

STATIVITY OPERATORS IN 1066

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1. INTERVALS AND POINTS, EVENTS AND STATES

Tichy 1985: against interval semantics for temporal phenomena. Not against a semantics with intervals, but against a semantics based on a notion **truth at an interval of time**.

The temporal theory of my 1066 paper (Landman 2007) is somewhat in the spirit of Tichy:

-1066 uses **intervals** but not the notion **truth at an interval**, only **truth at a point**.

-1066 assumes that 'interval-constructing' operators construct the **bounding points** of intervals, rather than intervals themselves.

Standard assumptions:

-A domain of **eventualities** EV partitioned into a set of **events** $EVENT$ and a set of **states** $STATE$;

-A set of **worlds** W ;

-A **temporal structure of points and intervals, I , containing a set of points** $POINT$.

-A **temporal trace function** $\tau: EV \times W \rightarrow I \cup \{\perp\}$, a partial function from eventualities and worlds into intervals, assigning to an eventuality in a world its running time in that world (\perp means: undefined).

Taylor 1974/Dowty 1979: Events take time:

For every $w \in W$ for every $e \in EVENT$: if $\tau(e,w) \neq \perp$ then $\tau(e,w) \in I - POINT$

States can take points as running time, but events cannot.

Stative/eventive predicates:

Verbs, verb phrases, and sentences denote **sets of eventualities**

$X \subseteq EV$ is **stative** iff $X \subseteq STATE$

$X \subseteq EV$ is **eventive** if $X \subset EVENT$.

Truth at a point of time:

$X \subseteq EV$ is **true at point of time** $p \in POINT$ in world w iff $\exists e \in X: \tau(e,w) = p$.

Asserting a tensed sentence is **asserting that it is true now**, and this means: asserting that it is true **at now**. Hence, with Taylor/Dowty:

Now is a point of time.

Since the grammar (or the bit of it that I am concerned with here) is not going to derive **mixed** sets of eventualities (sets that contain both events and states), it follows that:

Only stative sentences can be truthfully asserted.

I will assume that a tensed statement X is **assertible** iff if $X \neq \emptyset$, X contains eventualities that **can** be true at points. With this, it follows (for the part of grammar I will be concerned with) that:

All assertible tensed sentences are stative.

Thus, while verb interpretations can be stative or eventive, the grammar must derive at the sentence level a set of states. This means that, if you start out with an eventive predicate, at some stage of the derivation of a felicitous tensed sentence a **stativity operator** must apply.

2. TENSE STATES AND PERSPECTIVE STATES

I introduce (following 1066) **tense states** and **perspective states** (corresponding to Reichenbach's **speech points** and **reference points**).

pointstate(s) iff $s \in \text{STATE} \wedge \forall w[\tau(s,w) \in \text{POINT}]$

r-pointstate(s) iff $s \in \text{STATE} \wedge \forall w \forall v[\tau(s,w)=\tau(s,v) \wedge \tau(s,w) \in \text{POINT}]$

A pointstate is a state whose running time is a point (in every world). An r-pointstate is a pointstate which is **temporally rigid**, in that its running time is the same point in every world. I assume that the model is supplied with a rich set of pointstates and r-pointstates:

r-pointstate assumption:

STATE contains at least as many r-pointstates as the interval structure I contains points.

I will assume that r-pointstates can be manipulated in dynamic interpretation structures for discourse (which I will not specify here, but take for granted). And this means that we can introduce the following predicates on r-pointstates:

Perspective states:

s is a **perspective state relative to D** ,

pers_D(s) iff s is an r-pointstate that is salient in discourse D .

Tense states:

s is a **tense state relative to D** ,

tense_D(s) iff s is a perspective state that is salient in discourse D as a **speech state** (i.e. its running time is a speech point, i.e. a **now**).

These dynamic predicates obviously form a link between the sentence grammar (the derivations) and a more general discourse theory. Since the discourse aspects of tense

and perspective play only a small role in the discussion in this paper, I will suppress, for readability, index D in the rest of this paper, and call the predicates **pers** and **tense**.

3. TENSE-PERSPECTIVE-ASPECT OPERATORS

I assume (for Dutch and English, which are the languages I will be concerned with) a system of three (optional) functional categories, *tense*, *perspective* and *aspect*, and corresponding to these, three sets of operations, TENSE, PERSPECTIVE and ASPECT. I assume that when such a functional category is realized in the syntax, an operation from the corresponding set is realized in the semantics.

[_{teP} [_{tense}] [_{peP} [_{perspective}] [_{asP} [_{aspect}] [_{VP} vp]]]]
TENSE **PERSPECTIVE** **ASPECT**

The relevant operators are all **operations from sets of eventualities to sets of eventualities**.

I discussed these operations in 1066. What will be relevant in this paper is their **sortal restrictions**.

ASPECT:

PERFECT : sets of → sets of
 STATES → STATES
 EVENTS → EVENTS

[Perfect picks out **maximal eventualities**, in a sense defined in 1066]

PROGRESSIVE: sets of → sets of
 EVENTS → EVENTS

[Progressive maps sets of events sets of **event stages**, which are themselves events.]

Thus, the progressive operation is **sorted**: it is only defined for **eventive predicates** and it yields as output an **eventive predicate**.

TENSE:

PAST = $\lambda P \lambda s. \text{tense}(s) \wedge \exists e \in P: \tau(e, w) < \tau(s, w)$
PAST sets of → sets of
 STATES → STATES
 EVENTS → STATES

PAST is, in essence, the Priorian past operation: It takes a set of eventualities X and maps it onto the set of **tense states** that have one of the eventualities in X in their past. These tense states have, by definition, a speech time (a **now**) as their running time. Restricting out attention to **one speech time, now**, **PAST(X)** is going to be true at **now** iff **PAST(X) ≠ ∅** iff $\exists e \in X: \tau(e, w) < \text{now}$. On this semantics, **PAST** is a **stativizer**: it takes as input a set of states or events, and gives as output a set of states.

$$\text{PRESENT} = \lambda P \lambda s. \text{tense}(s) \wedge \exists e \in P: \tau(e, w) = \tau(s, w)$$

$$\text{PRESENT:} \quad \begin{array}{ccc} & \text{sets of} & \\ & \text{STATES} & \rightarrow \\ & \text{EVENTS} & \rightarrow \end{array} \quad \begin{array}{c} \text{sets of} \\ \text{STATES} \end{array}$$

PRESENT takes a set of eventualities X and maps it onto the set of **tense states with the same running time as** one of the eventualities in X . Since tense states are point states, this semantics requires the input to be a set of states, since events are never true at points. Thus, **PRESENT** is **not** a stativizer, it **requires** a stative input (and then yields a stative output.).

PERSPECTIVE:

$$\text{EXTERNAL} = \lambda P \lambda s. \text{perspective}(s) \wedge \exists e \in P: \tau(e, w) < \tau(s, w)$$

This is the **same** operation as **PAST**, except that it outputs for input X the set of **perspective (rather than tense) states** that have an eventuality in X in their past.

$$\text{EXTERNAL} \quad \begin{array}{ccc} & \text{sets of} & \\ & \text{STATES} & \rightarrow \\ & \text{EVENTS} & \rightarrow \end{array} \quad \begin{array}{c} \text{sets of} \\ \text{STATES} \\ \text{STATES} \end{array}$$

$$\text{INTERNAL}_1 = \lambda P \lambda s. \text{perspective}(s) \wedge \exists e \in P: \text{end}(\tau(e, w)) = \tau(s, w)$$

$$\text{INTERNAL}_2 = \lambda P \lambda s. \text{perspective}(s) \wedge \exists e \in P: \tau(s, w) \subseteq \tau(e, w)$$

INTERNAL₁ is the operation I used in 1066. It is an **endpoint operation**: it maps set of eventualities X onto the set of perspective states that have as running time the **endpoint** of the running time of an eventuality in X .

For the purposes of the present paper, you may find **INTERNAL**₂ conceptually easier: it maps X onto the set of perspective points that are inside the running time of an eventuality in X .

[Given the constraints on states and activities discussed in 1066, this only makes a difference for accomplishments, and I will ignore the difference here.]

INTERNAL, like **EXTERNAL** and **PAST**, and **unlike PRESENT**, is a stativizer.

$$\text{INTERNAL} \quad \begin{array}{ccc} & \text{sets of} & \\ & \text{STATES} & \rightarrow \\ & \text{EVENTS} & \rightarrow \end{array} \quad \begin{array}{c} \text{sets of} \\ \text{STATES} \\ \text{STATES} \end{array}$$

4. 1066

1066 is a proposal concerning how these operations are realized in English and Dutch. I assume that in both languages *tense* is realized in the same way:

$$\begin{array}{l} [{}_{tense} \text{pastmorphology}] \rightarrow \text{PAST} \\ [{}_{tense} \text{null}] \rightarrow \text{PRESENT} \end{array}$$

The languages differ with respect to the realization of perspective and aspect:

English has the following options:

1.- no *perspective*- no *aspect* no semantics of perspective or aspect here

2.- [_{peP} [*perspective have*] [_{asP} [*aspect -ed*] [_{VP}]]]
EXTERNAL(PERFECT (VP))

3.- [_{peP} [*perspective be*] [_{asP} [*aspect -ing*] [_{VP}]]]
INTERNAL(PROGRESSIVE (VP))

Dutch has the same options 1 and 2:

1.- no *perspective*- no *aspect* no semantics of perspective or aspect here

2.- [_{peP} [*perspective hebben/zijn*] [_{asP} [*aspect g--ed*] [_{VP}]]]
EXTERNAL(PERFECT (VP))

But internal perspective and progressive aspect are not lexicalized (in the categories *perspective* and *aspect*), and this gives **three more options** in Dutch:

3.a. [_{peP} [*perspective null*] [_{VP}]]]
INTERNAL(VP)

3.b. [_{asP} [*aspect null*] [_{VP}]]]
PROGRESSIVE(VP)

3c. [_{peP} [*perspective null*] [_{asP} [*aspect null*] [_{VP}]]]
INTERNAL(PROGRESSIVE (VP))

Of these, the first and the third option are of central importance in 1066.

The assumption is that in English there is no null aspect and no null perspective, aspect and perspective are fully lexicalized in English. In Dutch, like in English, external perspective and perfect aspect are lexicalized (and occur together), but internal perspective and progressive aspect are not lexicalized in the categories *perspective* and *aspect*

[I assume that the explicit progressive in Dutch [*aan het lopen zijn/ at the walk be*] is a copula PP construction which gets an internal progressive meaning independently from the perspective-aspect system (through the meaning of the preposition)].

The name 1066 derives from the fact that I assume that English changed from a Dutch style system to a lexicalized system in the transition from Old English to Middle English, before 1066.

5. STATIVE PREDICATES IN ENGLISH AND DUTCH

Ignoring for the moment **modal predicates** (and this includes predicates with an habitual interpretation), 1066 predicts differences between English and Dutch concerning **which surface predicates allow stative interpretations**.

In English, for non-modal predicates, **what you see is what you get**. Stative VPs cannot occur in the progressive (excepting stage-level states), since **PROGRESSIVE** requires an eventive input:

(1) #Fred is *knowing the answer*.

Eventive VPs cannot occur in the simple present (except with a modal, habitual interpretation), since **PRESENT** requires a stative input

(2) #Fred *waltzes*.

But perspective phrases have a **stative interpretation also when the VP is eventive**, so they **can** occur in the present

(3) Fred *has waltzed*

(4) Fred *is waltzing*

(5) Fred *has been waltzing*.

For Dutch we find the following. The fact that stative VPs cannot occur in the progressive is relevant for the explicit progressive form:

(6) #Fred is het antwoord aan het weten.

Fred is the answer at the know

Fred is knowing the answer

but not for the form with null-progressive aspect, because you can just **not** realize the null aspect.

While in English, if you don't see lexical perspective and aspect, you know it isn't there, this is not the case for Dutch. Thus, a **present** surface form *walst* allows a derivation [_{teP} **null** [_{peP} **null** [_{VP} *wals*]]] and the interpretation of the perspective phrase is **stative: (INTERNAL(VP))**. Thus, the simple present with an eventive verb is perfectly felicitous, also without an habitual interpretation:

(7) Fred *walst*.

Fred *waltzes*

The option of realizing both null perspective and null aspect is relevant for accomplishments. 1066 predicts that accomplishments in the simple present have a felicitous **progressive** interpretation:

- (8) Fred schrijft een boek.
 Fred writes a book
 Fred is writing a book

For the complex forms, we get the same facts as in English.

So far we have assumed that all tensed sentences need to end up stative. If the VP predicate is not stative to begin with, the derived predicate can get to be stative through **stativity operators**. The differences between Dutch and English with respect to the simple present are derived from this and 1066: a set of assumptions about how the relevant operations are grammaticized.

Main idea: stativity plays a more fundamental role in the grammar than is usually assumed, and stativity effects pop up in unexpected places.

6. STATIVITY AND CONTINUOUS *SINCE*

I discussed this case in 1066. I will present the argument of 1066 here, but without the heavy technical details that burdened the argument in my previous expositions, to bring out more clearly that what we are dealing with here are stativity effects.

We are concerned with cases like (9) which have a **continuous** interpretation.

- (9) I have lived in Amsterdam since 1992.

I assume that the semantics of (9) involves a **continuity operator CONTINUOUS**. Its semantics can be described, a bit informally, as follows:

CONTINUOUS takes a predicate P, and determines an interval *i* such that:

1. P is true at every point in *i*.
2. The endpoint of *i* is identified with the perspective point introduced by a perspective operation that **CONTINUOUS** is in the scope of.

At this point the assumptions about points and intervals that I started out with become relevant.

1. The input predicate P is postulated to be true at every point in *i*. Since **only stative predicates are true at points**, it follows that:

The input of CONTINUOUS is required to be a stative predicate.

2. The output, **CONTINUOUS(P)** determine a set of intervals. But I assume that it does so **indirectly**. I take the **output** of **CONTINUOUS** for stative input P to be a **relation between point states**:

CONTINUOUS =

$$\lambda P \lambda s_2 \lambda s_1. \text{pointstate}(s_1) \wedge \text{pointstate}(s_2) \wedge \tau(s_1, w) < \tau(s_2, w) \wedge \\ \forall t \in \text{POINT}: \tau(s_1, w) \leq t \leq \tau(s_2, w): \exists e \in P: \tau(e, w) = t$$

This indeed means that the output is a relation between pointstates:

The output of CONTINUOUS is a stative relation.

The second constraint on **CONTINUOUS** is a grammatical binding constraint: In a felicitous derivation, **CONTINUOUS** must be in the scope of a perspective operation, and the running time of the outermost state argument of **CONTINUOUS** (which is the endpoint of the interval) must be identified with the perspective argument of the perspective operation it is in the scope of.

I assume further that, in continuous *since 1992*, *since* constrains the continuity operator and puts the s_1 -argument in 1992, the s_2 -argument after 1992.

Summarizing the stativity characteristics:

CONTINUOUS	sets of STATES	→	relations between STATES
In the scope of PERSPECTIVE			

Let me stress at this point: these stativity characteristics are – in the present framework - **not** stipulated input and output constraints: they **follow** from the meanings postulated. Also, the analysis of perspective binding I developed in 1066 justifies calling a relation between states **stative**: the relation gets turned into a predicate at a later stage of the derivation, and this predicate is stative.

Except for the analysis of the stativity involved, the present analysis of continuous *since* is pretty much what you find in the literature (e.g. Mittwoch 1988's universal *since*). But the stativity assumptions lead to interesting interactions with 1066.

In the first place, we notice:

The predicate that a continuous *since* phrase adjoins to must be a stative predicate.

With this, 1066 predicts that the differences between Dutch and English concerning which surface predicates express stative predicates (and progressive predicates) are going to show up on the predicate that continuous *since* adjoins to.

In English a continuous *since* phrase can adjoin to stative predicates, and perspective-progressives, but to eventive predicates only if they have an habitual interpretation:

- | | |
|---|-----------------------------|
| (10) I have lived in Amsterdam since 1992 | stative |
| (11) I have been doing the dishes since this morning | internal+progressive |
| (12) I have driven a car since I was 18. | habitual |
| (13) #I have done the dishes since this morning | eventive[continuous] |

In Dutch, a continuous *sinds* phrase can adjoin to eventive predicates without the latter having an habitual interpretation, including accomplishments, but the latter get a progressive interpretation. (Examples after the next bit of discussion)

Let us think about the linking to the perspective. We start with a stative predicate *live in Amsterdam/woon in Amsterdam* and with the *since* phrase: *since 1992/sinds 1992*. We take the Dutch case first.

We adjoin *sinds 1992* to *woon in Amsterdam* and get a stative relation: *woon in Amsterdam sinds 1992*. The semantics of the continuity operator requires this to be in the scope of a perspective operator. The simplest way to satisfy this, in Dutch, is to generate a higher **null**-perspective (with meaning INTERNAL):

[_{peP} [_{perspective} **null**] [*woon in Amsterdam sinds 1992*]]

I show in 1066 how the semantic linking constraint gets satisfied in this predicate, giving the predicate the right meaning. The important thing is that we can continue this derivation straightforwardly by generating present tense:

[_{teP} [_{tense} **null**] [_{peP} [_{perspective} **null**] [*woon in Amsterdam sinds 1992*]]]

Thus, 1066 predicts that Dutch allows a **continuous present**:

- | | | |
|------|---|--|
| (14) | Ik woon sinds 1992 in Amsterdam | stative |
| | I live since 1992 in Amsterdam | |
| (15) | I ben sinds vanmorgen de afwas aan het doen | progressive PP |
| | I am since this morning the dishes at the do | |
| (16) | I rij sinds mij 18de auto | habitual |
| | I drive since my 18 th (year) car | |
| (17) | Ik doe sinds vanmorgen de afwas | eventive |
| | I do since this morning the dishes | |
| (18) | Ik schrijf sinds 1992 een boek | accomplishment |
| | I write since 1992 a book | with progressive interpretation |

English does not allow **null**-perspective. This means that the perspective constraint on the continuity operation can only be satisfied in English if you realize perspective lexically. But realizing perspective in English, means realizing perspective **and** aspect.

<i>have</i>	<i>-ed</i>	or	<i>be</i>	<i>-ing</i>
EXTERNAL PERFECT			INTERNAL PROGRESSIVE	

We consider the second option here. We have *since 1992* we have the predicate *live in Amsterdam* and we have perspective *be* and aspect *-ing*. Where can *since 1992* be adjoined? Theoretically there are three options, indicated by the arrows:

[[_{peP} [_{perspective} <i>be</i>]	[_{asP} [_{aspect} <i>-ing</i>]	[_{VP}]]
	↑	↑	↑
	1	2	3

1: higher than *be*; 2. between *be* and *ing* 3. under *ing*

Option 1 is not possible, because then the continuity operator is not in the scope of the perspective, violating the semantic constraint.

For continuous *since*, I could give a semantic account for why option 2 is not possible (the *since* phrase must adjoin to a stative predicate, but the aspect phrase is eventive because of the progressive). However, that account will not extend to non-continuous *since*, which I will discuss next, so instead I will just assume that this is not an available adjunction site.

So we are left with the third option: adjoin *since 1992* to the VP.

By the semantics of the continuity operator, the interpretation of the result of adjunction, *live in Amsterdam since 1992* is **stative**. It forms the input for **PROGRESSIVE**. But **PROGRESSIVE** requires an **eventive input**, hence this is not felicitous. Thus option three is not possible, because the progressive doesn't apply to statives (not stative predicates, not stative relations).

This means that the perspective constraint cannot be satisfied by realizing *be -ing*. Note the **crucial difference** with the Dutch case: there is no similar conflict in Dutch, **because in Dutch you can realize null-perspective without realizing progressive aspect. This is a strong argument for separating the notions of internal perspective and progressive aspect.**

What does this mean for English? Well, it means that:

In English the continuity operator requires external perspective to be realized (and hence, by 1066, both external perspective and perfect aspect)

- | | |
|---|---|
| (19) I have lived in Amsterdam since 1992. | |
| (20) # I lived in Amsterdam since 1992 | (no null-perspective) |
| (21) #I live in Amsterdam since 1992. | (no null perspective) |
| (22) #I am living in Amsterdam since 1992 | (<i>be ing</i> incompatible with CONTINUOUS) |

I show in 1066 how the semantic linking constraint gets satisfied in this predicate, giving the predicate the right meaning.

7. NON-CONTINUOUS SINCE

- (23) I have written two books since 1992.

In earlier presentations of 1066, I assumed that non-continuous *since*, as in (23), is continuous *since* minus continuity. And it could be just that in some dialects (or in some contexts):

- (24) Since I wrote these papers, I *found* two very striking instances.
[Burke, 1756, OED]

But in most contexts and most dialects, examples like (23) require *have* as much as continuous *since* does. I will assume with Mittwoch 1988 that the semantics of non-

continuous *since* involves a **BETWEEN** operator. Crucially, in the present framework, I will assume that **BETWEEN** differs **only** from the continuity operator in its internal semantics:

BETWEEN =
 $\lambda P \lambda s_2 \lambda s_1. \text{pointstate}(s_1) \wedge \text{pointstate}(s_2) \wedge \tau(s_1, w) < \tau(s_2, w) \wedge$
 $\exists e \in P: \tau(s_1, w) < \tau(e, w) < \tau(s_2, w)$
Perspective linking: the same as for **CONTINUOUS**

This semantics predicts that, unlike continuity, the **input** of **BETWEEN** can be **eventive**: the semantics of **BETWEEN** does **not** impose a stativity requirement. This is what we see in (23).

But, on the present analysis the **output** of **BETWEEN** is as much a stative relation as continuity. So, **BETWEEN** is a **stativizing operation**:

BETWEEN:	sets of		relations between
	STATES	→	STATES
	EVENTS	→	STATES

In the scope of **PERSPECTIVE**

This means that, with respect to perspective binding, the situation in English for non-continuous *since* is **exactly the same** as for continuous *since*. Thus:

Non-continuous *since* takes *have* as well.

As we have seen, in Dutch continuous *since* is most standardly realized as continuous present, with null internal perspective, though the English option with external perspective is also possible.

When it comes to non-continuous *since* in Dutch, we find that the null-internal perspective option is not possible here:

- | | |
|--|-----------------------|
| (25) #Ik schrijf twee boeken sinds 1992. | non-continuous |
| I write[<i>present</i>] two books since 1992 | |
| (26) #Ik schreef twee boeken sinds 1992 | non-continuous |
| (27) Ik heb twee boeken geschreven sinds 1992. | non-continuous |
| I have two books written since 1992 | |

The framework of 1066 itself does not explain why Dutch refuses to realize null perspective in these cases.

An intuitive rationale:

Present or Past tense attaches to a verb stem.

It is, at a psychological level, **irresistable** to think of that verb-stem tense complex as being in some intuitive sense semantically past, if the inflection is past, and semantically present, if the inflection is present: i.e. *write* is present, *wrote* is past.

This intuition is maintainable in the case of continuous *since* (with 'present' stretched to 'up to present'), but – by the semantics of non-continuous *since* – there is a straightforward

conflict in the case of (25): the verb-tense complex is present, but the semantics is past, because of the meaning of BETWEEN.

This, one can assume, is too confusing to make the null-perspective option attractive in the case of non-continuous *since*:

Dutch does not allow realizing null-perspective on the result of adjoining non-continuous *since* to a predicate.

If this is what the constraint is like in Dutch, then not only is (25) not realized, (26) is not either. Hence, with this constraint, for non-continuous *since*, Dutch falls back to the English option, as in (27).

8. A REMARK ON *ALREADY*

Mittwoch 1988 observes that, in English, continuous *since* is incompatible with *already*, on the reading where *already*, so to say, concerns the length of the continuity interval:

(28) #I have already lived in Amsterdam since 1992.
(intended meaning: i.e., a considerable time).

Mittwoch also shows that non-continuous *since* can easily occur with *already*:

(29) I have already seen him twice since he came back.
(#i.e. a considerable time)

However, as the continuation shows, also in (29) the interpretation of *already* does not concern the length of the 'between' interval. So neither continuous *since* nor non-continuous *since* is compatible with *already* on this interpretation. I will restrict my attention to continuous *since*.

In Dutch, the facts are the same as in English for the form with the perfect:

(29) #Ik heb al sinds 1992 in Amsterdam gewoond
I have already since 1992 in Amsterdam lived

But **not** for the continuous present: *al/already* is fine with exactly this 'i.e. a considerable time' interpretation:

(30) Ik woon al sinds 1992 in Amsterdam, ja ja, een hele tijd.
I live already since 1992 in Amsterdam, yes yes, a considerable time

How can we account for this?

Proposal: on this interpretation:

ALREADY:relations between states → sets of states

with meaning, say, something like the following:

$$\text{ALREADY}(\lambda s_2 \lambda s_1. \text{CONTINUOUS}(s_1, s_2, \text{LIA}) = \lambda s_2. \exists s_1. \text{CONTINUOUS}(s_1, s_2, \text{LIA}) \wedge s_1 \text{ is considerably before } s_2)$$

At this point we have reached a situation that I discussed extensively in 1066:

The tandem facts about perspective binding in 1066:

FACT 1:

INTERNAL($\lambda s_2. \exists s_1. \text{CONTINUOUS}(s_1, s_2, \text{LIA}) \wedge s_1$ is considerably before s_2) resolves perspective binding.

FACT 2:

Perspective binding cannot be resolved in:

EXTERNAL(**PERF**($\lambda s_2. \exists s_1. \text{CONTINUOUS}(s_1, s_2, \text{LIA}) \wedge s_1$ is considerably before s_2))

In 1066 Perspective binding to **INTERNAL** perspective turns the relation between states into a predicate of states which is just the output of *already* minus the considerable bit. But perspective binding to **EXTERNAL** perspective requires a different operation on the relation between states, which I give in 1066.

Hence, with this assumption about the meaning of *already* as an operation on relations between states, the facts in (28)-(30) follow from 1066.

9. AGAINST STATIVIZING NEGATION (For Anita Mittwoch)

In this section I am concerned with the difference between (31) and (32):

- (31) #I have **done the dishes** since last week. **eventive[continuous]**
 (32) I haven't **done the dishes** since last week. **continuous**

Unlike (31), (32) is fine with a continuous interpretation. How does this come about?

Proposal 1: Stativizing negation

Assume that negation can incorporate internal perspective:

$$\neg_{\text{st}} = \lambda P \lambda s. \text{pers}(s) \wedge \neg \exists e \in P: \tau(s, w) \subseteq (\tau(e, w))$$

Then negation can be a stativizer: it can take an eventive predicate *do the dishes* and turn it into a stative predicate:

$\neg_{\text{st}}(P)$ is the set of perspective states that are not temporally included in any event in P

This is a stative predicate, so continuous *since* can apply to it, and we get:

not do the dishes since this morning:

the relation that holds between pointstates s_1 and s_2 if every point from s_1 to s_2 is the running time of a perspective state **not** surrounded by a do the dishes event.

This means that dishwashing events are absent from the relevant interval.

Stativizing negation is interesting, since it can give you Partee's interpretation for (30):

(33) I didn't turn off the stove:

$$\lambda s_1[\mathbf{tense}_D(s_1) \wedge \exists s_2[\mathbf{pers}_D(s_2) \wedge \tau(s_2, w) < \tau(s_1, w) \wedge \neg \exists e \in \text{TOS}: \\ \tau(s_1, w) \subseteq \tau(e, w)]]$$

(I didn't turn off the stove at a past perspective time.)

Proposal 2: Mittwoch 1988: $\neg +$ non-continuous *since*.

Mittwoch 1988 assumes that on the interpretation given, *since* in (32) is **non-continuous** *since*. If so, the eventive nature of *do the dishes* is not a problem. She next assumes that, on the interpretation given, the **scope** of the negation is *do the dishes since this morning*. (i.e. VP negation). Since the negation of an existential is a universal, the result looks like a continuous interpretation. Hence (32).

One potential problem with this second proposal is that on any test that I can come up with for distinguishing continuous *since* from non-continuous *since*, the *since* in (32) patterns with continuous *since*.

I will give one example. There are contexts in which continuous *since* and non-continuous *since* are distinguished prosodically. Thus, consider (34) with continuous *since*, and consider the following natural intonational pattern for the continuous interpretation in (34): pronounce (34) with **no stress** and **no pauses** until you reach the stress on *two*.

(34) He has lived in Amsterdam since 1992, hasn't he?

Now copy this intonational pattern **exactly** onto (35) with non-continuous *since*:

(35) #He has written two books since 1992, hasn't he?

Non-continuous *since* seems not felicitous in this intonational pattern.

Now copy the same intonational pattern onto (36), with negation and non-continuous *since*:

(36) He hasn't written any books since 1992, has he?

Unlike (35), (36) is perfectly fine in the intonational pattern of (34).

This is to be expected on the stativizing negation proposal, but raises questions on the scope proposal: if the intonational pattern relates to the meaning of *since* chosen, you wouldn't expect this.

This is not exactly a strong argument for the following reason. Even if we assume that the intonational pattern goes with a semantic unit which is a continuity operator, we can assume that (36) allows a semantic analysis in which **exactly what happens** is that negation and non-continuous *since* form a semantic unit:

$$\text{not+ } \text{since}_{\text{non-continuous}} 1992 \rightarrow \text{since}_{\text{non-continuous}}^{\neg}$$

$$\lambda P \lambda s_2 \lambda s_1. \tau(s_1, w) \subseteq 1992 \wedge 1992 < \tau(s_2, w) \wedge \neg \exists e \in P: \tau(s_1, w) < \tau(e, w) < \tau(s_2, w)$$

There is independent reason to think that such semantic units can be formed. A well known case is exception phrases like *but his wife*. They modify positive or negative universal semantic units. But they are also ok in sentences like (37) where strictly speaking there is no unit: we see negation, polarity *any* and the *but* phrase:

(37) He **didn't** dance with **anybody** but his wife.

Polarity *any* is not a universal and does not allow a *but* phrase, except in cases like (37) where there is an auxiliary negation.

Thus, if (36) allows an interpretation with semantic operator $\text{since}_{\text{non-continuous}}^{\neg}$, the latter is a continuity operator, and hence we may well expect (36) to behave as if it contains a continuity operator as a semantic unit.

Let's now look at an argument in the other direction. Mittwoch's semantics for the **BETWEEN** operator is, for eventive input predicates, a **strong** semantics:

(38) I have written two books since 1992.

For this to be true, two books writing events must have **started after** the begin point of the interval and **ended** before the endpoint of the interval. Thus, (38) does not express (39):

(39) I have finished two books since 1992.

The same in (40):

(40) I have managed to do at least one thing on my list:
since this morning, I have done the dishes.

On Mittwoch's analysis, (40) is not true if I did half of the dishes yesterday evening, and finished them this afternoon. My informants strongly agree with Mittwoch (as often, a bit to my non-native surprise) about these cases.

Now a strong semantics for $\text{since}_{\text{non-continuous}}$ produces a weak semantics for $\text{since}_{\text{non-continuous}}^{\neg}$. Look at (41):

(41) I haven't written any books since 1992.

As long as there is no book that I started after 1992 and that got written before now, (41) is true. In particular, (41) is true even if I finished in 1994 the big book I started in 1989, and even if I started a big book in 2005 which is still unfinished. Again, my informants agree with Mittwoch: (41), apparently, isn't about books started before or books not finished now.

If these data are correct, a stativizer negation approach has some pertinent problems. The obvious stativizing interpretations that would come to mind would be: the one we gave, or the one that incorporates the endpoint operation, or an inchoative one that incorporates a beginpoint operation:

$$\begin{aligned} \neg_{\text{st}} &= \lambda P \lambda s. \mathbf{pers}(s) \wedge \neg \exists e \in P: \tau(s, w) \subseteq (\tau(e, w)) \\ \neg_{\text{st}} &= \lambda P \lambda s. \mathbf{pers}(s) \wedge \neg \exists e \in P: \tau(s, w) = \mathbf{end}(\tau(e, w)) \\ \neg_{\text{st}} &= \lambda P \lambda s. \mathbf{pers}(s) \wedge \neg \exists e \in P: \tau(s, w) = \mathbf{begin}(\tau(e, w)) \end{aligned}$$

As can be checked, none of these operations in combination with continuous *since* is exactly equivalent to *since*^{non-continuous}: each of these combinations is **stronger** than the *since*^{non-continuous}. Too strong, if my informants are right.

I want to add to this an independent argument against stativizing negation. Let's first look at the simple present:

(42) I smoke.

(42) does not have an eventive interpretation, it only has an habitual interpretation.

Now look at (43):

(43) I don't smoke.

(43) does not have an eventive interpretation either: (43) expresses the negation of the habitual (42). We understand how (42) gets to be habitual: *smoke* is not stative, hence cannot occur in the present, the habitual interpretation is stative, so it can occur in the present.

Now, if there is stativizer negation, then we expect another interpretation for (43), in essence equivalent to (44):

(44) I am not smoking.

And that interpretation doesn't exist.

I don't think that this by itself settles the case against stativizer negation. Maybe the habitual interpretation of the simple present is grammaticized enough to block an alternative interpretation strategy. So let us look at a context which requires a stative input where the habitual interpretation plays no role.

I discussed such a case in 1066, namely overlapping interpretations for the simple past in the context of punctual when-clauses. I will give only the relevant part of the data discussed in 1066 here. Consider the following sentences on an interpretation where the main clause predicate is simultaneous with the time of the *when* clause:

- (45) I *was asleep*, when John came in. **stative**
 (46) I *was sleeping*, when John came in. **progressive**
 (47) #I *slept*, when John came in. **eventive**

The analysis I gave for these facts, and the differences with Dutch, is that I assume that in these cases the *when* clause functions as a perspective on the main clause predicate requiring identity of running time in the same way as the present does. That's why (47) is infelicitous. Note that habitual interpretations are not possible in this context. Now put in a negation:

- (48) I wasn't asleep, when John came in.
 (49) I wasn't sleeping, when John came in.
 (50) #I didn't sleep, when John came in.

The negation doesn't improve (50), showing that here too, we cannot have stativizing negation. But, one would think that **if** stativizing negation exists, (50) is *par excellence* a context where it should show up. And it doesn't.

This means that even if we can come up with a stativizer negation interpretation that solves the problems discussed above, an account along the lines of Mittwoch is to be preferred. The same is true if there are dialects concerning non-continuous *since* that differ from Mittwoch's. The better strategy for those is to play around with the semantics of **BETWEEN**, rather than that of negation.

Anita heeft al gelijk sinds 1988. (gelijk hebben = be right)

10. SOME THOUGHTS ON MODALS

Most of the material in this section is very tentative and preliminary.

I start out with an assumption about null-internal perspective in Dutch. I have assumed that we can realize null-internal perspective in Dutch. I have also discussed a case where we don't seem to be able to. I will add to the latter case now by making a general restrictive postulate:

Infinitives in Dutch cannot be interpreted as perspective phrases with a null internal perspective (nor null progressive aspect).

Thus the infinitive of the verb *wals-* [_{INF} *walsen*] does not have an analysis [_{peP} [_{perspective} **null**] [_{INF} *walsen*]].

I will start with a nice consequence of this assumption. We come back to the continuous present in Dutch. We now look at modal verbs in the continuous present. Look at (51):

- (51) Hij *kan* (al) sinds Januari in Amsterdam wonen.
 He can already since January in Amsterdam live

Kunnen is a modal auxiliary verb which takes an infinitive and allows for a variety of modal interpretations, epistemic, deontic, dynamic. (51) is scopally ambiguous, it can mean (52) or (53):

(52) It is possible that he has lived in Amsterdam since January.

(53) He has been able to/allowed to live in Amsterdam since January.

Now we look at (54) and (55):

(54) Hij kan (al) sinds zijn achtste piano spelen.

He can already since his 8th (year) play the piano

(55) Hij kan (al) sinds gisteravond televisie kijken.

He can already since yesterday evening watch television.

The interesting thing about these examples is that they are perfectly felicitous, but they allow only the narrow scope interpretation of *kunnen*:

(54) means (56) and cannot mean (57):

(56) He has been able to play the piano since he was eight.

(57) It is possible that he has been playing the piano since he was eight.

Well, the possibility in (57) requires maybe inhuman stamina, that's why we have (55): (55) means (58) and cannot mean (59):

(58) He has been able to watch television since yesterday evening.

(59) It is possible that he has been watching television since yesterday evening.

This fact follows if we make one more assumption, which we need to make anyway, one would think:

Auxiliary modal *kunnen* is a stativizer.

The argument now goes as follows: *kunnen* in (51)-(55) takes an infinitive. The infinitive does not allow for an interpretation with null-internal perspective. In (51) the infinitive complement is stative, the modal allows both scope possibilities. In (56)-(57), however, the infinitive complement is **eventive**. We're dealing with continuous *since* which requires a **stative** complement. If we give the modal scope under the predicate that the *since* phrase adjoins to, it will turn the eventive predicate into a stative predicate, and the sentence is felicitous. If we insist on giving it wide scope, the sentence is infelicitous.

Turning things around, the interpretation possibilities of (54) and (55) support the infinitive restriction proposed.

Modal auxiliaries are stativizers, they are, for one thing, perfectly fine in the present:

(60) John may write a book.

Not all modals are stativizers, modal adverbials, for instance, are not:

- (61) #*Maybe* John writes a book.
 (62) #John *possibly* writes a book.

In the ideology of 1066 it is not enough to **declare** modals stativizers. The interpretation of a modal predicate must be able to be true at points, so it must denote a set of states, and it must get to denote a set of states by the meaning of the modal.

Now, we already have stativizing operations, perspectives. A natural assumption would then be that the semantics of auxiliary modals are modal perspective operators. [I don't mean by that that they are of the category *perspective*, but that their meaning is built from similar operations.]

We come to the tentative bit. I want to propose that a modal like *can* in English and *kunnen* in Dutch has **two kinds of interpretations**, and these interpretations relate to two kinds of perspective. The first interpretation I will call the **temporally transparent** interpretation, the second interpretation I will call the **temporally opaque** interpretation. On the temporally transparent interpretation, the modal incorporates a perspective which is, like present tense, an identity test:

$$can_{transparent} \rightarrow \lambda P \lambda s. \mathbf{pers}(s) \wedge \exists v \in MB_{\tau(s,w)}: \exists e \in P: \tau(e,v) = \tau(s,v)$$

$MB_{\tau(s,w)}$ is the modal base at $\tau(s,w)$.

[I have linked the modal base here to the running time of *s*. I assume it can also in principle be linked to **now**, but the distinction plays no role here.]

I am less sure about the exact nature of the perspective of the temporally non-transparent interpretation, but for concreteness I will assume it to be a **futurate perspective**, which is the converse of EXTERNAL:

$$can_{opaque} \rightarrow \lambda P \lambda s. \mathbf{pers}(s) \wedge \exists v \in MB_{\tau(s,w)}: \exists e \in P: \tau(e,v) > \tau(s,v)$$

What does this mean? Both $can_{transparent}$ and can_{opaque} are stativity operators in that they have a stative output. But $can_{transparent}$ requires a stative input as well. If $can_{transparent}$ occurs in the present, the effect is that 'the time of its complement' is equated with now (but in a different world). can_{opaque} is a true stativity operator, its complement can be stative or eventive, but when it occurs in the present the time of 'its complement' is set in a different world to later than now.

What we predict is the following: if the complement of *can* is **stative**, the sentence in the present **allows** for an interpretation where the complement is interpreted at now, but in a different world:

- (63) John can be in Amsterdam. (be in Amsterdam now)
 (64) John can be working at home. (be working at home now)
 (65) John can have written a book. (writing in the past of now)

But if the complement of *can* is **eventive**, the sentence does not have a transparent interpretation, but only an opaque interpretation (there is a world where a bookwriting event is realized after now):

(66) John can write a book (bookwriting after now)

What do we predict for Dutch? The complement of the modal is an infinitive, which doesn't allow a null-internal perspective. This means that, unlike in the case of the simple present without a modal, we expect to find exactly the same facts as in English. And that is the case:

(67) John kan in Amsterdam zijn. (the same)
 John can in Amsterdam be

(68) John kan thuis aan het werken zijn
 John can at home at the work be

(69) John kan thuis gewerkt hebben.
 John can at home worked have

but:

(70) John kan een boek schrijven
 John can a book write

(70) means the same as (66), it doesn't have a modal present progressive interpretation.

Importantly, we find the same contrast in the past:

While (71) and (72) can have the same interpretation, (73) and (74) cannot:

(71) Fred zwom
 Fred swam

(72) Fred was aan het zwemmen
 Fred was at the swim
 Fred was swimming

(73) Fred kon zwemmen
 Fred can[PAST] swim
 Fred could swim **past modality**

(74) Fred kon aan het zwemmen zijn
 Fred can[PAST] at the swim be
 Fred could be swimming

In (74) the time of the modality and of the swimming can be the same past time, (73) does have that interpretation, it has the same 'futurate' interpretation of the swimming with respect to the past modality time.

This is interesting because the modal is embedded under PAST and that means that the effect of the transparent identity check operation cannot be derived independently from

assertability conditions, So the stativity effects in these past cases support the identity check operation postulated. (The same holds for the stativity effects in the *when*-clauses in the simple past).

This is of course only the beginning of an analysis of modals, but it shows the moral of this talk: there is more to stativity and eventivity than meets the eye (especially in Dutch), and it is linguistically fruitful to try to sort out the effects of stativizing operators.