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硕 士 学 位 论 文

**Some Observations on the Form and Meaning of the
Perfect and *since*-adverbial**
论完成式和 *since* 副词短语的形与意

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Abstract

The first part of the thesis investigates some problems in Iatridou et al (2001)'s account of the perfect and summarizes three universal features of the perfect constructions in European languages. With cross-linguistic data, a revised version of Iatridou et al's proposal on the perfect is proposed. With the revised theory, the thesis explains many behaviors of the perfect constructions in English, French and German, especially the U-reading of perfect progressives in English and the functions of perfect-level universal quantifiers in English (*always*, *ever since*, *at least since*), French (*toujours*) and German (*schon immer*).

The second part mainly deals with the temporal adverbial *since α* . In this part, we probe into the problems in Dowty (1979), Mittwoch (1988) and IAI's analyses of *since*-adverbials. Borrowing Dowty (1979) and IAI's ideas of perfect-level adverbials and eventuality-level adverbials, we define two types of temporal adverbials, i.e. frame-level adverbials and eventuality-level adverbials. With various language data, we argue that *since*-adverbials introduce a time frame/interval in which eventuality is evaluated or through which eventuality is observed. We also find that universally speaking, *seit* in German, *depuis* in French, *desde* in Spanish and many others are frame-level adverbials. Thus the feature of frame-level adverbials is the universal feature of these groups of temporal phrases. Unlike its counterparts in other languages, *since* is quite unique, for it can be used only in perfect constructions, hence a perfect-level adverbial. Following IAI, we put *since*-adverbials between PERF operator and Asp operator. The last part of the chapter deals with the semantics of *since α* and aims at the resolution of the complex U/E-ambiguity. With empirical evidence, we reject Mittwoch (1988) and IAI's lexical ambiguity approach and α -inclusive and α -exclusive distinction. Comparing the situation at α and the situation

at u, we propose that the left end and right end of PTS in English is symmetrical and the PTS is on a sliding base on both ends. The semantic structure of *since*-adverbials is proposed at the end and an analysis in a new perspective on the complex U/E-ambiguity is put forward.

Key Words: Perfect, Tense and Aspect, Formal semantics, *Since α* , U/E-ambiguity

Classification Code: H03

摘 要

论文第一部分探讨了 Iatridou et al (2001)对于完成式分析的一些问题,并且总结了欧洲语言中完成式结构的三个普遍特征。通过对大量具体的跨语言数据的研究,本文基于 Iatridou et al (2001)的方案提出了一个修正版本。运用这个修正的理论,本文解释了英语、法语和德语中许多完成式结构的语言现象,特别是英语中完成进行时的全称解读现象和英语、法语、德语中各种完成式全称量词的功能,包括英语中的 *always*、*ever since*、*at least*, 法语中的 *toujours*, 和德语中的 *schon immer*。

论文第二部分主要研究时间副词短语 *since α* 。这个部分主要探讨了 Dowty (1979)、Mittwoch (1988)和 Iatridou et al (2001)对于 *since* 副词短语分析中的问题。在借鉴 Dowty (1979)和 Iatridou et al (2001)关于完成式层面副词短语和事件层面副词短语概念的基础上,本文分别定义了以下两种时间副词短语:框架层面副词短语和事件层面副词短语。通过具体的语言证据,本文指出 *since* 副词短语引入了评价或者观察事件的框架时间段。同时发现,普遍的来说,德语中的 *seit*, 发育中的 *depuis*, 西班牙语中的 *desde* 等都是框架层面副词短语。由此可以推知,框架层面副词短语是这一组时间短语的普遍特征。但是, *since* 和其他语言中的副词短语有点不一样,比较特别。因为他只能用在完成式结构中,因此是个完成式层面副词短语。按照 Iatridou (2001)的分析,本文认为 *since* 副词短语介于完成式算子和体算子之间。本章最后部分着手于解决 *since α* 的语义和复杂全称/存在歧义现象。通过实例,本文对 Mittwoch (1988)和 Iatridou et al (2001)提出的词汇歧异法以及 α 包含和 α 去除的区别提出了不同的看法。通过对比完成式在 *u* 上和 *在 α 上* 的情况,本文提出英语中的完成式时间段的左右端对称,并且都处于滑动状态。本章最后部分提出了 *since* 副词短语的语义,并且对复杂全称/存在歧义现象进行了深入的分析。

关键词： 完成式，时体，时态逻辑，形式语义，从 α 以来，全称/存在歧义

中图分类号： H03

Chapter One

The Perfect: Phenomena and Theories

Along with the development of semantics, the English perfect construction has attracted much attention from numerous scholars in the field. Its function resembles in many ways those of tense and aspect, but its semantics differs much from them. For example, the present perfect is somewhat similar to simple past, for they both describe an event or a state which happened or held prior to NOW. So, some semanticists propose that the perfect construction expresses a kind of anteriority which simply means occurrence before NOW or the utterance time (henceforth *u*). However, this kind of proposal cannot distinguish the present perfect from the simple past which also describes a past eventuality or state. It is on the basis of the differences between simple past and the present perfect that semanticists have been pursuing the semantics of perfect.

1.1 Two proposals on the perfect: Reichenbach (1947) and Dowty (1979)

In the literature, there are two major theories of the Perfect, namely Anteriority theory and Extended-Now theory. The first theory is propounded by Reichenbach in his well-known book *Elements of Symbolic Logic*. Reichenbach (1947) introduces three parameters to analyze the English temporal system, i.e. Event Time (E), Reference Time (R) and Speech Time (S). He ascribes tense to the relation between R and S: R—S stands for past, R, S stands for present, and S—R stands for future. “The position of E relative to R is indicated by the words ‘anterior’, ‘simple’, and ‘posterior’” (Reichenbach, 1947: 296). In his theory, the perfect is to express temporal anteriority, i.e. E—R.

However, there are still many problems in his theory, the most serious of which is that he cannot account for the progressive.

In Reichenbach’s framework, simple present and present progressive have the same temporal schema, i.e. E, R, S. But, intuitively speaking, they are quite different. The main problem here is that Reichenbach (1947) treats the three temporal parameters as time points but not intervals.

The other theory was established by Dowty (1979) in the framework of Montague Grammar, which is called Extended-Now theory (henceforth XN theory). The main idea of the theory is that the (present) perfect denotes an interval of time which starts from sometime in the past and ends at speech time, and the event time is located somewhere in this interval. Dowty treats the perfect as an “extended now” operator XN, which is defined as follows:

XN-Perfect:

$$\| \text{XN - PERF} \| = \lambda P \in D_{it}. \lambda i \in D_i. \exists i' \in D_i. [\text{XN}(i', i) \ \& \ P(i')] \quad ,$$

where $\text{XN}(i', i)$ means that i is a final subinterval of i' . (1979: p.342; qtd. in Alexiadou et al., 2001: p.8)

In his theory, there are also three times involved, namely i' (the event time), i (the frame time) and j (the evaluation time), which are very similar to the notions used by Reichenbach (1947)¹. However, there is a fundamental difference between these two sets of temporal notions: Dowty treats his times as intervals, while Reichenbach sees them as moments of time. Unlike Reichenbach’s theory, Dowty’s interval temporal logic can easily explain the difference between the progressive and the simple form. The progressive means that $\lambda j \in D_i. \exists i' \in D_i. i' \supseteq j$, while the simple form expresses $\lambda j \in D_i. \exists i' \in D_i. i' \subseteq j$.

1.2 Tense or aspect?

Besides the meaning of the perfect, the place of the perfect in grammar is also puzzling and controversial. Is it a kind of tense? A kind of aspect? Or something different from tense and aspect? Huddleston (1970) and McCawley (1971) believe that “the perfect is a past tense embedded within the scope of another tense, a kind of relative tense” (Binnick, 1991: p.264). Some have proposed ID (Indefinite Past) theory and CR theory (Current Relevance), in which “the meaning of the perfect is precisely that of the preterite” (ibid.; p.264). The ID theory emphasizes that the difference between the perfect and the past lies only on the condition of time they talk about: whether the time is definite or not. In the CR theory, the perfect is treated as semantic past plus certain pragmatic conditions. Traditionally speaking, the perfect is ascribed under aspect: “[t]he perfect is said to describe (or focus on) a state that follows from a prior eventuality (Parsons 1990, Vlach 1993, Girgi&Pianesi 1998 and others).” (Iatridou et al., 2001: p.154) Opposing to the aforementioned views, Comrie

¹ In the case of present perfect, i' is similar to E, i to S, j to R.

(1976) points out that “[t]he perfect is rather different from these aspects [perfective and imperfective], since it tells us nothing directly about the situation in itself, but rather relates some state to a preceding situation” (p.52).

Despite the controversy so far, most semanticists nowadays have admitted that the perfect is a structure quite different from either tense or aspect. Tense relates the time relative to the event or the situation to the utterance time. So, generally speaking, there are three tenses: past (prior to *u*), present (simultaneous with *u*) and future (posterior to *u*)². Aspects, on the other hand, “are different ways of viewing the internal temporal constituency of a situation” (ibid., p.3). According to Comrie (1976), there are mainly two aspects, namely perfective and imperfective. Smith (1997) further divides aspects into two categories: situation aspect (*aktionsart*) and viewpoint aspect. Comrie’s aspects belong to the second category. According to XN theory, the perfect provides a temporal interval where the time of situation locates and this kind of function matches neither tense nor aspect.

Furthermore, in English, the perfect is expressed through the use of auxiliary *have*. (1) and (2) have the same tense, i.e. the present, but they are different:

(1) Tony walks to school.

(2) Tony has walked to school.

Tense in English can be shown from the inflection of the main verb or some auxiliaries. *Has* in (2) is the combination of the present tense and the perfect. On the other hand, the progressive is a kind of imperfective, which is also different from the perfect in syntax. The progressive is realized by *been walking* in (3).

(3) Tony has been walking to school.

Thus, syntactically speaking, the perfect is different from either tense or aspect.

Based on the above semantic and syntactic facts, Iatridou et al. (2001) (henceforth IAI) proposes that the perfect is also a functional head and constructs a new architecture of Tense Phrase in syntax. According to the grammar of English, we can generalize the order of functional heads in TP as follows:

Tense > Perfect > Aspect > VP (Alexiadou et al., p.viii)

The hierarchy “is accepted by most researchers and thought of as being present across languages” (ibid.). We can draw a tree structure of (3) within such a framework:

² There are some controversies over whether future is a tense or a modal among many scholars. However, in this thesis I will not go any further into the issue and simply treat future as a tense.

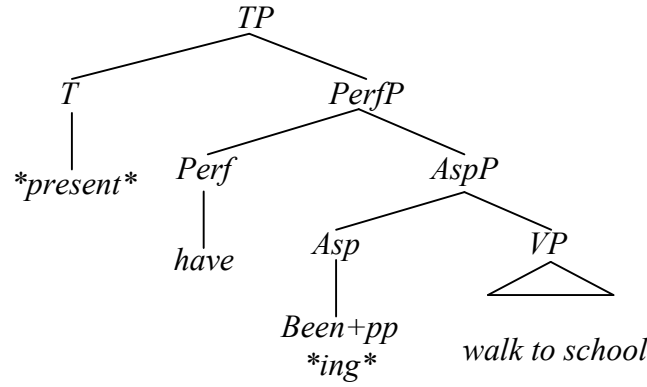


Figure 1. A New TP structure

Apart from the syntax, IAI also properly describes the semantics of the perfect:

- The Perfect introduces a time interval: the “perfect time span” (PTS).
- The Right Boundary (RB) of the PTS is set by Tense.
- The Left Boundary (LB) of the PTS may be set by “perfect adverbials”.
- The lower predicate (event) is predicated of the PTS, either directly or mediated by various devices, most notably operators associated with the Perfective or Imperfective. (Fintel & Iatridou, 2005: p.1)

Later, Fintel & Iatridou (2005) gives a comprehensive and compositional semantic account of fig. 1.

- Tense:
 - $^u\llbracket \text{PRES } \phi \rrbracket^t = 1$ iff $^u\llbracket \phi \rrbracket^u = 1$.
 - $^u\llbracket \text{PAST } \phi \rrbracket^t = 1$ iff $\exists t' < u: ^u\llbracket \phi \rrbracket^{t'} = 1$.
- Aspect:
 - $^u\llbracket \text{PRF } \phi \rrbracket^t = 1$ iff $\exists t' \subseteq t: ^u\llbracket \phi \rrbracket^{t'} = 1$.
 - $^u\llbracket \text{IMP } \phi \rrbracket^t = 1$ iff $\exists t' \supseteq t: ^u\llbracket \phi \rrbracket^{t'} = 1$.
- The Perfect:
 - $^u\llbracket \text{PERF } \phi \rrbracket^t = 1$ iff $\exists t': RB(t, t')$ and $^u\llbracket \phi \rrbracket^{t'} = 1$.
 - $RB(t, t') - t$ is the Right Boundary of t' – iff $t \cap t' \neq \emptyset$ and $\exists t'' \subseteq t: t' \leq t''$. (p.3-4)
 - $^u\llbracket \text{since 1990 } \phi \rrbracket^t = 1$ iff $LB(1990, t)$ and $^u\llbracket \phi \rrbracket^t = 1$.
 - $LB(t, t') - t$ is the Left Boundary of t' – iff $t \cap t' \neq \emptyset$ and $\exists t'' \subseteq t: t' \geq t''$. (p.3-4)

The following example illustrates Fintel&Iatridou (2005)’s proposal:

(4) (=3)) Tony has been walking to school.

[_{TP} PRES [PERF [_{AspP} IMP [_{VP} Tony walk to school]]]]

$\exists t: RB(u, t)$ and $\exists t' \supseteq t: \text{Tony walk to school at } t'$.

Under this framework, semanticists can explain the famous Universal/Existential-Perfect Reading which I will address in the following section.

1.3 U-Perfect and E-Perfect

In the literature, scholars have identified three major interpretations of the present perfect:

- (5) Since 2000, Alexandra has lived in LA. UNIVERSAL
 - (6) Alexandra has been in LA (before). EXPERIENTIAL
 - (7) Alexandra has (just) arrived in LA. RESULTATIVE
- (Pancheva, 2001: p.277)

Pancheva (2001) explains the three kinds of present perfect interpretations as follows:

The UNIVERSAL perfect... asserts that the underlying eventuality holds throughout an interval, delimited by the time of utterance and a certain time in the past (in this case, the year 2000). The EXPERIENTIAL perfect... asserts that the underlying eventuality holds at a proper subset of an interval, extending back from the utterance time. The RESULTATIVE perfect makes the same assertion as the Experiential perfect, with the added meaning that the result of the underlying eventuality (be in LA is the result of arrive in LA) holds at the utterance time. The distinction between the Experiential and the Resultative perfects is rather subtle. The two are commonly grouped together as the EXISTENTIAL perfect (McCawley 1971, Mittwoch 1988). (p.1)

As to EXPERIENTIAL and RESULTATIVE perfects, scholars commonly group them as the EXISTENTIAL perfect, for there is subtle distinction between them (McCawley 1971, Mittwoch 1988, Pancheva 2001 and others). In summary, there are mainly two kinds of perfect interpretations, namely U-Perfect (Universal-Perfect) reading and E-Perfect (Existential-Perfect) reading. U-Perfect reading suggests that the eventuality in the perfect construction holds throughout the PTS, while E-Perfect reading suggests that the eventuality occurs somewhere within the PTS. The U/E-Perfect reading can be found even in the same sentence:

(8) John has slept for an hour.

a) U-Perfect reading: the hour of John's sleeping is *immediately before now*.

b) E-Perfect reading: the hour of John's sleeping is *somewhere in the past of now*.

(Rathert, 2001: p.367)

Though we can properly identify the U/E-Perfect by intuition, the mechanism behind them remains unclear.

Another U/E-ambiguity involves the temporal adverb *since*. Even when we use the same since-adverbials, we can get different readings:

(9) Tony has been ill since Tuesday. (U-Perfect)

(10) Tony has been to Rome since Tuesday. (E-Perfect)

In order to uncover the hidden mechanism, IAI (2001) proposes that the U/E-Perfect ambiguity is determined both by the adverb *since* (we will come to this part in Chapter 2) and by viewpoint aspect and aktionsart, i.e. AspP and VP below PerfP (cf. 174-6). In order to distinguish the different roles viewpoint aspect and aktionsart play, IAI introduces a feature [\pm bounded]:

Telics and activities (i.e. nonstatives) can carry either progressive or nonprogressive morphology, the choice between the two corresponding to unbounded versus bounded interpretation...

Statives can be either [bounded] or [unbounded]... (2001: p.175)

To be specific, the four aktionsarts proposed by Vendler (1957) are divided into two groups, nonstatives and statives. The former includes activity, accomplishment and achievement. Both of the two groups of verbs can have either [+bounded] or [-bounded] feature, which results in the morphological differences:

- | | | |
|----|-------------------------|----------------------------|
| a. | nonstative, [unbounded] | → progressive |
| b. | nonstative, [bounded] | } → nonprogressive (ibid.) |
| c. | stative, [unbounded] | |
| d. | stative, [bounded] | |

Based on the eventuality distribution, IAI prescribes the meaning of the perfect as follows:

There is an interval (the perfect time span) in/throughout which there is a bounded/unbounded eventuality.

- | | | | |
|----|------------------|--------------|------------------------|
| a. | ...throughout... | unbounded | → universal perfect |
| b. | ...in... | unbounded... | → experiential perfect |
| c. | ...in... | bounded... | → experiential perfect |

- d. ...throughout... bounded... → depends on Aktionsart
(2001: p.175-6)

1.4 Imperfection of IAI's proposal on the perfect

However, IAI's proposal of the perfect is not without a problem.

IAI contends that "the U-perfect asserts that the underlying eventuality holds throughout the interval specified by the adverbial and at its endpoints" (2001: p.158). That is to say, the PTS includes the RB which in the case of the present perfect is u. They support the argument by the following sentences:

(11)*She has been sick at least/ever since 1990 but she is fine now.

(12)*She has always lived here but she doesn't anymore.

They even use this kind of data to determine whether a perfect is U-Perfect or E-Perfect: if the eventuality in the perfect holds uncanceledly at u, it should be U-Perfect (henceforth IAI's U/E-Perfect distinction criterion). However, this kind of assertion is specious. Let's see (13) and (14),

(13)Tony has been sick, and he still is: that's why he is absent.

(14)Tony has been sick, but he is fine now.

According to (13) and (14), both u-inclusive and u-exclusive readings are ok to the U-Perfect. It follows that whether u is included in *Tony has been sick* or not is open to pragmatic criteria and temporal anaphors in discourse (for example *lately*, see following discussion). But IAI denies such an analysis: they see (13) and (14) as unmodified perfects, i.e. perfects without certain adverbials like *for* and *since*. They suggest (15) is the same as (16) as far as the interpretation of the perfect is concerned:

(15)Tony has been sick.

(16)Tony has been sick lately.

According to them, (16) says nothing about Tony's health condition at present:

(17)Tony has been sick *lately*, but I don't know how he is now.

In short, there is a covert *lately* in unmodified perfects. Further, comparing it with Bulgarian cases, they argue that the eventuality in (16) does not include u and thus is not a U-perfect, neither are unmodified perfects.

But, how can IAI justify that (15) equals to (16)? IAI actually equals the unmodified perfect to a modified perfect to prove that unmodified perfects exclude u, which is very dubious in the line of reasoning. Meanwhile, the PTS of (15) is unspecific, there is no overt LB. Semantically speaking, the LB of (15) can be any

time prior to u:

(18) Tony has been sick since the time when he was born.

(19) Tony has been sick since last summer.

But according to OED, *lately* in (16) means “not long since; within a short time past; within recent times; recently, of late” (“lately”, def. 3) which is in a sense of recent past and different from the interval introduced in (18) and (19). So (16) is just one case or a possible interpretation of (15), i.e. we can say (16) entails (15). In this sense, we cannot identify (16) with (15).

Even when we concede to accept the assertion that (15) is the same as (16), IAI’s analysis is still not correct. As being noted earlier, IAI believes that *lately* is only a perfect-level adverb: “[i]n the English, this adverbial (*lately*) must take the present perfect” (2001: p.162); “the adverb *lately* takes the present perfect only” (2001: p.192, Note 18). However, this stipulation is wrong, for we can happily use *lately* in constructions other than the perfect:

(20) One of your tenants, whose mother is lately dead. (“lately”)

(20) suggests that *lately* can introduce a time span which surrounds u and encompasses it. Meanwhile, after consulting native speakers, I find that the interval introduced by *lately* must include the utterance time:

(21) ??I was busy lately.

This view is shared by Michaelis (1998):

Like the since-adverbial construction, *lately* requires that the upper boundary be fixed by a reference time equated with speech time.

Hence, preterite-form sentences like (a) are anomalous:

(a) *He was acting odd lately. (p.275, Note 9)³

With the above facts, the continuative reading of VP *be sick* should remain intact throughout the u-inclusion PTS introduced by Perfect and *lately*, which results in a perfect U-Perfect under the definition of U-Perfect I have mentioned in the introduction part, though the rendering of the U-Perfect reading is not in accordance with IAI’s U/E distinction criterion. What’s more, Michaelis (1998) also believes a sentence like (16) is U-Perfect rather than E-Perfect:

The adverb *lately*, however, differs from *recently* and the since-adverbial in that it is compatible only with the continuative

³ I do find some sentences use *lately* in past tense, e.g. *he lately moved into a new house*. The adverb *lately* in such sentences does not introduce a time span up to the utterance time. Instead, it only indicates a time point prior to u, which is similar to the temporal adverb *bujiu qian* in Chinese. And the adverb *lately* in (16) and (20) is similar to the temporal adverb *jintai* in Chinese.

PrP... *lately* does not co-occur with the existential PrP, in which an event type is instantiated WITHIN rather than THROUGHOUT the present-inclusive interval. (ibid., Note 8)

From these we can see IAI's U/E distinction is so strong a rule that excludes many other potential U-Perfect sentences.

Another thing IAI argues for is that "the perfect of the progressive in isolation does not have the U-Perfect reading" (2001: p.162). This contention is opposite to Vlach (1993) which holds that the perfect of the progressive only has U-reading (cf. IAI, 2001: p.162). To IAI, (22) is not a U-Perfect,

(22) I have been cooking.

For "nothing is asserted about the utterance time (the sentence can be continued by *but I'm done now*).” (IAI, 2001: p.162) That is to say, the unmodified perfect progressive does not have the U-Perfect reading but only the E-Perfect reading. However, we find it hard to figure out an E-Perfect reading for (22) under the framework of IAI and Fintel & Iatridou (2005). However, we can have the following syntactic and semantic structures for it:

(23) [TP PRES [PERF [AspP IMP [VP I cook]]]]

(24) $\exists t: RB(u, t)$ and $\exists t' \supseteq t: I \text{ cook at } t'$.

The perfect provides the sentence with an RB of u , i.e. $t = \dots u$] in terms of interval notation in mathematics. As the progressive means $\exists t' \supseteq t$, we can calculate that:

$$\left. \begin{array}{l} \text{Present Perfect: } u \text{ is the RB of } t \Rightarrow u \subset t \\ \text{Progressive: } \exists t' \supseteq t \end{array} \right\} \Rightarrow \exists t' \supset u \Rightarrow {}^u \llbracket \phi \rrbracket^u = 1$$

$${}^u \llbracket \phi \rrbracket^{t'} = 1$$

Figure 2. Semantic calculation of u-inclusion reading of the unmodified present perfect progressive

The result shows that the eventuality described in (22) holds at u , which means that, according to IAI's U/E distinction criterion, (22) is a U-Perfect. The above calculation can also prove that under the framework of IAI and Fintel & Iatridou (2005), all the present perfect progressives are U-Perfect. Of course, the result is contrary to IAI's assertion that the unmodified perfect progressive does not have the U-Perfect reading.

Moreover, concerning the adverb *for*, it is ambiguous between a perfect-level adverb and an eventuality-level adverb. We can coerce *for* into a perfect-level adverb

in the following context:

(25) Tony moved here 2 years ago. He has lived here for 2 years.

Obviously, the perfect in (25) is a U-Perfect where Tony's living here holds throughout the past 2 years. According to IAI's U/E distinction criterion, Tony's living here should be uncanceled at NOW. But, IAI's prediction is wrong; we can say (26) without difficulty.

(26) Tony moved here 2 years ago. He has lived here for 2 years before he moves out.

Though Tony's living here is not achievable at NOW in (26), the perfect is inevitably a U-Perfect, according to the original definition of U-Perfect.

Meanwhile, the E-Perfect requires a proper inclusion, i.e. $\exists t' \subset t$. But how can this condition be reflected in syntax and semantics? This condition should not be a part of TENSE, PERFP or AspP. IAI attributes it to the ambiguous readings of perfect-level adverbs. They suggest perfect-level adverbials are ambiguous between "durative" and "inclusive":

If the perfect-level adverb is durative, the underlying predicate must hold of every subinterval of the perfect time span (universal quantification over the points of the interval); that is, the perfect time span must be "filled up" with a homogeneous predicate. On a durative interpretation, since LB and RB belong to the perfect time span, the predicate holds of them too. This is how the U-perfect is derived.

If the perfect-level adverbial is inclusive, then the perfect sentence asserts that a particular eventuality is properly included in the perfect time span (existential quantification over the points of the interval). This is how the E-perfect is derived. (2001: p.164)

However, this kind of treatment is quite perplexing and confusing. For example, in such a framework there are at least 3 types of *for*-adverb: eventuality-level *for*, durative perfect-level *for*; inclusive perfect-level *for*. And according to this theory, there should always be a covert perfect level adverb imposing the condition of $\exists t' \subset t$ on the semantics of unmodified perfects, which no evidence can prove.

Again, for unmodified perfects like the following, as I have mentioned earlier, IAI contends that they are never U-Perfects:

(27) I have lived in London.

For (27) has two interpretations, i.e. according to IAI's U/E-Perfect distinction criterion, (27) is cancelable at *u*, hence an E-Perfect:

(28) I have lived in London and I still do. (*u*-inclusive)

(29) I have lived in London before. (*u*-exclusive)

But, later in IAI's section 3.4.4, they acknowledge that the meaning of completion derives from features below the perfect, i.e. AspP, not from the perfect itself or perfect-level adverbials. They also admit that the cases of statives in English can be U-Perfect (175-6). A reasonable conclusion from this part is that in fact unmodified perfects with statives can be U-Perfects, which is inconsistent with their former assertion that unmodified perfects can never be U-Perfects.

From this we can see unmodified perfects with statives are ambiguous between U-Perfect and E-Perfect. This view is well in accordance with IAI's analysis of the [\pm bounded] features of statives in English. As suggested by them, the stative *live* in (28) is a stative with the feature [-bounded], while the one in (29) is a stative with [+bounded]. Thus, the different interpretations of (28) and (29), are contributed by syntactico-semantic features of the stative.

Furthermore, IAI's proposal on the perfect cannot apply to the perfect constructions in other languages.

1.5 The perfect universals

In many European languages, we find various constructions very similar to the perfect in English, e.g.:

Passé Composé in French:

(30) Jean a été malade.

"Jean has been sick."

(31) Je l'ai toujours aimé.

"I have always loved him."

Perfekt in German:

(32) Ich habe hier gewohnt.

"I have lived here."

(33) Ich habe hier schon immer gewohnt (bis vor kurzen).

"I have always lived here (until recently)." (Iatridou et al., 2001: p. 190)

Pretérito Perfecto in Spanish:

(34) Ha vivido en Londres, ahora vive en Berlín.

“He has lived in London, but now he lives in Berlin.”

(35) Siempre ha vivido en Londres.

“He has always lived in London.”

Perfect tense in Swedish:

(36) Vi har alltid rest till Spanien förr, men nu föredrar vi Grekland.

“We have always gone to Spain before, but now we prefer Greece.”

(Holmes&Hinchliffe, 2008: p. 126)

(37) De har varit gifta i många år.

“They have been married for many years.” (ibid., p. 127)

Perfect tense in Danish:

(38) Jeg har boet i Birkerød i ti år (og bor der endnu).

“I have lived in Birkerød for ten years (and still live there).”

(39) Jeg har boet i Birkerød (på et tidspunkt, men bor der ikke længere).

“I lived in Birkerød (at some stage but don't live there any longer).” (Allan et al., 2000: p. 92)

Other examples of the perfect construction can be found in Dutch, Portuguese, Bulgarian, Macedonian, Italian, and Romanian and so on. Though many scholars today argue that the so-called “perfect tense” in these languages are different constructions from the perfect in English, especially the perfect tense in Latin and NT Greek, and compound past in Romance languages, having studied various usages of these perfect constructions, I find three common characteristics of them:

- a. Describing past events. All these constructions describe events which happen/are initiated in the past.
- b. U-aboutness (utterance time-aboutness). All these constructions (at least some usages of some constructions, e.g. perfect in OT Hebrew and NT Greek) relate the described events in the past to u, either positively (including u) or negatively (excluding u).
- c. Introducing a time interval. All these constructions introduce a time interval in or throughout which an eventuality holds. IAI calls such an interval the perfect time span (PTS).

These three characteristics are what I call the universal features of perfect constructions. In this sense, though the perfect constructions in European languages have many different functions, e.g. the perfects in Danish, NT Greek and Swedish can

express future activities and states, they share some fundamental functions. Dowty (1979)'s XN-Theory and IAI's revised version formalize the three universal features of the perfect as I have reviewed in previous sections. But their proposals are not well applicable to the perfect constructions in other European languages.

According to Dowty (1979), *i'* (=PTS) semantically includes *u* in the present perfect, for *u* is a final subinterval of *i'*. And in IAI's proposal, universal quantifier *always* means “‘throughout the perfect time span’; that is, there is a universal quantification over the points of the perfect time span, therefore including the boundaries” (168). Accordingly, if we combine the perfect with the perfect-level adverbial *always*, we would inevitably get a U-Perfect where the eventuality described still holds at *u*, hence the ungrammaticality of (12) in English. However, if we apply the same analysis to phenomena in other European languages, we will be mistaken: according to Dowty (1979) and IAI's theories, (33) in German and (36) in Swedish should be ungrammatical. However, these two examples actually stand as grammatical. If the PTS in German and Swedish also semantically include *u*, the universal quantifier *schon immer* and *alltid* will inevitably render the eventualities described to be held throughout the PTS, thus the eventualities will semantically be held at *u* which is a part of the PTS.

Chapter Two

A New Proposal for the Perfect

2.1 A revised theory for the perfect

To solve the aforementioned problems, it's necessary to revise IAI's proposal for the perfect.

In the literature, as acknowledged by many scholars, U-Perfect and E-Perfect are two universal types of perfect construction (McCawley 1971, Mittwoch 1988, Pancheva 2001). But U-Perfects in different languages have distinctive behaviors: some of them semantically hold the described eventualities at *u*, e.g. U-Perfects in English and French; others excludes *u*, e.g. those in German and Swedish. Moreover, as noted earlier, the relation of the perfect to *u* is a universal feature of the perfect, i.e. the PTSs in different languages can include or exclude *u* depending on language-specific parameters. If the PTS in a language excludes *u*, there are still U-Perfects in such a language, e.g. (33) in German. So it is not sufficient to distinguish U/E-Perfects by the criterion of *u*-inclusion or *u*-exclusion, i.e. IAI's U/E-Perfect distinction criterion. As far as I'm concerned, PTS has a direct relation with *u*, and U/E-Perfect has a direct relation with PTS. With this view, I propose the following definitions of U/E-Perfect:

(40) U-Perfect: $\forall t_2 \in t: t_2 \in t' \Rightarrow t' \supseteq t$

(41) E-Perfect: $\exists t_2 \subseteq t: t_2 \supset t' \Rightarrow t' \subset t$

To be specific, if the event time (*t'*) is included somewhere within the PTS (*t*), the perfect will be E-Perfect. If the event time includes the PTS, the perfect will be U-Perfect.

Anyhow, with the above definitions, we are still unable to give a comprehensive explanation for the different behaviors of German U-Perfect and English U-Perfect, for we have not yet defined the relation of *u* and PTS.

IAI argues that PTS semantically includes *u* as its Right Boundary (RB). But it is unlikely the same as cases in German. In German, the eventuality described by a perfect with a universal quantifier (*schon immer* in (33)), i.e. a U-Perfect, over the points of the PTS can be canceled at *u*. That is to say, semantically speaking, *u* is not a point of PTS, otherwise the eventuality should hold at *u*. This view is shared by Von

Stechow (1999) who also argues that “in German, the Universal perfect does not assert that the utterance time is included in the underlying eventuality” (qtd. in IAI: p. 190, note 10). A similar analysis can be applied to Dutch and Swedish.

What about the PTS in English? Is it the same as what IAI has proposed, i.e. the PTS includes *u*? (12) in English shows that, unlike German, the U-Perfect in English seems to be *u*-inclusive. Nonetheless, if the PTS in English includes *u*, it is difficult to explain the perfect progressive like the following (42):

(42) I have been cooking. But I’m done now.

According to IAI’s analysis, (42) should be an E-Perfect. However, the compositional analysis of the present perfect progressive, shown in fig. 2, has proved that under the framework of IAI, such an E-reading could never be rendered. In my point of view, (42) is actually a U-Perfect rather than an E-Perfect. This kind of usage of the present perfect progressive is not uncommon in English. As Hewings (1999) notes, “[t]he situation or activity (described by the present perfect progressive) may still be going on, or it may just have stopped” (p.14). That is to say the truth of ${}^u[\phi]$ in the present perfect progressive can be either 0 or 1, or to be short, the truth of ${}^u[\phi]$ in the present perfect progressive is unclear. When ${}^u[\phi]=0$, as the case in (42), it seems that the use of present perfect progressive is similar to the Resultative reading of the present perfect, e.g. (7). However, it is not true. Comparing (42) with (43), I find that (42) is not a case of Resultative reading.

(43) I have (just) cooked.

(43) suggests that there is a time when I did cooking but this time did not last as long as the interval where I evaluate the eventuality. However, (42) suggests a quite different meaning: from the beginning of the interval where I evaluate the eventuality until the moment just before the utterance time, I did cooking continuously. From the comparison of (42) and (43), we can easily figure out that (42) has a continuative reading while (43) has an E-reading. If the PTS can exclude *u*, the continuative reading of (42) will turn out to be a U-reading, which is in accordance with my suggestion.

In view of the above analyses, the PTS in English can either include or exclude *u*, i.e. the PTS in English is on a sliding base which can both include and exclude *u*. Analyzing the perfect constructions in other European languages, we find that in some languages like Danish, French, Spanish and Portuguese, the PTSs act similarly to that in English; while in some other languages like Dutch and Swedish,

the PTSs semantically exclude *u*. Generally speaking, the universal feature of the PTS in languages is that, semantically and pragmatically speaking, it is on a sliding base between *u*-inclusion and *u*-exclusion.

In order to formalize this universal feature of the PTS and to propose a revised theory of IAI's, I would like to introduce a mathematical operator: *sup*(S).

Def.: “In mathematics, given a subset *S* of a partially ordered set *T*, the supremum (*sup*) of *S*, if it exists, is the least element of *T* that is greater than or equal to each element of *S*” (“Supremum”)

To be specific, the supremums of intervals (*a*, *b*) and [*a*, *b*] are both *b*. In terms of the universal feature of the present perfect, I propose that *u* is the supremum of the partially ordered time interval set PTS, i.e. $u = \text{sup}(\text{PTS})$.

Now I redefine the semantics of the perfect as follows:

$$(44) {}^u\llbracket \text{PERF } \phi \rrbracket^t = 1 \text{ iff } \exists t' : t = \text{sup}(t') \text{ and } {}^u\llbracket \phi \rrbracket^{t'} = 1$$

$$(45) t = \text{sup}(t') - t \text{ is the supremum of } t' - \text{ iff } \bar{t} = t' \cup t, \bar{t} \text{ is a continuum of interval and } \exists t_1 \in t, \forall t_0 \in t' : t_0 \leq t_1$$

The actual length of *t'* (=PTS) is subject to specific language parameters. For example, in German, the PTS is semantically *u*-exclusive, which I use $t = \text{sup}_{\text{ex}}(t')$ to represent. In French and English, the PTSs are on a sliding base, i.e. they can be either *u*-inclusive or *u*-exclusive⁴.

With the revised proposal, we can easily illustrate the two different *U*-readings of the present perfect progressive like (22): *u*-inclusive and *u*-exclusive.

$$(46)(=23) [\text{TP PRES} [\text{PERF} [\text{AspP IMP} [\text{VP I cook}]]]]$$

$$(47) \exists t : u = \text{sup}(t) \text{ and } \exists t' \supseteq t : \text{I cook at } t'.$$

From (47) we can see that the semantics of the imperfective (progressive) aspect ensures $t' \supseteq t$, which accords perfectly with the definition of *U*-Perfect in (40). Thus all present perfect progressive are *U*-Perfects.

The *u*-exclusive reading is available only when PTS excludes *u*, i.e. $u \cap t = \emptyset$, and $\neg \exists t_2 \in t' : t_2 > t$:

$$\left. \begin{aligned} u \cap t = \emptyset &\Leftrightarrow \forall t_1 \in u, \forall t_0 \in t : t_0 < t_1 \text{ or } t_0 > t_1 \\ u = \text{sup}(t) &\Leftrightarrow \bar{t} = t' \cup t, \bar{t} \text{ is a continuum of interval and } \exists t_1 \in t, \forall t_0 \in t' : t_0 \leq t_1 \end{aligned} \right\}$$

$$\Rightarrow \forall t_1 \in u, \forall t_0 \in t : t_0 < t_1$$

$$\left. \begin{aligned} \exists t' \supseteq t, \neg \exists t_2 \in t' : t_2 > t &\Leftrightarrow \exists t' \supseteq t, \exists t_0 \in t, \forall t_2 \in t' : t_2 \leq t_0 \end{aligned} \right\}$$

⁴ It should be noted again that whether the PTS is *u*-inclusive or *u*-exclusive has nothing to do with *U*/*E*-Perfect, e.g. if the PTS is *u*-exclusive, the perfect can still be a *U*-Perfect.

$$\Rightarrow \left. \begin{array}{l} \forall t_1 \in u, \forall t_2 \in t': t_2 < t_1 \Leftrightarrow t' < u \\ {}^u\llbracket \phi \rrbracket^{t'} = 1 \end{array} \right\} \Rightarrow {}^u\llbracket \phi \rrbracket^u = 0$$

Figure 3. Semantic calculation of u-exclusive reading of (22)

The u-exclusive reading is illustrated as follows:

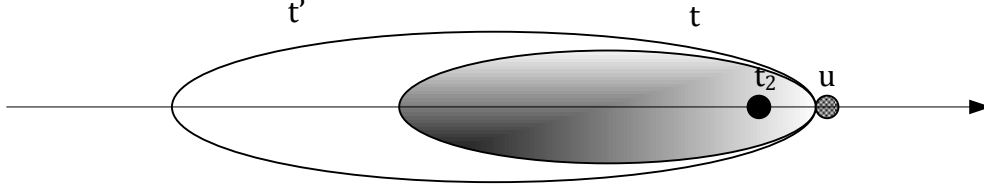


Figure 4. Illustration for u-exclusive reading of (22)

From fig. 4 we can see that either t' expands rightward or t (PTS) slides to include u will inevitably render t' to intersect or include u , hence a u-inclusive reading: ${}^u\llbracket \phi \rrbracket^u = 1$. This u-exclusive interpretation of (22) shown in fig. 4 can be found in (42).

2.2 The perfect-level adverbials: universal quantifiers

Another thing I want to address is the function of some universal perfect-level adverbials, such as *always*, *ever since* and *at least since* in English, *toujours* in French, and *schon immer* in German.

First of all, let's look at the function of *schon immer* in German. As proposed by IAI, a perfect-level adverbial like *always* introduces a universal quantifier over the points of PTS (168). The universal quantifier *schon immer* in German has the same function, which ensures that $\forall t_0 \in t: {}^u\llbracket \phi \rrbracket^{t_0} = 1 \Leftrightarrow {}^u\llbracket \phi \rrbracket^t = 1$. As the PTS in German semantically excludes u , the truth of eventuality in (33) at u is uncertain.

However, the cases in English are quite different. (28) in English has two interpretations: a U-reading and an E-reading. If we insert the universal quantifier *always* into it and get (48), we can only obtain a U-Perfect:

(48) I have *always* lived in London.

Thus (12) is ungrammatical. In the revised proposal of IAI, the PTS in English is on a sliding base from excluding u to including u . But after adding *always*, the PTS tends to include u . Other perfect-level adverbials like *at least/ever since* can also lead to the same phenomena, cf. (11). If the function of perfect-level universal quantifiers is the same as that of *schon immer* in German which merely introduces a universal quantifier over the points of PTS, (48) should be ambiguous between u-inclusive and u-exclusive, for the PTS in English can either include or exclude u . So the

perfect-level universal quantifiers have more functions than *schon immer* does.

Inspired by the lexical meaning of *at least* which expresses a mathematical relation of “ \geq ”, I think these perfect-level adverbials can expand the range of the modified time set, i.e. PTS. So, I propose that the perfect-level universal quantifiers in English have two functions:

- a. To introduce a universal quantifier over PTS;
- b. To maximize the PTS.

The semantics of *always* would be:

$$(49) \text{Always: } \forall t_2 \in t: t_2 \in t' \& \bar{t} = \text{Max}(t)$$

$$(50) t \text{ has Max}(t) \text{ iff } \exists t = t \cup u$$

With the proposed semantics of *always* and the revised theory of IAI, we can give a full compositional analysis of (48)’s semantic u-inclusive reading.

$$(51) [\text{TP PRES } [\text{PERF always } [\text{AspP PRF } [\text{VP I live in London }]]]]$$

$$(52) \exists t: u = \text{sup}(t), \exists t' \subseteq t \text{ and } \forall t_2 \in t: t_2 \in t', \bar{t} = \text{Max}(t) = t \cup u: \text{I live in London at } t'.$$

$$\left. \begin{array}{l} \exists t' \subseteq t \\ \forall t_2 \in t: t_2 \in t' \\ \bar{t} = \text{Max}(t) \Rightarrow \exists t = t \cup u \\ {}^u\llbracket \phi \rrbracket^{t'} = 1 \end{array} \right\} \Rightarrow t = t' \left\} \Rightarrow \exists t: t' = t \cup u \Rightarrow u \subseteq t' \right\} \Rightarrow {}^u\llbracket \phi \rrbracket^u = 1$$

Figure 5. Semantic calculation of semantic u-inclusive reading of (48)

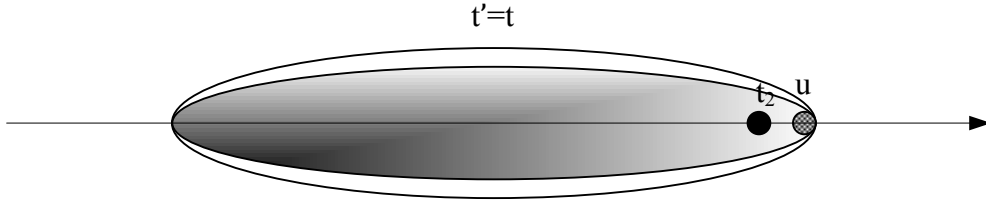


Figure 6. Illustration for semantic u-inclusive reading of (48)

The perfect-level universal quantifier in French has the same functions to those in English. That is to say, (31) in French with the perfect-level adverbial *toujours* semantically implies that the eventuality described holds at *u*. Thus (53) is ungrammatical:

- (53) *Je l'ai toujours aimé, mais maintenant pas du tout.
 “I have always loved him, but not anymore.”

2.3 Default features of statives in English and French perfect constructions

Though the perfect in English and *passé composé* in French have similar functions in PTS and perfect-level universal adverbials, they differ in behaviors of perfect+stative constructions.

In English, though the perfect+stative construction has two interpretations, the U-reading is preferred⁵. For example, (54) has two interpretations: (55) (U-Perfect) and (56) (E-perfect).

(54) I have lived here.

(55) I have lived here and I still do. (U-Perfect)

(56) ??I have lived here once. (E-Perfect)

As we can see, (55) is the preferred reading while (56) seems unacceptable, for the presence of existential adverbial *once* seems to rule out the perfect form. However, if we provide an appropriate context, a sentence like (56) can survive.

(57) “We’ve met a lot of people that moved back here – have lived here once and moved back here because this is where they were happiest”.
(Granville Historical Society)

On the other hand, things in French are the opposite. In French, the perfect+stative construction has two interpretations too, e.g. (58) in French:

(58) Marie a été heureuse à la vue de son fils.

“Marie was^{PC} happy at the sight of her son.” (Smith, 1997: 195)

At the utterance time (u), Marie may or may not be happy, which would result in U-reading and E-reading respectively. But, generally speaking, *passé composé* are usually not compatible with U-reading as shown by (59):

(59) # Jean a été malade hier soir et il est malade maintenant.

“Jean was sick^{Perf} this morning and he is^{Pr} sick now.” (ibid.)

In order to account for the distinctive behaviors of perfect+stative constructions in English and French, I adopt IAI’s proposal of VPs with the [\pm bounded] feature. According to IAI, statives with [+bounded] feature tend to exclude endpoints, while ones with [-bounded] tend to include them (175-6).

In English, the default feature of statives in perfective is [-bounded], which means $t' = t$ and is illustrated by (55) and (56). While in French the default feature is [+bounded], which explains why (30) usually cannot be followed by *et il malade maintenant* (“and he is sick now”) as shown in (59). So in English,

⁵ Rodney Huddleston and Geoffrey K. Pullum (2002) holds an opposing opinion of such a reading. It believes that “[t]he non-continuative reading of the perfect is much the more frequent, and can be regarded as the default one.” (p. 141) From the explanation and analysis of the assertion, I think it misunderstands the meaning and function of aspectuality and confuses it directly with non-/continuative reading of the perfect in English, hence a misreading.

“Perfect+Perfective+[-bounded] Stative” forms a U-Perfect. That is to say sentences like (28) and (54) can have either a U-Perfect reading or an E-Perfect reading, depending on the features of VP in the perfect construction.

Chapter Three

Modified Perfects: *since* α as an Example

By far, we have dealt with the right end of PTS, i.e. utterance time. Now, I would like to look at the left end of the PTS: whether or not the situation is the same as that at u .

In IAI, the left end of the PTS, i.e. LB, is set by perfect-level adverbials, e.g. *for an hour*, *since 1990*, *in an hour* and so on. In the present chapter, I will focus mainly on *since* α ⁶ which is the most controversial of all.

3.1 Introduction

Bennett & Partee (1978) categorize *since* as a frame adverbial referring to “an interval of time within which the described action is asserted to have taken place” (p.22; reprinted in Partee, 2004: p.79). In English, *since* is mostly used in perfect constructions. For example,

(60) Tony has lived in Chicago since 1997.

(61) *Tony lived in Chicago since 1997.

(62) Tony has walked for 2 hours.

(63) Tony exercised for 2 hours.

The only sentence type which allows *since* in a non-perfect construction is:

(64) It's 4 years *since* we last met.

Unlike other frame adverbials, *since* α is a little bit unique, because it refers to an interval of time which has the interval of α as its initial end point.

Meanwhile, in the literature, scholars find that the perfect constructions with *since*-adverbials usually have U/E-Perfect ambiguity. For example:

(65) John has been asleep since yesterday.

(66) U-reading: from yesterday to the utterance time, the eventuality of John's being asleep is throughout the whole time interval.

(67) E-reading: from yesterday to the utterance time, there is an eventuality of John's being asleep in the time interval.

⁶ *Since* has two different usages in English, one of which serves as a temporal adverb indicating the beginning of a certain time interval. The other one is a connective meaning “for the reason that”. In this article, we will not treat the second use but will focus on the temporal one.

Rathert (2001) calls this kind of ambiguity involving the temporal adverbs *since* complex U/E-ambiguity, in contrast with the simple U/E-ambiguity arising with the use of *for*-adverbials.

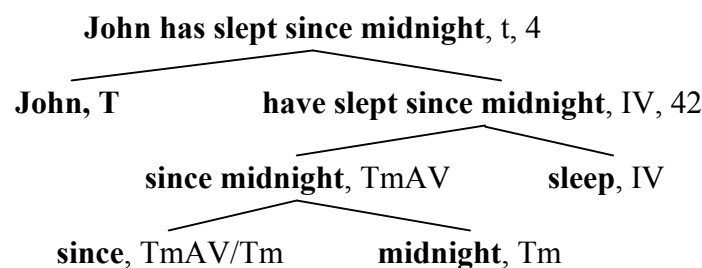
Dowty (1979) had already noticed this kind of complex U/E-ambiguities:

For most speakers (though apparently not quite all), **since** α has an interpretation ... that need not entail that its sentence has been true at all times since α , but only at some time since α . (p.347)

But, he only gives a semantic explanation for the U-Perfect reading:

Since ($\in B_{TmAV/Tm}$) translates into:

$$\lambda \mathcal{P}_t \lambda \mathcal{P}_t \mathcal{P}_t \left\{ \hat{t}_1 \left[\wedge t_2 \left[[t_1 < t_2 \ \& \ XN(t_2)] \rightarrow \mathcal{P}_t \{t_2\} \right] \right] \right\}$$



$$\wedge t_2 \left[[\mathbf{midnight}' < t_2 \wedge XN(t_2)] \rightarrow [XN(t_2) \wedge AT(t_2, \mathbf{sleep}'(j))] \right] \text{ (ibid., p.344-5)}$$

From the LF of *John has slept since midnight*, we can see that there are two Extended-NOW operator, one of which is redundant. The problem remains either in the semantics of *since*-adverbial or the syntactic rule 42, both of which introduce an XN operator in the LF. Dowty (1979) ascribes the problem to “the last occurrence of ‘XN(t_2)’, which derives from S42’ (ibid., p.345). However, as far as I’m concerned, S42 prescribes the formation of a perfect construction, and the Extended-NOW interval (=PTS) is introduced by the perfect, but not by some specific temporal adverbials. Accordingly, we cannot delete XN operator in S42. Otherwise it would be hard for us to distinguish it from the Past tense. Thus, the problem remains in the semantics of *since*-adverbials which by itself introduce an XN-NOW Perfect reading, though, acknowledgably, *since*-adverbials almost always accompany the perfect, except for cases like (64).

For the E-reading of (65), Dowty (1979) himself cannot find a way out. He tries to postulate a lexical or type ambiguity of *since* similar to that those of *for* by (IV/IV)/Tm. But, a problem arises: this would mean that *since*-adverbials can be aspectual adverbials, just as *for*-adverbials are. In fact, it is not the case, “since **since**

α is one of the adverbials that locates the time of the verb with respect to the time of speech, i.e. it is not an aspectual adverbials” (ibid., p.348).

Richards (1982) and Henry (1982) share the same view on *since*, which is as follows:

Since 7.00 (A) is true in M relative to (w, i) iff the initial bound of i = 7.0 and for every subinterval j of i A is true in M relative to (w, j) .
(Richards, 1982: p.97; Henry, 1982: p.147)

However, we can see from the definition, there is an obvious problem in it: there is a universal quantifier over every points of i , which means the eventuality is true throughout the interval i . The “throughout” meaning will definitely rule out the potential E-Perfect reading shown in (67). In other words, Richards (1982) and Henry (1982) haven’t recognized the U/E-Perfect ambiguity.

Like Dowty (1979), which tries to postulate a type ambiguity of *since* for the complex U/E-ambiguity, Mittwoch (1988) resorts to a similar approach: *since* is lexically ambiguous. The lexical ambiguity roots in her finding that *since* in U/E-Perfect expresses different temporal information.

(68) Tony has been ill *since* Tuesday. (U-Perfect)

(69) Tony has been to Rome *since* Tuesday. (E-Perfect)

In both (68) and (69), we have the same temporal adverbial *since Tuesday*. But the temporal intervals introduced by this adverb are different. In (68), the time of *Tony’s being ill* includes *Tuesday*, while in (69) the time of *Tony’s being to Rome* excludes it. Seeing this distinction and refuting Richards (1982) and Henry (1982)’s universal quantificational explanation, Mittwoch (1988) proposes the following interpretations for the complex U/E-ambiguity:

Since^U Tuesday (Have^U (A)) is true in M relative to (w, i) iff i is the final moment of an interval j and there is an interval k such that k is a final subinterval of Tuesday and the initial proper subinterval of j and A is true in M relative to (w, j) , where A is interpreted as a state.
(p.219)

Since^E Tuesday (Have^E (A)) is true M relative to (w, i) iff i is the final moment of an interval j and Tuesday is the initial lower boundary interval of j , and for some subinterval k of j A is true in M relative to (w, k) . (ibid.)

Though Mittwoch (1988) defines the Have^U (A) and Have^E (A) separately, she

doesn't assign semantics for *since*^U and *since*^E individually. That is to say, the semantics of *since* is defined syncategorematically. Thus, the analysis is not a truly compositional one. (cf. Rather, 2003: 72-4)

Following Dowty (1979) and Mittwoch (1988), Iatridou et al. (2001) classifies *since*-adverbials as belonging to the group of perfect-level adverbials, i.e. the only position it locates is right under the node of PerfP. That is why *since* must be accompanied by the perfect construction in most cases. As *since* introduces the left end of a certain time span and must be accompanied by the perfect construction, IAI stipulates that the left boundary (LB) of PTS is set by the argument of *since*. In other words, the PTS in the present perfect is bounded between *since*-adverbials and utterance time.

In order to deal with the complex U/E-Perfect ambiguity, similar to Mittwoch (1988), IAI believes *since* is a semantically ambiguous adverb between durative and inclusive ones: "When *since* is durational, it yields the U-perfect only. When *since* is inclusive, it yields the E-perfect" (p. 164).

Then, how can we distinguish durational *since* and inclusive *since*? IAI doesn't give us a direct explanation; they just exemplify it:

(70) *Since 1990, I have read "The Book of Sand" five times.* (p.165)

They show that *since* in (70) is an inclusive one. Why not a durational one? They argue that "[w]e also need a predicate that can satisfy the subinterval requirements of the durative side of *since*, in other words, a homogeneous predicate" (p.164). That is to say, durational *since* has an aspectual-selection feature. Even if we give a homogeneous predicate to *since*-adverbials as in (71), we find it hard to distinguish the durational one from the inclusive one:

(71) *Since 1990 I have been sick.* (ibid., p.165)

In (71), both U-reading and E-reading are possible.

Viewing the problem, they also acknowledge that the U/E-Perfect ambiguity is not only determined by the adverb *since*, but also by viewpoint aspect and aktionsart, i.e. AspP and VP below PerfP. In order to clarify the different roles viewpoint aspect and aktionsart play, IAI introduces a feature [\pm bounded], as we have already mentioned in Chapter 1.1.3.

However, there are still problems with their vacillating positions on the U/E-Perfect ambiguity. One of them is that if the U/E-Perfect is determined by the types of *since*-adverbials, aspect and aktionsart, what the determinant factor is. IAI

tells us nothing about that.

3.2 My analyses of *since*-adverbials

There are two major problems concerning *since* α : one is the syntactic and semantic nature of *since*-adverbials; the other is the complex U/E-ambiguity raised by Dowty (1979), Mittwoch (1988) and so on. I will deal with them separately.

3.2.1 *Since* α : a Perfect-level adverbial

IAI adopts Dowty (1979)'s definition of perfect-level adverbials and eventuality-level adverbials, and classifies *since*-adverbials as perfect-level adverbials. However, I cannot find the exact definitions of these two groups of temporal adverbials in Dowty (1979), or in IAI either. As far as I understand, the function of the first kind of temporal adverbials can be characterized as follows:

(72) Frame-level adverbials (or Perfect-level adverbials in the perfect construction): to introduce a time frame/interval in which an eventuality is evaluated or through which eventuality is observed.

The interval introduced by Frame-level adverbials is similar to Reichenbach (1947)'s Reference Time (R), except for that the former is an interval of time and the latter is a point of time, as we have mentioned in Chapter One.

Similarly, we define the eventuality-level adverbials as in (73)

(73) Eventuality-level adverbials: to introduce a time interval through which an eventuality actually happens or is initiated.

The interval introduced by eventuality-level adverbials is also similar to Eventuality Time (E) in Reichenbach (1949)'s term.

In terms of IAI's proposal, perfect-level adverbials modify t , while eventuality-level adverbials modify t' .

As for perfect-level adverbials, we can learn from (74) that from 10:00 till NOW is the time interval where we observe the *Tony's running* eventuality. In fact, Tony may probably have run before 10:00, or continue to run into future time.

(74) Tony has been running since 10:00.

On the other hand, in (75), the *for*-adverbial is obviously an eventuality-level adverbial.

(75) Tony ran for 5 hours.

The sentence states that the actual time interval of *Tony's running* is 5 hours,

no more or no less.

Though IAI classifies *since*-adverbials as perfect-level adverbials, it doesn't provide enough evidence to justify it. The remaining question is why *since*-adverbials are perfect-level ones rather than eventuality-level ones. In the following part, I will focus on the question.

To see what kind of temporal adverbials *since* α is, according to the aforementioned definitions, we need to identify the property of the time interval the adverbial introduces into the preposition.

First, let's look at the following scenarios:

Scenario 1: I visited the USA in 1998, in 1999 and in 2000.

In the context of scenario 1, we have the following sentences, some of which are true while others are not.

(76) I have visited the USA 3 times since 1996. (True)

(77) I have visited the USA 3 times since 1997. (Some people believe it true, while some others deem it untrue)

(78) I have visited the USA 3 times since 1999. (Untrue)

Scenario 2: Tony became ill last Sunday and is still ill now.

In the context of the second scenario, we again have the following sentences:

(79) Tony has been ill since last Sunday. (True)

(80) Tony has been ill since this Monday. (True)

(81) *Tony has been ill since last Friday. (Untrue)

As we can see from the two scenarios above, we used two different kinds of verbs. One of them is non-stative, while the other is stative. We use these examples here to test whether *since*-adverbials describe the eventuality time or not.

The results are quite obvious and the answer is a definite NO. In scenario 1, we can easily find the eventuality time is somewhere in 1998, 1999 and in 2000 respectively. However, the time intervals introduced by *since*-adverbials do not indicate these specific time points or intervals. In the cases of sentences with non-statives, we can extend the α **back to** anytime, as you wish, **prior** to the first occurrence of the eventuality. So *since* α doesn't introduce eventuality time in non-stative perfects.

The case is similar to sentences with statives. In scenario 2, we can easily find out the eventuality time to be from sometime in *last Sunday* till NOW. Though we cannot make the α be **prior** to *last Sunday*, semantics allows us to make it **posterior** to the starting time point of the eventuality. Again, we learn from the fact that *since* α

doesn't introduces eventuality time in stative perfects.

Another thing we should note here is that though (77), (78) and (80) are grammatical, we seldom use these kinds of sentences under the described contexts. Because usually we pragmatically infer the eventuality time from α^7 , that is why we sometimes confuse the α with eventuality time.

The matter is more clearly addressed by one of my testees, which I would like to quote below:

since t means something like *if you start the clock at t*.

If you have visited the USA three times since 1996, but never before that, then you have also visited the USA three times since 1945, and you have visited the USA three times since 1597, and you have visited the USA three times since 1356, and so on. While all of them are true, there is no point, in a conversation, of mentioning any year but a year close to the range of years you are particularly interested in.

If you have been ill since Sunday, but not before that, then you have also been ill since Monday, and you have been ill since Tuesday, and you have been ill since Wednesday, and so on, until today. While all of them are true, there is no point, in a conversation, of mentioning any day but a day close to the full range of days when you have been ill. (CalifJim, 2009)

What's more, as we have mentioned in Chapter One, the perfect with statives can also render an E-reading, say

(82) Tony has been sick twice since last year.⁸

In this case, unlike what we get in scenario 2, we cannot draw the α towards the utterance time. Instead, like the situation in scenario 1, we can extend the α back to any time prior to the eventuality time which ranges between *last year* and NOW.

(83) Tony has been sick twice since last month.

(84) Tony has been sick twice since the year before last.

As we can see from these examples, the entailment conditions of *since*-adverbials are not subject to non-/statives distinction, but to U/E-Perfects.

In summary, in E-Perfect reading, we have:

⁷ We can analyze the inference by the Quantity Maxim of Grice's Cooperative Principle. However, it is not the theme of the present paper, so we will not delve into it.

⁸ Assuming one in January this year, and the other in February.

$$(85) \tau(\alpha) \leq I(\tau(e))^9$$

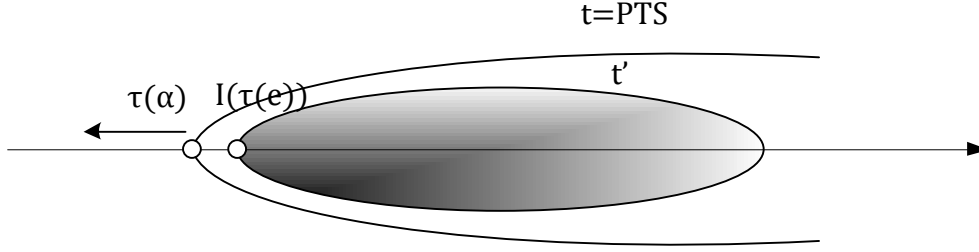


Figure 7. The entailment condition of *since*-adverbials in E-Perfect

In U-Perfect reading, we have:

$$(86) \tau(\alpha) \geq I(\tau(e))$$

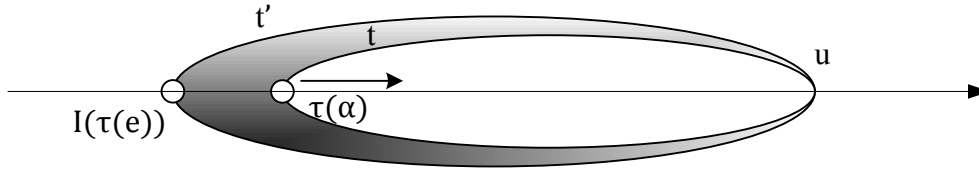


Figure 8. The entailment condition of *since*-adverbials in U-Perfect

In short, we conclude:

$$(87) \text{E-Perfect} + \text{since } \alpha \text{ entails E-Perfect} + \text{since } (\alpha-\beta)$$

$$(88) \text{U-Perfect} + \text{since } \alpha \text{ entails U-Perfect} + \text{since } (\alpha+\beta)$$

An interesting phenomenon is that we have two reverse entailment orderings in E-Perfect and U-Perfect.

Now, we are clear that *since*-adverbials are not eventuality-level adverbials but temporal adverbials which introduce intervals where we can observe or evaluate the eventuality, i.e. perfect-level adverbials in the perfect.

One thing to mention is that to introduce an evaluation interval is the universal feature of *since*-adverbials cross-linguistically. Universally speaking, *since*-adverbials are actually frame-level adverbials, say *seit* in German, *depuis* in French, *desde* in Spanish and many others. In German, *seit* can be used without perfect construction. However, with or without the perfect, *seit* α still introduces an evaluation interval rather than eventuality interval. Similar cases are found in French and Latin. *Since* in English has some strict uses: it must be accompanied the perfect¹⁰, so it is a

⁹ $\tau(\)$ is a function which turns the denotation of ϕ into its spanning time interval, say $\tau(\text{Beijing Olympic Games})$ = the time interval from 8 Aug. 2008 to 24 Aug. 2008; or turns the eventuality of e into its eventuality time, say $\tau(\text{Tony is sick})$ = the eventuality time of *Tony's being sick*. $I(\)$ is a function of initial end point which takes time interval as its argument and turns it into the beginning point of the interval, say $I(\tau(\text{Beijing Olympic Games}))$ = 8 Aug. 2008.

¹⁰ There is only one exceptional case found in (64). For now, I cannot explain this phenomenon.

perfect-level adverbial rather than a more general frame-level adverbial. I think it is a lexical feature of *since* in English.

This kind of phenomenon is addressed previously by Fintel & Iatridou (2005). Quoting the solution proposed by von Stechow, they describe it as follows:

This treatment does not by itself predict that *since*-adverbials are perfect-level adverbials. For example, as it stands they could be used to modify the interval introduced by tense. That is, they could say of some kind of extended Present that it stretches back to 1990 and the same might occur with a simple Past. In fact, there are such uses of the German *seit*-adverbials. For English, we need to introduce a stipulation. We quote from von Stechow:

For the time being, we require the following:

Perfect-level adverbials:

since t must be immediately embedded under PERF

... It is, of course, precisely this syntactic restriction that makes *since t* a perfect-level adverbial and there seems to be no way of getting rid of this constraint, one of the idiosyncrasies of English.

(p.4-5)

In summary, syntactically speaking, *since*-adverbials in English are adjoining PerfP, as shown in fig. 9:

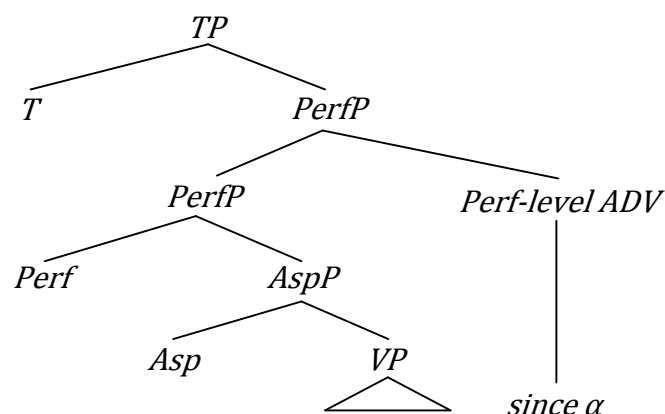


Figure 9. The syntax of Perfect-level adverbial *since α*

3.2.2 The semantics of *since α*

In the previous section, we talked a lot about the function and syntax of *since α*. In this section, we will have a close look at its semantic part.

Since usually requires a temporal locating phrase, like *1999* and *the death of*

Tony's father. But it cannot be combined with temporal durational phrases, like *2 hours* and *4 nights*.

(89) Tony has been upset *since his father's death*.

(90) *Tony has been happy *since 2 days*.

This is because *since* marks a specific beginning of a certain time interval rather than an unspecific beginning of an uncertain time interval, like the beginning of a 4-hour interval. Such a feature of *since* is lexically encoded.

According to IAI, *since* α determines the Left Boundary (LB) of the PTS (p.164). As we mentioned earlier, α can be either a temporal locating phrase or a sub-clause connected by it. The questions are whether the time interval denoted by α is included or not; whether the situation at α is the same as that at u in our earlier proposal. In the following part, I will discuss these topics.

A. *Since* + α (where α refers to a specific time point), e.g. *since 3 p.m.*, *since midnight*.

At a specific time point, it is quite difficult for us to pin down the truth value of the preposition. For example,

(91) I have been cleaning the table since 3 o'clock. (U-Perfect)

(92) I have played the piano twice since 3 o'clock. (E-Perfect)

In (91) and (92), the truth values of the propositions are hard to determine, for we don't have enough evidence to prove it. Such a puzzle roots deeply in the fact that the specific time point is instantaneous. Though from the ontology of intentional logic, there is a certain truth value of the proposition at a specific time point, practically speaking, it is impossible to judge from intuition. Even for different linguists, their judgments vary greatly to the same type of perfect. For U-Perfect with *since* α , Mittwoch (1988) regards all the eventualities hold true at α , for *since*^U α in U-Perfect, α would simply be the initial moment of j (eventuality time in Mittwoch's term). Hence $\llbracket p \rrbracket^j = 1$ entails $\llbracket p \rrbracket^\alpha = 1$.

IAI holds a similar view. IAI believes *since* in a U-Perfect is a durational one, which means the PTS must include α that *since* introduces. U-Perfects means for every point or interval of the PTS, the preposition is true, thus at α , it is also true.

On the other hand, Dowty (1979) have an opposite judgment. As we reviewed in Chapter 2.1, he interprets (93) as (94):

(93) John has slept since midnight.

(94) $\wedge t_2 \left[[\mathbf{midnight}' < t_2 \wedge \mathbf{XN}(t_2)] \rightarrow [\mathbf{XN}(t_2) \wedge \mathbf{AT}(t_2, \mathbf{sleep}'(j))] \right]$

(p.345))

From (94) we can see that *midnight* is prior to t_2 , the mixture of eventuality time and the Extended-NOW. In other words, *midnight* is excluded from the eventuality time and the PTS, which is shown more clearly in fig.10:

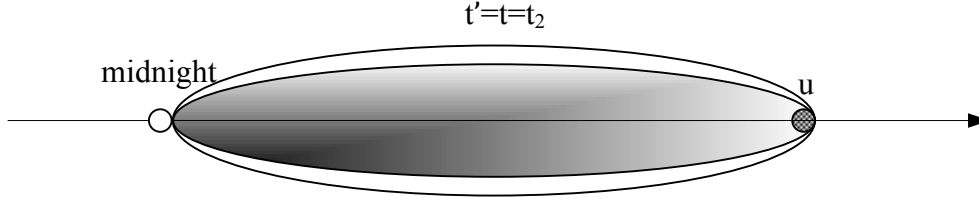


Figure 10. *Midnight-exclusive U-reading*

We can also find Dowty's view of the property of α in his definition of *since* adverb:

$$(95) \lambda \mathcal{P}_t \lambda \mathcal{P}_t \mathcal{P}_t \left\{ \hat{t}_1 \left[\wedge t_2 \left[[t_1 < t_2 \ \& \ \text{XN}(t_2)] \rightarrow \mathcal{P}_t \{t_2\} \right] \right] \right\}$$

In (95), we find that t_1 ($= \tau(\alpha)$) is always prior to t_2 . That is to say, the PTS always excludes the α interval.

B. *Since* + α (where α denotes a specific time interval), e.g. *since 1996*, *since Tuesday*.

Mittwoch (1988) discovers a similarly interesting phenomenon concerning modified perfects with *since* α , especially when α denotes a specific time interval:

... [I]n the existential reading of

(11) Sam has been in Boston since Tuesday.

Tuesday is excluded from the range of possible intervals of Sam's being in Boston that are covered by the sentence. (He may have been in Boston on Tuesday, but that visit would not be included in what the sentence asserts.) In the universal reading of (11) Tuesday, or at least part of it, is included. (p.207)

That is to say, together with other examples above, Mittwoch (1988) believes that *since*-adverbials behave distinctively in U/E-Perfects. In other words, she advocates a durational/exclusive lexical ambiguity of *since*. However, Mittwoch (1988)'s method still cannot account for Dowty (1979)'s interpretation of (93).

Similar to Mittwoch (1988)'s approach, IAI proposes that *since* is ambiguous between inclusive one and exclusive one, and *since* α sets the LB of the PTS in the same way as what u does for the RB of the PTS.

$$(96) {}^u \llbracket \text{since } 1990 \ \phi \rrbracket^t = 1 \text{ iff } LB(1990, t) \text{ and } {}^u \llbracket \phi \rrbracket^t = 1.$$

$$(97) LB(t, t') - t \text{ is the Left Boundary of } t' - \text{iff}$$

$$t \cap t' \neq \emptyset \text{ and } \exists t'' \subseteq t: t' \geq t''. \text{ (Fintel \& Iatridou, 2005: p.3-4)}$$

From the LF representation of (97), we can see that IAI believes the PTS includes α , at least a part of it. This could also be found in the following statement from Fintel & Iatridou (2005):

... [A]n interval that *since 1990* is true of is one that starts some time in 1990. 1990 is a Left Boundary of the PTS iff the PTS starts some time in 1990. (p.4)

The problem is that IAI and Fintel & Iatridou (2005) provide only one semantic representation of *since*-adverbials, mainly the inclusive one, leaving the exclusive one undefined.

In order to deal with the problems above, I have designed two scenarios:

Scenario 3: John pressed the keyboard of a piano at exactly 3 o'clock. Then he played for 2 minutes, stopped. Sometime later, he played again, and then stopped. There is no more playing of the piano from then on.

In this scenario, we can happily conclude that

(98) John has played the piano twice *since 3 o'clock*.

The above obviously has an E-Perfect reading. But it includes the time point introduced by *since*-adverb. If we adopt Mittwoch (1988)'s point of view, we cannot say the above sentence. Instead, we should assert the following:

(99) John has played the piano twice since 2:59.

Because, if we want to include 3 o'clock when John really did playing piano in the PTS, we need to introduce a time point prior to 3 o'clock, say 2:59. However, (99) is inappropriate in the scenario.

(99) ?So John has played the piano twice since 2:59.

One of the reasons is that 2:59 has no antecedent in the discourse, i.e. there is not an occasion which introduces this time point. The temporal antecedent in the discourse is 3 o'clock which compensates the inclusion of the time point introduced by *since*-adverbial.¹¹

Scenario 4: Supposing it is at noon, C's boss asked him to write 3 letters today in the morning. C wrote the first letter at 9:30 and is writing the second one. Now, A asks B what C's progress is. B can perfectly reply by (100) without a problem,

(100) He has written only one letter *since this morning*. (E-Perfect)

¹¹ Another reason is that according Grice's Quantity principle, i.e. we should say no more or no less, 3 o'clock is the time point which can be included in the PTS by context, so there is no need to assert a prior time which no temporal antecedent supports. Of course, such an explanation goes beyond the theme of the paper, so I will not unfold it.

If, under the framework of Mittwoch (1988), *since* in (100) is an exclusive one which excludes *this morning* from the PTS and eventuality time, we would expect that the first letter is finished at noon, which is false in the context provided.

Rathert (2003) also finds Mittwoch (1988)'s claim empirically wrong:

Data I gathered from the web tell that instead 'inclusiveness' is the way to go for both readings. To put it in other words: we easily find sentences with e-readings ... where the event occurs within, not after Tuesday. (p.94)

More counterexamples to Mittwoch (1988) and IAI can be found in Rathert (2003: p.225-8).

With scenarios above and ample examples from Dowty (1979) and Rathert (2003), we find that the situation of eventuality at α is quite similar to that at u . In both cases, eventualities may or may not hold true at the interval. That is to say, the left end of PTS set by *since* α is also on a sliding base, in the same way as the right end of the PTS is. Thus, I propose the following LF representation of *since* α :

$$(101) \quad {}^u\llbracket \text{since } \alpha (\phi) \rrbracket^t = 1 \text{ iff } \tau(\alpha) = \inf(t) \text{ and } {}^u\llbracket \phi \rrbracket^t = 1$$

$$(102) \quad t = \inf(t') - t \text{ is the supremum of } t' - \text{ iff } \bar{t} = t' \cup t, \quad \bar{t} \text{ is a continuum of interval and } \exists t_1 \in t, \forall t_0 \in t': t_1 \leq t_0$$

From the definitions of the perfect in Chapter One and *since* α here, we can see that the PTS in English is on a sliding base on both ends. Whether α is included in the PTS or not is subject to language-specific parameters, pragmatic criteria and discourse temporal antecedents. The definition also tells us that *since* is not a lexical-ambiguous temporal adverb.

Now, let's look at the α -inclusion and the α -exclusion in the same sentence (103).

(103) Sam has been in Boston since Tuesday.

$$(104) \quad [_{TP} \text{ PRES } [\text{ PERF } \text{ since Tuesday } [_{AspP} \text{ PRF } [_{VP} \text{ Sam is in Boston }]]]]$$

$$(105) \quad \exists t: u = \sup(t), \tau(\text{Tuesday}) = \inf(t), \exists t' \subseteq t : \text{ Sam is in Boston at } t'.$$

When $\tau(\text{Tuesday}) \cap t = \emptyset$ and $\forall t_2 \in t : \tau(\text{Tuesday}) < t_2$, we can get the α -exclusion reading in (103), as illustrated in fig.11.

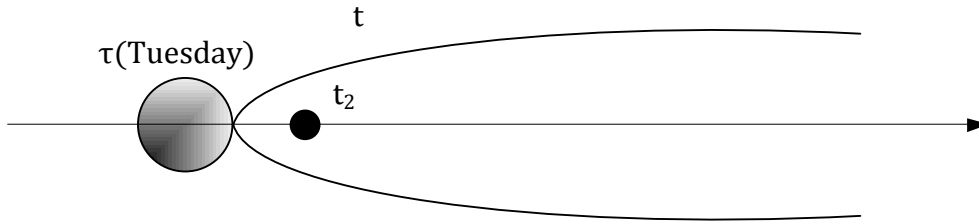


Figure 11. The α -exclusion reading in (103)

When $\tau(\text{Tuesday}) \cap t \neq \emptyset$, we can have the α -inclusion reading in (103).

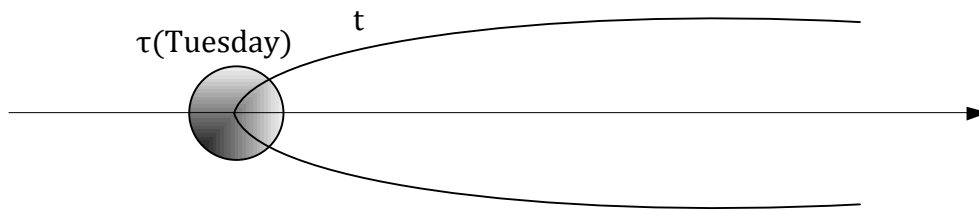


Figure 12. The α -inclusion reading in (103)

Another thing we can learn from the semantics of *since*-adverbials is that *since* has nothing to do with U/E-Perfect readings. The complex U/E-readings actually arise from the aktionsart and the feature of VP in the perfect construction, as we have argued in Chapter One.

Chapter Four

Conclusion

In many European languages, we find various constructions very similar to the perfect in English, e.g. *passé composé* in French, *Perfekt* in German, and so on. Having observed various usages of the perfect-similar constructions in many European languages, we find three common characteristics of them:

- a. Describing past events. All these constructions describe events happened/initiated in the past.
- b. U-aboutness (utterance time-aboutness). All these constructions (at least some usages of some constructions, e.g. perfect in OT Hebrew and NT Greek) relate the described events in the past to u, either positively (including u) or negatively (excluding u).
- c. Introducing a time interval. All these constructions introduce a time interval in or throughout which an eventuality holds. IAI calls such an interval the perfect time span (PTS).

These characteristics are the universal features of perfect constructions. Dowty (1979) has formalized the three features of English perfect construction in his well-known XN-Theory.

However, Dowty's theory, which focuses only on English, cannot account for (33) in German. Because *schon immer* as a universal quantifier will inevitably render (33) to include u, which is contrary to *bis vor kurzen*.

Another case which cannot be explained by Dowty (1979)'s XN-Theory concerns the unmodified perfects in English, like (22).

Iatridou et al. (2001), which proposes a refined version of XN-Theory, argues that unmodified perfects like (22) are never U-Perfects. However, such an assertion conflicts with the compositional meaning of the present perfect progressive construction (henceforth the PPP).

The result of fig. 2 clearly shows that the eventuality in the PPP should always be true at u, hence a U-Perfect according to Iatridou et al. (2001), which is contrary to their own assertion.

To (106), though we acknowledge that there are two interpretations of it, the

continuative reading is preferred.

(106) I have lived in London

(107) I have lived in London, and I still do.

(108) ??I have lived in London, but not anymore. (Contradictory or unacceptable)

Thus we cannot simply judge perfect+statives to be experiential, for (107) accords perfectly with the definition of U-Perfect, i.e. the eventuality in the perfect construction holds throughout the PTS.

In order to explain various phenomena of the perfect and solve the problems addressed in chapter one, the thesis proposes a revised version of XN-Theory which is based largely on Iatridou et al. (2001) and Fintel & Iatridou (2005) (cf. (44) and (45)).

In (44) and (45), we can see that t' (PTS) is on a sliding base which can either include or exclude t ($=R$ in Reichenbach's term). The actual length of PTS is subject to language parameters. For example, in German, the PTS is strictly u-exclusive, which we use $t=sup_{ex}(t')$ to represent. In French and English, however the PTSs are indeed on a sliding base, and they can be either u-inclusive or u-exclusive.

To the PPP including (42), we propose that all of them are U-Perfects and (42) is just an extreme case of the PPP: $u=sup(t)$ & $t'=t$. To explain (107) and (108), we adopt Iatridou et al. (2001)'s proposal of VPs with $[\pm \text{ bounded}]$ feature. $[+\text{bounded}]$ statives tend to exclude endpoints, while $[-\text{bounded}]$ ones tend to include them. In English, the default feature of statives in perfective is $[-\text{bounded}]$, which means $t'=t$ and is illustrated by (107) and (108); while in French the default feature is $[+\text{bounded}]$, which explains why (59) usually cannot be followed by *et il malade maintenant* ("and he is sick now"). So in English, "Perfect+Perfective+ $[-\text{bounded}]$ Stative" forms a U-Perfect. That is to say, (106) can have either a U-Perfect reading or an E-Perfect reading, depending on the features of VP in the perfect construction.

Another thing we address is the function of some perfect-level adverbials, such as *always*, *ever since* and *at least since*. Iatridou et al. (2001) believes *always* introduces a universal quantifier over the PTS, which turns an E-Perfect into a U-Perfect. Inspired by the lexical meaning of *at least* which expresses a mathematical relation of " \geq ", we think these adverbials can expand the range of the modified set. So, we propose that these three adverbials in English have the following two functions:

- a. introduce a universal quantifier over PTS;
- b. maximize the PTS.

Immer and *schon immer* in German do not have the second function as their English counterpart does, for the PTS in German excludes *u* which means there are no maximum of PTS available.

In Chapter 3, we probe into the problems in Dowty (1979), Mittwoch (1988) and IAI's analyses of *since*-adverbials. Borrowing Dowty (1979) and IAI's ideas of perfect-level adverbials and eventuality-level adverbials, we define two types of temporal adverbials, i.e. frame-level adverbials and eventuality-level adverbials. With concrete language data, we argue that *since*-adverbials introduce a time frame/interval in which eventuality is evaluated or through which eventuality is observed. We also find that universally speaking, *seit* in German, *depuis* in French, *desde* in Spanish and many others are frame-level adverbials. Thus the feature of frame-level adverbials is the universal feature of these groups of temporal phrases. Unlike its counterparts in other languages, *since* is quite unique, for it can be used only in perfect constructions, hence a perfect-level adverbial. Following IAI, we put *since*-adverbials between PERF operator and Asp operator. The last part of the chapter deals with the semantics of *since α* and the resolution of the complex U/E-ambiguity. With empirical evidence, we refute Mittwoch (1988)'s and IAI's lexical ambiguity approaches, and α -inclusive and α -exclusive distinction. Comparing the situation at α and the situation at *u*, we claim that the left end and right end of PTS in English are symmetrical and that the PTS is on a sliding base on both ends. The semantic structure of *since*-adverbials is claimed at the end of section 3.2.2 and a new perspective on the complex U/E-ambiguity is put forward.

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