The Perfect in Ancient Greek

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1. Preliminary remarks

1.1. The aspect system of Ancient Greek

Many studies have been devoted to the phenomenon of the Ancient Greek Perfect formation, done by classicists, comparative linguists and, to a smaller degree, formal linguists. The formation poses a lot of problems which are worth thinking about, so e.g. the striking change in the history of Greek from a state formation to a past tense. This study tries to examine if this change could be described more precise than it has been done before. The approach which I took is rather obvious: If we assume that the perfect basically has got stative qualities (a fairly standard assumption, cf. e.g. Sihler 1995: 564-579), we are already on the field of *aktionsarten* as Vendler (1957) first described them. They have become the background of numerous accounts of a big variety of problems connected with verbal semantics. So it seems to me rather straightforward to look, whether the concept of *aktionsarten* might be a useful tool in accounting for the Ancient Greek perfect formation as well. The method of decomposition used here is mainly taken from Irene Rapp's study of the German *zustandspassiv* (1997).

One of the most striking features of Ancient Greek, compared to modern Indoeuropean languages as well as even to ancient languages like Latin, is the big variety of forms which are included in the verbal paradigm. This is due to the fact that Greek has extra categories on all levels. Where e.g. other languages have only two voices, Ancient Greek has three (active, middle, passive), and the same could be said about verbal modes (four: indicative, subjunctive, optative and imperative) and, for Archaic Greek, about number (singular, dual, plural). Especially the tense system seems to be greatly inflated. On the second glance, however, one notices that this last observation is

mainly due to the interaction of two distinct categories, namely tense and aspect.

I feel justified in stating that the verbal system of Ancient Greek is based on aspect rather than tense (Chantraine 1927: 16). This is obvious from the fact that - at least in Classical Greek up to the later *koiné* - only indicative forms are tense marked (alongside a compulsory aspect marking, of course), whilst all other forms, i.e. infinitives, optative etc., do not show tense features but only aspectual features (Kühner and Gehrt 1966: 1,131; 182; Schwyzer and Debrunner 1950: 256).

(1)   a. katéb<u>e</u>n chthès eis Peiraiâ ... háma (!) t<u>è</u>n heort<u>è</u>n boulómenos
           theásasthai.
           'I went down to the Piraeus ... because I wanted at the same time to
           watch the feast.'
           katéb<u>e</u>n: Indicative of the aorist stem; past.
           boulómenos: Participle of the so-called 'present' stem; simultaneous.
           theásasthai: Infinitive of the aorist stem; simultaneous.

      b. Polémarchos ... ekéleuse dramónta tòn paîda perimeînaí he keleûsai.
           'Polemarchus made his servant run and ask us to wait for him.'
           ekéleuse: Indicative of the aorist stem; past.
           drámonta: Participle of the aorist stem; simultaneous.
           perimeînai: Infinitive of the aorist stem; simultaneous or futural.
           keleûsai: Infinitive of the aorist stem; simultaneous or futural.

The point in (1) (both from Plato's *Republic*, 327ab) is that the aorist forms do not denote events that happened in the relative past, but simultaneous events. This is in contrast to the fact that the indicative aorist always expresses past tense. Since both the indicative and the non-indicative forms are built on the same aoristic stem, the stem in itself cannot have the notion of past or relative past.

The same goes probably for Proto-Indoeuropean. Most modern Indoeuropean languages, on the other hand, tend to be organized in terms of tense rather than aspect, the latter playing only a minor role, if at all (cf. Chantraine 1927:16).

The aspect category is marked by stem formation morphemes. Tense, on the other hand, is marked by morphemes which appear at the utmost periphery of the verbal form. One should mention here

especially the augment (a prefix of the form [e-]), which denotes past tense (Kühner and Blass 1966: 2,6; Kühner and Gehrt 1966: 1,130). It can modify only indicatives, from which follows that only indicatives can bear temporal meaning (cf. Rijksbaron 1984: 4-5). I want to emphasize that, at least in Archaic and Classical Greek, the stems as such are not tense-marked, but only marked in respect of aspect. The future stem, which is the only tense marked stem, plays an extra role in this system.

Traditionally one distinguishes three kinds of aspectual stems which are usually called presence-stem, aorist-stem and perfect-stem (Kühner and Blass 1966: 2,3). Since however this nomenclature implies that these stems as such carry features of the tenses after which they are named, one should prefer a terminology whose terms are neutral regarding tense. A possible terminology would be 'durative stem', 'aorist stem' and 'resultative stem', respectively. This sort of terminology is far from being accepted in Classical Philology, but there is a tendency in more modern grammars, like Sihler 1995, to abandon the traditional terminology. Sihler e.g. talks about 'eventive verbs' which are distinguished in 'durative eventive' and 'punctual eventive' and contrasts them to the 'stative verbs' which represent the so-called perfect stems (Sihler 1995: 564).

The properties of the three aspects in Greek are usually described as follows: The aoristic aspect denote that an action or event is completed, whereas the durative aspect emphasizes rather the development or being-in-progress of an action or an event, no matter whether the event is completed or not (Kühner and Gehrt 1966: 1,130). A by-product from that basic distinction is the notion of duration or repetition which is often implicated in using durative stem forms and indeed led to calling this aspect 'durative'. This leads to the conclusion that these two aspects are distinct from each other in the first place by only one feature [± perfective] which is either positive or negative (cf. Rijksbaron 1984: 1-2). The fact that at least in the indicative the aorist describes a finished event in contrast to the durative forms, explains why aorist stems cannot form a present tense, as by using present tense one denotes *per definitionem* that an event is not yet completed (Kühner and Gehrt 1,131; Schwyzer and Debrunner 1950: 270).

Describing the aspectual properties of perfect stems does not work on such relatively easy lines as it is the case with eventive stems. I will turn to perfect stems in a minute. Before I do so, however, I want to say a few things about stem formation.

1.2. The internal structure and paradigmatization of Greek verbs

Another stipulation about the Proto-Indoeuropean and consequently the Proto-Greek verbal system is that it was not organized originally in paradigms (Schwyzer 1939: 818), but rather like it is suggested by Sanskrit: Verbs are formed *ad hoc* by combining a verbal stem which represents the basic meaning of the verb with a verbal head morpheme which carried some aspectual information, at least a feature [± perfective] (cf. Austefjord 1984: 161: "morphologische Selbständig-keit").

Consequently we have to regard verbs in principle as compound entities rather than atomic units. Verbs are as a rule structured according to the following scheme (cf. Schwyzer 1939: 417; for a similar structure of Latin nouns cf. Wunderlich 1986: 233):

(2) $[_V [R] V]$

R stands for 'root'. Indoeuropean - and Greek - roots are morphemes which carry basically the conceptual information. They are bound morphemes, i.e. they must undergo combination with other morphemes in order to function as verbs, nouns etc. On the early stage of Proto-Greek, which I describe here, it was presumably the mere roots that constituted lexicon entries. In order to form a verb, as mentioned above, the selected root had to undergo derivation by means of a verbal heal morpheme. All features relevant for the concept's functioning as a verb are encoded in the verbal head morpheme. The same goes for nouns, adjectives and adverbs as well, of course. The root, on the other hand, probably did not carry any word class features, originally.

An important consequence is as follows: If it was in Proto-Greek roots and not verbs that formed entries of the mental lexicon, it is *a*

priori not possible to postulate verbal paradigms for that stage of the language. If we did so, it would be questionable where the information concerning the paradigm should be encoded. The root cannot bear paradigmatic features since it is *a priori* not verbal. If we would e.g. form a noun from the same root we might be at a loss, what to do with the paradigmatic inherent information. The verbal heads, on the other hand, do not carry paradigmatic information either since they operate freely and do not allow predictions about which other head morphemes are compatible with it.

That this stipulation is correct is indicated by the fact that there is a mismatch between aorist and durative stems in languages like Ancient Greek. There is e.g. more or less free combination of thematic and athematic durative or aorist stems. If the verbal system *a priori* made up paradigms, one should expect there to be more uniformity.

Table 1. Free combination of thematic and athematic stems in a verbal paradigm

	athematic aorist	thematic aorist
athematic durative	*deík-ny-mi - é-deik-sa*	*ól-ly-mai - ol-ó-men*
thematic durative	*lý-o - é-ly-sa*	*gí-gn-o-mai - e-gen-ó-men*

Therefore the aorist form is not predictable from the durative form and *vice versa*.

(3) dur. *phaíno* → aor. *éphena*   ≠> dur. *lambáno* → aor. *elámbena*
     dur. *leípo* → aor. *élipon*   ≠> dur. *kteíno* → aor. *éktinon*
     dur. *deíknymi* → aor. *édeixa*   ≠> dur. *ómnymi* → aor. *ómsa*

Furthermore there exist, even in the Attic of forth century BC, from some verbal stems two different durative or aorist stems. Both can even be found in the same author. The verbal stem *kten-* 'kill', for instance, forms two duratives in Demosthenes, one with $j^e/_o$-suffix *kteíno* (e.g. Dem. 23,26) and one with *ny*-Suffix *ktínnymi* (e.g. Dem. 19,259). The same could be said for the verbal stem *men-* 'stay', which in Attic shows two durative stems, with ∅-morpheme *méno* (e.g. Isocr. 13,12) or with C_1i-morpheme *mímno* (e.g. Soph. *Tra*. 539). There are also verbal stems which form two aorist stems, like *pith-* 'persuade': There is an aorist with ∅-morpheme *épithon* (APr 204) alongside one with -*s(a)*-morpheme *épeisa* (Dem. 18,179)

In a secondary process some often used combinations of verbal stems and aspectual head morphemes were grouped together to paradigms. These frequent combinations eventually suppressed other combinations which were used more seldom, and achieved normative character. If we turn back to e.g. the duratives of the verbal stem *men-* 'stay': The ∅-morpheme alternative catches on in face of the variant with present-reduplication. Consequently we find the word today as *méno̱* in the dictionary and not as *mímno̱*. Some of these paradigms become so prevalent, that they adopt normative character to which new formed verbs - loan words, for example - yield automatically. That is the case with e.g. the Latin a-conjugation and the German weak conjugation: New verbs like Latin *parabolare* 'to speak' (from AGr *parabolé̱* 'simile') or German *checken* (from Engl. *to check*) build their forms automatically after the prevalent and productive pattern.

The process of paradigmatization is rather advanced in some languages (like Latin), whilst in other languages it has just begun (like Ancient Greek). That paradigmatization is well under way is indicated e.g. by forms which adopt features of some morphologically related forms, although these features do belong originally and semantically only to the latter. An example is the aorist in Ancient Greek. Originally only the indicative was tense-marked, but in Late Antiquity also other forms like infinitives and participles adopt a past reading. That leads to the conclusion, using the I-split-hypothesis (as instantiated by Pollock 1989), that the syntactic side of paradigmatization is basically a merging of the functional categories Asp and T (cf. Speyer 2003).

1.3. The perfect formation

I confined myself in the previous section on eventive stems. Now the question remains how to extend the account in that framework to the perfect formation. As I suggested further above, the resultative aspect, which is usually attributed to the perfect, is somehow more complex than the durative and aoristic aspects.

Roughly speaking, the resultative aspect denotes a state which prevails after some event has taken place and which is caused by this event (e.g. Kühner and Gehrt 1,130; 146-147; Schwyzer and

Debrunner 1950: 258-259; 263; Bornemann and Risch 1978: 215). One suspects quite soon that this description implies that the perfect has an aspectual feature [- perfective], as it is the case with durative verbs (cf. Gerö and v. Stechow 2002: 11). I do not want to dwell on this point at length; the only thing one should note here is a distinct temporal feature of perfect forms which they share with durative forms but not with aorist forms. The state expressed by a perfect form has begun at a time t_1 which lies before the time of speech production s*, but is still valid at s*. An aorist form of a state verb, on the other hand, does not imply that the state is still persisting at s*. Coming to the difference between duratives and perfects, it seems that this difference can be captured in the first place by the statement that the perfect exclusively denotes states, whilst the durative can denote all kinds of *aktionsarten* (cf. Schwyzer and Debrunner 1950: 258-259; 263). This is not to say, of course, that this is the only difference between perfect forms and durative forms. I regard this remark however for sufficient for the present purpose.

The best way to account for the facts seems to me to think of the perfect as a relatively independent formation in morphological terms, rather a matter of word formation than inflection. The main impetus for that decision is that obviously the perfect formation changes the *aktionsart* of the verbal stem (*aspectual class* in Dowty's [1979: 52] terminology). Mere inflective processes usually do not change anything in the field of *aktionsarten*; durative and aoristic forms of one verb, for instance, show the same *aktionsart*. The perfect consequently does not operate on the level of grammatical aspect but of aspectual classes.

Thus the perfect aspectual properties cannot be traced back to basic distinction like it is the case with the durative and aorist. In forming a perfect a more complex operation must take place which I am going to describe in chapter 2. Let us assume that the paradigmatization of forms with primitive aspects like durative and aorist, which are distinguished merely by a feature [± perfective], was completed rather early, already before the literary tradition starts. The paradigmatization of the more complex perfect occurs much later, only in the 4th century BC. In course of that paradigmatization process the perfect looses important properties which the perfect word formation in Protoindoeuropean originally had, and shifts to a tense-marked form (chapter

3). The only form which is not affected by that process is the passive perfect participle which keeps to the original features of the perfect. On this ground a new periphrastic formation can take over the domain of the former perfect (chapter 4).

2. Starting point: the perfect in Early Attic

2.1. Morphology of the Greek Perfect

The obvious course of action is to reconstruct the original condition of the (Ancient) Greek perfect. This stage is roughly equivalent with the perfect in Homeric Greek and Early Attic, represented by Aeschylus, and early Aristophanes.

Before I begin, I want to apologize that the theoretical level of this essay is going to be rather low, perhaps too low for many linguists. But my intention was first to sketch out the language change and I do not think I need more theoretical accounts for that than I gave. Secondly I wished to keep this essay also understandable for scholars which are not so acquainted with formal linguistics, which is true for many Classicists.

For convenience's sake I start by giving a paradigm of the Greek perfect. The active forms are from *gégona* 'to have become = to be', the passive from *lélymai* 'to be freed'. The passive endings denote also the middle voice. I want to remark here that in my opinion (following Costello 1984: 135-136) the passive voice did not develop out of the middle voice and is therefore a secondary phenomenon, but that Indoeuropean already had a separate passive voice which merged morphologically with the middle voice only later. Therefore the concept of passive is quite natural for Indoeuropean languages like Greek.

Table 2. Perfect paradigm

act.	Sg.	Pl.	pass.	Sg.	Pl.
1.Ps.	gé-gon-a	ge-gón-amen	1.Ps.	lé-ly-mai	le-lý-metha

2.Ps.	gé-gon-as	ge-gón-ate	2.Ps.	lé-ly-sai	lé-ly-sthe
3.Ps.	gé-gon-e(n)	ge-gón-asi(n)	3.Ps.	lé-ly-tai	lé-ly-ntai
inf.	ge-gon-énai		inf.	le-ly-sthai	
part.	ge-gon-ós/-yîa/-ós		part.	le-ly-ménos/-e/-on	

I repeat here some characteristics of the Ancient Greek perfect. It is originally a [- perfective]-marked word formation which expresses the resultant state of some event. Note that I do not yet distinguish between active and passive voice. If the perfect is originally not an aspect form but a word formation of its own, it is able to take an *aktionsart* which may differ from other forms of the same verbal stem. Principally the *aktionsart* 'state' is assigned to the Greek perfect (cf. Vendler 1957 for the properties of *aktionsarten*).

The morphological side of this formation is simple. The basis is a verbal stem, to which a not fully specified morpheme is prefixed (cf. Marantz 1982: 439-40; Olsen 1990: 204-5). The perfect active is characterized by peculiar endings which are partly present-marked, although there is a lot of influence by aorist endings (Kimball 1991: 148-150). The -k- which often occurs between perfect stem and ending is a product of reanalysis and probably was considered by speakers of Ancient Greek to be part of the ending (Kimball 1991: 150-152). The passive (and middle) voice used the present-marked (or: primary) endings.

But how can we account for the lexical-semantic operation connected with this formation?

2.2. The notion of lexical-semantic structure

In order to answer this question I am going to use a method of verbal decomposition that is mainly based on Rapp (1996: 241-245; 1997: 31-79), but is also strongly influenced by Dowty (1979), Wunderlich (1985; 1986; 1987), Bierwisch (1986), Jackendoff (1990) and von Stechow (1995). Rapp's method is very apt for my purpose since it exemplarily manages to assign Vendler's *aktionsarten* to a limited number of operators. It was developed originally for German, but is universal in character.

Before we try to answer the question of perfect semantics, however, it might be valuable to know what we are actually talking about. In other words: Where shall we house verbal (de)composition?

I base my explanations on a model of language modularity which is very similar to the one presented by Bierwisch (1986: 779) and Jackendoff (1990: 16). In Jackendoff's model there are, roughly speaking, three autonomous levels of structure: conceptual, syntactic and phonological structure. The mental lexicon is assigned only a place on the interface between conceptual structure and syntactic structure (Jackendoff 1990: 18); it might prove to be better, however, to count the lexicon as a module of its own, as it is suggested by Bierwisch (1986).

When talking about verbal (de)composition, we are talking about Conceptual Structure, which is, as mentioned above, an autonomous, in some ways syntax-like level of representation beneath syntax proper. An important subsystem of Conceptual Structure, if not a module on its own, is the Lexical-Semantic Structure (= LSS) (in Bierwisch's terminology Semantic Form [SF]). The task of LSS is to translate the concepts into lexical-semantic representations (= LSR) which are used as input to syntax. By that LSS is underlying syntactic deep structure and determining it. So we can say, it is a prelexical system, which however at the same time determines the choice of words. It is syntax-like in that its formation rules resemble in some ways that of syntax proper (cf. Bierwisch 1986: 767-768; 779-780).

I want to remark that, although this level has to do with semantics, it must strongly be distinguished from the other, better-known syntax-semantics interface, i.e. the Logical Form (*contra* Wunderlich 1987: 363). LF is the final level of syntactic representation which is reached after several cycles of transformations and it is on this level that the sentence is interpreted (Chomsky 1995: 167-199). The conceptual structure and its very part we are mainly interested in, lexical-semantic structure, is to be thought as a lexicon-syntax interface level, which generates basic syntactic structures according to the properties and requirements of the lexems involved in the sentence-building process which are associated with the concepts and encode them.

How should we imagine Conceptual Structure to work? Its task is to connect several concepts, i.e. entities represented in the memory of

the brain, to conceptual systems. These conceptual systems are the raw material for sentences and form the input into speech production modules like syntax (cf. Jackendoff 1990: 22-25).

The business of LSS as subsystem of Conceptual Structure seems to be mainly to translate the concepts into words taken from the lexicon and thereby to format a conceptual system so that it is a suitable input for syntax. When saying 'words taken from the lexicon' I do not wish to entail that only pre-formed lexical entities can be used. Let us assume here that the lexicon consists besides a list of existing words of a word formation sub-module which is again working on lines similar to syntax (cf. Selkirk 1982: 6-12). So on LSS the mental lexicon is not only searched through for lexical entries fitting to the concepts but also for word formation mechanisms which can be used for building words which finally fit to the concepts. If the search for a word or a word formation process has been successful, the concept can be expressed by the found word. If this is not the case, the concept must be expressed using a paraphrase which in many cases just mirrors the internal structure of a concept. The point is that the whole content of the concept must be projected into syntax, esp. the argument places. This is done by linking rules, also called correspondence rules (Jackendoff 1990: 245-279; Fortmann and Frey 1997: 156-157). Depending on the number of arguments which are provided in LSS a different syntactic deep structure – in the sense as a basis for further transformations, not in the sense as independent level of representation – will be generated.

The concepts in themselves are usually no primitives, but complex entities with an internal structure. Although one has tried in the past to trace back all verbal concepts to a very limited list of some thirty predicates, whose different combinations would be able to generate all verbal concepts (e.g. Jackendoff; this view goes essentially back to Katz and Fodor 1963), it is perhaps closer to the reality if one allows for a principally unlimited number of lexical verbal concepts. They probably have got some internal structure nevertheless, which I am going to neglect however in this article. Alongside these lexical verbal concepts exists a restricted number of functional verbal concepts or operators which connect the lexical concepts or take scope over them (cf. Bierwisch 1986: 780). This distinction reminds of the distinction between lexical and functional categories in syntax proper, where we

have typically a limited set of elements that can be head of a functional category (the auxiliaries e.g. for I°, 'if' and 'that' for C° and so on) and an *a priori* unrestricted number of elements that can be the head of a lexical category (cf. Jackendoff 1990: 10-11).

Lexical concepts in general are functions with zero or more argument places (Wunderlich 1985: 184; Jackendoff 1990: 23-24). The same goes, of course, for functional concepts, on which I will turn further below. Many nouns have no argument (e.g. 'tree'), some have one (e.g. 'son'), some have more (e.g. 'relation'). Adjectives usually have one argument, some even more (e.g. 'proud'). The same goes for verbs, although there is a limited number of verbs that have presumably no argument (the weather verbs; Wunderlich 1985: 211). Otherwise verbs can take one (e.g. 'to sleep'), two (e.g. 'to write') or three arguments (e.g. 'to give') (cf. Wunderlich 1985: 184-186).

Similar again to words in syntax, concepts belong to different classes. Unlike in syntax, however, these classes must be divided into sub-classes which are determined by the number and the theta-roles of the arguments. For verbal concepts this has been done e.g. by Irene Rapp (1997), whose account I follow here.

Lexical verbal concepts can be grouped together in five classes which are labelled with corresponding markers. The classes are distinct from each other by the number and kind of arguments which the verbs which belongs to the respective class can take. There are two classes of activity verbs, both of which she marks DO, depending on whether one (e.g. *schreien* 'to shout': $SCHREI_{DO}$ [x]) or two (e.g. *streicheln* 'to stroke tenderly': $STREICHEL_{DO}$ [x,y]) arguments are realized. The x-argument (=q1) takes the role of an *agent*, the y-argument (=q2) of a *patient* or *theme*. The finer distinction between *patient* and *theme* can be made by Jackendoffs action tier (1990: 125-151). Since, however, the main purpose of that concept lies in determining the thematic hierarchy and by that finally the basic word order (Jackendoff 1990: 258; Fortmann and Frey 1997: 156-158), a problem which I am not going to address in this article, I will confine myself to the thematic tier when I give the LSS representation of verbs.

State verbs, on the other hand, constitute three classes: BE with one argument (e.g. *schlafen* 'to sleep': $SCHLAF_{BE}$ [x]), PSYCH with two arguments (e.g. *wissen* 'to know': $WISS_{PSYCH}$ [x,y]) and LOC with

two arguments as well (e.g. *umgeben* 'to surround': UMGEB$_{LOC}$ [x,y]). The x-argument (=q1) takes the role of an *experiencer*, whilst the y-argument (=q2) takes the role of a *theme* with PSYCH-verbs, and the role of *location* with LOC-verbs.[1]

Table 3. Classes of primitive *aktionsarten*

akt.art	class	Germ. ex.	representation	q-roles
activity	DO (1)	schreien	lx SCHREI$_{DO}$ (x)	x = AG
„	DO (2)	streicheln	ly lx STREICHEL$_{DO}$ (x,y)	x = AG; y = PAT/TH
state	BE	schlafen	lx SCHLAF$_{BE}$ (x)	x = EXP
„	PSYCH	wissen	ly lx WISS$_{PSYCH}$ (x,y)	x = EXP; y = TH
„	LOC	umgeben	ly lx UMGEB$_{LOC}$ (x,y)	x = EXP; y = LOC

In German and English most state verbs are of the PSYCH- or LOC-type, whereas one-place state verbs are rare. In other languages like Latin and Ancient Greek a large number of one-place state verbs can be found which in German or English would be rather expressed by using an adjectival expression and the copula (cf. Sihler 1995: 497).

(4)   AGr. 'nosé<u>o</u>'   ≅   Engl. 'I am sick'
            'aporé<u>o</u>   ≅   Engl. 'I am at a loss'

It is important to note here that there are correspondences between some state predicates and some activity predicates. For many activity concepts there is one corresponding state concept. If we take an activity like 'paint', for instance, which denotes the process of bringing coloured oil etc. onto a canvas or something like that, there corresponds directly a state concept which denotes the state of the canvas after it was painted on. This state concept is represented in English by the past participle 'painted'. Perhaps one should think of verbal concepts as complex two-fold entities which as a rule have a state- and an activity-side, who can be stimulated distinct from each other. One could try to imagine something like a coin as a simile of that. The problem of correspondence is virulent esp. in forming causatives. I postpone further remarks about that a bit.

In order to generate the other *aktionsarten*, i.e. non-causative and causative accomplishments and achievements, respectively, one has to

combine the basic predicates with operators. In Rapp's theory - she is mainly influenced by Dowty 1979 and von Stechow 1995 - there are only three operators, namely BECOME, DEVELOP and CAUSE, which could be, following Dowty 1979, as well reduced to only two. If we combine the operators BECOME or DEVELOP with basic verbal concepts from one of the five classes mentioned above, we get the non-causative *aktionsarten*. Thus the operator BECOME generates non-causative achievements, the operator DEVELOP generates non-causative accomplishments.

We could describe the value of these operators as follows: BECOME means that a proposition f (whose predicate is to be thought of as a state predicate) is true at a time t, but false at the immediately preceding moment t-1 (Dowty 1979: 73-78; cf. Wunderlich 1987: 358-359; von Stechow 1995: 83).

Figure 1. The BECOME-operator

DEVELOP means that a proposition f is true at a time t, but false at a time t-n; n > 1. In the meantime, inclusively between (t-n)+1 and t-1, neither f nor ¬f is globally true (cf. von Stechow 1995: 83). This is most obvious in creation verbs like 'to paint a picture'. In that time another proposition y is true which is related to f in the following way: At a moment from which ¬y is true, f is true. In Dowty 1979 Vendler's achievements and accomplishments are treated as one class to which consequently corresponds only one operator, i.e. the BECOME-operator.[2]
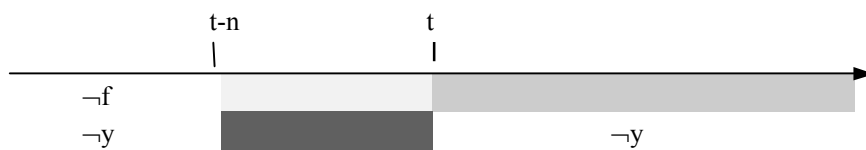

Figure 2. The DEVELOP-operator

I now try to formalize these operators in a rather shorthand and simplifying manner; but I think the main points are going to be clear nevertheless (for a more detailed account see von Stechow 1995: 83).

DEVELOP is an operator of the type $<<e,t>, <e,t>>$ and has as semantic value

F (DEVELOP) (f) = 1 iff $\exists$t [f (t-n) = 0 & f (t*) = u & f (t) = 1 in which t* = (t-1) - (t-n).

BECOME is also an operator of the type $<<e,t>, <e,t>>$ and has as semantic value

F (BECOME) (f) = 1 iff $\exists$t [f (t-n) = 0 & f (t*) = u & f (t) = 1 in which t* = (t-1) - (t-n), and lim (t*) $\rightarrow$ 0.

So it comes out that BECOME indeed is only a special case of DEVELOP and therefore one should use only one operator. I will keep nevertheless to the DEVELOP-operator since I want to stay compatible with Vendler 1957 and Rapp 1997, but the reader must bear in mind that BECOME and DEVELOP are only two names of the same thing.

These operators take one of the basic verbal state predicates mentioned above as an argument. An example is the German *einschlafen* 'to fall asleep':

(5)   'einschlaf-'   =   lx BEC (SCHLAF$_{BE}$ (x))

All these simple non-causative accomplishments/achievements (in the following: acc/ach) have in common that q1 takes the role of an *experiencer* and not of an *agent*. The change of state consequently does not happen intentionally but by an external impetus.

Causative acc/ach, on the other hand, are far more frequent than non-causative ones. The change of state is caused by an action of some subject. In LSS this action appears as an activity component with the form P_{DO} (x,<y>); q1 is *agent*. The change of state is added as a non-causative acc/ach component to the activity component. The state component which is part of the non-causative acc/ach component represents the resultant stage of the *theme*. Therefore the argument of

the state predicate is not the x-argument of the verbal activity expression but the y-argument. This is an important detail. The action-activity and the change-of-state-acc/ach components are itself arguments of an operator called CAUSE, which does the linking of the two components (cf. Dowty 1979: 91-110; von Stechow 1995: 83-84).

If we turn to fig. 2 we see that the propositions f and y correspond to the state and activity components, respectively: f is the resultant state P_{BE} (y), y the action P_{DO} (x,<y>) which leads to the resultant state. It seems that verbal concepts which are qualified for causative acc/ach-formation must be composed of two faces, an activity-face and a state-face, which are stimulated depending on the context, as mentioned above.

Allow me a little digression. For now we can turn again to verbal state-predicates of the 'painted'-type, which represent the resultant state f mentioned in the last paragraph. This sort of state-concept looks very much like an adjectival predicate. It is hard to state what exactly the differences between this kind of verbal state concepts and adjectival concepts are. It is not that adjectival concepts as a rule do not have an activity side, because it is easy to form non-state verbs from adjectives; the underlying concepts then must be something like verbal activity predicates.

Some languages even offer word formation mechanisms which turn adjectives into causative verbs. In Ancient Greek this is done by a morpheme *-óō*, in Hebrew there is a diathesis called '*hifᶜil*' that builds causative verbs out of non-causative verbs and adjectives. In English and German there once existed similar mechanisms as well, although they are not productive any more.

(6)   a. AGr.   alloîos 'different'   =>   alloióō 'I make different'
      b. Hebr. kabed '(he was) heavy' =>   hikbid 'he made heavy'
      c. Engl. broad   =>   to broaden
      d. Germ. rot 'red'   =>   röten 'to make red'

Activity concepts of that sort, however, cannot be stimulated on their own but must be stimulated together with their state counterparts, thus forming a causative acc/ach.

Another possible difference between verbal state predicates of the 'painted'-type and adjectival predicates could be in the time structure.

Verbal state predicates of the 'painted'-type necessarily are to be thought of as having a well-defined starting point - i.e. the end of the corresponding activity - whilst adjectival predicates proper do not. But I only want to suggest that here. I do not intend to offer a satisfactory solution of that problem anyway.

Turning back to causativ acc/ach, let us illustrate their formation with an example. To keep in line with previous examples, I take the causative achievement *jemanden einschläfern* 'to make someone sleep'.[3] Proposition y equals some action of an agent x which causes a patient y to fall asleep. Proposition f equals the stage of y being asleep. In that case the activity component is different from the state component which is symbolized in the notation by an indifferent P which requires to become contextually filled. If we take another causative accomplishment like 'to paint something', the activity component corresponds directly to the state component.

(7)   '*jmdn. einschläfer-*'   = ly lx CAUSE (P_{DO} (x), BEC ($SCHLAF_{BE}$ (y)))
       'to paint something'   = ly lx CAUSE ($PAINT_{DO}$ (x), DEV ($PAINT_{BE}$ (y)))

It is important to point out two issues. Firstly: The active-passive distinction only makes sense in the area of causative acc/ach. These verbs are usually transitive, whereas verbs with other *aktionsarten* are in general not transitive. Two-place states can form some sort of a pseudo-passive (e.g. 'the town is surrounded by hills'), but the crucial condition for passivization, the *agent*-role of q1, is not fulfilled. Therefore, besides the formation of a passive-like construction, verbs like 'surround' do not share many properties with acc/ach.[4]

Secondly: The q2-argument is of crucial importance for causative acc/ach, since it is the sole argument of an essential part of the verbal meaning, i.e. the state component. Consequently such complex *aktionsarten* can operate only in the domain of VPs and not Vs, since q2 must be realized in order to make the acc/ach-*aktionsarten* accessible (cf. Kratzer 2000: 8). If q2 is not realized, the verb as head of the VP looses the status of being selectable for advanced *aktionsarten* and turns to be a mere activity. From that follows that there are ambiguous verbs which in normal speech in the majority of cases behave like causative acc/ach, but can be used also as activities. That applies pre-

sumably to most causative acc/ach, especially if the embedded activity component belongs to the one place DO-category. An example:

To paint a picture is a causative accomplishment, y denoting the process of 'painting', f the 'painted' condition of the completed picture. If the relevant domain were only the V° *paint* without object, one could not build an accomplishment from that, since q2, which would be needed as argument of the state component in the calculus of a causative accomplishment, is not realized. *To paint* without object can therefore only be an activity.

(8)   *I paint a picture* =   CAUSE (PAINT$_{DO}$ (i), DEV (PAINT$_{BE}$ (pict.)))
                    (NB: typical calculus of a causative accomplishment)
        I paint   =   ~~CAUSE~~ (PAINT$_{DO}$ (i), ~~DEV (PAINT$_{BE}$ (pict.))~~)
                    => PAINT$_{DO}$ (i)
                    (NB: typical calculus of an activity)

After these brief explanations - for more detailed accounts I refer to the works which I listed in the beginning of that section – we feel ready to apply the method to Greek, especially the Greek perfect. We can take for granted that *aktionsarten* are relevant for Greek since already Aristotle[5] presented a basic theory of *aktionsarten*.

2.3. The Greek Perfect on LSS-level

The course of action is as follows: If we decompose some perfect forms from Early Attic texts and compare the results with decompositions of some random non-perfective forms of the same verb, the semantic operation connected with perfect formation should become clear from the differences between perfect and non-perfect.

Starting with non-causative acc/ach we notice that perfects of such verbs have pure state character. The stative representation of the perfect form (9-11b) corresponds directly to the stative component which is contained in the non-perfect form of the same verbal stem (9-11a). I left a variable at the argument place to suggest that it is an overall correspondence and has nothing to do with the specific arguments.[6]

(9) a. éntha dè   pleîstoi **thánon** dípsej   te   limôj   t'.
         then CONN most   died   thirst_DAT and hunger_DAT and
         'then most people **dies** of thirst and hunger.'
         lx BEC (THNE_BE (x))   (AP 490f.)

     b. tís   ou **téthnēke**
         who not PF-die_{3.SG}
         'who **is** not **dead**?'
         lx THNE_BE (x)   (AP 296)

(10) a. ex arkýon   péptoken, **oíchetai**   d' ho thēr.
         off trap-net_{GEN.PL} PF-fall_{3.SG} runs-away but the animal.
         'the animal is out of the trap-net and runs away'
         lx DEV (OICHO_BE (x))   (AE 147)

     b. pâsa   gàr isch`ys Asiatogenès **oíchoke.**
         whole for power Asian-born PF-run-away.
         'all the power from Asian breed is gone.'
         lx OICHO_BE (x)   (AP 13)

(11) a. ou gàr pân   stráteuma **perâj**   tòn   Hélles porthmòn
         not for whole army   transgresses the_ACC Helle_GEN ford_ACC
         'for does not the whole army **transgress** the Hellespont?'
         ly lx DEV (PERA_LOC (x,y))   (AP 799f.)

     b. **pepéraken**   mèn ho stratòs eis antíporon chóran
         PF-transgress_{3.SG} CONN the army   to opposite_ACC land_ACC
         'the army has **gone over to (= is on)** the opposite coast.'
         ly lx PERA_LOC (x,y)   (AP 65)

If one tries the same for causative acc/ach one sees that likewise the
state component is isolated although it is embedded much deeper.

(12) a. hēmâs tônde   symboúlous **kaleîs.**
         us_ACC these_GEN counselors_ACC call_{2.SG}
         'you **call** us counselors of these plans'
         ly lx CAUSE (KLE_DO (x,y), BEC (KLE_BE (y)))   (AP 175)

     b. oútinos   doûloi **kéklēntai** phōtòs oud' hypékooi.
         nobody_GEN slaves PF-call_{3.PL} man_GEN not-or subject
         'they are not called slaves and are subject to no man.'
         ly KLE_BE (y)   (AP 242)

(13) a. all' hỗde daímọn tis   **katéphtheire** stratón
     but so   demon some destroyed   army
     'but so a demon destroyed the army'   (AP 345)
     ly lx CAUSE (K.PHTHER$_{DO}$ (x,y), DEV (K.PHTHER$_{BE}$ (y)))

    b. họs en miâj plẹgêj **katéphthartai** pol`ys ólbos,
     how in one stroke PF-destroy much happiness
     'lo, what a great happiness is destroyed with one blow'   (AP 251)
     ly K.PHTHER$_{BE}$ (y)

(14) a. charâj dè mè **'kplagêjs**   phrénas.
     joy$_{DAT}$ but not startle$_{CONJ-2.SG}$ minds$_{ACC}$
     'you should not **startle** their minds with joy.'   (AC 233)
     lz ly lx CAUSE (EKPLAG$_{DO}$ (x,y), DEV (EKPLAG$_{PSYCH}$ (y,z)))

    b. sigộ   pálai   dýstẹnos **ekpeplẹgménẹ** kakoîs.
     silent-I-am since-long sad   PF-startle-Part. evils$_{DAT}$
     'I say nothing since long time, **being startled** by the evils.' (AP 290)
     lz ly EKPLAG$_{PSYCH}$ (y,z)

kaléọ 'to call' can be treated as causative accomplishment since it is basically a verb of speaking and can have an activity reading (= 'to shout') as well as a causative accomplishment reading (= 'to say something loudly' or 'to call sth. sth.'). One can state that verbs of speaking in their two-place-usage in general have a result, namely the being-in-the-world of some utterance, and that they resemble in that other verbs of producing like 'to paint sth.'. Verbs of speaking and other ambiguous verbs will play a crucial role for explaining the language change in ch.3.

    Going back to the main thread, we see on (12) to (14) quite distinctly that q1 does not appear any more in the Perfect-LSR.

    Obviously in using a perfect form a speaker of Ancient Greek only instantiates the state component of a verb. This is in sharp contrast to other forms like durative and aoristic forms in which the complete LSR of the verb is used. If we compare the decomposed perfect forms with decomposed durative/aorist forms, it looks as if in using a perfect all non-stative elements of the verbal LSR are deleted. This is probably not the case, though, because we had to assume an operation with a comparatively high computational expenditure: First, the complete LSR of a verb has to be generated on LSS, after that all non-stative

components have to be found out and scratched. This is by no means economical, especially, if we take into account that no part of the non-stative parts of the complete verbal LSR influences the argument structure or anything else on the syntactic level. Furthermore, it is not clear if deletion on LSS-level is at all possible; deletion seems to be a highly restricted operation which works only on the very surface level of PF.

We do not face these problems if we assume that in the first place only the state-component of the verb appears in LSR. The stative concept in itself is 'verbal' by virtue of its usage in a verbal environment, so that the non-stative components are not needed at all in order to secure a verbal meaning. When the stative structure on LSS is filled with material from the mental lexicon, this is done by means of a word formation mechanism that assigns prelexical structures of the form $P_{BE/PSYCH/LOC}$ (x <,y>) to a word formation mechanism $[C_1e\text{-}[R]]$, where R is any root which corresponds to the lexical content of P, and C_1 is an underspecified [+ cons]-anchor which receives its remaining phonological features by linking to the features of the first consonant in the root. This is valid for Proto-Greek mainly; in Ancient Greek, as we know it, a number of perfect forms is saved separately in the lexicon, namely those which are not derivable from the root so easily. But that is of minor importance, especially since the mechanism presumably still worked for new words in the times of Ancient Greek. If we think of verbal concepts being two-sided, with an activity face and a state face, it is no problem to have only one side stimulated on LSS.

I want to remark here that in my opinion passive formation as a whole is a process taking place at LSS rather than syntax (cf. Wunderlich 1985: 195-204) and is on the whole about actualizing only the state face of a verbal concept. Event passives would then be built by adding a BECOME/DEVELOP operator to the state face. So the LSR of an event passive would resemble that of a non-causative acc/ach. The whole point in passivization - and the difference to non-causative acc/ach - is that the x-argument, as it is no part of the state component in passivizable verbs, does not show up in LSS. But I want to leave it at that, since it leaves a bit the main course of argument I want to pursue in that article.

I will present now a scheme of the LSR of perfect verb forms in comparison to that of non-perfect verb forms.

Table 4. Scheme of the perfect formation

aktionsart of verbal stem	decomposed meaning of verbal stem	decomposed meaning of perfect
non-causative ach.	lx lS BEC (S (x))	lx lS S (x)
non-causative acc.	lx lS DEV (S (x))	lx lS S (x)
causative ach.	lS lA lylx CAUSE (A (x,y), BEC (S (y)))	ly lS S (y)
causative acc.	lS lA lylx CAUSE (A (x,y),DEV (S (y)))	ly lS S (y)
states	lx lS S (x)	lx lS S (x)
activities	<ly> lx lA A (x,<y>)	$\varnothing$

S stands in that table for all sorts of state predicates, i.e. predicates with the marking BE, PSYCH and LOC. A stands likewise for all sorts of activity predicates, i.e. predicates with the feature DO (1) and DO (2). In causative acc/ach A and S usually correspond to each other.

Now we are able to say something about the active-passive-relation in the Greek perfect. At the examples one could see that there are forms with active endings alongside forms with passive ones. Further above, however, I made two statements: perfect forms are automatically states, and: the active-passive distinction makes sense only in the field of causative acc/ach. Therefore we should in the first place not expect passive endings in state verbs such as perfect forms.

If one takes a closer look to the examples, however, one sees that there is a regular distribution: passive endings occur only at perfects of causative acc/ach. The explanation for that is rather obvious: At these verbs q1 does not appear in the state component. All other verbs do have q1 in their state component and take therefore active endings. We can therefore formulate a condition which regulates in a simple way the distribution of active and passive endings, perhaps by means of generating of a feature [± θ1] or [± med] which is checked at a VoiceP-node (Speyer 2003); the different values of that feature show up in morphology as active vs. mediopassive endings:

If q1 argument of stative component   => active (e.g. *téthneke* [9])
If q1 no argument of stative component=> passive (e.g. *kéklentai* [12])

The picture is a bit blurred by deponent verbs, i.e. active verbs that feature passive endings due to historical reasons, and by the middle voice which is essentially active but reflexive (i.e. q1 = q2) and takes the same endings as the passive voice. Therefore we might find sometimes examples of active perfects (that means, of perfects with q1) with passive endings. The overall idea does not get affected by that, however (for the problems of deponents see Embick 2000).

An important consequence from what was said up to now is that causative acc/ach should only be able to form passive perfects. And indeed, there do not occur any active perfects of causative acc/ach of the type *pepaídeuka* in Early Attic. These forms occur only later on in history and are manifestations of a language change, which I will try to describe as accurately as possible in the following parts of this essay.

Before I can turn to that question I should complete my description of the perfect in Early Attic. The remaining primitive *aktionsarten* 'state' and 'activity' could on the first glance pose certain problems for the approach.

Let us first take a look on states. Since the state component is already isolated in their verbal meaning, the perfect formation should not alter anything in the meaning; maybe one should regard it as impossible with state verbs since it is obviously redundant. On the other hand one can easily find quite a few instances of perfects derived from state verbal stems.

(15) a. hápas dè trachýs hóstis àn néon **kratêj**.
          all   but tough whoever MP newly reigns
          'everybody is tough who **reigns** only since a short time'
          lx KRATE$_{BE}$ (x)   (APr 35)

      b. dorykránou   lónch$\underline{e}$s ischýs **kekrát$\underline{e}$ken**.
          spear-headed$_{GEN}$ lance$_{GEN}$ power PF-reign$_{3.SG}$
          'the power of the spear-headed lance **reigns mightily**.'
          lx KRATE$_{BE}$ (x)   (AP 149)

(16) a. t$\hat{\underline{o}}$n   seism$\hat{\underline{o}}$n   **katechónt$\underline{o}$n**
          the$_{GEN.PL}$ earthquake$_{GEN.PL}$ continuing$_{GEN.PL}$
          'while the earthquakes went on'
          lx KATASCHE$_{BE}$ (x)   (T. 3,89,2)

b. lógou **kateschekótos**
word_{GEN} PF-continuing-Part._{GEN}
'as the account sticks to the people's minds'
lx KATASCHE_{BE} (x)   (T.1,11,2)

A possible solution is a certain feature of these state-perfects. For it seems to be that in perfects of state verbs the verbal meaning is intensified in some respect. Intensification is usually a pragmatic property. Indeed we can see the redundant use of a state-formation on the basis of another state formation as implicature, namely as a violation of the second sentence of the Maxim of Quantity, which runs 'Do not make your contribution more informative than is required' (Grice 1989: 26). In using the perfect form instead of the simple form of a state verb the speaker obviously does say more than he must. So there is an implicature running, and a very close-by implicature is that of intensity. It was probably used so often that it turned to a generalized implicature. From that basis it could emancipate from the domain of state verbs and become productive with other verbs as well. In other words: The speakers of Ancient Greek may have found the perfect form a relatively easy way of expressing intensity, and therefore may have used it not only with state verbs, where it originally belonged to as intensity-implicature, but with other verbs as well. So we can explain the wide-spread usage of the perfect form as marker of intensity in Early Greek like in Homer (Rijksbaron 1984: 36; cf. Gerö and v.Stechow 2002: 15-16 for a different approach).

Even pure activity verbs, which should not be eligible to form a perfect at all, after what have been said, are enabled to build up perfect forms by virtue of this generalized implicature. Such forms however do not have the properties of 'real' perfect forms - representing only the state-component of a verbal LSR - but rather that of redundant perfect forms of state verbs, i.e. their LSR is equal to the LSR of the imperfective non-perfect verb forms. They are not very common, especially not in Early Attic; one which is yet relatively frequent is *kékraga* 'to shout', the perfect from *kraz̲o̲*.

(17) a. kanachanòn méga **anékragon**: ô̲ boulè̲...
       and-gaping greatly shouted_{1.SG} oh council

'and I gaped and shouted: councillors!...'
lx KRAG$_{DO}$ (x)   (Ar.Eq.641f.)

b. kaì **kékragas**, hósper aeì tèn pólin katastréphei
   and PF-shout$_{2.SG}$ as-GP always the$_{ACC}$ town$_{ACC}$ destroy$_{2.SG}$
   'and you **shout**, as you always are destroying the town?'
   lx KRAG$_{DO}$ (x)   (Ar. Eq. 274)

Krázo acts like a state verb in that it forms a redundant perfect *kékraga* which implicates the notion of intensity. On LSS there is no difference between perfect and non-perfect in the case of implicature-perfects.

After these considerations we can try to define the semantic value of perfect formation: It is a state formation which instantiates exclusively state components from the verbal meaning. The distribution of active and passive endings results automatically from the first argument of the state component as opposed to the full LSR of the verb. If it is q1, active endings are used, if q2, mediopassive ones.

The lexicon entry of the perfect formation morpheme could look as follows:[7]

(18) PC:[8] C_1e / __C_1...
      KC: Vaf
      SK: [_R]
      SC: lx lS S (x) iff S ∈ {P$_{BE/PSYCH/LOC}$}

Now one question remains open. The stative component of the verbs under discussion has a very similar structure to that of adjectives, which are also state predicates. Why is it that the Greeks do not take the obvious way of doing and represent the adjective-like stative component as an adjective, adding inflection by using the copula, as is e.g. the case with the German *zustandspassiv* (Rapp 1996; 1997: 172-185)? That is especially surprising, taken the fact that Protoindoeuropean would supply them with a convenient mode of verbal adjective formation, i.e. the *-to*-suffixe (Sihler 1995: 622). If we look at German, whose *zustandspassiv* has about the same properties as the Ancient Greek perfect, we notice that the *-to*-suffixe actually is at the bottom of the German weak past participle (Sihler 1995: 621-2),

so that we can presume that it would have been a regular option on a protoindoeuropean background.

First one has to say that the *-to*-verbal adjective in Greek cannot be used for state formation since it has developed a different meaning in Ancient Greek (Kühner and Blass 1966, 2: 9; Schwyzer 1939: 810; Sihler 1995: 622-3). It denotes the possibility of some event or action to take place or to be performed, resembles therefore more the German adjectives ending in *-bar* or the English ones ending in -(*a*)*ble*.

(19)   a.   Agr. *lytós*   ≠   Engl. *solved*; Germ. *gelöst*
                     but   =   Engl. *soluble*; Germ. *lösbar*
       b.   Agr. *horatós* ≠   Engl. *seen*;   Germ. *gesehen*
                     but   =   Engl. *visible*; Germ. *sichtbar*

The deverbal *-to*-adjective can occasionally come rather close to the meaning of a past participle, but this usage is rare. So Ancient Greek has to form in the first place a new adjective before it can make up an analytic state formation.

There is indeed another adjective which can fill the gap, namely the participle of the perfect formation. In order to form a participle of the perfect one first has to form a perfect, however, so that the periphrastic form 'participle + copula' is by all means no simpler alternative.

But perhaps we are making here a lot of fuss about a problem which indeed is no problem at all. First we have to bear in mind that in Ancient Greek it is quite natural to form verbs on the base of an adjective - or an adjectivized noun - which denote simply the adjectival meaning + copula (cf. Sihler 1995: 497-498). I gave some examples under (4), but give some others here nevertheless.

(20)   a.   *áporos* 'perplex' => *aporéo* 'I am perplex'   = *áporós eimi*
       b.   *thámbos* 'amazement ' => *thambós* 'amazed' => *thambéo* 'I'm amazed'
       c.   *álgos* 'pain'   => *algéo* 'I am in pain'

Finally we can see that the Greeks indeed did use the periphrastic option, especially in contexts in which the synthetic form would yield in a consonant cluster which the Greek could not pronounce, but also in other contexts.[9]

(21)   a.   h<u>o</u>s pánta g'   **ést'** ekeîna **diapepragména**

how all   MP   is   that   PF-destroy-Part.
'how all that is destroyed'   (AP 260)

b.   kaì eis tosoûtón **eisi** tólm*ēs*   **aphigménoi**
and to so-much are boldness_GEN PF-come-Part.
'and they have come to such a degree of boldness'   (L.22)

2.4. The resultative notion

The feature which is most commonly linked with perfect forms is the resultative notion (e.g. Kühner and Gehrt 1966: 1,146-147; Schwyzer and Debrunner 1950: 263; Bornemann and Risch 1978: 222). The main task of the perfect, it is said, is to denote a state which was caused by some event and is therefore the result of this event.

That is completely correct. Nothing to say against this. Especially, because it is a perfectly accurate description of the effect which a purely stative LSR of verbs which usually have non-stative components in their LSR as well must show.

Therefore there is no contradiction at all between the stative approach adopted here and the traditional resultative notion. I want to add that the idea to account for the perfect semantics with the notion of state rather than that of resultativeness is by no means a new one. Starting with Wackernagel (e.g. 1926: 168) many scholars emphasize rather the state nature of the perfect than the resultative notion connected with it (e.g. Chantraine 1927: 4-20 *et passim*; Rijksbaron 1984: 1-4; 34-36; Sihler 1995: 564). Especially telling is Chantraine's account: The perfect "signifie l'état" (1927:8) throughout his work; the term "resultatif" (Chantraine 1927: 119-415), on the other hand, is used not to describe the state character but already the XN-notion which is going to be an important feature in the shift of the perfect towards a past-tense form (cf. ch.3). So already Chantraine abandons the resultative notion as by-feature of the state nature altogether.

The state components of the 'painted'-type do *per definitionem* denote a resultant state, as we saw earlier when talking about the BECOME and DEVELOP operators. So the resultative notion is already encoded in their bare LSR.

State components of non-causative acc/ach are like verbal state predicates. However, the operators which take the state predicates as arguments in building non-perfect forms are connected with the concept of change. Therefore it looks as if the pure state predicates that show up in the LSR of the perfect forms would be a result of the event described by the full non-causative acc/ach LSR. That is, if the perspective is taken from the standpoint of the non-perfect forms and their full LSR. If the full LSR describes a more or less punctual evolution of a certain state, the LSR of the perfect form which denotes this state as such, must be interpreted as the result of the evolution.

So we can say, that the resultative notion which is a commonplace of grammars of Ancient Greek is nothing else than a way of describing the effect of the fact that only the state component of verbs is represented in the LSR which lies at the bottom of a perfect form.

A possible problem are state predicates of the 'painted'-type which are not the result of some verbal action, hence the equation stative = resultative would experience a serious challenge. We faced a similar problem in section 2.2. I do not feel entitled to say something about that at the moment, but I think the difference lies in the nature of the respective stative predicates. One should perhaps imagine state predicates of the 'painted'-type, which are eligible for being part of a causative acc/ach., as having a different time structure from pure adjective predicates. Predicates of the 'painted'-type might contain somewhere in their semantics a restrictive information about their starting point, in the sense that the predicate can only hold at the end of a preceding corresponding action. Pure adjective predicates, on the other hand, do not have this information.

A vintage example is 'to be open' vs. 'to be opened'. If I say 'the window is open' I do not say anything about whether the window was built that way, i.e. never was closed. On the other hand, if I say 'the window has been opened' I imply necessarily that there was some time when it was closed and some time during which the window was opened by someone. I think the LSR of these terms is different from each other:

(22) 'the window is open':   OPEN (window)
      'the window is opened': $OPEN_{BE}$ (window)

and consequently the LSR of the verb 'to open' is not

(23)   ly lx CAUSE (OPEN$_{DO}$ (x,y), OPEN (y))

but

(24)   ly lx CAUSE (OPEN$_{DO}$ (x,y), OPEN$_{BE}$ (y))

in which the predicate OPEN$_{BE}$ contains, as all verbal state predicates, a restriction which one could try to catch like

(25)   lt lP$_{BE}$ lP$_{DO}$ P$_{BE}$ (t) = 1 iff $\exists$P$_{DO}$ $\exists$t [P$_{DO}$ (t-n) = 0 & P$_{DO}$ (t*) = 1 &
        P$_{DO}$ (t) =0] in which t* = (t-1) - (t-n) and iff N (P$_{DO}$ → P$_{BE}$)

This term is compatible with and corresponds directly to the properties of the DEVELOP-operator. This correspondence could function as a checking mechanism and could make sure that only predicates containing this information can combine with the DEVELOP-operator.

   I would like to mention in passing that in order to convert an adjective into a verb the specific 'verbal' time information has to be added to the semantics of the adjective. Any account of conversion as a morphological process must respect that.

   Adjectives do not have information of that sort in their semantics. If at all, they possibly feature something like

(26)   lt lP P(t) = 1   iff $\exists$P $\exists$t [P (t-n) = u & P (t) = 1]

There is, however, evidence that in Greek that problem does not play a crucial role anyway, since adjectives in attributive use (to which one can count also the usage with copula) seem to be used only in order to denote permanent states, thus are always used as individual-level predicates. The Greek counterpart of 'open' consequently could only be used when the argument is in the permanent state of being open, i.e. indeed never was opened. The same goes for other adjectives. I did not intend to dwell on that point rather long; I only wanted to hint at a possible train of thought which might be useful to approach the problem of the difference between adjectival and verbal state predicates.

3. Diachronic view on the Greek perfect

Obviously the original stage of Ancient Greek discussed in ch.2 did not persist. In Modern Greek there is no state formation which goes back directly to the Greek perfect. But even in ancient texts we find non-stative perfect forms.

The perfect shifted from a state formation to a past form (Chantraine 1927: 114-190; suggested in Wackernagel 1926: 169-170). At the same time it is adopted as a regular form into the verbal paradigm. In Attic we can follow the development rather well since many texts in that dialect are preserved. The examples for the original stage were Aeschylus' (525/4 - 456/5) *Persians* (written 472) and Aristophanes' (c.445 - c.385) *Knights* (Ar.Eq.; 424). We will see that the shift takes place within three generations.[10] It started in the generation which was born around 460-440 BC (the examples are Thucydides' [c.460 - after 399] *Peloponnesian War*, vol. 1, ch. 1-50 [T.; c.420] and Lysias' [c.445 - after 380], speech no. 12 *Against Eratosthenes* [L; 403]), is well under way in the generation born c.430-410 (the examples are Plato's [428 - 348/7] *Republic*, vol. 2, p.357-371 [P; c.370] and Xenophon's [c.430 - c.355] *Hellenica*, vol. 1 [X; c.360]) and is completed in the generation which was born c.400-380 (featuring Dinarchus' [c.360 - after 292] *Against Aristogeiton*, ch. 1-12 [D; after 338] and Aischines' [c.390 - c.325] *Against Ktesiphon*, ch.1-21 [Ai; 330]). I chose texts as little stylized as possible, to keep comparatively close to the vernacular, and left out therefore sophisticated orators like Isocrates or Demosthenes. We will further see that in the *koiné*, i.e. the standardized Greek used after ca. 330 BC until the end of Antiquity throughout the Eastern Mediterannean, the Attic shifted perfect is adopted. As an example for *koiné* Greek I chose Polybius' (c.200 - c.120) *Roman History,* vol. 1 (Pb; after 160).

3.1. End of fifth century BC: Thukydides, Lysias

Save for activity verbs the original condition is still prevalent.[11]

(27) tò siderophoreîsthai **emmeméneken**
      the iron-carrying   PF-prevail$_{3.SG}$
      'The habit of carrying weapons prevails and prevails.'   (T.1,5,3)
      MEN$_{BE}$ (x)   :   MEN$_{BE}$ (x)

(28) a. allà symphéronta têj   politeíaj **gegénetai**.
          but advers$_{N.PL}$ the$_{DAT}$ state$_{DAT}$ PF-become$_{3.SG}$
          'but things prevailed which **were** against the interest of the state.' (L. 7)
          BEC (GEN$_{BE}$ (x))   :   GEN$_{BE}$ (x)

      b. kaì egò toiaûta **pepysménos** diépleusa   Megaráde.
          and I   such$_{N.PL}$ PF-learn-Part**.** across-travelled Megara-wards.
          'and I went over to Megara, **being aware** what was up'   (L. 17)
          BEC (PYTH$_{PSYCH}$ (x, y))   :   PYTH$_{PSYCH}$ (x, y)

(29) a. ei gàr **eíretai**   exeînai   par' hopotérous eltheîn
          if for PF-say$_{3.SG.PS}$ to-be-possible for   each   come-Inf.
          'for if **it is said** that it would be possible for them to join the alliance'
          CAUSE (RHE$_{DO}$ (x,y), DEV (RHE$_{BE}$ (y))) : RHE$_{BE}$ (y)   (T. 1,40,2)

      b. diazómata échontes egonízonto, kaì ou pollà éte **pépautai**.
          loincloths having   contested$_{3.PL}$ and not many years PF-stop$_{3.SG}$
          'they used to contest clad in loincloths, and since few years this habit
            does not any more prevail.'   (T.1,6,5)
          CAUSE (PAU$_{DO}$ (x,y), BEC (PAU$_{BE}$(y))) : PAU$_{BE}$(y)

In the field of activities we notice a slight change. Activities, as we recall from ch.2, only occasionally used to form perfects which had the same properties as perfects from state verbs, i.e. a generalized implicature denoting intensification. Now, however, we find for the first time perfect forms with an unambiguous past reading

(30) a. ou mèn oudè barbárous **eíreke**
          not CONN not-but barbarians$_{ACC}$ PF-speak$_{3.SG}$
          'but of course he **did** not **speak** about barbarians.'
          RHE$_{DO}$ (x,y) : XN-Past (RHE$_{DO}$ (x,y))   (T. 1,3,3)

      b. hýbrei dè pollà   es hemâs álla   te **hemartékasi**[12]
          pride$_{DAT}$ but much$_{N.PL}$ to us   other$_{N.PL}$ and PF-badly-treat$_{3.PL}$
          'they **treated** us badly in respect of many other things because of pride.'
          HAMART$_{DO}$ (x,y) : XN-Past (HAMART$_{DO}$ (x,y))   (T. 1,38,5)

c. hósper ti   tôn   állōn   eulógōs **pepoiekótes**.
   how-GP something the$_{GEN.PL}$ other$_{GEN.PL}$ sensibly PF-act-Part.
   'as if they **had acted** otherwise somewhat sensibly.'
   POIE$_{DO}$ (x) : XN-Past (POIE$_{DO}$ (x))   (L 7)

I will now present a possible scenario for the rise of such forms.

The basic shift is possibly a change in the character of activities, although I must confess I do not see a way of accounting for it at the moment.

A more certain way of explaining the new activity perfect profits from the fact that in Greek most activity verbs do have a reading as causative acc/ach as well, depending on whether they take one argument or two. An example is *rhe-*, which can either mean 'to speak' (activity, q1), or 'to say something' (accomplishment, q1, q2). Such ambiguous verbs can form a perfect without further ado, if it is the accomplishment reading that is instantiated: *ti eírhetai* 'something is said' (cf. 29a).

By overgeneralization the usage of this form is extended to the activity reading, so that perfects of the one-place-version of such verbs can be formed: *eírhetai*. In German a similar impersonal passive can be formed: 'es wurde gesprochen' In English the corresponding present perfect passive form of 'to speak' would be odd. The approximate meaning is 'there were people speaking'.

On that ground other perfect forms can be built, again by overgeneralization. Since active is the natural voice of activities, it is clear that the first thing to do is to construct active forms of these passive pseudo-activities, just by replacing the passive ending by an active one, usually together with -k-, which was analysed as part of the active perfect ending.[13] In (30a) we have an instance of such a new active form. Let us illustrate the building process by analogy:

(31)   *eírhe-tai* - '?it was spoken' (*v.supra*) => *eíre-ke* - 'he has spoken'

In most cases perfect active and passive are formed from the same stem. This indicates that the hypothesis is correct, that they are derived from each other rather than that they are inherited separate stem forms.

Furthermore unambiguous activity verbs can by analogy adopt this new option of perfect formation. I did not find examples in my samples from Thucydides and Lysias, but that is due to the fact that unambiguous activity verbs in Greek are rare. Almost all activity verbs can take a second argument and achieve by that an acc/ach-reading (for Indoeuropean statives already observed by Chantraine 1927: 119). That goes also for the verbs in (30b) and (30b), which can take a second argument and so do mean 'to make s.th. wrong' or 'to make s.th.', respectively.

I should now drop a line about the semantics of this new perfect. It has become obviously a past tense form and a part of the verbal paradigm, which means that the formation in principle is freely available for all verbs. The way towards a past-tense is relatively easy, since any perfect form of the old state meaning implies automatically that the underlying action is completed, consequently lies in the past. The perfect-based past must have different properties from the two past forms which the Greek morphology already offers, i.e. the aorist indicative and the imperfect.

In contrast to the aorist the perfect implies that the resultant state of the verbal action still prevails at the time of speech. So it is, contrary to its name, an imperfective verb form. The imperfect does not imply that necessarily either, but it could. The imperfect, however, often implicates that the verbal action took a rather long time (see section 1.1), which the perfect does not. This rough sketch already shows sufficiently that all three past forms indeed do have different properties. It is useful to analyse the perfect tense semantics as a sort of 'Extended Now', as it is done by Gerö and v.Stechow (2002: 28ff.). In LSS it is now no more the pure state predicate of a verbal concept which is represented, but the full predicate structure of the verb together with a temporal operator, let us call it XN, which denotes that the results of the verbal action which is described still prevail. In shifting from the state component to the full verbal structure the focus does not lie on the resultant state any more but on the event described by the verb; the fact, that the resultant state prevails, is only an additional notion with but minor importance.

3.2. The next generation: Plato, Xenophon

The shift has started to affect all causative acc/ach verbs which have begun to form indiscriminately an XN-perfect active (32). The perfects form which are not newly formed after the semantic shift, i.e. the perfect passive of causative acc/ach verbs and (active) perfect forms of non-causative acc/ach verbs, keep there old state property (33).

(32)   a.   hósas   te   naumachías **nenikékate** kaì naûs **eiléphate**
how-many$_{ACC}$ and sea-battles$_{ACC}$ PF-win$_{2.PL}$ and ships PF-seize$_{2.PL}$
'how many sea-battles you **have won** and ships **seized**.'   (X.1,1,28)
CAUSE (NIKA$_{DO}$ (x,y), DEV (NIKA$_{BE}$ (y))) : XN (CAUSE ...)

   b.   epeispleî Theraménes...kaì Thrasýboulos...amphóteroi **ergyrologekótes**.
up-sailed Theramenes and Thrasybulos   both   PF-collect-Part.$_{AC}$
'Theramenes and Thrasybulos, both **having collected** money, sailed up.'
CAUSE (ARG~$_{DO}$(x,y), DEV(ARG~$_{BE}$(y))) : XN (CAUSE ...) (X.1,1,12)

(33)   a.   Egò mèn oûn taûta eipòn ójmen   lógou   **apelláchthai**.
I   CONN   that saying thought$_{1.SG}$ speech$_{GEN}$ PF-free-Inf.$_{PS}$
'I thought I **would be released** from speaking, after I have said that'
CAUSE(AP~$_{DO}$ (x,y), DEV(AP~$_{PSYCH}$ (y,z))) : AP~$_{PSYCH}$ (y,z)   (P.357a1)

   b.   hoì dè poloûntes tèn tês   ischýos   chreían... **kéklentai**... misthotoí.
the C selling the$_{ACC}$ the$_{GEN}$ strength$_{GEN}$ service$_{ACC}$ PF-call$_{3.PL}$ hired-hands
'those who sell the service of their work **are called** hired hands.'
CAUSE (KLE$_{DO}$ (x,y), DEV (KLE$_{BE}$ (y))):   KLE$_{BE}$ (y)   (P.371e5)

   c.   ouk állothén   toi autoùs **akekóamen è**   ék   tôn   nómon
not   elsewhere-from MP them   PF-hear$_{1.PL}$ than from the$_{GEN}$ laws$_{GEN}$
'all we **know** (= have heard) about them we know (=h.h.) from the laws.'
DEV (AKOU$_{PSYCH}$ (x,y))   :   AKOU$_{PSYCH}$ (x,y)   (P.365e2)

The perfect passive participle still shares all properties of the remaining perfect forms. Later on we will see that it develops semantics independent from the remaining perfect forms.

(34)   a.   kathorâj tàs toû   Mindárou   naûs...**apeilemménas** hyp` autoû.
spot$_{3.SG}$ the the$_{GEN}$ Mindaros$_{GEN}$ ships   PF-cut-off-Part. by   him
'he spotted Mindarus' ships, as they **have been cut off** by him.'
CAUSE (APOLAB$_{DO}$ (x,y), DEV (AP$_{BE}$ (y))): AP$_{BE}$ (y)   (X. 1,16)

NB: The PP$_{hypo}$ is not compulsory, hence to be regarded as free adverbial.

b. **antitetagmén<u>o</u>n**   pánt<u>o</u>n pròs   Oitaíous polemíous óntas
   PF-line-up-Part.$_{GEN.PL}$ all$_{GEN.PL}$ against Oeteans enemies   being
   'after all **have been lined up** against the Oeteans, their enemies'
   CAUSE (AN$_{DO}$ (x,y), DEV (AN$_{LOC}$ (y,z)) :   AN$_{LOC}$ (y,z)   (X.2,18)

c. méchri àn aphík<u>o</u>ntai hoi **h<u>e</u>jr<u>e</u>ménoi**   ant'   ekeín<u>o</u>n
   until   MP arrive$_{CJ}$ the PF-elect-Part. instead-of those
   'until they arrive who **have been elected** instead of those.'
   CAUSE (HAIRE$_{DO}$ (x,y), HAIRE$_{BE}$ (y))) : HAIRE$_{BE}$ (y)   (X.1,27)

Activities form also an XN-Past; there were no perfect forms of unambiguous activity verbs in my sample, so I present an example from Plato's *Apologia*:

(35) pósas   ámeinon ... h<u>e</u>méras ... taútes tês   nyktòs **bebí<u>o</u>ken**
     how-many better   days   this$_{GEN}$ the$_{GEN}$ night$_{GEN}$ PF-live$_{3.SG}$
     'how many days **did he live** better than this night'   (Ap. 40d7)
     BIO$_{DO}$ (x,y) : Past (BIO$_{DO}$ (x,y))

In the field of states there is no shift; perfect forms of state verbs still are roughly equivalent to their durative counterparts, featuring however a notion of intensity (note that in [36b] the non-perfect forms of the verb *diathryléomai* already mean 'to be stunned') .

(36) a. pány gàr   theîon **pepónthate**
        totally CONN divine PF-feel$_{2.PL}$
        'for you **definitely are in a** totally divine **state of mind**.'
        PATH$_{PSYCH}$ (x,y)   : PATH$_{PSYCH}$(x,y)   (P.368a5)

b. apor<u>ô</u>   méntoi **diatethryl<u>e</u>ménos** tà   <u>ô</u>ta akoú<u>o</u>n Thrasymáchou
   am-perplex CONN PF-be-stunned-Part. the ears hearing Thrasymachus
   'I **am** perplex and **completely deafened** when I listen to Thrasymachus.'
   DIATHRYLE$_{BE}$ (x) : DIATHRYLE$_{BE}$ (x)   (P.358c7)

3.3. Late Attic and koiné: Aischines, Dinarchus, Polybius

It is easy to predict what is going to happen in this generation: The new past-marked active perfect forms of activities (37) and causative acc/ach prevail (38) and begin to influence the old stative passive forms of causative acc/ach, so that the latter also adopt a past-reading (39). These old state perfect forms shift consequently from a presential state-passive to a preterital process-passive. The XN-notion does not necessarily prevail. The development is still under way in Late Attic, so we find besides unambiguous instances of preterital process passive (40a) alongside ambiguous ones which still could be understood as state passive (40b). In the *koiné* the shift is going to be completed. It is important to add, that passive participles in general keep their state meaning in contrast to all other forms which develop towards past tense forms.

(37) kaì taûta hoútos eû **prokateilephótos**   toû   nomothétou
       and that so   well PF-watch-out-Part.$_{GEN}$ the$_{GEN}$ legislator$_{GEN}$
       'and that, although the legislator **did watch out** so accurately'
       PROKATALAB$_{DO}$ (x,y) :   Past (PROKATALAB$_{DO}$ (x,y))   (Ai 11)

(38) a. all' **epidédoka** têj   pólei mnâs hekatón
          but PF-give$_{1.SG}$ the$_{DAT}$ city$_{DAT}$ mines hundred
          'but I **gave** hundred mines to the city.'   (Ai 17)
          CAUSE (EPIDO$_{DO}$ (x,y), DEV (EPIDO$_{PSYCH}$ (y,z))) : Past (CAUSE ...)

       b. eàn   exeléncho Ktesiphônta kaì paránoma **gegraphóta**
          as-soon-as prove$_{1.SG}$ Ktesiphon$_{ACC}$ and unlawful   PF-write-Part.
          'as soon as I prove that Ktesiphon **made an** unlawful **petition'**   (Ai 8)
          CAUSE (GRAPH$_{DO}$ (x,y), DEV (GRAPH$_{BE}$ (y))): Past (CAUSE...)

(39)   epì tioioútois **eíleptai**   prágmasi n□n adikôn
          on such$_{DAT.PL}$ PF-catch$_{3.SG.PS}$ things$_{DAT}$ now wrong-doing'
          'he **was caught** now in flagranti under such circumstances'   (D 21)
          CAUSE (LABDO (x,y), BEC (LABBE (y))) : Past (CAUSE ...)

(40) a. **heúrentai** kreíttones logoi tôn   nómon
          PF-find$_{3.PL}$ stronger   words the$_{GEN}$ laws$_{GEN}$
          'there **were found** better ways of expressions than the laws.' (Ai 11)
          CAUSE (HEURE$_{DO}$ (x,y), DEV (HEURE$_{BE}$ (y))) : XN (CAUSE...)

       b. kaì gàr thanátou áxia   pollà   **diapépraktai**

and for death$_{GEN}$ worthy$_{N.PL}$ much$_{N.PL}$ PF-perform$_{3.SG}$
'and many deeds were/are performed that are worthy of death penalty.'
CAUSE (DIAPR˜$_{DO}$ (x,y), DEV (DIAPR˜$_{BE}$ (y))) :   XN (CAUSE...)
or   :   DIAPRAK$_{BE}$ (y)   (D 2)

Very few causative acc/ach verbs still show perfect forms with an unambiguous state meaning, which one should regard as independently lexicalized perfect forms.

(41)   nómon en hôj   diarrhéd̲e̲n **gégraptai**...
       law$_{ACC}$ in which$_{DAT}$ explicitly   PF-write$_{3.SG}$
       'a law, in which **is written** explicitly:...'
       CAUSE (GRAPH$_{DO}$ (x,y), DEV (GRAPH$_{BE}$ (y))) : GRAPH$_{BE}$ (y)   (Ai 14b)

Already in Late Attic the past semantics of the new perfect is so marked that occasionally there is confusion with the domain of other past forms like the aorist: In (42) we have a perfect form with aorist meaning. The sentence does not entail that the Greek after that never won any battle. On that stage of language history such cases are the exception. In late antiquity, however, cases like (42) become the rule

(42)   kaì presbýteros Dionýsios **nenik̲e̲kò̲s**   toùs   Héll̲e̲nas
       and older   Dionysius PF-defeat-Part.$_{AC}$ the$_{ACC.PL}$ Greek$_{ACC.PL}$
       'and after Dionysius the elder had defeated the Greek'   (Pb1,6,2)
       CAUSE (NIKA$_{DO}$ (x,y), BEC (NIKA$_{BE}$ (y))) :   Past (CAUSE ...)

As consequence of that development eventually perfect and aorist merge morphologically since they do not have any different properties any more. This process is observable in other languages as well, Latin e.g. The Latin perfect is a mixture from original aorist (e.g. *dixi < dic-s-i*, cf. AGr. *é-deik-s-a*) and perfect (e.g. *te-tig-i*, cf. AGr. *te-tach-a*) forms (e.g. Stempel 1997: 270) already at the time in which the literary tradition starts.

The remaining verb classes, i.e. states (43) and non-causative acc/ach (44), keep to their original state meaning. Since they are rare, however, compared with causative acc/ach, they do not constitute more than a niche phenomenon and achieve the characteristics of a closed class.

(43)   a. **sesígetai**   mèn   tò   kálliston   kaì s̲o̲phronéstaton k̲é̲rygma

PF-fall-silent$_{3.SG}$ CONN the most-beautiful and most-sensible message
'the most beautiful and sensible message **has fallen silent**.'
DEV (SIGA$_{BE}$ (x))   :   SIGA$_{BE}$ (x)   (Ai 4)

   b. t$\underline{\hat{o}}$n   **eithismén$\underline{o}$n**   tim$\underline{o}$ri$\hat{\underline{o}}$n
      the$_{GEN.PL}$ PF-get-used-Part.$_{GEN.PL}$ penalties$_{GEN.PL}$
      'of the **usual** penalties'
      DEV (ETHID$_{PSYCH}$ (x,y))   :   ETHID$_{PSYCH}$ (x,y)   (D 3)

(44) eg$\underline{\grave{o}}$ dè **pepisteuk$\underline{\grave{o}}$s**   h$\underline{\acute{e}}$k$\underline{o}$ pr$\hat{\underline{o}}$ton mèn   toîs   theoîs,...
     I   but PF-believe-Part. come$_{1.SG}$ first   CONN the$_{DAT.PL}$ gods$_{DAT.PL}$
     'but I come and firstly **do believe** in the gods'
     PISTEU$_{PSYCH}$ (x,y)   :   PISTEU$_{PSYCH}$ (x,y)   (Ai 1)

If we put together the classes of verbs which participate in the shift and compare them to those that do not so, we see that it is the verb classes which contain an activity predicate that take part in the shift. This corroborates the assumption made further above that the shift might after all be caused by a change in the character of activity predicates.

Table 5. Aktionsarten that take part in the shift towards past form

perfect keeps state reading		*perfect shifts towards XN-past*	
- states	lx lS S (x)	- activities	ly lx lA **A** (x,y)
- noncausative acc/ach		- causative acc/ach	ly lx lS lA
	lx lS DEV/BEC (S (x))	CAUSE (**A** (x,y), DEV/BEC (S (y)))	

I want to add that in the *koiné* this stage prevails: Causative acc/ach (45) and activities (46) build perfect forms in active and passive voice which have no state meaning any more, but are mere past tense forms - with exception of the passive participle. Perfects of non-causative acc/ach (47) and states (48) keep their state meaning, but they form a closed class.

(45) a. pólemos, hòn   pr$\hat{\underline{o}}$ton **ex$\underline{\acute{e}}$nenke** ... pròs   Aitoloùs Phílippos
       war   which first   PF-start$_{3.SG}$ against Aetolians Philipp
       'the war which originally Philipp **started** against the Aetolians'
       CAUSE (EK˜$_{DO}$ (x,y), BEC (EK˜$_{BE}$ (y))) : XN (CAUSE ...)   (Pb1,3,1)

      b. kaì nomísantes tò ... mégiston méros hautoîs **en$\underline{\acute{y}}$sthai**
        and thinking   the ... biggest   part   them$_{DAT}$ PF-achieve
        'and thinking the biggest part fior them **would be achieved**'

$$\text{CAUSE (ANY}_{DO} \text{ (x,y), BEC (ANY}_{BE} \text{ (y))) : XN (CAUSE ...) (Pb1,3,6)}$$

(46) allà pántes h<u>o</u>s épos eipeîn archê̯j kaì télei **kéchr<u>e</u>ntai** toúto̯j
but all   as   word say-Inf. start_{DAT} and end_{DAT} PF-use_{3.PL}   that_{DAT}
'but all **used** it from A to Z, as they say.'
$\text{CHRA}_{DO} \text{ (x,y)}$: $\text{Past (CHRA}_{DO} \text{ (x,y))}$ (Pb1,1,2)

(47) **péphyke** toîs   philmathoûsin   ho t<u>ê</u>s pragmatik<u>ê</u>s historías trópos.
PF-grow the_{DAT.PL}eager-to-learn_{DAT.PL}the the_{GEN} pragmatic_{GEN}history_{GEN} kind
'the pragmatic sort of history **is innate** to those who are eager to learn'
$\text{DEV (PHY}_{BE} \text{ (x)) : PHY}_{BE} \text{(x)}$ (Pb1,2,8)

(48) tàs mèn gynaîkas kaì tà tékna   t<u>ô</u>n   **ekl<u>e</u>rek<u>ó</u>t<u>o</u>n** ... dielómenoi kateîchon
the C   women and the children the_{GEN} PF-be-exiled-Part._{GEN} robbing owned
'they robbed the women and children of the exiles and so owned them.'
$\text{AKLERE}_{BE} \text{ (x)}$: $\text{AKLERE}_{BE} \text{ (x)}$ (Pb1,7,4)
NB: the verb *akl<u>e</u>réo̯* is already a state verb and means 'be exiled'.

4. The perfect passive participle: a special case

The perfect passive participle (p.p.p.) shares until c.350 BC all properties of the remaining perfect forms, as it is the rule with participles in Ancient Greek. After that time, i.e. about at the same moment as the shift begins to affect perfect passive forms, the p.p.p. begins to adopt properties of its own.

I think this indicates that the p.p.p. has become a deverbal adjective at that time, i.e. the p.p.p. formation morphemes start to be understood rather as adjective formation morphemes. This adjective corresponds to the verbal state predicate of the 'painted'-type. The same was up to that time true for all perfect forms, as we have seen, but holds now only for the p.p.p.

What are the different properties? In contrast to the other perfect forms of causative acc/ach and activities, the p.p.p. keeps to the old state reading which the perfect originally had ([49]; cf. ch.2). This makes the p.p.p. a suitable basis for building a new state formation in order to express concepts as the state passive. It is actually the only option if one wants to express stative concepts.

(49)   a. tà d' álla   pánta   pragmateías **prostetagménas**   katà ps<u>é</u>phisma

the$_{N.PL}$ but other$_{N.PL}$ all$_{N.PL}$ affairs$_{ACC}$ PF-order-Part.$_{ACC}$ according-to vote
'but the other matters are such that **are ordered** according to the vote.'
CAUSE (PROSTAK$_{DO}$ (x,y), DEV (PR˜$_{BE}$ (y))) : PR˜$_{BE}$ (y) (Ai 13)

b. hoi **pepeisménoi** synópsesthai tà hóla...
the PF-persuade-Part. together-see-Inf. the whole
'those, that **are sure** to see the whole together' (Pb1,4,7)
CAUSE (PITH$_{DO}$ (x,y), DEV (PITH$_{PSYCH}$ (y,z))) : PITH$_{PSYCH}$ (y,z)

c. dià tò synéchesthai toîs **proeireménois** polémois
through the be-busy-Inf. the$_{DAT.PL}$ PF-before-mention-Part.$_{DAT.PL}$ wars$_{DAT}$
'because they were very busy with the wars **mentioned before**.'
CAUSE (PRORHE$_{DO}$ (x,y), DEV (PR˜$_{BE}$ (y))) : PR˜$_{BE}$ (y) (Pb1,7,9)

To be more precise: Any state concepts, when they are formed in LSS and sent to the lexicon for finding a corresponding way of expressing, consequently cannot get hold of the old perfect formation, as this formation is now corresponding to concepts with a special XN-Past-operator, but have to take the p.p.p. which is stored as an adjective or whose production morphemes are stored as an adjective formation process independent of the other perfect forms. Only the bare state predicate, however, can be expressed by that formation. For expressing inflection features one has to add the copula, as it is done with adjectival concepts proper (cf. Wunderlich 1985: 213). As with adjectives, there are cases, in which the inflection does not need to be expressed, namely when the adjective or p.p.p. is an adjunct to some constituent of the matrix sentence (49). In other cases, as mentioned above, inflection features are added by using the copula, which by this time has grown to be a semantically empty element, which can function as pure inflection marker without adding unwanted semantic information (50).

Although the combination of p.p.p. and copula looks rather like an analytic verb form now, not unlike its German or English counterparts, it should still be regarded as a combination of adjective and copula, as the German *zustandspassiv* (state passive; Rapp 1996, 1997: 181-185).

(50) a. <timoríai> haì en toîs nómois **eisì gegramménai**.
<penalties> which in the laws are PF-write-Part.$_{PS}$
'penalties, which **have been fixed** in the laws' (D 12b)
CAUSE (GRAPH$_{DO}$ (x,y), DEV (GRAPH$_{BE}$ (y))): GRAPH$_{BE}$ (y)

b. ou gàr mónon toû   krínein **ên**   kairòs **horisménos**
   not for only   the$_{GEN}$ judging was$_{3.SG}$ date   appoint-Part.$_{PS}$
   'there have been appointed a date not only for jurisdiction' (Dd. 1,70,10)
   CAUSE (HORID$_{DO}$ (x,y), BEC (HORID$_{BE}$ (y))) : HORID$_{BE}$ (y)

The segregation of the p.p.p. from the remaining perfect forms and the consequent adjectivization may have been triggered by independently lexicalized p.p.p.s which have been lexicalized at a point of history at which the whole perfect still had state reading.

(51)   t$\hat{o}$n   **eithisménon** tim$\underline{o}$ri$\hat{o}$n
       the$_{GEN.PL}$ get-used$_{GEN.PL}$ penalties$_{GEN}$
       'of the usual penalties'
       DEV (PSYCH (x,y)) :   PSYCH (x,y) (D 3)

We could theoretically think of other participles which might behave in the same way, like the aorist passive participle (a.p.p). It should be possible to express the 'painted'-type state predicates also with the a.p.p., since this participle on first glance does not seem to denote a different concept. So why using the p.p.p.?

The p.p.p. is by its special features in a clear contrast to the a.p.p., which is only passive-marked and hence neutral regarding tense and, actually, also aspect. Of course it can denote a resultant state, even with XN-reading, but only since it is aspectually unmarked and can be used therefore as a jolly joker for all passive participles. Cases like (52d) are rare, however; the a.p.p. usually denotes a process passive like in (52a,b) or is ambiguous between state and process passive. The p.p.p., on the other hand, can be used exclusively to denote a resultant state which prevails, hence has an obligatory XN-reading (a.p.p. vs. p.p.p. in [52b]).

So if some speaker/writer wants to express a state concept in an unambiguous manner, he takes the p.p.p. rather than the a.p.p., since the former is indeed unambiguous whereas the latter can denote all sorts of passive concepts. In other words: The LSR of the p.p.p. always shows the pure state predicate, whilst the LSR of the a.s.s. is likely to show other predicates - like Past-operators, BECOME or the

like - alongside the state-predicate (which, being essential part of all passive formations, must be part of the LSR).

(52) a. stratoû **phtharéntos**
army$_{GEN}$ wipe-out-a.p.p.$_{GEN}$
'after the army **was wiped out**'   (AP 283)
Past (DEVELOP (PHTHER$_{BE}$ (y)))

   b. **gnosthéntes**   têj   te skeuêj ... xyntethamménej.
recognize-a.p.p. the$_{DAT}$ and armour$_{DAT}$ PF-with-buried-Part.$_{DAT}$
'as they were recognized by the armour buried together with them.'
gnosthéntes: Past (BECOME (GNO$_{BE}$ (y)))
xyntethamménej: TAPH$_{BE}$ (y) & XYN (y)   (T 1,8,1)

   c. eis Lakedaímona grámmata **pemphthénta** heálosan
to Sparta   letters   send-a.p.p.   caught$_{3.PL}$
'they intercepted a letter which **was sent** to Sparta' (X1,23)
LSR could be: Past (BECOME (PE˜$_{BE}$ (y)))   or   PE˜$_{BE}$(y)

   d. ho **prosagoreutheìs** symmachikòs   pólemos
the so-call-a.p.p.   ally-belonging-to war
'the **so-called** confederation war'   (Pb 1,3,1)
PROSAGOREU$_{BE}$ (y)

The combination of p.p.p. with copula is, as I hinted at further above, not a new phenomenon. Examples of that combination can be found already in Early Attic. They function as periphrastic alternatives to the synthetic forms, especially in cases, when the formation of a synthetic form would result in consonant clusters which are not in line with Greek phonological rules, like in the third person plural. That is rather straightforward, because the combination of participle and copula indeed matches directly the corresponding synthetical form, as long as the shift described in ch.3 has not yet taken place. The combination as periphrastic option to perfect passive forms, however, must cease to work shortly after the new state formation p.p.p. + copula arises. In an author like Dinarchus, however, both constructions still exist alongside each other, sometimes even in the same paragraph: In (53a) is an example of the periphrastic option, whilst (53b) is a new state passive. After that point the combination p.p.p + copula cannot be any more a

periphrastic option of synthetic perfect forms but is indiscriminately understood as representation of a state concept.

(53) a. hósonper **ên** epì têj   graphêj tímem' **epigegramménon**
         as-much was in the$_{DAT}$ charge$_{DAT}$ fine   down-write-Part.$_{PS}$
         'a fine as high as it was put down in the accusation.'   (D 12)
         CAUSE (EP$\check{}_{DO}$ (x,y), DEV (EP$\check{}_{BE}$ (y))) : XN (CAUSE ...)

    b. <timoríai> haì en toîs nómois **eisì gegramménai.**
       fines   which in the$_{DAT.PL}$ laws$_{DAT}$ are write-Part.$_{PS}$
       '<fines> which are written down in the laws.'
       CAUSE (GR$\check{}_{DO}$ (x,y), DEV (GR$\check{}_{BE}$ (y))) :   GR$\check{}_{BE}$ (y)   (D 12)

The new state passive formation keeps on throughout antiquity. Examples can be found for instance in as late an author as Eusebius of Caesarea (4th cent. AD).

(54) a. **espasménos**   te   perì pân **ên** méros
         paralyse-Part.$_{PS}$ and at   each was limb
         'each of his limbs **has been paralysed'**
         DEV (SPAS$_{BE}$ (x))   :   SPAS$_{BE}$ (x)   (hist.eccl. 1,8,7)

    b. hóte dè kaì polýs **ên epikechyménos** ...   ho tês   kakías káros
       when but and much was PF-pour-out-Part. the the$_{GEN}$ evil$_{GEN}$ daze
       'when also a big daze in respect to evil **has been poured out'**
       CAUSE (EPI$\ulcorner_{DO}$ (x,y), DEV (EP$\check{}_{BE}$ (y))) : EP$\check{}_{BE}$ (y)   (hist.eccl. 1,1,21)

5. Summary

The Greek perfect started life as a state formation that denoted purely the stative parts of the verbal meaning. After c.430 BC the perfect starts to shift from a stative word-formation to a form denoting past-tense, incorporated in the verbal paradigm. The development is triggered by ambiguous activity verbs and holds for all verbs containing a DO-labelled predicate, i.e. activities and causative acc/ach, and is completed after c.350 BC. The only form that remains stative is the p.p.p. which probably becomes adjectivized independently. On that basis the formation of a new stative passive consisting of participle and copula is made possible.

Notes

I wish to express my warmest thanks to Irene Rapp, Katerina Zambolou and especially Arnim von Stechow, from whose suggestions, comments and critics this essay profited substantially.

I used a system of abbreviations of my own, both in interlinear translations and source report. In interlinear translations I confined myself to the most necessary information. Inflectional features like Case (GEN, DAT, ACC), Number (SG, PL), gender (M, F, N), Person (1, 2, 3) are written as subscript; other morphemes are attached with a hyphen. Particles are often represented by an abbreviation and not translated. The remaining abbreviations are as follows:

CJ	=	conjunctive mood	MP	=	modal particle
CONN (or: C)	=	connective particle	-Part.	=	participle
GP	=	gradational particle	PF-	=	perfect morpheme
-Inf.	=	infinitive			

Ancient Greek authors and works are cited using the following source informations:

AC	=	Aeschylus, Choephoroi	Ar.Eq.	=	Aristophanes, Knights	L	=	Lysias
						P	=	Plato, Republic
AE	=	id., Eumenides	D	=	Dinarchus	Pb	=	Polybius
Ai	=	Aischines	Dd.	=	Diodorus	Soph.	=	Sophocles,
Ap.	=	Plato, Apology	Dem.	=	Demosthenes	Tra.	=	Trachiniae
AP	=	Aischyl., Persae	eccl.hist	=	church history	T	=	Thucydides
APr	=	id., Prometheus	Isocr.	=	Isocrates	X	=	Xenophon

1. Thematic Roles according to Jackendoff 1972: 29ff.; 1990: 257ff., but with a separate *experiencer*-role in contrast to Jackendoff 1990: 262. Cf. for an elegant system of thematic roles also Wunderlich 1985: 187-193.
2. *Accomplishments* in Vendler's terminology; Dowty uses the term accomplishments for something like causative accomplishments/achievements (1979: 91-110) and calls Vendler's accomplishments 'degree-achievements' (1979: 88-90). Dowty tries (in 1979: 139-145) to exaggerate the value of the BECOME-operator so that it is applicable also to Vendler's *accomplishments*. The important insight which follows from that is that Vendler's *achievements* are in fact only a special case of *accomplishments*, i.e. the case in which the time interval goes towards zero. In this paper I consequently am not going to distinguish between *achievements* and *accomplishments* in Vendler's

terminology, encouraged by the fact that they do not show different behaviour in Ancient Greek.

3. In the literal sense 'to make sleep', not 'to kill an animal by lethal injection'.

4. It is not in all contexts possible to add a temporal adverbial in-PP to the verb 'surround', for instance, or to make it a complement of 'begin' or 'stop, while real acc/ach allow these adverbials or matrix verbs regardless of the context (tests after Dowty 1979: 56-57).

5. The distinction between *kinéseis* (telic verbs, i.e. accomplishments, achievements) and *energeíai* (atelic verbs, i.e. states, activities) in *Metaphysics* 9.6.7-10 (1048b).

6. The abbreviations of the quoted tragedies by Aischylus are: AP = The Persians, AC = Choephorai, APr = Prometheus Bound.

7. Following the format of Olsen 1986.

8. Underspecified morpheme, cf. Marantz 1982: 445-446; Olsen 1990: 204-205. I used a shorthand here; for the full phonological mechanism see Marantz (1982).

9. Schwyzer 1939: 812; the perfect then being something like **aphikntai* (cf. Costello 1984: 137). In other dialects, like Ionian, the -n- becomes syllabified and comes out as a schwa, which is notated as a, e.g. Herodotus 1,140: *Mágoi dè kechorídatai < *kechorídntai* 'The Magoi are different'. The syllabification of interconsonantal -n- is quite common in Greek, e.g. acc. sg. **nyktn > nýkt?,* written *nykta* 'night'. A parallel process applies to the German dialect Swabian: standard German [*laufn*] > Swabian [*lauf?*]. It may be noted that the periphrastic passive option might go back to Protoindoeuropean times (Costello 1984: 148-156) and implies no change of meaning in the first place (Schwyzer 1939: 811).

10. This is about the speed in which linguistic changes normally occur, cf. Kroch 2000: 719ff.

11. In the following sections I used a shorter notation for decomposition. First I write the meaning of the verbal stem as it is apparent from random durative or aorist examples, after a sign ':' I notate the meaning of the perfect form under discussion. I do also neglect lambda abstraction. Semantics of finiteness markers are ignored throughout this essay.

12. *pollà álla* is no V-selected object but an adverbial adjoined to V'. Such so-called 'inner objects' are rather common in Ancient Greek.

13. The -k- has presumably risen from metanalysis. Some verbs, like *títhemi* used a stem expanded by -k- in order to form the aorist (like Latin *fa-c-io* 'I do'). Later, when aorist and perfect endings had developed close to identity, the -k- was thought to be part of the ending first of the aorist of *títhemi* and the like, second of the perfect, and was transported to perfect stems ending in long vowel. It came in handy, being a hiatus-deleting element. Cf. Kimball (1991: 150-152). To the problem of aspirated perfects cf. Ringe 1984.

References

Aristotle
   1957   *Metaphysica*: Ed. W. Jaeger. Oxford: Oxford University Press

Austefjord, Anders
   1984   Zur Gestaltung des germanischen Tempussystems. *Indogermanische Forschungen* 89: 160-168.

Bierwisch, Manfred
   1986   On the nature of semantic form in natural language. In: Klix, Friedhard and H. Hagendorf (eds.), *Human Memory and Cognitive Capabilities*. Part B. Amsterdam: Elsevier, 765-784.

Bornemann, Eduard and Ernst Risch
   1978   *Griechische Grammatik*. Frankfurt: Diesterweg.

Chantraine, Pierre
   1927   *Histoire du Parfait Grec*. Paris: Librairie ancienne Honoré Champion.

Chomsky, Noam
   1995   *The Minimalist Program*. Cambridge/Mass.: MIT Press.

Costello, John R.
   1984   The periphrastic passive construction in Proto-Indo-European. *Word* 35: 125-161.

Dahl, Östen
   1985   *Tense and Aspect Systems*. Oxford: Blackwells.

Dowty, David R.
   1979   *Word meaning and Montague Grammar*. Dordrecht: Reidel.

Embick, David
   2000   Features, syntax and categories in the Latin perfect. *Linguistic Inquiry* 31: 185-230.

Fortmann, Christian and Werner Frey
   1997   Konzeptuelle Struktur und Grundabfolge der Argumente. In: F.J. d'Avis and U. Lutz (eds.), *Zur Satzstruktur im Deutschen*, 143-170. (Arbeitspapier Nr. 90 des SFB 340.) Univ. Tübingen.

Gerö, Eva-Carin and Arnim von Stechow
   2002   Tense in time: the Greek perfect. Ms., Seminar für Sprachwissenschaft, Universität Tübingen, forthcoming.

Grice, Paul
   1989   *Studies in the Way of Words*. Cambridge/Mass.: Harvard University Press.

Kimball, Sara E.
   1991   The origin of the Greek k-perfect. *Glotta* 69: 141-153.

Kratzer, Angelika
   2000   Building statives. Ms., University of Massachusetts, Amherst.

Kroch, Anthony S.
    2000   Syntactic change. In: Mark Baltin and Chris Collins (eds.), *The Handbook of Contemporary Syntactic Theory*, 629-739. Malden / Oxford: Blackwells.

Kühner, Raphael and Friedrich Blass
    1966   *Ausführliche Grammatik der griechischen Sprache. Erster Teil: Elementar- und Formenlehre*. 2 volumes. Third impression. Darmstadt: Wissenschaftliche Buchgesellschaft. First published Hannover: Hahnsche Buchhandlung [1892].

Kühner, Raphael and Bernhard Gerth
    1966   *Grammatik der griechischen Sprache. Zweiter Teil: Satzlehre*. 2 Bände. Third impression. Darmstadt: Wissenschaftliche Buchgesellschaft. First published Hannover: Hahnsche Buchhandlung [1892].

Jackendoff, Ray S.
    1972   *Semantic Interpretation in Generative Grammar*. Cambridge, Ma.: MIT Press.
    1990   *Semantic Structure*. Cambridge, Ma.: MIT Press.

Katz, Jerrold J. and Jerry A. Fodor
    1963   The structure of a semantic theory. *Language* 39: 170-210.

Marantz, Alec
    1982   Re reduplication. *Linguistic Inquiry* 13/3: 435-482.

Olsen, Susan
    1986   *Wortbildung im Deutschen*. Stuttgart: Kröner.
    1990   Konversion als ein kombinatorischer Wortbildungsprozeß. *Linguistische Berichte* 127: 185-215.

Pollock, Jean-Yves
    1989   Verb movement, universal grammar, and the structure of IP. *Linguistic Inquiry* 20/3: 365-424.

Rapp, Irene
    1996   Zustand? Passiv? - Überlegungen zum sogenannten Zustandspassiv. *Zeitschrift für Sprachwissenschaft* 15/3: 231-265.
    1997   *Partizipien und semantische Struktur.* (Studien zur deutschen Grammatik 54.) Tübingen: Stauffenburg.

Rijksbaron, Albert
    1984   *The Syntax and Semantics of the Verb in Classical Greek.* Amsterdam: Gieben.

Ringe, Donald A.
    1984   E‡lhfa and the aspirated Perfect. *Glotta* 62: 125-141.

Schwyzer, Eduard
    1939   *Griechische Grammatik*. Band 1. München: C.H. Beck.

Schwyzer, Eduard and Albert Debrunner
    1950   *Griechische Grammatik*. Band 2. München: C.H. Beck.

Selkirk, Elizabeth O.

1982 *The Syntax of Words*. Cambridge/Mass.: MIT Press.

Sihler, Andrew L.
 1995 *New Comparative Grammar of Greek and Latin*. New York/ Oxford: Oxford University Press.

Speyer, Augustin
 2003 Short verb movement in Ancient Greek. Ms., Department of Linguistics, University of Pennsylvania.

von Stechow, Arnim
 1995 Lexical decomposition in syntax. In: Egli, Urs, Peter E. Pause, Christoph Schwarze, Arnim von Stechow and Götz Wienold (eds.), *Lexical Knowledge in the Organization of Language*, 81-117. Amsterdam/Philadelphia: John Benjamins.

Stempel, Reinhard
 1998 Zu Vorgeschichte und Entwicklung des lateinischen Tempus- und Modussystems. *Historische Sprachforschung* 111: 270-285.

Vendler, Zeno
 1957 Verbs and times. *The Philosophical Review* 66: 143-160.

Wackernagel, Jacob
 1926 *Vorlesungen über Syntax*. Erste Reihe. Basel: Birkhäuser.

Wunderlich, Dieter
 1985 Über die Argumente des Verbs. *Linguistische Berichte* 97: 183-227.
 1986 Probleme der Wortstruktur. *Zeitschrift für Sprachwissenschaft* 5,2: 209-252.
 1987 Partizipien im Deutschen. *Linguistische Berichte* 111: 345-366.