

**Magdolna Ohnmacht**  
**Progressive Aspect as a Temporal Determiner-Function**

**Theses**

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## 1. Goals

The main goal of the research is to examine the temporal properties of progressive viewpoint aspect in Hungarian. In detail, I argue for the following statements:

- I. Sentences with progressive viewpoint aspect can be taken as categoric judgements with a temporal topic they are about.
- II. Generalized quantifiers can be assumed to be in the temporal domain too, with viewpoint aspect functioning as a determiner.
- III. As a consequence of point II., the account for mathematical properties of natural language determiners in PTQ can be applicable in the temporal domain in order to describe different viewpoint aspects.
- IV. As a result, I give a definition for the progressive aspect that does not give rise to the problem of interruption.

## 2. Problems

According to the informal description of the meaning of progressive aspect by Jespersen (1932), an event in progress serves as a temporal frame around the time of evaluation of the sentence (reference time). Attempts to give a formal definition for this temporal frame reading had been problematic from the beginning as the standard definition of progressive aspect shows (Bennett – Partee (1978)):

*[PROG $\alpha$ ] is true at  $t$  iff there is an interval  $I$  such that  $t$  is a proper subset of  $I$ ,  $t$  is not a final subinterval of  $I$ , and  $\alpha$  is true at  $I$ .*

We face two fundamental problems with this definition (and the similar ones e.g. Dowty (1979), Landman (1992), etc.): the imperfective paradox and the problem of interruption. **Imperfective paradox** appears when the predicate of the progressive sentence is telic. Imperfective paradox is the phenomenon that the truth of a sentence in the past progressive (e.g. *John was drawing a circle.*) does not entail the truth of the sentence in the simple past

(see *John drew a circle.*). As for atelic predicates, the entailment is valid (see *John was pushing a cart.* → *John pushed a cart.*)

We need to distinguish the other problem, the **problem of interruption** from the imperfective paradox. The problem of interruption arises with telic and atelic predicates alike. It appears because definitions of the kind above try to catch the temporal frame reading. As for these definitions, beyond the time of evaluation  $t$  they suppose a larger interval  $I$  containing  $t$ , which means a continuation of the ongoing event. In case of interruption however there is no such interval  $I$  because of the interruption, still the sentence is true (e.g. *I was playing the piano when I had a fit.*). I am interested only in the problem of interruption in this research, that is, in the phenomenon that a sentence in the progressive can be true without the ongoing event described in going further.

### 3. The structure of the dissertation

The dissertation consists of two main parts: in the first one (see 3-4. chapter) on the basis of linguistic data I give an account for the information structure of sentences in the progressive and I introduce the term temporal topic. In the second part I give a definition for the notion of aspect within the theoretical framework of PTQ and I examine the theoretical consequences of the given definition.

After an introduction in the first chapter, I review the most determinative accounts for progressive aspect in the literature in the second chapter. I consider both intensional and extensional theories: Dowty (1979), Landman (1992) and Varasdi (2006) are the intensional and Parsons (1989) and Kearns (1991) are the extensional ones I review.

In the third chapter first I review Kiefer (2006) and Piñón (1995) from the Hungarian literature, then consider the grammatical feature of the progressive in Hungarian, and finally specify the type of progressive sentences I intend to examine. I am interested in sentences where a) the progressive clause is the main clause (see (1) against (2)) and b) there is a temporal adverb in the progressive sentence (see (3)).

1. *Épp telefonáltam, amikor eleredt az eső. De nem tartott sokáig, mert Aurélnak rohannia kellett valahová. Azt mondta, majd visszahív.*

'I was talking on the phone when it started raining. **It didn't last long** because Aurél was in a rush. He said he would call me later.'

2. *Épp telefonáltam, amikor eleredt az eső. De nem tartott sokáig, a fa koronája alatt még vizes sem lett a járda.*

'I was talking on the phone when it started raining. **It didn't last long**, the sidewalk didn't even become wet under the tree.'

3. *Mit csináltál tegnap délben /amikor eleredt az eső?*

'What were you doing at noon yesterday / when it began raining?'

a) *(Épp) fűvet nyírtam.*

'I was mowing the lawn.'

b) *Tegnap délben épp futottam.*

'I was running at noon yesterday.'

c) *Akkor épp aludtam.*

'I was sleeping at that time.'

Progressive sentences are rather constrained both in a semantic and syntactic level. One of these restrictions is that certain kinds of temporal adverbial cannot appear in a progressive sentence felicitously. These adverbials are among the ones that Vendler (1957) used in the classification of verbs: *in* adverbs and *for* adverbs can not appear in the progressive sentence as (4b) and (5b) show.

4. a) *Aurél fél óra alatt fölmászott a hegyre.*

'Aurél climbed the mountain **in half an hour**.'

b) *\*Aurél fél óra alatt éppen mászott föl a hegyre.*

'Aurél was climbing the mountain **in half an hour**.'

5. a) *Aurél fél órán át futott.*

'Aurél ran **for half an hour**.'

b) *\*Aurél fél órán át éppen futott, amikor....*

'Aurél was running **for half an hour** when....'

6. a) *Aurél délben éppen mászott föl a hegyre/ éppen futott.*

'At noon Aurél was climbing the mountain /running.'

b) *Aurél szombaton épp vitorlázott.*

'On Saturday Aurél was sailing.'

Given that the earlier accounts for this phenomenon (see Kiefer (2006) and Kearns (1991)) are built on the durativity of these adverbials as the main reason for the incompatibility, they are not satisfying as (6a-b) show. The temporal adverbs in (6) are perfectly compatible with the progressive aspect irrespective of their duration.

With the help of predicate-negation and question-answer tests I show that *in* adverbs and *for* adverbs belong to the predicative part of the sentence but temporal adverbs that can appear in a progressive sentence felicitously both syntactically and semantically are topics. That is, I explain the incompatibility of certain temporal adverbs and progressive aspect with the information structure of the progressive sentences. I find that progressive sentences are categoric judgements that are statements about a temporal topic. The advantage of the suggested account is that it does not build its argumentation on the durativity of the temporal adverbs.

In the fourth chapter I examine the properties of temporal topic (reference time) of progressive sentences. I show that it a) can denote any temporal interval regardless of its duration, b) satisfies the unicity requirement because it denote a unique temporal interval, and c) must be given in the discourse. I compare the temporal topic of progressive sentences and the TTI (Temporal Topic Interval) described by Glasbey (2005) in English perfect sentences. I find that the temporal topic in a progressive sentence is really a topic, a discourse topic, while TTI is not.

The linguistic data and tests in the first part of the dissertation clearly show that the temporal topic in a progressive sentence behaves like an ordinary topic denoting an object. Thus I regard temporal topic (reference time of a progressive sentence) as an ordinary discourse topic. On the basis of this parallelism of the nominal and temporal domain, in the second part of the dissertation I examine the temporal topic in the framework of PTQ by Barwise – Cooper (1981).

In the fifth chapter, on the one hand, I review the applied theoretical background (PTQ) and the properties of determiners I consider relevant in connection with the notion of temporal topic. I present studies on the other hand that independently of each other support

my motivation to apply PTQ in the case of temporal topic. These studies are Montague (1969), Kearns (1991), Corazza (2002).

The sixth chapter presents the core of the research: (1) I introduce the applied temporal model which is Kamp – Schiehlen (2001). (2) On the basis of Blackburn (1994) I give the assumed temporal structure of progressive sentences and show that aspect (progressive aspect in the first place here) can be regarded as a temporal determiner. (3) I redefine the PTQ for the temporal domain and (4) reveal the mathematical properties of determiners in the temporal domain. Finally, in the seventh chapter I consider the conclusion of the suggested account.

(1) Kamp – Schiehlen (2001) make a distinction between predicates of temporal measure expressions (*year*) denoting duration and that of referential temporal expressions, that is, calendar terms (*2012, this year*). (The adverbs serving as temporal topic belong to the latter class.) Predicates of calendar expressions impose a partition on the continuum of time that makes it possible to treat time as quasi-discrete. The denotation of a measure predicate (e.g. *year, day*) can be derived from the denotation of the corresponding calendar predicate (e.g. *2012, today*) by the help of equivalence relation ( $\equiv$ ). Thus predicates of calendar terms denote an interval, a single element of a given partition, while predicates of measure terms denote an entire equivalence class of the given partition. According to Kamp – Schiehlen (2001) there is a systematic correspondence between calendar terms and their unique denotation. The context itself within which the unicity requirement of a given calendar term is satisfied is an element of a temporal predicates' denotation, namely, that of the predicate “one up” in the given partition., The adverb *in June* for example has a single interval as its denotation only if there is a salient year in the given context.

(2) With the help of Hungarian examples I show that temporal topic and aspect together create a complex temporal expression that can be interpreted as a temporal generalized quantifier within which aspect has the temporal determiner function. Then I give the temporal structure of a progressive sentence on the basis of Blackburn (1994) although in a slightly modified way. Blackburn (1994) treat the temporal trace of an event by introducing a new propositional symbol ( $i, j, k \dots \in \text{NOM}$ ) standing for the **nominal**. In any model, a nominal is true at exactly one time, that is, it ‘name’ the unique time it is true at. Thus, with the nominal we can catch the referential nature of the past tense e.g. in the sentence *John ran*. For this sentence to be true it is not enough to have a time in the past at which the sentence *John run* is true but this time must be the very time denoted by the nominal. As for the viewpoint aspect,

what really matters is the relation between reference time denoted by the temporal adverb and the event time. Because of this particular reason, unlike Blackburn (1994) I do not take the temporal adverb as one that overtly specifies the nominal (the temporal trace) but I put them both in the representation of the sentence, each having its own denotation: the temporal trace denotes event time while the temporal adverb denotes reference time. I give the temporal trace ( $\chi$ ) of an event by the temporal trace function **tr** as follows:  $[[\chi]] := \mathbf{tr}[[Aur\acute{e}l\ sail]] = j$ . According to what has been said above I give the following representation for the progressive sentence containing a temporal topic in (7)

7. *Múlt szombaton Aurél éppen vitorlázott.*

'Last Saturday Aurél was sailing.'

$[ASP_{\langle\tau, \tau\rangle, \langle\langle\tau, \tau\rangle, t\rangle} (Last\ Saturday)_{\langle\tau, \tau\rangle} (Aur\acute{e}l\ sail)_{\langle\tau, \tau\rangle}]_t$

(3) Given that PTQ is a set-based theory and we are interested in intervals, that is, ordered sets in the examination of temporal properties of the progressive aspect, I redefine the rules based on sets in PTQ for intervals as follows:

**SZT1:** If  $\eta$  is an expression of type  $\langle\tau, \tau\rangle$  denoting a temporal interval, that is, ordered set then its denotation can be given as follows:

$$[[\eta]] \in P_{\subseteq T \times T}, \text{ that determines an interval } i \subseteq T$$

**SZT2:** If  $R_T$  is an n-argument temporal predicate then its denotation can be given as follows:

$$[[R_T]] \subseteq T^n.$$

**SZT3:** If  $D_T$  is a temporal determiner and  $\eta$  is an expression denoting a temporal interval then  $D_T(\eta)$  is a temporal generalized quantifier the denotation of which can be given as follows:

$$[[D_T(\eta)]] = [[D_T]] ([[ \eta ]])$$

**SZT4:** If  $Q_T = D_T(\eta)$  is a quantifier and  $\gamma$  is an expression denoting a temporal interval then the denotation of  $Q_T\gamma$  is a truth value:

$$\begin{aligned} [[Q_T\gamma]] &= 1, \text{ ha } [[\gamma]] \in [[Q_T]] \\ &0, \text{ ha } [[\gamma]] \notin [[Q_T]] \end{aligned}$$

**SZT5:** Every temporal predicate denotes a temporal interval.

If ASP is a temporal determiner and  $\eta$  is an expression of type  $\langle \tau, \tau \rangle$  denoting a temporal interval then  $Q_T := [[\text{Asp}(\eta)]] := [[\text{Asp}]] ([[ \eta ]])$  where ASP is an expression of type  $\langle \langle \tau, \tau \rangle, \langle \tau, \tau \rangle, t \rangle$  that create an expression of type  $\langle \langle \tau, \tau \rangle, t \rangle$  - that is, an expression interpretable as a generalized quantifier – with  $\eta$  of type  $\langle \tau, \tau \rangle$ .

Accordingly, aspect as a temporal determiner has the interpretation of a function in the model and takes the reference time denoted by the temporal adverb as an argument with which creates a temporal generalized quantifier (see  $Q_T := [[\text{ASP}(\textit{last Saturday})]]$ ). It means that aspect is a function that assigns a set of subsets of the temporal universe to a subset of the temporal universe.

Further, if  $Q_T := [[\text{ASP}(\textit{Adv})]]$  is a temporal generalized quantifier and  $\gamma$  is an expression of type  $\langle \tau, \tau \rangle$  then the quantifier  $Q_T$ , the interpretation of the expression  $\text{ASP}(\textit{Adv})$  of type  $\langle \langle \tau, \tau \rangle, t \rangle$ , is a function -  $(Q_T)(\gamma)$  – that takes the temporal interval  $\chi$  (event time) denoted by  $\gamma$  of type  $\langle \tau, \tau \rangle$  as an argument and assigns a truth value to it (see below). Thus the denotation of a temporal generalized quantifier  $Q_T$  can be given as sets of intervals of time.

$$[[ Q_T (\chi) ]] = 1, \text{ if } [[ \chi ]] \in [[ Q_T ]], \text{ 0 otherwise}$$

In case of the given example it means:

$$[[ \text{ASP}(\textit{last Saturday})(\chi) ]] = 1, \text{ if } [[ \chi ]] \in [[ \text{ASP}(\textit{last Saturday}) ]], \text{ 0 otherwise.}$$

If we think of aspect as having the same function as natural language determiners and we define it as a relation between two sets then according to PTQ, we are supposed to be able to give certain properties of the relations defined by different aspects. Considering the generalized quantifiers containing universal determiner and the natural language determiners *a/an, the*, the corresponding temporal generalized quantifiers containing temporal determiners can be defined as follows respectively<sup>1</sup>:

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<sup>1</sup> Referring to the character of the relation at hand the subscriptions are to make a distinction between different aspects ( o: overlap, p: part, s: singleton)



$[[ASP_p(\text{Adv})]] := [[ASP_p(\text{múlt szombaton})]] := \{j \subseteq T \mid [[\text{múlt szombaton}]] \subseteq j\}$   
 $[[ASP_o(\text{Adv})]] := [[ASP_o(\text{múlt szombaton})]] := \{j \subseteq T \mid [[\text{múlt szombaton}]] \circ j \neq \emptyset\}$   
 $[[ASP_s(\text{Adv})]] = [[ASP_s(\text{múlt szombat})]] := \{j \subseteq T \mid [[\text{múlt szombat}]] = i, i \subseteq j\}$

- (4) Considering aspects temporal determiners I assume that they show similar behaviour than their natural language equivalents in connection with monotonicity and conservativity. I define temporal monotonicity and conservativity as follows:

### Temporal Monotonicity

Suppose that  $i = [[\text{Adv}]]$ ,  $j = \text{tr}([[ \varphi ]])$ , where  $\text{tr}$  is the function that gives the temporal trace denoted by the sentence radical ( $\varphi$ ). A temporal determiner  $D_T$  is monotone iff narrowing or expanding its argument interval  $i$  or  $j$  the sentence remains true. In case of narrowing  $i$  or  $j$   $D_T$  is monotone decreasing while in case of expanding  $i$  or  $j$   $D_T$  is monotone increasing.

Perfective:

M13)  $i \subset i'$ : **Last Saturday I ran for an hour.**  $\Rightarrow$  **Last week I ran for an hour**

M14)  $i' \subset i$ : **Last Saturday I ran for an hour.**  $*\Rightarrow$  **Last Saturday I ran for an hour in the morning.**

M15)  $j \subset j'$ : **Last Saturday I ran for an hour.**  $*\Rightarrow$  **Last Saturday I ran for two hours.**

M16)  $j' \subset j$ : **Last Saturday I ran for an hour.**  $\Rightarrow$  **Last Saturday I ran for half an hour.**

Progressive:

M17)  $i \subset i'$ : **Last Saturday I was sailing.**  $*\Rightarrow$  **Last week I was sailing.**

M18)  $i' \subset i$ : **Last Saturday I was sailing.**  $\Rightarrow$  **Last Saturday I was sailing in the morning.**

M19)  $j \subset j'$ : **Last Saturday I was sailing.**  $\Rightarrow$  **Last Saturday I was at sea.**

M20)  $j' \subset j$ : **Last Saturday I was sailing.**  $*\Rightarrow$  **Last Saturday I was hoisting the sails.**

The entailment patterns show that, regarding monotonicity, perfective aspect and progressive aspect are inverse of each other:  $\uparrow\text{PERF}\downarrow, \downarrow\text{PROG}\uparrow$ .

### Temporal Conservativity

Suppose that  $i = [[Adv]]$ ,  $j = \mathbf{tr}([[φ]])$ , where  $\mathbf{tr}$  is the function that gives the temporal trace denoted by the sentence radical ( $φ$ ). A temporal determiner is conservative if for any  $φ$  and  $Adv$ :

$$(ASP([[Adv]]))(\mathbf{tr}([[φ]])) \Leftrightarrow (ASP([[Adv]]))([Adv] \circ (\mathbf{tr}([[φ]])))$$

In case of the given example it means:

$$(ASP([[last\ Saturday]]))([χ]) \Leftrightarrow (ASP([[last\ Saturday]]))([last\ Saturday] \circ [χ])$$

The sentence in (7) is true in a model where Aurél spends the whole Saturday (or even beyond it) with sailing. That is exactly what we call temporal frame reading. It is, on the other hand, not true in a model where the sailing does not last the whole Saturday. Since (7) is true in both cases when the sailing begins earlier or ends later than Saturday and when it does not too, clearly, regarding the truth value of the sentence the only relevant temporal interval is the one denoted by the adverb, that is the reference time. It means that progressive aspect shows conservativity.

## 4. Conclusions

In the seventh chapter I discuss the problem of interruption in light of the results of the study. As it has been already mentioned the problem of interruption arises because the formal definitions attempting to give the truth conditions of a progressive sentence want to catch the temporal frame reading described informally by Jespersen.

The results of the study support Parsons' statement that as for the truth conditions of a progressive sentence, what really matters is the ongoing event alone, regardless its continuation:

*„The inertia worlds approach focusses on the idea of what would be the case (described in nonprogressive terms) if present activities were to go uninterrupted.*

***I suggest that it is the present activities that are the whole story.***" (Parsons (1989), 221-222)

In Parsons (1989) the point is that progressive events and non progressive events have the following **inherent properties**: the relationship between an event and the temporal interval at which it occurs is different in the case of a progressive event and a non progressive event.

Given these properties being inherent, Parsons' account avoids the problem of interruption and imperfective paradox but with low explanative power.

According to the account I suggest aspect in general is a determiner-function that assigns a set of subsets of the temporal universe (event times) to a subset of the temporal universe (the reference time). Progressive aspect in particular assigns to a subset of the temporal universe those temporal intervals of which the reference time is a subpart. To put it simpler, progressive aspect assigns to the given reference time those event times of which the given reference time is a subpart. So I give a definition for progressive aspect as follows:

$$[[\text{PROG}]](\text{Adv}) := \{j \subseteq T \mid [[\text{Adv}]] = i, i \subseteq j\}$$

Considering progressive aspect as a temporal determiner-function we can examine the properties of natural language determiners. I found that progressive aspect is left monotone decreasing, right monotone increasing and conservative temporal determiner as well. Conservativity has a special importance in the case of progressive aspect, because it comes from the conservativity that only the reference time (the temporal interval denoted by the temporal adverb) is relevant for the truth conditions of a progressive sentence. Thus all those temporal intervals are irrelevant which are not parts of the given reference time. It means that the temporal interval denoted by the possible continuation of an ongoing but interrupted event is irrelevant. Therefore the semantics of progressive aspect (in terms of temporality at least) does not contain the possible continuation of an ongoing event. In fact, I agree with Kearns (1991) in that the temporal frame reading is not an entailment but only an implication satisfying Grice's maxim of quantity.

Similarly to Parsons (1989) and Kearns (1991) my dissertation gives an extensional account for the progressive aspect because it does not employ possible worlds. I came to the same conclusion as Parsons and Kearns did, namely that a definition for the progressive aspect does not need to refer to a possible continuation of the ongoing event. The advantage of the suggested account is that its result comes as a corollary consequence from a well elaborated formal theory, PTQ.