therefore the second sentence in (iib) is contradictory:

- (ii) a. Endill started to keep a diary. He used to write with a pencil, but now he wrote with a pen.
b. Endill started to keep a diary. #He would write with a pencil, but now he wrote with a pen.

⁶ Binnick (2005), (2006) views the periphrastic habitual as a *present* tense, parallel to the *present* perfect, but in the following attested example, P (the interval modified by *now*) is actually most naturally interpreted as preceding speech time.

- (i) She said that she now understands an awful lot of things. She always **used to ask** my opinions of things and that now a lot of my answers made sense.

imperfective aspect as a default view of habituais, while allowing the perfective aspect in some circumstances. Languages which do not mark the perfective/imperfective contrast mark a special aspect, the retrospective habitual, which is similar in complexity to the perfect aspect.⁷

5. The modal nature of habituality

5.1 Modality of simple and periphrastic forms

After having shown in section 3 that habituality cannot be characterized aspectually in a uniform manner, we propose to characterize it as modal. The modal nature of habituality has been noted repeatedly, starting with Carlson (1977), Dahl (1975), Comrie (1985:40), and as recently as Bittner (2008), Landman (2008) and others, and serves to distinguish habituality from accidental event plurality. We adopt the view that habituality is inherently modal, and thus cannot be characterized by a purely temporal notion of event recurrence (such as Van Geenhoven 2001, 2004, Scheiner 2003, Rimell 2005). We now show that this is the case for both simple and periphrastic forms.

First, both simple and periphrastic forms support counterfactuals. Both sentences below have a reading where they entail that whatever class might have taken place, the students would have typically worn a tie for it.

- (23) a. be-1952 ha-studentim be-utrecht **lavš-u** 'aniva ba-ši'urim
in-1952, the students in Utrecht wear.PAST-3P tie in class
'In 1952, the students in Utrecht wore a tie in class.'
- b. be-1952 ha-studentim be-utrecht **hay-u lovš-im** 'aniva ba-ši'urim
in-1952 the students in Utrecht BE.PAST-3P wear-P tie in class
'In 1952, the students in Utrecht would/used to wear a tie in class.'
(translated from Delfitto 2000: (2a))

Second, since habitual sentences are modal, the generalizations they denote only hold systematically in idealized versions of reality, and allow exceptions in actuality, very similarly to the generic interpretation of noun phrases. This tolerance towards exceptions is true both for

⁷ Portuguese is an interesting case to examine in light of the correlation which we try to establish here concerning the availability of a retrospective habitual in languages which lack a perfective/imperfective contrast. Portuguese, featuring the perfective/imperfective contrast, seems to have a periphrastic habitual form, but it is not retrospective, rather it behaves like a (restricted) version of a universal present perfect form (Giorgi and Pianesi 1997, Schmitt 2001, Cabredo-Hofherr, Laca and Carvalho 2008):

- (i) Você tem feito seus deveres de casa?
you have.PR.SG do.PP your homework ?
'Have you done/been doing your homework regularly?'
(Cabredo-Hofherr, Laca and Carvalho 2008:(6a))

This form is not retrospective, since in the present perfect P is not disjoint from R. Indeed, it can co-occur with *now*, unlike the English periphrastic habitual we saw above in (21b):

- (ii) Agora já tem comido o suficiente.
Now I have-present eating enough
'Now I took the habit of eating enough.'
(Giorgi and Pianesi 1997: 48 (21))

the simple and the periphrastic forms; thus there is no difference in this respect between (24a) on its habitual reading, and (24b):

- (24) a. dina **'išn-a** 'axarey 'aruxat-ha-'erev
 Dina smoke.PAST-3SF after dinner
 'Dina smoked after dinner.'
- b. dina **hayt-a** **me'ašen-et** 'axarey 'aruxat-ha-'erev
 Dina BE.PAST-3SF smoke-SF after dinner
 'Dina would/used to smoke after dinner.'

Third, the periphrastic form with the auxiliaries *would* and *haya* is the one used in other modal environments, such as modal subordination in (25). Moreover, habituais themselves trigger modal subordination, e.g. *baked/used to bake* in (26), parallel to the modal auxiliary *might* in (25):

- (25) 'alul lehikanēs lekan ganav
 might to.enter to.here thief
 hu **haya** **loke'ax** kodem kol et ha-maxšev
 he BE.PAST.3SM take.SM first of all ACC the-computer
 'A thief might enter. He **would take** the computer first.'
- (26) safta šeli **aft-a** / **hayt-a** **of-a** 'ugot mešag'ot,
 grandmother my bake.PAST-3SF / BE.PAST-3SF bake-SF cakes amazing
 hi **hayt-a** **yoc-et** la-gina ve-**qotefet** tapuxim,
 she BE.PAST-3SF go.out-SF to.the-garden and-pick-SF apples
 axar kax hi **hayt-a** **xozer-et** la-mitbax u-**megarešet** et kulam...
 then she BE.PAST-3SF return-SF to.the-kitchen and-shoo-SF ACC everybody...
 'My grandmother baked/used to bake amazing cakes. She would go out to the garden and pick apples. Then she would return to the kitchen and shoo everybody out...'
 (translated from Carlson and Spejewski (1997, 102 (1)))

The auxiliaries *would* and *haya* are also used in counterfactuals. The correspondence of counterfactuality and habituality has been observed for many languages (e.g. Palmer 1986, Iatridou 2000, Cristofaro 2004).⁸

5.2 Retrospectivity and actualization

One of the arguments for the modality of habitual sentences given by Krifka *et al.* (1995) involves examples where habituality holds without a single instantiation:

- (27) meri **tipl-a** b-a-do'ar me-'antarqtīqa.
 Mary handle.PAST-3SF of-the-mail from-Antarctica.
 mikevan še-lo haya do'ar kaze, haya l-a harbe zman panuy

⁸ In Serbo-Croatian too, according to Thomas 1998, one way of expressing habituais is in the conditional. This way mainly presents the habit "as belonging to a distant past, terminated, cut off from the moment of speech." (Thomas 1998: 241)

because that-not HYY.PAST.3SM mail such, HYY.PAST-3SM to-her lots time free
 ‘Mary handled the mail from Antarctica. Since there was no such mail, she had a lot of free time.’

We noted in Boneh and Doron (2008) that periphrastic habituals, on the other hand, are judged to be false if uninstantiated:

- (28) meri **hayt-a** **metapel-et** b-a-do’ar me-‘antarktika
 Mary HYY.PAST-3SF handle-SF of-the-mail from-Antarctica
- # mikevan še-lo haya do’ar kaze, haya l-a harbe zman panuy
 because that-not HYY.PAST.3SM mail such, HYY.PAST-3SM to-her lots time free
 ‘Mary used to handle the mail from Antarctica. # Since there was no such mail, she had a lot of free time.’

The two sentences of (28) are contradictory, since the first sentence conveys the actualization of episodes described by the verb phrase, and hence the existence of mail from Antarctica, which the second sentence denies.

Since the modal character of periphrastic habituals has been established in the previous section, we conclude that the requirement for actualization does not signal lack of modality.⁹ There are actualization requirements for other modal operators as well, as has been demonstrated for several languages (Bhatt 1999, Hacquard 2006).

We also note that the requirement for actualization can only be satisfied by an iteration of episodes, not by a single episode. In the following example, where a single episode is actualized, the simple form is acceptable while the periphrastic one is not:

- (29) **Context:** Ruti started a new job. She decided to go there by bus. She only went there once, and shortly after that she died.
- a. Ruti **nas'a** la’avoda ba-otobus
 Ruti went.PAST-3SF to-work by-bus
 ‘Ruti went to work by bus.’
- b. #Ruti **hayta** **nosa’at** la-avoda ba-otobus
 Ruti BE.PAST-3SF go-SF to-work by-bus
 ‘Ruti would / used to go to work by bus.’

(29a) can be understood habitually, assuming Ruti had been disposed to continue going to work by bus, but (29b) is infelicitous even under this assumption.¹⁰ The simple form is possible on the basis of a potential sequence of events that continue uninterrupted in alternative worlds where Ruti remains alive, while the periphrastic form is false, since it requires a sequence of events (more than one), all of which are in the actual world.

To conclude this section, habituality, whether expressed by the periphrastic or the simple form, was shown to have a modal component. The two forms differ as to whether a sequence

⁹ In Boneh and Doron 2008, we assumed that the requirement for actualization does signal lack of modality of the periphrastic form. We are grateful to Yael Greenberg and to Christopher Piñón for pointing out to us that actualization requirements are not incompatible with modality.

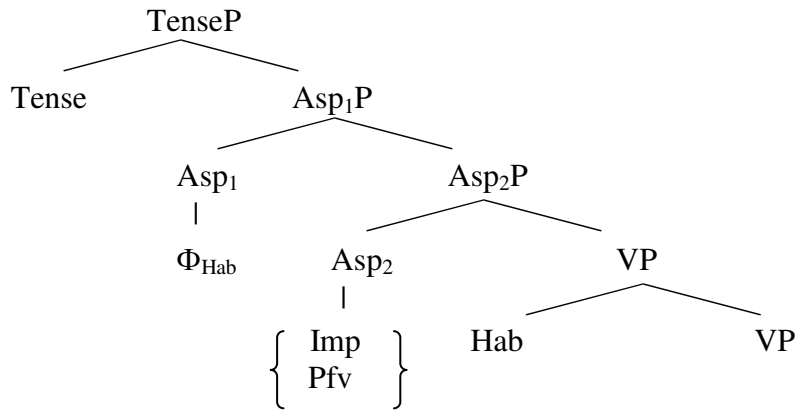
¹⁰ (29a) may also be understood episodically, of course.

of events realizing the habit must necessarily take place in the actual world or not. The periphrastic form requires actualization. We would like to relate this fact to the conclusion of the previous section, whereby the periphrastic form serves to characterize an interval of time. It seems to us that only properties which are actualized can serve to characterize a temporal interval, and not unactualized dispositions.

6. The structure of habituality

We have concluded that the perfective/imperfective contrast is not the distinguishing factor between simple and periphrastic expressions of habituality, since both may be imperfective. Neither is modality the distinguishing factor between them, since we have found habituality to be modal in both forms. Rather we have shown that the periphrastic form is distinguished by its complex aspectuality: it offers a viewpoint on a preceding period of time which is both retrospective and imperfective. These findings can be integrated into the general framework we proposed in Boneh and Doron (2008). We continue to assume a habituality operator, Hab which is a modal VP adjunct. Hab being an adjunct, it does not affect the morphology of the verb. The modified VP is input to aspectual operators. In simple expressions of habituality, Hab is the input to the Pfv/Imp operators. In the periphrastic expression of habituality, which involves a complex aspect, a higher aspectual operator Φ_{Hab} is found, which is realized as an auxiliary yielding the periphrastic habitual form, and only applies to imperfective predicates.

(30) Habitual sentence with simple/periphrastic forms



The concept at the basis of habituality is event iteration for an interval (e.g. Vlach 1993). We define iteration on the basis of Kratzer (2005), where e is a variable over events, w – over worlds and Q – over properties of plural events (where plurality includes singularity); σ is the sum operator of Link (1983), and \subset is the proper subpart relation.

(31) $ITER \sim \lambda Q \lambda e \lambda w [Q(e, w) \ \& \ e = \sigma e' [Q(e', w) \ \& \ e' \subset e]]$

According to this definition, e is an $ITER(Q)$ event in w iff e is the sum of all Q -events in w , where the sum has proper subparts, i.e. it consists of at least two Q -events. For example, e is an $ITER(JOHN-SMOKE)$ event in w iff e is the sum of all $JOHN-SMOKE$ events in w (assuming there are at least two).

Next, we define the interval i for which $ITER(Q)$ holds in w . We assume that the running time of a sum of events is an interval, i.e. the interval that starts where the earliest event starts, and

ends where the latest event ends.

(32) $\text{FOR} \sim \rightarrow \lambda Q \lambda i \lambda w \exists e [i = \tau(e) \ \& \ \text{ITER}(Q, e, w)]$

According to this definition, Q holds iteratively at i in world w iff i is the running time of the sum of Q -events in w . To exemplify: w is a world where JOHN-SMOKE holds iteratively at the one-year interval i iff the running time of the sum of all JOHN-SMOKE events in w is that one year interval i (assuming once again that there are at least two).

Before defining Hab as a modal operator on predicates Q of events, we note that though Hab does not require the actualization of Q , it does require some **initiating event**, an event which initiates the state s which is the disposition to Q :

(33) $\text{init}(Q, s, w)$ iff $\exists e [\tau(e) < \tau(s) \ \& \ e \text{ is an event initiating the disposition to } Q \text{ in } w]$

We do not give an analysis of the notion of "initiating-the-disposition", but we have in mind events which satisfy either Q or some other condition securing the disposition to Q , such as a contract, the manufacturing of an inanimate object with particular telic qualia etc.

We now define Hab as a modal operator. $\text{Hab}(Q)$ is stative, irrespective of Q , since it holds of instants as well as extended intervals. For a state s to count as satisfying the predicate $\text{Hab}(Q)$, it must, first, be initiated, and second, be part of an interval i for which Q iterates, at least in worlds of the modal base $\text{MB}_{\tau(s), w}$:

(34) $\text{Hab} \sim \rightarrow \lambda Q \lambda s \lambda w [\text{init}(Q, s, w) \ \& \ \forall w' \in \text{MB}_{\tau(s), w} \exists i [\tau(s) \subseteq i \ \& \ \text{FOR}(Q, i, w')]]$

The modal base (as in Kratzer 1981, 1991) associates with an interval i and a world w , a set of accessible worlds $\text{MB}_{i, w}$ which is a set of nomic alternatives to world w at time i , ordered with respect to an ideal world where dispositions hold constantly once initiated. For example, $\text{Hab}(\text{JOHN-SMOKE})$ is a relation between states s and worlds w that holds iff s is properly initiated in w as a JOHN-SMOKE habit, and in every accessible world w' , the sum of smoking events in that world has a running time including that of s , assuming that in w' there are at least two JOHN-SMOKE events.

According to (34), a habit can be predicated on the basis of event iteration in alternatives to the actual world, yet some initiating event is required in the actual world, which satisfies either Q or some other condition securing the disposition to Q . In the case of many habituals, the initiating event will itself simply satisfy Q . For example, the habit of smoking is initiated by an event of smoking. The initiating event does not have to be plural, since one might suspect any singular event of being the first episode of a habit:

(35) When did you start to smoke? (said while you smoke for the first time)

The analysis thus claims that in order for John to have the habit of smoking in this world, there must be an initiating event in this world, typically at least one event of smoking. There need not be more smoking events in this world, but iteration *is* central to the notion of habituality: in the accessible worlds, which are the worlds in which nothing inhibits John from living according to his dispositions, the habit is instantiated by more than one event.

As for the aspectual operator Φ_{Hab} , it is realized as the aspectual auxiliary that gives rise to the periphrastic expression of habituality. The aspectuality it expresses is complex, in that it applies to the output of the imperfective operator, and in that it predicates both actualization and "distancing" from the temporal perspective P . Its own output are intervals of time which

will eventually be ordered by the tense operator with respect to S. $\Phi_{\text{Hab}}(Q)$ thus maps properties of intervals i , which stands for the reference time R, to properties of intervals i^* , which stand for the perspective P. The contribution of Φ_{Hab} is thus to require imperfectivity (second conjunct in the definition below), to require the extended interval nature of R, i.e. R is not an instant but a period of time (third conjunct in the definition), to require actualization (fourth conjunct) and proper precedence of R to P (last conjunct):¹¹

$$(36) \quad \Phi_{\text{Hab}} \sim \lambda Q \lambda i^* \lambda w \exists i \exists s [Q(i, w) \ \& \ i \subseteq \tau(s) \ \& \ |i| \neq 0 \ \& \ w \in \text{MB}_{\tau(s), w} \ \& \ i < i^*]$$

7. Comparison with other analyses

7.1 Dissociating habituality from plurality

The analysis proposed in the previous section contrasts with a recent analysis of habituais proposed by Ferreira (2005). Ferreira, following Comrie (1976) (and similarly to Cipira and Roberts 2000, among others), views habituality and progressivity as subtypes of imperfectivity, and proposes a unified analysis for both progressive and habitual readings of imperfective sentences, semantically and morphologically (the latter, for the Romance languages). According to him, the only difference between progressive and habitual readings concerns the number (singular or plural) of the events that are quantified over in the logical form of the sentences. The modality is the same, and involves the same ideal worlds in which an ongoing event of the kind described by the sentence is not interrupted by external factors (e.g. Dowty 1979, Landman 1992, 2008, Portner 1998). The difference between progressive and habitual readings reduces to the fact that in the former applies to singular events and the latter to plural events.

We do not think that singular vs. plural number is actually the distinguishing factor between progressivity and habituality. We follow Krifka (1992), Landman (1996), Kratzer (2005) and others, in considering VP to denote plural events in general. Therefore, we view both progressives and habituais as potentially denoting plural events. Progressive and habitual predicates are very different from one another, but not necessarily in number. The progressive may apply to plural events:

(37) Sue is dialing a busy number.

This sentence most probably expresses a plurality of dialings, since the number is busy. Even when the sentence denotes a plural event, it does not necessarily express habituality.

Conversely, as we have already demonstrated above, in section 5.2, a plurality of events need not be actualized in order for a habitual sentence to be true. In cases when there is ambiguity between progressive and habitual, it can still be the case that neither requires an actual plurality of events:

(38) Johnny is crossing the street on his own.

Assume Johnny is a small child, crossing the street on his own for the very first time. Under this scenario, both readings are possible.

¹¹ Given fn. 5, the last conjunct has to be modified for *would*, where it should say = rather than <.

Similarly in French, Kleiber (1987) mentions the contrast in interpretation between (39), which he considers habitual, and (40), which he does not consider habitual, despite the fact that both may involve a plurality of events:

- (39) Paul allait à l'école à pied, l'année dernière. (ibid: 209 ex (2))
Paul walked-IMP to school, last year
- (40) Paul allait à l'école à pied, la semaine dernière. (ibid: 208 ex (24))
Paul walked-IMP to school, last week

Thus we think that the progressive and the habitual do not necessarily differ in number. Rather, the progressive and habitual operators are different modal operators. Consider the difference between (41) and (42):

- (41) This student writes good papers.
- (42) This student is writing good papers.

The sentence in (41) describes a disposition of the student, expressed by iterations of good paper writing in all accessible worlds of the modal base. In (42) on the other hand, the good paper writing may very well be accidental, with the progressive only requiring the continuation of the particular sequence of good-paper writing in those accessible worlds where these particular good papers are written.

The following pair of examples attests another difference in the modality of the progressive and the habitual simple forms.

- (43) a. #They are issuing visas at the consulate, but they are closed this month.
b. They issue visas at the consulate, but they are closed this month.

The progressive seems to require an event of visa-issuing within every relevant subinterval of the habit-time. But (43a) states that this requirement is not met within the present month, and is thus contradictory. As we demonstrated in section 5.2 above, the habitual operator Hab does not require actualization, and (43b) is therefore not contradictory.

Finally, another argument can be based on Giannakidou (1995), who shows that habituality and progressivity differ in the licensing of negative polarity items in Greek. It therefore cannot be the case that both habituality and progressivity are expressions of one and the same operator. Giannakidou shows that *kanénas* indefinites are licensed in habitual but not in progressive sentences, though both share the same imperfective morphology:

- (44) a. ótan thimótane, o jánis égrafe **kanéna gráma** ston patéra tou
Whenever he remembered-IMP, John wrote-IMP **any letter** to his father. (habitual)
(Giannakidou 1995:(30))
- b. *ti stigmí pu o jánis milúse me **kanénan φίλο tu** sto tiléfono, éGINE to atíxima
While John talked-IMP on the phone with **any friend of his**, the accident took place.
(Giannakidou 1995:(32))

7.2 Habituality and disposition

A sentence such as (45a) below is not captured by Ferreira's account of the habitual, since it can clearly be true without a single, let alone plural, event of actually selling vacuum-cleaners. Ferreira (2005) (also Scheiner 2002) does not consider such a sentence habitual, but rather as a verbal counterpart of (45b),

- (45) a. John sells vacuum-cleaners
b. John is a vacuum-cleaner seller

not only in meaning but in morphology as well: similarly to the nominalizer suffix *-er* attaching to the stem *sell*, Ferreira proposes that English might have a zero-affix verbal counterpart taking eventive predicates as its argument and returning stative predicates with the same interpretation as that of the *-er* noun.

In Krifka *et al.* (1995), Lenci and Bertinetto (2000), Mittwoch (2005), professional occupations are brought as cases attesting to the modal nature of habituals, where the actual world need not necessarily be included in the worlds where the occupation is realized as a sequence of episodes. In the analysis developed here, we have included professional occupations as satisfying the habitual operator *Hab*. What is central to the analysis is that the episodes in question are non-accidental in nature, whether they occur in the actual world or not.

Moreover, we reject the view (Lawler 1973, Dahl 1975, Schubert and Pelletier 1989, Green 2000, Menéndez-Benito 2005, Ferreira 2005) that sentences like (46) have two distinct readings: a dispositional reading and a habitual reading.

- (46) a. This machine crushes/crushed oranges.
b. This car goes/went 250 km/h.

According to the ambiguity view, (46) means on the former reading that the machine or car has the capacity/ability of crushing oranges or going 250km/h, on the latter reading, it means that it regularly/usually does.

This purported ambiguity is independent of the question of whether the car or the machine needs to perform the attributed activity even once for the sentence to be true. Menéndez-Benito (2005) shows that there are dispositional sentences which *cannot* be true if there are no instantiating episodes involved:

- (47) Bob jumps 8.90. (Krifka *et al.* 1995, 55: (97))

This sentence cannot qualify as true on a dispositional reading without a single actual event, which we would view as an initiating event in the sense of (33) above. Taking into consideration only Bob's physical state, talent and other external circumstances is not enough. As such it is not paraphrasable by *Bob can jump 8.90*, which may be true if no actual jumps to this height occurred. Conversely, we have shown that habituality is not in general characterized by actualization. Thus non-actualization is not what distinguishes dispositions from habituality.

What is seen as two readings in (47) is actually two different circumstances which satisfy the sentence, depending on whether the habit is actualized beyond an initiating event or not.

These are actually two types of circumstances, not two readings.¹² The contexts which favor the dispositionality interpretation are more restricted, and often disappear with locative modifiers, as in the following example from Hackl (1998: (65a)). This example is only interpreted as a habit, though without the locative modifier, it is more naturally interpreted as a disposition:

(48) John speaks French in the car.

8. Conclusion

In this paper we have argued for a broad modal conception of habituality, one which includes dispositionality. Dispositionality is not part of progressivity, hence we concluded that the progressive is built on a distinct modal operator.

We have shown that habitual sentences cannot be characterized uniformly in aspectual terms. Contrary to the common view, habituality is not exclusively associated with imperfectivity, both semantically and morphologically. We have shown, for the Romance languages, that perfective forms also give rise to habitual interpretation. In languages lacking the perfective/imperfective contrast such as Hebrew, English and Polish, we have found that aspectuality is determined to a large extent on the basis of lexical aspect. Thus, habituals, like states in general, are interpreted imperfectively by default. In context, it is possible to coerce perfectivity, but not when the habitual form is used to characterize an interval in retrospect. We have pointed to an operator in these languages, expressed by periphrasis, which expresses exactly this retrospective habituality. Since it is used to characterize a period of time, this operator also predicates the actualization of the habit.

The natural association of stativity with imperfectivity underlies the pervasive belief that habituality is a subcase of imperfectivity. However, the picture that emerges from this paper is that habituality is only indirectly related to aspect, and that in the different languages, aspectual properties manifested by a given habitual form depend on the particular aspectual operators at work in that language.

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¹² We disagree with Menéndez-Benito who argues for the existential nature of dispositional sentences by pointing to the fact that they license negative polarity items,

(i) John eats anything

similarly to possibility modals and unlike necessity modals, where only the former selects *any*:

(ii) a. John can eat anything.

b. *John must eat anything.

We are not convinced that the contrast in (ii) indeed holds in general, and it seems to us to be reversed for epistemic modality.

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