Aspectual Shift via Supervaluation

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Abstract. Aspectual shifts in connection with temporal adverbial modification usually are treated by close analogy with type-coercion in programming languages. The paper shows that by taking a good metaphor too literally, semantic research so far did not do full justice to the kind of flexibility observable in the natural language examples. A new proposal is developed within the framework of finite-state temporal semantics combined with a supervaluational concept of underspecification. The simple shifting algorithm used in the present approach generates the correct set of possible readings on the basis of linguistic input only and, furthermore, may claim cognitive plausibility.

1 Introduction

There is a long tradition in philosophy of language and linguistics that has attempted to explain the way sentences express the temporal structure with respect to which they are to be interpreted. From the perspective of research in the field of semantics and syntax of natural language, differences in situational structure have been shown to have influence on, for instance, truth conditions and entailments, temporal sequencing in discourse, grammaticality of imperative, progressive, pseudo cleft and adverbial constructions. These observations helped isolate aspectually relevant properties, and gave rise to a number of tests which are now commonly used to distinguish at least four classes of situations: *states, activities, accomplishments* and *achievements*.

While, sometimes, aspectual classes are thought to be a means to classify verbal lexical entries, a closer look at the data shows that the aspectual class of a verbal phrase can change during the process of semantic composition under the influence of nominal arguments, prepositional phrases, tense and aspectual markers, aspectual auxiliary verbs and temporal adverbials. The aim of a theory of aspect, is therefore to predict the temporal structure of the situation denoted by a sentence on the basis of semantic information associated with certain of its syntactic constituents.

In the last twenty years, considerable progress has been made in describing the aspectual contribution of nominal and prepositional arguments (e. g.

Proceedings of the Twelfth ESSLLI Student Session
Ville Nurmi and Dmitry Sustretov (editors)

[?] [?]). But as far as the aspectual behaviour of temporal adverbials is concerned, some puzzling set of data still awaits proper explanation and appropriate formalization. From the very beginning of linguistic research on aspect, compatibility with "for"- and "in"-adverbials figured most prominently under the tests available to tell apart *telic* from *atelic* situations. The examples under (1) and (2) shortly repeat the well-known pattern.

(1) *be quiet for an hour / *in an hour*
*swim for an hour / *in an hour*

(2) *walk a mile *for an hour / in an hour*
*arrive *for an hour / in an hour*

Accordingly, atelic states and activities admit modification by a "for"-adverbial, but give rise to a marked interpretation when combined with an "in"-adverbial; for telic accomplishments and achievements things are just the other way around.

However, those claimed test cases do not seem to be as simple and clear cut as one would like to have them since, rather than being fully ungrammatical, the marked sentences display some kind of derived meaning. The focus of the temporal adverbial under (1) can be understood as being shifted from the situation itself towards its *pre-phase*, which is to culminate in the swimming process or the state of being quiet only an hour later. In case an *implicit boundary* for the swimming activity is being given by context (imagine a triathlon competition, for instance,) the process itself too can be modified by the adverbial after all. An *iterative* interpretation appears to be derivable for the examples under (2), with the "for"-adverbial giving the duration of the whole complex situation. Another possibility here is to let the adverbial fix the duration of the *preparatory phase*, i. e. the changement's being under development, preceding the culmination implicit in the underlying verbal description. Sometimes, a "for"-adverbial combined with a telic situation also seems to be able to modify the *result state* following its culmination, rather than any kind of process, as shown in (3).

(3) *leave the room *for an hour / in an hour*

These phenomena[1] in connection with the application of temporal adverbials to situations that are - under the perspective of traditional aspectual theory - not suitable for them have proven to be notoriously difficult to treat in every kind of available framework. At the same time, the observed cases do not have the status of real exceptions, but appear crosslinguistically and spread over the whole verbal lexicon. Therefore, no theory of aspect can be seen as fully adequate as long as not offering a conclusive, systematic

[1]Here and in all that follows I disregard the possibility of generic interpretations, as these seem to obey semantic principles different from what will be used to handle the group of examples presented above.

description and plausible explanation for this flexibility in adverbial semantics. The aim of this paper is to work out a formally simple analysis of the cases in question which should not only be able to generate the correct set of possible interpretations in a fully compositional manner, but also explains the underlying semantic mechanism in terms of a more general cognitive principle.

2 The State of Art: Type-Coercion

Before turning to my own proposal for an analysis of meaning shifts in connection with temporal modification, I will briefly discuss the idea figuring prominently in most of the recent theories (e.g. [**?**] [**?**] [**?**] [**?**] [**?**] [**?**] [**?**]). Moens and Steedman [**?**] conceived temporal adverbials as "(...) functions which 'coerce' their inputs to the appropriate type, by a loose analogy with type-coercion in programming languages". Under the perspective implicit in the quotation, aspectual shift is triggered in the cases under consideration by a conflict between the aspectual type of the situation to be modified and the aspectual constraint set by the temporal preposition heading the modifier[2]. Coercion operators, then, are thought to adapt the verbal input by mapping one sort of situation onto another. The underlying model is commonly supposed to include situations as first-order objects of the four basic sorts previously mentioned, i. e. states, activities, accomplishments, achievements (with the difference between the last two sometimes being neglected).

A first problem comes up immediately from this constellation. Since the temporal prepositions constrain the type of the situation only as far as telicity is concerned, the relation established by coercion cannot be *functional*, as it leaves us with several different possible outputs. And still worse, when looking at the given examples, it becomes clear that even when confined to one of the primitive ontological sorts, the output value of the operation remains underspecified, because after applying a "for"-adverbial to an accomplishment, for instance, the iterative and the result state interpretation alike count as stative. Since, on the other hand, in the case of real type coercion in programming languages the introduced relation has always to be functional, a first clear difference between the shifting operations in the two domains must be noted. Simply mapping one primitive semantic sort onto another cannot be what is formally going on in case of meaning shifts triggered by temporal adverbials, as this leaves us with no explanation for there being this exact number and kinds of readings one actually finds.

[2]There are examples (i. e. "hiccup all day") where aspectual shifts appear to follow solely from conceptual background knowledge concerning default durations of certain sorts of events, rather than being triggered by a conflict in aspectual type requirements. I take these phenomena as laying outside the scope of any formal semantic treatment, and will not deal with them any further here.

Moreover, when taking a closer look at the explanations commonly given in the debate, one finds that wrapped inside the so-called type-coercion function there are in fact relations of a very different kind, establishing links between the atomic elements in the model such that these get related in a conceptually much more fine-grained way than a simple mapping between two logical types could have induced. Examples of the relations commonly used are *Result, Iteration, Preparatory Phase*. Accordingly, although the whole process appears to be triggered by a type conflict at the very first, these connections, established inside some kind of ontological network, actually come into play as a second, seemingly independent factor. They are actively conducting the shifting operation in its various directions by following some underlying principle which remains entirely unknown. Similarly, theories of aspectual coercion stay silent or confine themselves to vague, intuitive circumscriptions concerning the decisive question of how these relations are precisely to be defined. Even in the more elaborated accounts the inherent semantic connections between the related concepts disappear behind the interpretation function and consequently get out of sight of language theory. Such point of view is entirely extrinsic to the adaptive potential of meanings and compositional principles themselfes, and makes semantic formalization a mere record of the data without further explanatory power. From the point of view of the type-coercion paradigm in programming theory, on the other hand, these kind of questions come up as a surprise, as this implicit, intermediate step on the way to the resolution of sort conflicts does obviously not have any counterpart in pure type coercion algorithms.

Consequently, the analogy between aspectual shifts triggered by temporal adverbials and type coercion as used in the programming language domain is, I claim, not as close as generally assumed. Applying the formal mechanism used in the latter case too strictly and blindly to the former, inevitably leads to the two interrelated problems mentioned above, and seems by now to obstruct a deeper understanding of what is actually going on when senses start floating like driven by themselves.

3 The Framework: Situations as Strings

In this section, I will (very) shortly introduce a decompositional approach to event semantics within the framework of *Dynamic Logic* [**?**] [**?**] [**?**] that has been proposed by Naumann [**?**] [**?**], together with a finite-state version of it developed by Fernando [**?**] [**?**] [**?**] [**?**]. What made me studying and, consequently, applying this kind of formalism was the intuition that what is needed to appropriately model aspectual shifts is the concept of a situation as a complex but logically coherent, dynamic unit. The more general theoretical decision lying in the background of the analysis taken up here is the move from traditional model theoretic semantics towards cognitive

semantics, with a switch in theoretical perspective that takes aspectual categories as "(...)*ways of viewing a happening, rather than intrinsic properties* (...) *of objective reality and the external world*"[**?**]. This "representational turn" now makes the semanticist describing descriptions of structures rather than structures themselves and, by doing so, opens up the possibility of an improved treatment of ambiguities in terms of *underspecification* [**?**]. The essential idea of this paper can be seen as being built on that spirit.

Quantificational Dynamic Logic, as known from program verification, offers a convenient formal tool for decomposing situational concepts by looking at them as some kind of *state transformers*. According to Naumann, verbal lexical information consists of a program gradually changing the value of a variable, which is normally corresponding to a particular property of the verb's object (*incremental theme*) or has been contributed by co-occurring prepositional phrases. The quantificational information coming from the determiner or preposition, respectively, controls the execution of a *while-loop* via a *boolean condition* and either makes the program terminating after a definite number of steps, or lets it going on indefinitely. The following example gives the translation within the framework of the telic phrase "eat three apples" (the domain of apples is structured as a *complete partial order*, with $\oplus$ being an operator on *chains* in this order such that x$\oplus$1 gives the least of all elements in the chain which are above the current value of x).

$$(\textit{while}\ \mathrm{x}{\neq}3\ \textit{do}\ \mathrm{x}{:=}\ \mathrm{x}{\oplus}1) = (((\mathrm{x}{\neq}3)?\ ;\ \mathrm{x}{:=}\ \mathrm{x}{\oplus}1)^{*}\ ;\ (\mathrm{x}{=}3)?)$$

Under this perspective, the traditional aspectual verbal classes can be described as distinctive abstract courses of transitions, with the telic/atelic-distinction corresponding to the terminating/non-terminating property of a program.

Moreover, if one takes the *finite computational sequences* or *traces* of such programs, one gets a *regular set of strings*. From a declarative point of view, as taken by Fernando, verbal meanings then become *regular languages*. The symbols of such languages can be thought of as enumerating propositions which depict a possible state in the model. The strings, accordingly, are recording observations over discrete time, like motion pictures or *comic stripes* being accepted by cameras, which can be formulated as *finite automata* or *finite Kripke models with partial valuations*.

On that basis, a regular operation *superposition* (&) over languages (L and L′) can be introduced as a compositional device for stepwise construction of complex situational descriptions.

$$\mathrm{L}\ \&\ \mathrm{L}' = \bigcup_{k\geq 1}\{(\sigma_1{\cup}\sigma'_1)\ ...\ (\sigma_k{\cup}\sigma'_k) \mid \sigma_1...\sigma_k \in L, \sigma'_1\ ...\ \sigma'_k \in L'\}$$

Superposition induces a *pre-order subsume* ($\succeq$) which, intuitively, compares two languages according to their informational content.

$$\mathrm{L} \succeq \mathrm{L}' \text{ iff } \mathrm{L} \subseteq \mathrm{L}\ \&\ \mathrm{L}'$$

A simple example (by Fernando), deriving the representation Λ(L) for the language "rain from dawn to dusk", should make the general idea clear.($\boxed{\ }$ stands for $\emptyset$-as-a-symbol, boxes replacing braces.)

$$\boxed{\text{rain}}^{+} \,\&\, \boxed{\text{dawn}}\,\boxed{\ }^{+} \,\&\, \boxed{\ }^{+}\,\boxed{\text{dusk}} = \boxed{\text{rain dawn}}\,\boxed{\text{rain}}^{*}\,\boxed{\text{rain dusk}}$$

Aspectual classes can now be characterized by using a small number of abstract notions defined with respect to the symbols ($\boxed{\alpha}$, $\boxed{\omega}$) that start and finish a given language, respectively (where σ *finishes* L if L $\succeq \neg\sigma^{+}\sigma$ and σ *starts* L if L $\succeq \sigma\neg\sigma^{+}$).

- *telic* (L) = $\neg\omega(\mathrm{L})^{+}\ \boxed{\ }$
- *iter* (L) = $\boxed{\ }\ \omega(\mathrm{L})^{+}$
- *prog* (L) = $\boxed{\ }\ \neg\alpha(\mathrm{L})^{+}$
- *reten* (L) = $\alpha(\mathrm{L})^{+}\ \boxed{\ }$

A certain situational type L falls under one of the four concepts χ just in case L $\succeq \chi$. The two conditions α and ω can either be preserved or immediately switched (reading the string from left to right for α and from right to left for ω), which gives a nice encoding of the idea of a situation being initially or finally bounded or unbounded. Below, I marked this property by using a short binary code, with the first digit corresponding to the beginning, the second to the ending, and 1 and 0 indicating the presence or absence of a boundary, respectively.

- *state: reten, iter* (0 0)
- *activity: prog, iter* (1 0)
- *achievement: reten, telic* (0 1)
- *accomplishment: prog, telic* (1 1)

The following two translations, which give formalizations within the framework of the accomplishment "walk a mile" and the activity "swim" from the initial examples, may serve as an illustration.

(4a) Λ(*walk a mile*) = $\boxed{\alpha\neg\omega}\,\boxed{\neg\alpha\neg\omega}^{+}\,\boxed{\neg\alpha\omega}$ =

$$\boxed{\neg\exists x \leq m\ (\mathrm{walk}(x)),\ \neg\mathrm{walk}(m)}\ \boxed{\exists x \leq m\ (\mathrm{walk}(x)),\ \neg\mathrm{walk}(m)}^{+}\ \boxed{\exists x \leq m\ (\mathrm{walk}(x)),\ \mathrm{walk}(m)}$$

(4b) Λ(*swim*) = $\boxed{\alpha\neg\omega}\,\boxed{\neg\alpha\omega}^{+}$ =

$$\boxed{\neg\exists x \neq \emptyset\ (\mathrm{swim}(x))}\ \boxed{\exists x \neq \emptyset\ (\mathrm{swim}(x))}^{+}$$

4 The Proposal: Supervaluations

Within the formalism introduced so far, the commonly assumed constraint on the interpretability of temporal adverbials reads as follows (with V denoting a verbal phrase, and I a temporal interval expression):

> Λ(V *in* I) = {Λ(V) & Λ(I) if Λ(V) is *telic*; $\emptyset$ otherwise}
> Λ(V *for* I) = {Λ(V) & Λ(I) if Λ(V) is *iter*; $\emptyset$ otherwise}.

The aim of this section is to improve on that by giving room, within the semantic framework itself, for those kinds of derived readings that actually can appear, as shown by the initial examples.

The heart of my proposal is *Supervaluation Theory*, originally introduced by van Fraassen [**?**] as a formal tool for handling *presupposition failure*. The general aim of van Fraassen's theory was to account for the "third possibility" beside the classical valuations *Truth* and *False* in a way that preserves as much as possible from the classical framework. So, notably, while the supervaluationist denies the metalogical *principle of bivalence*, he still accepts the logical *law of excluded middle* together with all other classical tautologies. This decisive difference to the several three-valued logical systems known is due to the idea of using *truth value gaps* rather than a proper third value. Ordinary partial valuations are extended to *supervaluations* by considering the possible completions of a given model, that is, the set of classical valuations which eliminate all truth value gaps. Take metavariable M to stand for partial models, M′ to range over all possible completions of M, and M* to be the *supermodel* of M, comprising M together with all its M′.

> A *supervaluation* based on M is a function that assigns *Truth* with respect to M* to a proposition p just in case p is classically true in all M′, *False* just in case it is false in all M′, and # (*gap*) otherwise.

This said, let me now turn back to the problem of giving an appropriately flexible formal characterization of the semantic contribution of temporal adverbials. The algorithm I want to introduce proceeds in three steps, illustrated here by means of a telic example. I assume the semantic representation of the temporal prepositions "in" and "for" under (5a) and (5b) as the starting point. These representations take into account the known sortal preferences relative to the situation modified by encoding the respective properties *telic* and *iter* according to the definitions given in the previous section. Prepositional meaning here is semantically characterized in an abstract and context-sensitive but non-ambiguous way.

(5a) $\Lambda(in) = \boxed{\neg\omega}^{+}\ \Box$

(5b) $\Lambda(for) = \Box\ \boxed{\omega}^{+}$

With the prepositions having combined with the nominal phrase "an hour" via superposition under (6a) and (6b), the adverbial is now ready to modify the event, whose abstract characterization is once more given in (7).

(6a) $\Lambda(\textit{in an hour}) = \boxed{\neg\omega}^{+}\ \square\ \&\ \boxed{\text{time(x)}}\ \square^{+}\ \boxed{\text{time(y) hour(x,y)}} =$

$\boxed{\neg\omega\ \text{time(x)}}\ \boxed{\neg\omega}^{+}\ \boxed{\text{time(y) hour(x,y)}}$

(6b) $\Lambda(\textit{for an hour}) = \square\ \boxed{\omega}^{+}\ \&\ \boxed{\text{time(x)}}\ \square^{+}\ \boxed{\text{time(y) hour(x,y)}} =$

$\boxed{\text{time(x)}}\ \boxed{\omega}^{+}\ \boxed{\omega\ \text{time(y) hour(x,y)}}$

(7) $\Lambda(\text{S}^{\text{tel}}) = \boxed{\alpha\neg\omega}\ \boxed{\neg\alpha\neg\omega}^{+}\ \boxed{\neg\alpha\omega}$

In the first, obligatory, phase, the representation of the temporal adverbial is combined with the abstract characterization of the situation by *superposition*. If the situational type of the verb phrase is fitting with the structural condition set by the preposition, including prepositonal meaning does not have any visible effect. The semantic material just combines normally via superposition, as can be seen under (8a), and the algorithm finishes here.

(8a) $\Lambda(\text{S}^{\text{tel}}\ \textit{in an hour}) =$

$\boxed{\neg\omega\alpha\ \text{time(x)}}\ \boxed{\neg\omega\neg\alpha}^{+}\ \boxed{\omega\neg\alpha\ \text{time(y) hour(x,y)}}$

However, in case of a sortal clash between the modifying adverbial and the event modified, combining the respective representations inevitably leads to a contradiction at some predetermined position inside the complex situational type, so happening in (8b).

(8b) $\Lambda(\text{S}^{\text{tel}}\ \textit{*for an hour}) = \boxed{\neg\omega\alpha\ \text{time(x)}}\ \boxed{\underline{\neg\omega}\underline{\omega}\neg\alpha}^{+}\ \boxed{\omega\neg\alpha\ \text{time(y) hour(x,y)}}$

These being the cases where interesting aspectual shifts turn up, the real action starts here. In its second phase, the algorithm applies a *repairing mechanism* by assigning the supervalue # to the proposition that previously had received contradictory valuations. The rationale behind this may be thought of as not passing judgement in the face of equally probable but opposing evidences. The result of this operation is shown in (9).

(9) $\Lambda(\text{S}^{\text{tel}}\ \#\textit{for an hour}) = \boxed{\neg\omega\alpha\ \text{time(x)}}\ \boxed{\underline{\#\omega}\underline{\omega}\neg\alpha}^{+}\ \boxed{\omega\neg\alpha\ \text{time(y) hour(x,y)}}$

The meaning of a temporal adverbial can, accordingly, be thought of as some kind of presupposition of which the semantic contribution is empty in case the verbal concept it combines with is showing the right internal structure, but which induces a truth value gap at a particular position inside the situational string whenever its structural constraint is not fulfilled. The general formal principle of triggering truth value gaps is right the one standardly assumed for other presuppositional expressions.

As stated above, lacking a truth value in the sense of supervaluationism consists in the capacity in principle to make precise in more than one way. That means, for a proposition p having been marked # in a supermodel M*, there are underlying models in M′ such that p is true in one of them, but false in the other. This *determintation* of previously underspecified information in all possible directions by grounding the freshly introduced supervalue # in the underlying classical models, is exactly what the algorithm is supposed to do in its third and last step. So, instead of loosing any information previously received, our ideal language user tries to get the best out if it by developing different hypothetical interpretations separately. Intuitively, this can be taken as a strategy to save monotonicity of the interpretation process by allowing reciprocal adaptions between preposition and situation. This step is spelled out in (10a) and (10b).

(10a) $\Lambda^1(\mathrm{S}^{\mathrm{tel}}$ *for an hour*$) =$ $\boxed{\neg\omega\alpha \text{ time(x)}}$ $\boxed{\underline{\omega}\neg\alpha}^{+}$ $\boxed{\omega\neg\alpha \text{ time(y) hour(x,y)}}$

(10b) $\Lambda^2(\mathrm{S}^{\mathrm{tel}}$ *for an hour*$) =$ $\boxed{\neg\omega\alpha \text{ time(x)}}$ $\boxed{\underline{\neg\omega}\neg\alpha}^{+}$ $\boxed{\omega\neg\alpha \text{ time(y) hour(x,y)}}$

This reintroduction of truth values after a forced gap gives rise to a specific set of new languages. What situational concepts do these rebuilt structures correspond to? In (10a) the event culminates immediately after start, so that the adverbial can now be interpreted as indicating the duration of the result state. According to the reinterpretation under (10b), on the other hand, the preparatory phase of the event is stretched, leading to a situation where it takes an hour to reach the result in question.[3]

So far so good, but what about the iterative interpretation we found as the third possibility when looking at this kind of example at the beginning? To get this interpretation derived, let us take one out of the several different-sized strings encoded by the *Kleene iteration* in the regular expression, which, after step number two of the algorithm, may look like this:

(10c)′ $\boxed{\neg\omega\alpha \text{ time(x)}}$ $\boxed{\#\underline{\omega}\neg\alpha}$ $\boxed{\#\underline{\omega}\neg\alpha}$ $\boxed{\#\underline{\omega}\neg\alpha}$ $\boxed{\#\underline{\omega}\neg\alpha}$ $\boxed{\omega\neg\alpha \text{ time(y) hour(x,y)}}$.

Now, obviously, different hypothetical classical valuations can be chosen for different states, leading, for instance, to the situational pattern under (10c).

(10c) $\Lambda^3(\mathrm{S}^{\mathrm{tel}}$ *for an hour*$) =$

$\boxed{\neg\omega\alpha \text{ time(x)}}$ $\boxed{\underline{\neg\omega}\neg\alpha}$ $\boxed{\underline{\omega}\neg\alpha}$ $\boxed{\underline{\neg\omega}\neg\alpha}$ $\boxed{\underline{\neg\omega}\neg\alpha}$ $\boxed{\omega\neg\alpha \text{ time(y) hour(x,y)}}$

That means, phases of "being-on-the-way" freely alternate with phases of "having-finished", thereby forming a complex situation which, as a whole, is the attaching point for the temporal information carried by the adverbial.

[3]Notice that I did not get rid of the factivity entailment for the result state here. In examples like "*read a book for a few minutes*" a further mechanism will therefore have to apply, similiar to what has been mentioned in footnote 2.

The aim of the semantic interpretation process has been achieved at that point. It was to make provision for the set of possible readings found in the cases under consideration in a compositional manner, i. e. only using lexical semantical entries and general rules for combining them. Of course, further methods will have to apply in order to filter out the best actual candidate by the help of more contextual information and general world-knowledge in the pragmatic module of the theoretical language system.

I finish this section by giving the two results within the framework of the analysis of the atelic example - a correct pre-phase and implicit boundary interpretation, respectively.[4]

(11a) $\Lambda^1(\text{S}^{\text{-tel}}\ \textit{in an hour}) = \boxed{\neg\omega\alpha\ \text{time(x)}}\ \boxed{\neg\omega\alpha}^{+}\ \boxed{\omega\neg\alpha\ \text{time(y) hour(x,y)}}$

(11b) $\Lambda^2(\text{S}^{\text{-tel}}\ \textit{in an hour}) = \boxed{\neg\omega\alpha\ \text{time(x)}}\ \boxed{\omega\neg\alpha}^{+}\ \boxed{\omega\neg\alpha\ \text{time(y) hour(x,y)}}$

5 Conclusion

The aim of this paper was to show how the meaning potential of temporal adverbials can be formally accounted for, and to give room, within the compositional semantic framework itself, for an efficient derivation and systematic explanation of the exact number and kinds of possible readings. According to the proposal made here, aspectual shifts consist in restructuring a situational concept from inside rather than in simple mappings from one atomic event onto another. Aspectual transitions thus happen with respect to representations and are made on a deeper, subatomic conceptual level but by exclusive recurrence to material already present in the enriched dynamic semantic representation. The whole process is triggered indeed by a type conflict, as traditionally assumed, but is now controlled by the introduction and consequent filling in of a truth-value gap. The two relevant factors - aspectual propriety and special ontological relatedness - which appeared formally independent from the point of view of static event semantics and, in the latter case, laid beyond the reach of any known compositional semantic treatment, thus naturally combine inside one and the same simple derivational step. Last but not least, the procedure of systematically introducing underspecification as some kind of claimed ignorance in the presence of conflicting evidences, and of subsequently trying out all possible specifications separately, seems to be a plausible hypothesis about the strategies we really use when adapting sense.

[4]The formally possible third reading, parallel to the iterative interpretation given for the previous example, is not very prominent here and normally not discussed in the literature. I, therefore, did not explicitly state it. But there are certainly special contexts in which this condition nevertheless may hold true (take an interval training session, for instance). So, no over-generation here. The α inside the second box of (11a) is due to α and ω for nontelic situations making reference to the same proposition (compare to (4b)).

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