

The aspectual makeup of Perfect participles and the interpretations of the Perfect*

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1. The types of perfect

Interpretation-wise, several types of perfect expressions have been recognized in the literature (e.g., McCawley 1971, Comrie 1976, Binnick 1991, Michaelis 1994, and others). To illustrate, a present perfect can have one of at least three interpretations:

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|-----|--|--------------|
| (1) | a. <i>Since 2000, Alexandra has lived in LA.</i> | UNIVERSAL |
| | b. <i>Alexandra has been in LA (before).</i> | EXPERIENTIAL |
| | c. <i>Alexandra has (just) arrived in LA.</i> | RESULTATIVE |

The three types of perfect make different claims about the temporal location of the underlying eventuality, i.e., of *live in LA* in (1a), *be in LA* in (1b), *arrive in LA* in (1c), with respect to a reference time. The UNIVERSAL perfect, as in (1a), 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, as in (1b), 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) and this terminology is adopted here as well.¹

Two related questions arise: (i) Is the distinction between the three types of perfect grammatically based? (ii) If indeed so, then is it still possible to posit a common representation for the perfect – a uniform structure with a single meaning – which, in combination with certain other syntactic components, each with a specialized meaning, results in the three different readings? This paper suggests that the answer to both questions is *yes*.

To start addressing these questions, let us look at some of the known factors behind the various interpretations of the perfect. It has to be noted that the different perfect readings are not a peculiarity of the present perfect despite the fact that they are primarily discussed in relation to that form. The same interpretations are available to the past, future and nonfinite per-

fects as well, modulo the fact that, in the calculation of meaning, the end point of the reference interval is past, future, or unspecified, respectively, relative to the utterance time (e.g., fall of 2002 in (2)).

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|-----|---|-----|
| (2) | <i>I met Alexandra in the fall of 2002.</i> | |
| | a. <i>Since 2000, she had lived in LA.</i> | U |
| | b. <i>She had been in LA before that as well.</i> | EXP |
| | c. <i>She had just arrived in LA.</i> | RES |
| (3) | a. <i>Next year, Alexandra will have lived in LA for 3 years.</i> | U |
| | b. <i>Alexandra will have been in LA by next year.</i> | EXP |
| | c. <i>Alexandra will have arrived in LA by Wednesday.</i> | RES |
| (4) | a. <i>Having lived in LA for ten years, Alexandra {is/was/will be} ready to move.</i> | U |
| | b. <i>Alexandra wanted to have been in LA by 2004.</i> | EXP |
| | c. <i>Alexandra's plan to have arrived in LA by July 4...</i> | RES |

Tense, therefore, has no effect on the availability of the different perfect readings. Aspect, on the other hand, does. It has been noted that the aspectual makeup of the participial VP – both in terms of the Aktionsart of the underlying eventuality and the grammatical aspect – is crucial in obtaining the Universal perfect interpretation. Only stative verbs and the progressive can form Universal perfects in English. In languages with perfective/imperfective distinction, the availability of the Universal reading depends on the availability of non-perfective participles (Iatridou, Anagnostopoulou and Izvorski 2001). Greek, for instance, obligatorily marks perfect participles as perfective, and as a result the Universal perfect is not possible in this language. Bulgarian allows non-perfective (imperfective or neutral) perfect participles for all Aktionsarten, and these are employed to yield a Universal perfect reading, in a role similar to the progressive in English. These facts have been previously noted and discussed by Iatridou, Anagnostopoulou and Izvorski (2001: 206-210) and will not be illustrated here.

The Resultative perfect too is aspectually restricted, although in this case the restriction is partly definitional. For this reading to obtain, the result state of the underlying eventuality must hold at the reference time. Some authors, e.g., Parsons (1990), Kamp and Ryle (1993), Giorgi and Pianesi (1998), define a result state for any type of eventuality, atelic as well as telic. Others, notably Kratzer (1994), posit that only telic events have a natural result state (target state) associated with them. The telos is the 'turning point' at which telic eventualities transition into the result state. With the reaching of the telos, an achievement such as *lose my glasses*

causes a state of the glasses being lost, and an accomplishment such as *build a sandcastle* quite clearly results in a state of the existence of a castle. There is no analogous inherent result state for an activity such as *run* or *build sandcastles*. An event of running may cause, e.g., a state of its agent's tiredness, but this is not a matter of the lexical meaning of *run*. Similarly, an event of building sandcastles results in no inherent, lexically specified, state. Based on this stricter definition of a result state, sentence such as the ones in (5) do not have a Resultative perfect interpretation, only an Experiential one, while the sentences in (6) may be Experiential or Resultative.

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|-----|--------------------------------------|------------|
| (5) | a. <i>I have run.</i> | EXP |
| | b. <i>I have built sandcastles.</i> | EXP |
| (6) | a. <i>I have lost my glasses.</i> | EXP or RES |
| | b. <i>I have built a sandcastle.</i> | EXP or RES |

On the Resultative reading, (6a) requires that the glasses be lost at the reference time, here contemporaneous with the utterance time, while on the Experiential reading there is no such requirement. Sentence (6b) is felicitous as an Experiential perfect regardless of whether the built sandcastle still exists, but if it does not, the sentence cannot be a Resultative perfect. Clearly, no such distinctions can be made in the case of (5).² Thus, only telic predicates yield the Resultative reading in English. The above discussion illustrates the role of Aktionsart in deriving the different readings of the Existential perfect. The role of grammatical aspect in this respect has not been investigated cross-linguistically. There have been no studies, as far as I know, of the effect of imperfective and perfective morphology on the availability of the Experiential and Resultative perfects. The present paper addresses this gap.

The role of aspect in determining the type of perfect in English can be summarized as follows. The Universal and the Resultative interpretations depend on the aspectual makeup of the participle, while the Experiential one appears not to. States, and events in the progressive, can give rise to either a Universal or an Experiential reading. Non-progressive activities can only be Experiential. Non-progressive telic events can be either Resultative or Experiential. In other words, any aspectual combination may yield an Experiential reading, while the Universal and the Resultative readings are derivable only by some, non-overlapping aspectual forms embedded in the perfect.

There are other factors that contribute to the choice of one or another of the perfect interpretations, besides aspect. Notably, different adverbials trigger different perfect readings. As pointed out in Iatridou, Anagnostopoulou and Izvorski (2001: 196-199), the Universal reading is possi-

ble only when the perfect is modified by an appropriate adverbial. Some adverbials that require the Universal perfect interpretation are *always, ever since (2000), at least since 2000, for 10 days now*; adverbials that allow it are *since 2000, for 10 days*³. Adverbials such as *before, 5 times, lately* are modifiers of the Experiential perfect. The Resultative perfect interpretation obtains in the case of *just now*. The role of adverbials in deriving the different perfect interpretations is not the main focus of this study; it is mentioned here briefly, only insofar as the different adverbials will be used as a diagnostic for the various readings throughout the paper.

2. Vagueness- vs. grammar-based accounts of the types of perfect

There have been different approaches to the source of the distinctions within the perfect. The focus, however, has been on the Universal-Existential distinction, specifically whether or not it is encoded in the linguistic structure and is thus a true ambiguity, or is a matter of vagueness. Relatively little is known about the distinction *within* the Existential perfect.

Previous approaches to the problem of the perfect types fall into several categories:

- I. The perfect is assigned a uniform meaning, and presumably structure; the different readings are a matter of vagueness, and contextual information determines the ultimate interpretation (Bauer 1970, Inoue 1978, McCoard 1978, Heny 1982, Klein 1994).
- II. The Universal-Existential distinction is grammatically encoded; no explicit proposals are made about the distinctions within the Existential perfect (Dowty 1979, Richards 1982, Mittwoch 1988, Abusch and Rooth 1990, Vlach 1993, Hitzeman 1998, von Stechow 1999, Rathert 2000, Iatridou, Anagnostopoulou, and Izvorski 2001, Musan 2001, 2002).
- III. The Universal-Existential distinction is semantic, determined by the Aktionsart of the underlying eventuality, but the distinctions within the Existential perfect are not grammatical – they are determined on the basis of a pragmatic notion of current relevance (Portner 1999).
- IV. The Experiential and Resultative perfects are structurally distinct; the Universal and the Resultative perfects are structurally identical and differ only in the Aktionsart of the underlying eventuality; there is no uniform overall representation for the perfect (Brugger 1997).

- V. The Resultative, Experiential and Universal perfects incorporate three different aspectual operators; there is no uniform overall representation for the perfect (von Stechow 1999, 2001).

As is evident from the above characterization, there appears to be no account that posits a uniform overall structure and meaning for the perfect and yet allows for distinct additional grammatical components to be embedded within that structure to derive the three distinct readings. The present paper aims to accomplish just that. The proposal is presented in the next section.

3. The perfect - structure and meaning

The position taken in this paper is that the different interpretations of the perfect – the Universal, the Experiential, and the Resultative – are grammatically encoded, yet there is still a uniform overall representation for the perfect. In other words, the three perfect types have distinct but partially overlapping syntactic structures, composed of elements shared by all, and also of elements that are specific to each type. The distinct structures may or may not be spelled-out differently by the morphological component, though the lack of overt realization is principled and constrained as well.

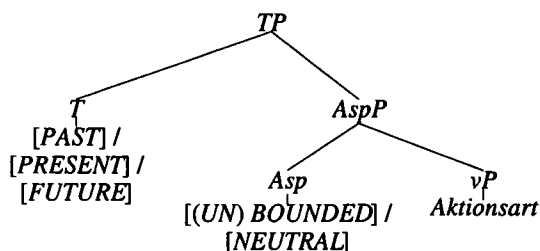
Evidence from Bulgarian and English is provided in support of the proposal that the aspectual makeup of the perfect participle determines the range of possible interpretations. Of particular concern here is the ambiguity within the Existential perfect, namely the distinction between the Experiential and Resultative perfects. The findings in Iatridou, Anagnostopoulou and Izvorski (2001) concerning the role of grammatical aspect in the availability of the Universal perfect are assumed without further elaboration.

3.1. The perfect as a higher aspect

It is proposed that the perfect is structurally more complex than other grammatical aspects such as the perfective or imperfective. The syntactic differences, and the corresponding meaning differences, between these grammatical aspects, are illustrated in (7) and (9). Formatives such as [PAST], [BOUNDED] etc., are to be understood as the values of syntactic objects such as T(ense) and Asp(ect), with semantic import as defined, and not as the overt past morphemes, perfective affixes, etc. The lowercase notation - past, perfective, etc. - is used for the particular structure-meaning combinations, e.g., T specified as [PAST], Asp specified as [BOUNDED], etc. For the time being, we put aside the issue of the exact morphological spell-out of these syntactic structures.⁴

Viewpoint grammatical aspect, to use a common terminology (e.g., Smith 1991), is composed of an Asp head⁵ which embeds a *vP* with a particular Aktionsart, and which can itself be directly embedded under T, as in (7a). The interpretations of the tense and aspect specifications are as in (7b):

(7) a.



b. i. Tenses:⁶

[[PAST]] = $\lambda p \lambda i \exists i' [i' < i \ \& \ p(i')]$

[[PRESENT]] = $\lambda p \lambda i \exists i' [i' = i \ \& \ p(i')]$

[[FUTURE]] = $\lambda p \lambda i \exists i' [i' > i \ \& \ p(i')]$

for any $i \in I$, the set of temporal intervals

ii. Grammatical viewpoint aspects:

[[UNBOUNDED]] = $\lambda P \lambda i \exists e [i \subseteq \tau(e) \ \& \ P(e)]$

[[BOUNDED]] = $\lambda P \lambda i \exists e [\tau(e) \subset i \ \& \ P(e)]$

[[NEUTRAL]] = $\lambda P \lambda i \exists e [i \not\subseteq \tau(e) \ \& \ P(e)]$

e is an eventuality,

$\tau(e)$ is the interval throughout which the eventuality holds,

P is a predicate of eventualities,

$i \in I$, the set of temporal intervals,

$i \not\subseteq i'$ iff $i \cap i' \neq \emptyset \ \& \ \exists t [t \in i \ \& \ t \notin i' \ \& \ \forall t' [t' \in i' \rightarrow t < t']]$

The structure in (7a) reflects a fairly standard approach to the representation of temporality in natural language. The architecture of Tense selecting Grammatical Aspect, which itself selects an Aktionsart appears in one form or another in most syntax-semantics accounts.

Semantically, tenses are treated here as existential quantifiers over temporal intervals, but nothing in the present discussion hinges on this issue.⁷ Tenses set up an evaluation interval relative to another evaluation interval, or in the case of matrix clauses, to the utterance time. Following Reichenbachian terminology, the evaluation interval set up by tense is often called the *reference time*. The past and the future tenses locate the reference time before or after, respectively, the prior evaluation time (or the utterance time in matrix clauses). The present tense is semantically vacuous.

Viewpoint aspects set up an interval – the interval at which the eventuality holds, often called the *event time* – in relation to an evaluation inter-

val. Composed with tense, the viewpoint aspects temporally situate the event time relative to the reference time. This view of the role of tense and aspect is consistent with proposals by von Stechow (1999, 2001) and Reichenbachian accounts such as Klein (1994), a.o. The contribution of imperfective (the semantics of [UNBOUNDED]) is to set up the event time as a superset of the reference time. Perfective (with the meaning of [BOUNDED]) has the opposite effect as it sets up the event time as a subset of the reference time. The meanings of [BOUNDED] and [UNBOUNDED] presented above are fairly standard.⁸

The representations in (7b) differ from common aspectual characterizations in the introduction of a new type of viewpoint aspect, that of neutral. Since this aspectual form will be relevant in deriving some of the ambiguities in the perfect, I will discuss it here in some detail.

The term *neutral* is due to Smith (1991), who characterizes it as a grammatical aspect that allows reference to the beginning point of an eventuality and part of its internal temporal structure but not to the end point. In Iatridou, Anagnostopoulou and Izvorski (2001) we proposed that Bulgarian shows an overt three-way distinction in its aspectual system between neutral, imperfective, and perfective.⁹ The following sentences in (8) illustrate that the three viewpoint aspects are morphologically distinct.¹⁰

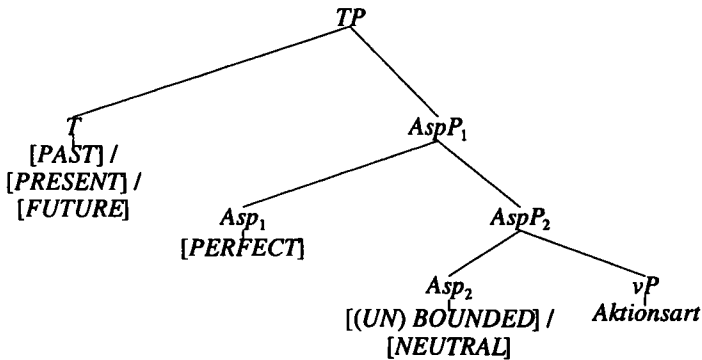
- (8) a. Az *stroix* *pjasâčna* *kula*.
 I build-NEUT.1SG.PAST sand castle
 ‘I was engaged in building a sandcastle.’
- b. Az *strojax* *pjasâčna* *kula*.
 I build-IMPERF.1SG.PAST sand castle
 ‘I was building a sandcastle.’
- c. Az *postroix* *pjasâčna* *kula*.
 I build-PERF.1SG.PAST sand castle
 ‘I built a sandcastle.’

Neutral has properties which are common with the perfective and others with the imperfective. It makes reference only to the beginning and the internal temporal structure of an eventuality. Therefore, it does not assert achievement of the goal with telic events, similarly to the imperfective: (8a) and (8b), in contrast to (8c), do not assert that a sandcastle came to exist. The neutral allows durative adverbials (e.g., (*v prodълzenie na*) *dva časa* ‘for two hours’) and disallows completive adverbials (e.g., *za dva časa* ‘in two hours’), again behaving like the imperfective and not like the perfective. However, similarly to the perfective and unlike the imperfective, neutral sequences with perfective eventualities (e.g., *when P(e)-perf.past*, *P(e)-neutral.past* is interpreted such that $\tau(e) < \tau(e')$). Also, neutral allows both durative and inclusive interpretation of time intervals (e.g.,

between 10 and 11 am), a property it shares with the perfective and not with the imperfective.

Let us turn now to the perfect. My analysis of the perfect diverges from common syntax-semantics accounts of that temporal expression. Usually, the perfect is said to be of the same syntactic and semantic category as viewpoint aspect (e.g., Giorgi and Pianesi 1998, von Stechow 1999, 2001, a.o.). Others treat the perfect as essentially an Aktionsart, a derived state (Parsons 1990, Klein 1992, 1994, Musan 2001, 2002). The position taken here, in line with that found in Iatridou, Anagnostopoulou and Izvorski (2001), is that the perfect is syntactically a higher aspect than the viewpoint aspects, and that semantically, it relates two evaluation intervals, rather than an evaluation interval and the time of an event – more like an embedded tense than like a viewpoint aspect. Concretely, the perfect embeds an AspP such as the one in (7a), specified for viewpoint aspect. Perfect participles thus consist of (at least two) different AspPs organized hierarchically. The following is a representation of the syntactic components, which enter into the composition of the perfect, and of their associated meanings. Respecting compositionality, the meanings of the possible tenses in T and viewpoint aspects in Asp₂ are the same as previously defined in (7b).

(9) a.



b. The Perfect:

$[[\text{PERFECT}]] = \lambda p \lambda i \exists i' [\text{PTS}(i', i) \ \& \ p(i')]$
 $\text{PTS}(i', i)$ iff i is a final subinterval of i'

The Asp₁ head contains identical feature specifications for the three types of perfect – Universal, Resultative, and Experiential. Further merging Asp₁ with T brings about the temporal location of the reference time (the final subinterval of the interval introduced by the perfect) and derives a present, past, etc. perfect. In other words, the perfect has a common syntax – an Asp₁ head embedding an Asp₂ projection whose head is specified for viewpoint aspect. Associated with the common syntax is a common mean-

ing for the perfect - a combination of the meaning of [PERFECT] in Asp₁ and the meaning contribution of a viewpoint aspectual projection.

The semantic role of the perfect is to introduce an interval, the Perfect Time Span (PTS)¹¹ and temporally relate it to the reference time such that the reference time is its final subinterval. This is a particular instantiation of the Extended Now theory of the perfect (McCoard 1978, Dowty 1979, a.o.). The Perfect Time Span is a term introduced in Iatridou, Anagnostopoulou and Izvorski (2001) for the concept of an Extended Now; it has the advantage of generalizing over intervals extending back in time from any reference time, not just a Now. The right boundary of the PTS coincides with the right boundary of the reference interval, and thus gets located by tense. The left boundary of the PTS is determined by various perfect-level adverbials, e.g. *at least since 2000* sets the left boundary as the year 2000; *for 6 years* sets it 6 years back from the right boundary, etc. In the absence of perfect-level adverbials, the left boundary, and thus the duration of the PTS, is left unspecified.

According to the present proposal, the viewpoint aspects – perfective, imperfective, and the added neutral - relate the event time to the reference time, whereas the perfect relates an interval of evaluation (the PTS), a reference time of sorts, to the reference time introduced by the tenses. In summary, the relations between intervals are as follows:¹²

- (10) Tense: a reference time to the speech time
 Perfect: a reference time to a reference time
 Viewpoint aspect: the event time to a reference time

3.2. The role of viewpoint aspect

It is further proposed that the distinctions between Universal, Experiential, and Existential readings have a grammatical basis, localizable to the particular featural specification of Asp₂. If Asp₂ is [UNBOUNDED], the Universal reading straightforwardly obtains. The viewpoint aspect first combines with the vP, which contributes a predicate over eventualities.

- (11) a. [_{AspP1} PERFECT [_{AspP2} UNBOUNDED [_{vP} vP]]]
 b. $\lambda p \lambda i \exists i' [\text{PTS}(i', i) \ \& \ p(i')] (\lambda P \lambda i \exists e [i \subseteq \tau(e) \ \& \ P(e)] (\lambda e' P(e'))) =$
 $\lambda i \exists i' [\text{PTS}(i', i) \ \& \ \exists e [i' \subseteq \tau(e) \ \& \ P(e)]]$

As the formula in (11b) indicates, the PTS is asserted to be a subset of the event time, i.e. the underlying eventuality holds throughout the PTS, which is the Universal perfect interpretation.

When Asp_2 has the value of [NEUTRAL], the Experiential interpretation obtains:

- (12) a. $[_{AspP1} \text{ PERFECT } [_{AspP2} \text{ NEUTRAL } [_{vP} \text{ vP }]]]$
 b. $\lambda p \lambda i \exists i' [\text{PTS}(i', i) \ \& \ p(i')] (\lambda P \lambda i \exists e [i \ \text{Pr}(e) \ \& \ P(e)] (\lambda e' P(e')))$
 $= \lambda i \exists i' [\text{PTS}(i', i) \ \& \ \exists e [i' \ \text{Pr}(e) \ \& \ P(e)]]$

As clear from (12b), embedding neutral viewpoint aspect under the perfect has the effect of asserting that the beginning of the event time is included in the PTS. The question of whether the end of the event time is included in the PTS or not is left open. Clearly, this is not the Universal reading. As discussed by Iatridou, Anagnostopoulou and Izvorski (2001), the Universal reading asserts that both the endpoints of the PTS are included in the event time. Yet in (12b), the left boundary of the PTS is asserted to precede the beginning of the event time and the right boundary of the PTS is not asserted to be included in the event time. Examples such as the ones in (13) illustrate the structure and meaning of (12):

- (13) a. *I have been sick lately.*
 b. *I have been working very hard these days.*
 c. *I have been losing my glasses recently.*

These sentences clearly have continuous readings. Moreover, they are consistent with a situation such that the underlying eventuality holds at the utterance time and beyond, but this is not part of the assertion. Thus, these are Experiential and not Universal perfects.

Finally, in English [NEUTRAL] may be possible outside of the perfect as well, as in (14), where the most natural interpretation is one of an incomplete reading of the Bible.

- (14) *We read the Bible this morning.*

Let us consider now the third aspectual combination – the perfect combining with an Asp_2P whose head has the value of [BOUNDED].

- (15) a. $[_{AspP1} \text{ PERFECT } [_{AspP2} \text{ BOUNDED } [_{vP} \text{ vP }]]]$
 b. $\lambda p \lambda i \exists i' [\text{PTS}(i', i) \ \& \ p(i')] (\lambda P \lambda i \exists e [\tau(e) \subset i \ \& \ P(e)] (\lambda e' P(e'))) =$
 $\lambda i \exists i' [\text{PTS}(i', i) \ \& \ \exists e [\tau(e) \subset i' \ \& \ P(e)]]$

The interpretation in (15b) is again the Experiential one. It is just a stronger version of (13b). (15b) asserts that the entire event time is included in the PTS, whereas (13b) asserts merely an overlap. With respect to atelic predi-

cates, this outcome is welcome. Consider the sentences in (16) in comparison to those in (13).

- (16) a. *I have been sick previously.*
 b. *I have worked very hard before.*

Whereas (13a,b) are compatible with the utterance time being included in the event time, (16a,b) are not, exactly as predicted by the two representations of the Experiential perfect in (12) and (15). The grammatical aspect that enters into the composition of the perfect participle is distinct in the two cases - neutral and perfective, respectively, but its morphological realization is the same on stative predicates. Statives do not appear in the progressive. Imperfective and neutral activities, on the other hand, have to be realized as progressive; when embedded under perfective, activities surface as non-progressive.

When the eventuality in a structure such as (15a) is telic, an Experiential reading obtains, which is appropriately captured by (15b). The sentences in (6) illustrate such a reading, e.g., in the case of (6a) the PTS includes the time of the event of me losing my glasses. This event cannot hold at utterance time, something which (15b) captures. Neither is it necessary for the result state of the event, the glasses being lost, to hold at utterance time, and (15b) accurately represents that.

The remaining problem is that the Resultative reading has not been captured so far. (15b) comes close, given that it represents the underlying eventuality as completed. In the case of telic predicates this would mean assertion of the achievement of the goal. However, a crucial element of the desired meaning is missing - the fact that the state resulting from the culmination of the telic event obtains at the reference time. As discussed earlier, a Resultative reading for (6a) requires that the glasses be still lost, and in the case of (6b), that the built castle is still standing, at the time of utterance.

A solution can be found if we define a new viewpoint aspectual form - resultative - selecting telic predicates, and itself selected by the perfect, with the meaning in (17):

- (17) $[[\text{RESULTATIVE}]] = \lambda P \lambda i \exists e \exists s [i \supset \pi(s) \ \& \ P(s,e)]$
 $i \supset i'$ iff $i \cap i' \neq \emptyset \ \& \ \exists t \exists t' [t \in i \ \& \ t \notin i' \ \& \ t' \in i' \ \& \ t' \notin i \ \& \ t < t']$

It is assumed that telic ν Ps are predicates of events and their result states, e.g. *lose my glasses* has the meaning of $\lambda s \lambda e [e \text{ cause } s \ \& \ \text{my-glasses-are-lost}(s)]$.

The idea of a resultative aspect is found in Kratzer (1998), von Stechow (1999, 2001). However, the particular meaning defined above is specific to

this proposal. In both Kratzer's and von Stechow's proposals, resultative is representative of the same category as the perfect, i.e., the two cannot co-occur. Here, resultative is treated as a viewpoint aspect, as a value of Asp_2 on a par with perfective, imperfective and neutral.

In (17), the meaning of resultative is defined in such a way that it can only combine with telic Aktionsarten. Unlike [BOUNDED], this viewpoint aspect not only asserts that the telic event (e.g. *lose my glasses*) culminates, but also, crucially, that the result state after culmination of the event (*my glasses be lost*) holds at a time that includes the endpoint of the reference time. When embedded in the perfect, [RESULTATIVE] viewpoint aspect has exactly the desired effect. (18b) represents the Resultative perfect reading, namely, that the result state of the culminated telic event holds at reference time.

- (18) a. [$_{AspP1}$ PERFECT [$_{AspP2}$ RESULTATIVE [$_{vP}$ vP]]]
 b. $\lambda p \lambda i \exists i' [PTS(i', i) \ \& \ p(i')]$
 $(\lambda P \lambda i \exists e \exists s [i \ \text{PT}(s) \ \& \ P(s, e)] (\lambda s \lambda e' P(s, e'))) =$
 $\lambda i \exists i' [PTS(i', i) \ \& \ \exists e \exists s [i' \ \text{PT}(s) \ \& \ P(s, e)]]$

Resultative is different from the other three viewpoint aspects in that it necessarily selects a telic Aktionsart. It remains to be seen whether this viewpoint aspect is independently instantiated in English and can combine with tense directly (similarly to neutral in Bulgarian) or whether it always needs to be selected by a perfect.¹³ Resultative aspect in Bulgarian, where it is attested independently of the perfect, is discussed in section 4, in connection with example (22) and (23).

3.3. Some cross-linguistic considerations

Now that we have identified the semantic components that enter into the composition of the three readings of the perfect, we are in a position to account for some of the cross-linguistic differences in the availability of the perfect readings. Greek does not have a Universal perfect. This fact can be captured by positing a syntactic restriction on the selectional properties of the perfect in Greek, such that it cannot embed an Asp_2 whose value is [UNBOUNDED]. Otherwise, Greek has the semantic operator [UNBOUNDED] and it can combine directly with tense. Exactly the opposite happens in Portuguese. It has been claimed that this language does not allow a Resultative and an Experiential reading of the perfect (Brugger 1998). This follows, if in this language the perfect necessarily selects an Asp_2 with the feature specification [UNBOUNDED].

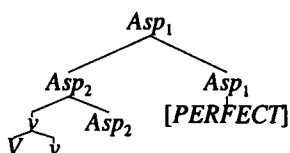
Thus we see that languages may pose syntactic restrictions on the combinatorial properties of aspects. The hierarchical organization in the perfect and meanings for the various aspects, as proposed here, allows for a straightforward account of the cross-linguistic availability of the various perfect interpretations.

4. On the morphology of perfect participles

The proposal developed in section 3 discussed the syntax of the perfect and the meaning contribution of the viewpoint aspects embedded in the perfect. The question of the exact morphological realization of the perfect participle was postponed. Here, I address the various ways the participle is spelled-out, for each perfect type, depending on the viewpoint aspect and the particular Aktionsart embedded under the perfect. The discussion is not meant to be an exhaustive treatment of the morphology of the perfect participle. Rather, my goal here is to illustrate that there is no one-to-one correspondence between the meaning of the formatives manipulated by syntax and their morphological realization. This is consistent with recent ideas about the semantics and morphology of aspect developed in von Stechow (2001).

I assume that either verb-movement in syntax or merger operations in the morphological component are responsible for the creation of a complex verbal head as in (19). Depending on the Aktionsart (the V-*v* complex), and the feature content of Asp₂, the perfect participle may have different overt instantiations.

(19)



Let us consider English first. An [UNBOUNDED] value for Asp₂ results in a Universal reading, as discussed earlier. If the underlying eventuality is a state, the participle is spelled-out as non-progressive, otherwise it has to be realized as progressive. The same split according to Aktionsart shows up in the Experiential perfect when the viewpoint aspect is [NEUTRAL] – an underlying state is spelled-out as non-progressive, any other Aktionsart has to form a progressive participle. When the viewpoint aspect is [BOUNDED], independently of the type of Aktionsart, the participle is non-progressive. Finally, the Resultative perfect is the outcome of [RESULTATIVE] embed-

ding a telic event, and the spell-out morphology is non-progressive. The above facts are summarized in (20).

(20) English

Perfect Type	Viewpoint Aspect		Aktionsart
	Semantics	Morphology	
Universal	[UNBOUNDED]	non-progressive progressive	state activity, telic
Experiential	[NEUTRAL]	non-progressive progressive	state activity, telic
	[BOUNDED]	non-progressive	any
Resultative	[RESULTATIVE]	non-progressive	telic

In Bulgarian, three feature specifications of Asp_2 yield the three perfect readings. Both [UNBOUNDED] and [NEUTRAL] are realized by the neutral morphology, or when neutral is not available for a particular predicate, by imperfective morphology.¹⁴ Finally, [RESULTATIVE] is spelled-out as perfective.

(21) Bulgarian

Perfect Type	Viewpoint Aspect		Aktionsart
	Semantics	Morphology	
Universal	[UNBOUNDED]	neutral/ imperfective	any
Experiential	[NEUTRAL]	neutral/ imperfective	any
Resultative	[RESULTATIVE]	perfective	telic

The question arises of whether [BOUNDED] is a viewpoint aspectual value that is used in Bulgarian. It appears to be the case that it is not. Evidence for this comes from the fact that perfective morphology in Bulgarian is always associated with telicity, even for atelic underlying predicates.¹⁵ Thus the state 'love' in (22a), with a perfective inflection, comes to be an inchoative 'fall in love', e.g., an achievement. The activity 'scream' in (23a), when inflected with perfective morphology, is interpreted as inchoative as well, i.e., 'start to scream'.¹⁶ These are not the readings that should obtain from a [BOUNDED] + state, and [BOUNDED] + activity combinations. Such

readings do not obtain when the atelic eventualities appear with non-perfective morphology, as (22b) and (23b,c) illustrate.

- (22) a. *Ivan obikna Maria.*
 Ivan love-PERF.PAST Maria
 'Ivan fell in love with Maria.'
- b. *Ivan običaše Maria.*
 Ivan love-IMPERF.PAST Maria
 'Ivan loved Maria.'
- (23) a. *Ivan pisna (*dva časa).*
 Ivan scream-PERF.PAST two hours
 'Ivan started screaming (*for two hours).'
- b. *Ivan pištja (dva časa).*
 Ivan scream-NEUT.PAST two hours
 'Ivan screamed (for two hours).'
- c. *Ivan pišteše.*
 Ivan scream-IMPERF.PAST
 'Ivan was screaming.'

In other words, it is not [BOUNDED] that is spelled-out as perfective outside of the perfect. Rather, the readings in (22a) and (23a) are derivable by [RESULTATIVE] in combination with a telic eventuality.

5. Grammatical distinctions in the Existential perfect

This section presents some additional arguments for positing distinct structures for the perfect types. Much has been said about the Universal-Existential distinction previously, thus the arguments for its grammatical basis will not be reviewed here (see the references above in section 2, point ii). I focus here on the distinction within the Existential perfect, namely the Experiential – Resultative ambiguity. Several arguments will be presented in support of the theory of the perfect and its ambiguities outlined above.

5.1. Brugger (1998) on the perfect types

Brugger (1998) is the first to argue for a formal distinction between the two types of Existential perfect. His arguments are based on the temporal interpretation of clauses embedded under the different types of present perfect. In such cases, the Experiential perfect behaves like a past tense, while the

[–past]. The [+past] feature that licenses the sequence-of-tense effects in the case of the Experiential perfect (illustrated in (25c)) is introduced lower than T, in the T/Asp head. The representation in (26a) is the LF for the Experiential perfect proposed by Brugger. The Resultative and the Universal perfects, on the other hand, have the LF in (26b). Instead of the temporal [+past] feature in T/Asp, these perfect types have an aspectual feature, called TERM (for terminal). TERM is presented as a viewpoint aspect (in the terminology of Smith 1991). It is said to “view” the terminal part of eventualities, defined as the result state for telic events and the final part of atelic eventualities.

- (26) a. $[_{TP} [-Past]_T [_{T/AspP} [+Past]_{T/Asp} [_{VP} VP]]]$ EXP
 b. $[_{TP} [-Past]_T [_{T/AspP} [TERM]_{T/Asp} [_{VP} VP]]]$ U, RES

According to Brugger, the different perfect interpretations and temporal effects are derived in the following way. In the case of the Experiential perfect, the participle (T/Asp) has no aspectual value, thus allowing for a variety of aspectual interpretations. The [+past] value in T/Asp shifts the event time in the past relative to the speech time. In the case of the Universal and Resultative perfects, as no past value is expressed in the T/Asp, the viewpoint (reference time) of the participle and the speech time are interpreted as co-temporal. For telic events this means that the result state holds at the speech time, and for atelic eventualities – that the final part is co-temporal with the speech time (but without implying the eventuality’s termination).

The arguments provided by Brugger for a grammatical distinction between the Experiential and Resultative perfects are important. The particulars of Brugger’s proposal are not adopted here, however. Of special relevance in this respect are the following two shortcomings of his account. The first has to do with the fact that no uniform structure and meaning is attributed to the perfect, as the LFs in (26) clearly illustrate. The second is related to the common representation for the Universal and Resultative perfects (cf. 26b).

The lack of a uniform representation for the perfect is problematic, because the fact that many languages use partially the same morpho-syntactic means to express the three readings of the perfect (e.g., auxiliary plus past participle in Germanic and Romance, auxiliary plus a specialized¹⁸ perfect participle in Slavic and Greek) remains unaccounted for. But perhaps more importantly, the uniform representation for the Universal and Resultative perfects, with the difference stemming solely from the Aktionsart of the VP, runs into a number of problems of its own. First, it remains unclear under such an account why some languages do not have a Universal perfect at all but do have a Resultative one, e.g., Greek, and perhaps German as well. As Iatridou, Anagnostopoulou and Izvorski (2001) point out, the fol-

lowing sentence in Greek, with a stative *vP*, does not have a Universal reading, only an Existential one. Adding adverbials that trigger the Universal interpretation, such as *always*, *at least since 1990*¹⁹ would only make the sentence ungrammatical.

- (27) *O Yannīs eχi ayapisi tin Maria.*
 the Jannis have-3sg loved theMaria
 ‘Jannis has fallen in love with Maria.’

Brugger’s account would predict that the aspectual value TERM would “view” the final part of the state and yield a Universal reading, contrary to fact. Second, activities embedded in the perfect are expected to trigger the Universal reading under Brugger’s account, but they do not (unless embedded under the progressive first), as seen earlier in (5). Third, the possibility of embedding a progressive under the perfect, and the fact that in such a case even telic Aktionsarten result in a Universal reading cannot be captured by a structure such as (26b).

- (28) *I have been losing my glasses ever since I bought new frames.*

Related to the last point is the observation that telic predicates in the Portuguese present perfect necessarily get an iterative reading (Giorgi and Pianesi 1998, Schmitt 2001):

- (29) *O João tem saído tarde.*
 the J. has left late
 ‘Joao has been leaving late’; not ‘Joao has left late.’

The perfect in (29) has a Universal interpretation only, similarly to the English progressive perfect in (28).

In sum, Brugger’s conclusions that the interpretive distinctions in the perfect have a grammatical basis are accepted here, without adopting his overall view of the syntax and semantics of the perfect.

5.2. Further arguments from English for a grammatical distinction

Another argument comes from the observation that there are distinctions of grammatical aspect as well, between the Experiential and the Resultative perfects. The Resultative perfect does not allow the progressive in English, whereas both the Universal and the Experiential do.²⁰

- (30) a. *I have been drinking coffee at least since 3 o'clock.* U
 b. *I have been drinking coffee on many occasions before.* EXP
 c. **I have been drinking this cup of coffee right now.* RES

As far as sequence-of-tense effects are concerned, the Universal and the Resultative perfect pattern together, in contrast to the Experiential perfect. Grammatical aspect, on the other hand, partitions the perfect types in a different way: the Universal and the Experiential pattern together, to the exclusion of the Resultative perfect. Both partitions contrast the Experiential and the Resultative types, supporting a grammatical distinction within the Existential perfect. Taken together, the temporal and aspectual effects argue for a three-way grammatical distinction in the perfect.

In addition to the different temporal and aspectual effects on the part of the three perfect types, there is other evidence suggesting that the distinctions within the perfect are grammatical. In particular, parallelism tests reveal that the Experiential and Resultative interpretations are not a matter of vagueness of an otherwise unambiguous perfect. If that were so, in a sentence such as (31a), the two conjuncts could receive distinct interpretations, one of them Experiential and the other Resultative. Instead, either both conjuncts have to be Experiential, or they both have to be Resultative. This is illustrated by the unacceptability of the sentences in (31b), where adverbial modification forces the two conjuncts to be distinct.²¹

- (31) a. *John has lost his glasses and Mary has too.*
 b. **John has just now lost his glasses and Mary has too, several times before.*

Thus we see that English offers several reasons to posit a grammatical distinction within the Existential perfect – effect on the temporal interpretation of clauses embedded under the perfect, the availability of embedding grammatical aspect such as the progressive, and matching interpretation in conjunction.

5.3. Grammatical distinctions in the Existential perfect in Bulgarian

Facts from Bulgarian provide additional support that the Experiential and the Resultative interpretations have a grammatical basis. Viewpoint aspect in the perfect participle has clear effect on the resulting perfect reading. The participle in the Resultative perfect has to be perfective, while the one in the Experiential perfect has to be imperfective or neutral.

The perfect in Bulgarian is analytic, formed with a *be*-auxiliary and a specialized participle (the 'I'-participle), which is distinct from the passive participle.

- (32) a. *Ivan e postroil pjasâčnata kula.*
 Ivan be-3SG.PRES build-M.SG.ACTIVE sand-the castle
 'Ivan has built the sandcastle.'
- b. *Pjasâčnata kula e postroena ot I.*
 sand-the castle be-3SG.PRES build-F.SG.PASS by I.
 'The sandcastle is built by Ivan.'

The perfect participle can express grammatical aspect, unlike, e.g., Greek, where the perfect participle can only be perfective.

- (33) a. *Ivan e stroil pjasâčna kula.*
 Ivan be-3SG.PRES build-NEUT.M.SG sand castle
 'Ivan has been building a sandcastle.'
- b. *Ivan e strojal pjasâčna kula.*
 Ivan be-3SG.PRES build-IMPERF.M.SG sand castle
 'Ivan has been building a sandcastle.'
- c. *Ivan e postroil pjasâčna kula.*
 Ivan be-3SG.PRES build-PERF.M.SG sand castle
 'Ivan has built a sandcastle.'

As proposed in section 3, viewpoint aspect has a direct effect on the interpretation of the perfect. Bulgarian provides direct evidence for this. In particular, as noted in section 4, the morphological aspect realized on the perfect participle varies with the possible readings of the perfect. The following examples illustrate the facts that are the basis for the generalization in (21). When the participle is neutral, adverbs triggering the Universal reading, such as 'all morning', are possible (cf. (34a)). Adverbs that are compatible with the Experiential reading only, such as 'many times' and 'before', are possible as well (see (34b) and (34c)). Yet adverbs such as 'now', which are compatible only with the Resultative reading, are not possible (see (34d)). Given that a resultative reading does not obtain when the participle is marked neutral, (34e) is not felicitous (the culmination of the underlying telic even is not asserted, thus the existence of a sandcastle is not asserted).

- (34) a. *Ivan cjala sutrin e stroil pjasâčna kula.*
 Ivan all morning is build-NEUT sand castle
 'Ivan has been building a sandcastle all morning.'

- b. *Ivan e stroil pjasáčna kula mnogo pāti.*
 Ivan is build-NEUT sand castle many times
 'Ivan has built a sandcastle many times.'
- c. *Ivan e stroil pjasáčna kula i predi.*
 Ivan is build-NEUT sand castle and before
 'Ivan has built a sandcastle before as well.'
- d. * *Ivan e stroil pjasáčna kula sega.*
 Ivan is build-NEUT sand castle now
 'Ivan has built a sandcastle now.'
- e. # *Ivan e stroil pjasáčna kula*
 Ivan is build-NEUT sand castle
- no šte ja razvali.*
 but will it destroy

'Ivan has built a sandcastle but will destroy it now.'

Imperfective participles have a similar effect to the neutral one. (35a) is an example of the Universal perfect, with the adverb 'always'. (35b) is an acceptable Experiential perfect. The Resultative reading is not available, as (35c) and (35d) illustrate.

- (35) a. *Maria vinagi e pristigala v polunošt.*
 Maria always is arrive-IMPERF in midnight
 'Maria has always arrived at midnight.'
- b. *Maria e pristigala v polunošt i predi.*
 Maria is arrive-IMPERF in midnight and before
 'Maria has arrived at midnight before as well.'
- c. * *Maria e pristigala sega.*
 Maria is arrive-IMPERF now
 'Maria has now arrived.'
- d. # *Maria e pristigala i šte sedi do*
 Maria is arrive-IMPERF and will stay to
- utre.*
 tomorrow

'Maria has arrived and will stay until tomorrow.'

The perfective perfect participle, on the other hand, allows only the Resultative reading, as the sentences in (36) illustrate.

- (36) a. **Maria vinagi e pristignala v polunošt.*
 Maria always is arrive-PERF in midnight
 'Maria has always arrived at midnight.'
- b. **Maria e pristignala v polunošt i predi.*
 Maria is arrive-PERF in midnight and before
 'Maria has arrived at midnight before as well.'
- c. *Maria e pristignala sega.*
 Maria is arrive-PERF now
 'Maria has arrived now.'
- d. *Maria e pristignala i ŝte sedi do utre.*
 Maria is arrive-PERF and will stay till tomorrow
 'Maria has arrived and will stay until tomorrow.'

The above sentences illustrated the role of viewpoint aspect in determining the interpretation of the perfect. The Bulgarian facts are consistent with those from English in (30) above, where it was shown that the progressive cannot be used in a Resultative perfect, but only in the Experiential and the Universal ones.

The next set of facts concern the temporal interpretation of clauses embedded under the three perfect types. The summary of the facts is given in (37).

- (37) a. Universal perfect: does not allow a shifted reading of a future, similarly to the present
- b. Experiential: allows a shifted reading of a future, like the past does
- c. Resultative: does not allow a shifted reading of a future, similarly to the present

The following sentences illustrate the facts in (37).²² Sentence (38a), whose main clause has past tense, allows both a simultaneous and a shifted interpretation for the embedded future-marked clause. The event time of *Ivan leave* can be two days after the utterance time or two days following the time of the matrix event (and thus possibly preceding the utterance time). A matrix present tense, in contrast, does not allow a shifted reading, as (38b) shows. Here only one interpretation is possible, the one where the event time of *Ivan leave* is two days after the utterance time.

- (38) a. *Ivan me ubedi/ubeždavaše*
 Ivan me convince- $\{\text{PERF/IMPERF}\}$.PAST.3SG
- če ŝte trâgva sled dva dena.*
 that will leave-IMPERF.PRES.3SG after two days

‘Ivan convinced me that he would leave in two days.’

- b. *Ivan me ubeždava*
 Ivan me convince-IMPERF.PRES.3SG

če šte trâgva sled dva dena.
 that will leave-IMPERF.PRES.3SG after two days

‘Ivan convinces me that he will leave in two days.’

The three perfect types behave differently. The Experiential perfect, as in (39a) is ambiguous as it allows the shifted reading. Neither the Universal perfect in (39b) nor the Resultative one in (39c) has the shifted reading. Thus, the Experiential perfect behaves similarly to the past tense, whereas the Universal and the Resultative perfects behave like the present tense.

- (39) a. *Ivan me e ubeždaval i predi*
 Ivan me is convince-IMPERF and before

če šte trâgva sled dva dena.
 that will leave-IMPERF.PRES.3SG after two days

‘Ivan has convinced me before that he would leave in two days.’

- b. *Ivan cjal den me e ubeždaval*
 Ivan all day me is convince-IMPERF.M.SG

če šte trâgva sled dva dena.
 that will leave-IMPERF.PRES.3SG after two days

‘Ivan has been convincing me all day that he will leave in two days.’

- c. *Ivan me e ubedil sega*
 Ivan me is convince-PERF.M.SG now

če šte trâgva sled dva dena.
 that will leave-IMPERF.PRES.3SG after two days

‘Ivan has convinced me now that he will leave in two days.’

The temporal effects described above for the Bulgarian perfect are the same as the ones identified by Brugger (1998).

5.4. Summary of grammatical distinctions in the perfect

The perfect types cluster the same way in Bulgarian and English with respect to their aspectual properties and temporal effect on clauses embedded under them. According to these criteria, we obtain the following clusters of properties, in both languages:

- (40) a. Viewpoint aspect: Universal and Experiential vs. Resultative
 b. Sequence of tense: Universal and Resultative vs. Experiential

The distinction between the Universal and the other two types of perfect has been shown to have a grammatical basis (see the references in section 2, ii). Given this, the fact that there are phenomena which consistently unify the Universal with one but not the other of the Experiential and the Resultative perfects, leads to the conclusion that the distinction among all three perfect types is grammatical in nature.

6. Conclusions

In this paper I proposed an analysis of the syntax and meaning of the perfect that has the following two characteristics: (i) it is unified, in the sense that it assigns a single structure and a single meaning to all perfect expressions; (ii) it attributes the ambiguities in the perfect to the different contribution of the various aspectual categories embedded in the perfect.

In particular, I proposed a version of the Extended Now view of the perfect (McCoard 1978, Dowty 1979, Iatridou, Anagnostopoulou and Izvorski 2001). The perfect makes a reference to a time interval – the Perfect Time Span – whose final subinterval is the interval of evaluation, and locates an eventuality in this time interval. How exactly the eventuality is temporally located relative to the PTS is determined by viewpoint aspect embedded in the perfect. Four different viewpoint aspects were identified of relevance for the perfect ambiguities. [UNBOUNDED] presents the interval at which the underlying eventuality holds as a superset of the reference interval. When embedded in the perfect, [UNBOUNDED] determines the Universal reading. [BOUNDED] properly includes the event time in the reference interval; accordingly, its presence under a perfect contributes to the Experiential interpretation. This type of Experiential is such that the underlying eventuality is asserted not to obtain at the reference interval (the utterance time in matrix clauses). Another Experiential reading, where this restriction does not obtain, is the result of the presence of [NEUTRAL] in the composition of the perfect. This viewpoint aspect locates only the beginning part of the eventuality, without making any claims about completion, both when embedded

under a perfect and independent of it. Finally, [RESULTATIVE] is a viewpoint aspect that selects for telic events and presents their result state as overlapping with the reference interval and continuing beyond it.

It was further proposed that the availability of perfect readings cross-linguistically is principled and determined on the basis of the selectional properties of the perfect. The perfect in Greek was argued to not select for [UNBOUNDED], while it was suggested that the perfect in Portuguese may select only for [UNBOUNDED].

Finally, it was shown that there does not exist a one-to-one correspondence between the semantics and morphology of the aspects, but that the mapping is still principled.

Notes

- * Many of the ideas presented in this paper stem from discussions with Sabine Iatridou and Elena Anagnostopoulou during our joint work, reported in Iatridou, Anagnostopoulou and Izvorski 2001. Sabine's and Elena's influence is gratefully acknowledged. Thanks to Arnim von Stechow for his detailed written comments, to Philippe Schlenker, and to the organizers and audience of the *International Workshop on Participles*, University of Tübingen, Seminar für Sprachwissenschaft, April 2001.
- 1. Other interpretations have also been noted: the so-called HOT NEWS perfect, as in (i), and the perfect of RECENT PAST, as in (ii); both, if distinct, perhaps a variant of the Resultative perfect or the Experiential Perfect.
 - (i) *The Lakers have won!*
 - (ii) *I have just graduated from college.*
- 2. In the case of some telic events with irreversible result states, such as the one in (i), the distinction between a Resultative and an Experiential reading is difficult to make.
 - (i) *I have graduated from college.*
- 3. The adverbial *for 10 days* can be "perfect-level" or "eventuality-level". This distinction is used in Dowty 1979, Vlach 1993, and others. It refers to the scope of the adverbial – over the perfect or only over the underlying eventuality embedded in the perfect. When it is perfect-level, *for 10 days* requires the Universal perfect; when it is attached lower, at the level of the eventuality, the Experiential reading results.
- 4. The structures in (7) and (9) ignore the issue of synthetic vs. analytic realization. Movement of the [ν -V] complex head to Asp (Asp₂ and Asp₁, in the case of (9)) to T would result in a synthetic form, whether perfective, imperfective, or perfect. Embedding of a semantically vacuous Aux(iliary)P (or a more complex Aux structure, if *have* is to be derived from *be* plus an incorporated head, as in proposals inspired by Kayne 1993), under T, with the Aux head taking the

highest AspP as its complement, would be the appropriate structure for analytic forms. See the discussion in Iatridou, Anagnostopoulou and Izvorski 2001, Appendix 2, on a proposal that relates such analytic perfect structures to the cross-linguistic availability of perfect participles as reduced relatives.

5. Semantic aspects are probably the syntactic specifier of AspP, rather than the head; similarly for the semantic tenses. This syntactic distinction is ignored, as not relevant for the discussion.
6. As defined, the tenses can be composed with one another. I assume that iteration of tenses in the same clause is syntactically prohibited.
7. Tenses can be treated as pronouns (Partee 1973, Heim 1994, Kratzer 1998, von Stechow 1999, Paslawska and von Stechow, to appear, a.o.).
8. Usually, the meaning of perfective, or [BOUNDED] is defined such as the event time is a subset of the reference time, instead of a proper subset, as defined here. Judgments are subtle as to whether in (i) 6pm can be included in the event time:
 - (i) *I wrote a squib from 2 to 6pm.*
9. The term neutral has not been used in traditional/ functionalist descriptions (e.g., Lindstedt 1985, Dickey 2000) or generative treatments (e.g., Slabakova 1997) of the tense-aspect system of Bulgarian. It remains an open question to what extent neutral is applicable to the rest of the Slavic languages.
10. Perfective morphology in Bulgarian is realized both with prefixes and suffixes. Obviously a more careful distinction between the two is needed. That verbal prefixes of Slavic are markers of perfective aspect is commonly acknowledged (e.g., Forsyth 1970, Binnick 1991, Krifka 1992, Schoorlemmer 1995, Piñon 2001, a.o.) though often these prefixes contribute to the lexical meaning as well.
11. The perfect, just as the tenses earlier, is represented as an existential quantifier over a PTS. Again, nothing hinges on this representation.
12. The perfect, as a relation between evaluation intervals, has a semantics similar to that of the tenses. Thus, labeling the perfect as an aspect rather than tense, is a terminological choice without much significance.
13. One candidate is the passive in (i):
 - (i) *The door is opened.*
14. When both a neutral and an imperfective participle is available for a given predicate, neutral must be used in the Universal and Experiential perfects. Imperfective is used only for the predicates that do not have neutral available. In Iatridou, Anagnostopoulou and Izvorski 2001: 233, we suggested that neutral is more specified than the imperfective. Both can be inserted in environments specified [NEUTRAL] or [UNBOUNDED], but neutral morphology also requires the specifications [dynamic] and [durative].
15. Treatments of Slavic (other than Bulgarian) aspect have commonly asserted that perfective forms are semantically quantized/telic, i.e. they denote

bounded eventualities with an inherent end-point (e.g., Krifka 1992, Filip 2000, Piñon 2001).

16. Note that I have selected verbs that form the perfective with a suffix, rather than a prefix (see also footnote 10). Thus the inchoative element cannot be attributed to a prefix inducing a lexical change.
17. The use of the term *lexical-aspectual* for the Aktionsart should not imply that I endorse a view that the eventuality classes – states, activities, accomplishments, achievements – are entirely lexically specified, with syntax playing no role. Rather, the use of the term acknowledges that the lexical meaning of predicates has a role in the determination of Aktionsart (and syntax does as well), whereas it has no role whatsoever in building a perfective, or an imperfective aspectual phrase.
18. Specialized in the sense that this participle is not also used in the passive. This remark, however, should not be taken as an endorsement of the view that the syncretism between the perfect and passive participle in the Germanic and Romance languages is an indication of complete identity of the syntax and meaning of the two.
19. Technically, Greek does not have an adverbial such as *since X, only from X till now*. This is not what is responsible for the lack of a Universal reading in sentences such as (27) however, as the same is true for Bulgarian, yet Bulgarian has Universal readings.
20. The Universal perfect, of course, requires the progressive on non-statives.
21. This complements the observation in Iatridou, Anagnostopoulou and Izvorski (2001: 227) that in a sentence such as (i) both conjuncts need to be Universal or both need to be Existential.
 - (i) *Since 1990 John has been sick and Mary has too.*
22. The examples were inspired by Iatridou (2000).

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