Challenges at the Syntax-Semantics-Pragmatics Interface

Challenges at the Syntax-Semantics-Pragmatics Interface:

A Role and Reference Grammar Perspective

Edited by

Robert D. Van Valin, Jr.

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EDITOR'S INTRODUCTION

ROBERT D. VAN VALIN, JR.

Challenges at the syntax-semantics-pragmatics interface: A Role and Reference Grammar perspective addresses important issues in syntactic theory from the point of view of a parallel architecture theory which looks at grammar as reflecting the complex interaction of structure, meaning, and function. Role and Reference Grammar [RRG] is a monostratal, non-derivational theory which posits a linking algorithm which maps between a syntactic representation and a semantic representation, and discourse-pragmatics plays a role in the mapping.[1] This is summarized in Figure 1.

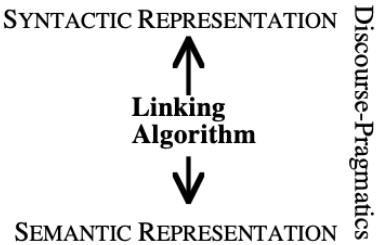

Figure 1: The organization of Role and Reference Grammar

The syntactic representation is concrete, in the sense that it represents the words and morphemes in their actual sequence and does not allow phonologically null elements, in particular no traces/unpronounced copies of words or phrases, null light verbs, null pronominals, null adpositions, etc. The semantic representation employs an *Aktionsart*-based system of lexi-

[1] For detailed introductions to RRG, see Van Valin and LaPolla (1997), Van Valin (2005), Pavey (2010), Mairal Usón, et al. (2012), Bentley, et al. (2022). For overviews of the theory, see Van Valin (2010, 2014, 2022a), Wu (2007), González Vergara (2006).

cal decomposition. The linking algorithm is bidirectional, mapping from semantics to syntax and from syntax to semantics. This reflects the fact that in language production speakers go from meaning to form to utterance, whereas in comprehension listeners go from utterance to form to meaning.[2] Discourse-pragmatics interacts with the linking algorithm in a variety of ways, and the interaction varies across languages, leading to significant differences in grammatical systems.

RRG has always been strongly cross-linguistically oriented, and this is a reflection of the 'founding question' that got work on it started back in the late 1970's: what would linguistic theory look like if it were based on languages with diverse structures, specifically Tagalog (Austronesian, Philippines), Dyirbal (Pama-Nyungen, Australia) and Lakhota (Siouan, North America), instead of English? This cross-linguistic orientation can be seen in the range of languages discussed in the papers in this volume, including Bamunka (Grassfields Bantu), Biblical Hebrew, Japanese, Persian, Pitjantjatjara (Pama-Nyungen, Australia), Russian, Tagalog, and Taiwan Sign Language. There is a comparably wide range of theoretical issues addressed, including verb classification and decomposition, light verb constructions, the instrument-subject construction, comparative constructions, case marking, adposition assignment, inversion constructions, clause linkage, and reference tracking. The contributions can be organized into four groups: (1) lexical representation and argument structure, (2) argument marking, (3) syntactic structure, and (4) information structure.

The first group addresses issues related to lexical representation and interesting cases of argument structure. In 'Activities, accomplishments and causation' Rainer Osswald explores the evolution of the RRG system of lexical decomposition in relation to the different proposals put forth in Dowty (1979), which is the basis of the original RRG system proposed in Foley and Van Valin (1984). The other two papers in the section deal with argument structure phenomena which deserve more attention in RRG. Jens Fleischhauer investigates light verb constructions in Persian, a language with a rich inventory of them, in 'Simplex and complex predicates in Persian – An RRG analysis'. Comparative constructions have not been analyzed from an RRG perspective, and Chien-hung Lin and Jung-hsing Chang present an RRG account of comparative constructions in Taiwan Sign Language in 'Linking syntax and semantics in comparatives of Tai-

[2] See Van Valin (2006, 2022b) for discussion of RRG as a component of a model of sentence processing.

wan Sign Language'. The emphasis is on their argument structure and the linking from semantics to syntax.

The second group of papers concerns the case and adpositional coding of direct and oblique arguments, focussing on dative and instrumental cases, the corresponding adpositions, and the syntactic expression of instrument arguments. Hideki Kishimoto investigates the contrast between dative case and postpositional marking of the third argument of ditransitive verbs in 'Dative case and three-place predicates in Japanese'. RRG makes an important distinction between *predicative* and *non-predicative* adpositions, i.e. adpositions that are assigned by rule (non-predicative) vs. those that contribute semantically to the clause and are part of the semantic representation (predicative); see Van Valin (2005:21-23, 49). The next two papers show that morphological cases, which are normally non-predicative, can also be predicative as well. The Western Desert language in central Australia has a dative-like case called the *purposive*, and it is the topic of Conor Pyle's contribution 'Purposive case and semantic arguments in Australian Western Desert dialects'. Wataru Nakamura examines RRG's claim that dative is the default case for non-macrorole direct core arguments in light of Jakobson's analysis of the instrumental as being the least marked case in Russian and reaches some interesting conclusions in his paper 'A Neo-Jakobsonian Account of Default Cases: Instrumental vs. Dative'. He also looks at the use of the English prepositions *with* and *by* in comparison with the Russian instrumental case. The next contribution, Koen Van Hooste's 'A Cross-Linguistic Survey of the Instrument-Subject Alternation', deals with variation in the morphosyntactic expression of instrument arguments, specifically with the possibility of expressing it as the subject, e.g. *The knife cut the bread* vs. *She cut the bread with the knife* in contrast to **The spoon ate the soup* vs. *She ate the soup with the spoon*, across a range of languages. The final paper of this section, 'Two-Theme Constructions and Preposition Assignment in Spanish' by Sergio Ibáñez Cerda, presents a contrastive analysis of the preposition assignment rules proposed for English in RRG with those posited for Spanish three-place predicates taking two theme arguments.

The third group of papers concerns aspects of syntactic structure. In her paper 'An Analysis of Non-Iconic Word Order in the Bamunka Reference Phrase', Ciara Anderson examines the structure of what are traditionally called 'noun phrases' in Bamunka, a Grassfields Bantu language spoken in Cameroon, in light of certain word order universals, giving an RRG account. The second paper concerns an important concept in the RRG theory of complex sentences, cosubordination. This notion has been subject to criticism, and there have been suggestions that it is not a valid construct.

Robert D. Van Valin, Jr. defends the concept, showing that the arguments against it lack validity in his paper 'Cosubordination'.

The final group investigates the syntax-pragmatics interface, commonly referred to as *information structure*. Anja Latrouite and Robert D. Van Valin, Jr. give an account of the rich inventory of inversion constructions in Tagalog in RRG terms in their contribution 'An RRG Account of Aspects of the Information Structure-Syntax Interface in Tagalog'. It reveals some unexpected interactions between syntactic positions and information structure. The final article in the volume concerns reference tracking in Biblical Hebrew: 'Why Eve Shouldn't Eat the Snake: An Intelligent Answer from Corpus-driven Information Structure and Reference Tracking in Biblical Hebrew' by Nicolai Winther-Nielsen. The author employs the discourse representations used in RRG as a crucial component of his analysis of the interpretation of potentially ambiguous utterances in context.

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PART 1.

LEXICAL REPRESENTATION AND ARGUMENT STRUCTURE

Activities, Accomplishments and Causation

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Abstract

The *Aktionsart* system is a crucial component of the syntax-semantics interface of Role and Reference Grammar (RRG). The purpose of this paper is two-fold: (i) to review the development of RRG's *Aktionsart* system since its adaption from Dowty (1979/1991) by Foley & Van Valin (1984) and to relate the various revisions introduced over the years to issues already mentioned in Dowty (1979/1991); (ii) to point out some issues in the latest formulation of the *Aktionsart* system in Van Valin (2018) and to sketch how to overcome them by a more expressive decomposition system.

Keywords

Aktionsart, semantic decomposition, event semantics, telicity, causation

1. Introduction

The *Aktionsart* system and its representation by means of logical structures is one of the cornerstones of the syntax-semantics interface of Role and Reference Grammar (RRG). The logical structures are a core component of the semantic representation of a sentence, and the positions of the arguments in these structures play a crucial role for the realization of the arguments in the syntax as determined by the linking system. The system of *Aktionsart* classes, as well as the system of logical structures in general, has evolved considerably over the years since the publication of Foley & Van Valin (1984), which was largely based on Dowty's (1979/1991) adaptation of ideas from Generative Semantics.

The present paper has a two-fold objective: First, we will take a look at the issues of Dowty's proposal, many of which have been pointed out by Dowty himself, and show how they have been addressed by the various modifications of the decomposition system of RRG. This includes, among other things, the

Table 1: The early *Aktionsart* system of RRG

Aktionsart class	Logical structure
State	$P(x)$ or $P(x, y)$
Activity	DO$(x, [P(x)])$ or DO$(x, [P(x, y)])$ (agentive) $P(x)$ or $P(x, y)$ (non-agentive)
Achievement	BECOME $P(x)$ or BECOME $P(x, y)$
Accomplishment	ϕ CAUSE ψ, with ϕ typically an activity structure and ψ typically an achievement structure

independence of causation from telicity as a consequence of introducing active accomplishments, and the more recent decomposition of (simple) accomplishments into a process and a result component. The second objective of the paper is to address issues of the current decomposition system and to suggest possible ways of how to overcome them. In particular, it will prove useful to clarify the denotational meaning of the logical structures, that is, to spell out the reference to states and events more explicitly. To this end, a decompositional system will be proposed which builds crucially on attributes and which is closely related to frame-based representations.

2. The early *Aktionsart* system and Dowty's heritage

2.1. The early *Aktionsart* system

The original version of the RRG *Aktionsart* system proposed in Foley & Van Valin (1984) uses the four classes *state*, *activity*, *achievement*, and *accomplishment*, much in line with Dowty's adaptation of Vendler's (1957) classification.[1] Table 1 reviews the original system as summarized in Van Valin (1990: 224, 1993: 36). It is characteristic of the early system that accomplishments are consistently analyzed as causative, i.e., as having the logical structure ϕ CAUSE ψ, in accordance with Dowty's aspect calculus (cf. Dowty 1979/1991: 91/124f). Achievements, on the other hand, are assumed to have the general form BECOME ϕ.

Note that the distinction between agentive and non-agentive activity shown in Table 1 is not strictly part of the calculus introduced in Chapter 2 of Dowty's

[1] The following brief review of the development of RRG's *Aktionsart* system draws considerably on Van Valin (2018).

book but is adapted from a revised classification sketched in a later chapter of that book (cf. Dowty 1979/1991: 184). The operator DO is in fact discussed rather controversially by Dowty with respect to its intended use for expressing agentivity, controllability and/or intentionality (cf. Section 2.2 below), and, for similar reasons, the use of DO has been strongly restricted in later versions of the RRG system (cf. Section 2.3). The early system represents unintentional/uncontrolled activities like falling by one-place predicates such as **fall′**, and it also introduces a generalized activity predicate **do′** which is unmarked for agency (Foley & Van Valin 1984: 53).

A remark on notation: The boldface+prime markup for primitive predicates like **fall′** was introduced in Foley & Van Valin (1984) and has been henceforth in use in the RRG literature. The notation was taken from Dowty (1979/1991), who uses boldface for words and employs the prime ′ to indicate the translation from natural language into a logical language. So, for Dowty, **fall** is an English word while **fall′** is a predicate. Since the boldface type does not serve any markup purposes in the standard presentation of RRG, we can simply declare **fall** to be the predicate that (roughly) represents the meaning of the English verb *fall*. For reasons of notational parsimony we will therefore write predicates in boldface without an additional prime in the rest of this paper.

2.2. A short (de)tour through Dowty 1979

It is worthwhile to recall the general motivation behind Dowty's 1979/1991 book. His primary goal was to combine theories of word meaning with Montague's formalized compositional framework of the syntax-semantics interface. The chosen approach to word meaning was inspired by the decomposition analyses (in terms of DO, CAUSE, BECOME, etc.) proposed in the Generative Semantics literature, which he regarded as "the most highly structured version of decomposition analysis" available (Dowty 1979/1991: vi). The respective analyses go back to his dissertation, which was completed in 1972 when Generative Semantics was still flourishing. It was thus already in this thesis where he developed the formal *Aktionsart* classifications and the representations that served as the basis of the semantic structures of the early RRG system shown in Table 1.

While having included the decomposition analyses of his dissertation in the 1979 book, Dowty did not hold back with pointing out the many issues he meanwhile saw in this approach, and with sketching alternative solutions. He also proposed a second approach, *interval semantics*, for modeling the se-

mantics of aspect (which was first published in Dowty 1977). Nevertheless, as Dowty (1979/1991: xix) emphasizes in the new preface to the second printing, the decompositional approach and the interval semantics account are not incompatible but can be fruitfully combined with each other, at least in principle, since they contribute to complementary domains: The decomposition approach is concerned with developing linguistically and cognitively motivated formalized representations for expressing aspectual and *Aktionsart* distinctions. Interval semantics, on the other hand, is concerned with the interpretation of such structures in the temporal domain, i.e., with respect to intervals, subintervals, lower and upper bounds of intervals, etc. That is, interval semantics is not to be seen as an alternative to decompositional semantics but as an attempt to spell out how the decompositional primitives are to be interpreted with respect to the time course or "dynamic contour" of the denoted events.

Among the operators DO, CAUSE and BECOME, only BECOME with its underlying change-of-state interpretation turns out as being useful in this respect. Roughly speaking, BECOME ϕ is true at an interval I if ϕ is not true at (an interval containing) the initial bound of I and ϕ is true at (an interval containing) the final bound of I. It is far less obvious how to evaluate CAUSE within an interval semantics (see the discussion in Dowty 1979/1991: 191, footnote 17). And the notion of intentionality that is supposed to go along with DO is even more remote in this respect. In fact, Dowty (1979/1991: 121) casts serious doubts on the viability of taking DO as an indicator of intentionality and/or controllability and, moreover, finds it "doubtful that DO can really distinguish all activities from statives, after all" (Dowty 1979/1991: 119). Hence, while a decompositional analysis on the one hand and an interpretation of *Aktionsart* and aspect in the temporal dimension on the other hand are compatible with, and most probably even dependent on each other, it is questionable that the triad DO, CAUSE, BECOME is appropriate for this purpose. Moreover, the interval-based semantics calls for further refinements as well, as will be discussed in what follows.

In the new preface, Dowty (1979/1991: xxii) notes that the formal interpretation of BECOME in his interval semantics has the defect that "when an event of change takes place over an interval of time, the change in some sense does not »take place« until the end of the interval." For example, the incremental change which goes along with an event as expressed by *paint the house red* is not captured by his treatment of BECOME. Dowty points to the work of Krifka and others who model the incremental character of such events in terms of an object-to-event homomorphism, and he more generally espouses the idea of developing his interval-based account into an event-based account

since the latter "is conceptually simpler, easier to formalize, and has substantive advantages" (Dowty 1979/1991: xxii).

2.3. Minor revisions of RRG's original *Aktionsart* system

The original adaptation of Dowty's system remained basically unchanged in Van Valin (1990, 1993) except for the following three minor qualifications: (i) The operator DO was restricted to the indication of agency as part of the *lexical* meaning of a verb as it is the case for *murder* in contrast to *kill*; see Van Valin & Wilkins (1996: 307ff) for arguments for restricting DO to lexicalized verbal agency. As mentioned in Section 2.2, there are also qualms about the correct interpretation of DO in Dowty (1979/1991). In particular, he notes that DO behaves like an *implicative verb* in the sense of Karttunen (1971) in that it does not affect the truth conditions of the embedded expression. Dowty (1979/1991: 118) concludes that the "contribution to meaning that DO makes is entirely in its conventional implicature." RRG's abandonment of DO as a general indicator of agency had the consequence that the argument of the generalized activity predicate **do** (cf. Section 2.1) may now be an agent or a pure effector, depending on the context.

(ii) The need for a distinction between punctual and durative achievements is briefly acknowledged (Van Valin 1993: 154, footnote 19). Not all achievements are punctual as attested by verbs such as *cool* and *dry*, which can be used in the progressive and even with durational adverbials. Dowty (1979/1991: 88ff) speaks of *degree achievements* in such cases but evades a thorough formal representation of them in his decomposition system. Likewise, BECOME was kept in Van Valin (1993) both for punctual and durative achievements.

(iii) The argument order in predicates of type **be-LOC** is reversed. While in Foley & Van Valin (1984), in line with Dowty (1979/1991: 210ff), **be-at**(x, y) means that x is (located) at y, the converse interpretation convention was established in Van Valin (1990): x is the location where y is located. This modification was obviously motivated by the desire of having a parallel representation of locative and possession predicates, which allows one to characterize the first argument of these predicates as "locative", or, to put it differently, to have uniform argument positions available for the default macro-role assignment principles. From this perspective, the switch of arguments in the **be-LOC** predicates is mainly theory-driven. On the other hand, alienable possession is in many languages expressed by a locative construction (Foley & Van Valin 1984: 48; see also Stassen 2009: 48ff).

Table 2: Simple *Aktionsart* classes (textbook version)

Aktionsart class	Logical structure
State	$P(x)$ or $P(x, y)$
Activity	**do**$(x, [P(x)])$ or **do**$(x, [P(x, y)])$
Semelfactive	SEML ϕ
Achievement	INGR ϕ with ϕ a state or activity structure
Accomplishment	BECOME ϕ

3. The textbook version and recent developments

What we call the "textbook version" of the *Aktionsart* classes and their logical structures is the version presented in Van Valin (2005, 2010). The textbook version coincides basically with the representation system introduced in Van Valin & LaPolla (1997), except for the semelfactive operator SEML, which has been added later, and a number of minor modifications to be mentioned below. The *Aktionsart* classes of the textbook version are summarized in Tables 2 and 3.

3.1. Simple *Aktionsart* classes

The *Aktionsart* classes listed in Table 2 are called *simple* since the corresponding logical structures are either primitive predicates representing states, or primitive predicates enclosed by **do**$(x, [\dots])$ representing activities, or expressions that result from applying one of the unary operators SEML, INGR or BECOME to a state or activity structure. (Due to lack of space, we put aside a discussion of the SEML operator.) The operator INGR (indicating *ingression*) has been introduced to make explicit the distinction between punctual and non-punctual change-of-state verbs (cf. Section 2.3). INGR is used for punctual verbs such as *shatter* and *explode* while BECOME is reserved for non-punctual, incremental verbs such as *melt* and *dry*. The members of the latter class are now referred to as *accomplishments*, in line with the original terminology of Vendler (1957), and in contrast to Dowty's restriction of this term to causative structures (cf. Section 2.1).

The representation of activities follows basically Van Valin & Wilkins (1996), who show that agency is best understood as being derived from a number of interacting morphosyntactic, semantic and pragmatic factors, and that

Table 3: Complex *Aktionsart* classes (textbook version)

Aktionsart class	Logical structure
Active accomplishment	**do**$(x, [P(x, y)])$ & INGR $Q(y)$ or **do**$(x, [P(x)])$ & INGR $Q(y, x)$
Causative	ϕ CAUSE ψ, with ϕ, ψ logical structures of any type

it is hence inadequate to anchor agency solely to a primitive operator DO in the semantic representation of the verb. The operator DO is therefore restricted to the representation of *lexicalized* agency (cf. Section 2.3) while the predicate **do** is assumed to be underspecified with respect to agency. However, instead of using **do** as a simple one-place predicate for activities, on a par with more specific activity predicates such as **walk**, Van Valin & Wilkins (1996) keep the decomposition structure of activities introduced by Ross (1972) and employed by Dowty (1979/1991), with DO now replaced by **do**. That is, an activity verb such as *walk* is represented by **do**$(x, [\textbf{walk}(x)])$ and not just simply by **walk**(x). This leads to the general semantic structure **do**$(x, [P(x)])$ (or **do**$(x, [P(x, y)])$) shown in Table 2, with the special case of **do**$(x, \varnothing)$ for unspecified activities. This way of representing activities apparently comes in handy for determining the first argument of an activity predicate (i.e., the effector) by the linking system since it can be directly read off from the logical structure. The semantic contribution of **do**, however, seems to be void, except for the case of **do**$(x, \varnothing)$. We will return to this issue in Section 4.1 below.

3.2. Active vs. causative accomplishments

The most prominent change in the *Aktionsart* system of Van Valin & LaPolla (1997) is the introduction of *active accomplishments* as a separate class. The vast majority of this class consists of accomplishment uses of activity verbs. The examples in (1) provide a paradigmatic set of such uses in English.

(1) a. Adam ate an apple. (consumption)
b. Mary drew a circle. (creation)
c. Kim walked to the store. (motion to goal)

According to the original decomposition system of Table 1, all of these accomplishment constructions are to be analyzed as causative (cf., e.g., Van Valin

1990: 224, Van Valin 1993: 38). For example, the sentences (1a) and (1c) would be assigned the logical structures (2a) and (2b), respectively.

(2) a. [**eat**(Adam, apple)] CAUSE [BECOME **consumed**(apple)]
b. [**walk**(Kim)] CAUSE [BECOME **be-at**(store, Kim)]

Van Valin & LaPolla (1997: 100f) point out that a causative analysis of the accomplishments in (1) is untenable for at least two reasons: (i) It is difficult if not impossible to come up with a valid *causative paraphrase* for these constructions. (ii) Languages with *causative morphology* do not mark accomplishment constructions of this type as causative. As a consequence, Van Valin & LaPolla (1997: 111) propose the revised representations in (3), in which the CAUSE operator is replaced by the connective '&', which has the meaning 'and then'.

(3) a. **do**(x, [**eat**(x, y)]) & BECOME **consumed**(y)
b. **do**(x, [**walk**(x)]) & BECOME **be-at**(y, x)

Accomplishment uses of activity verbs are thus conceived as denoting event sequences consisting of an activity immediately followed by an accomplishment. This analysis, however, has the undesirable implication that the accomplishment, which is a non-punctual change of state, does not start before the activity has ended. Therefore, the representations in (3) underwent a further revision in Van Valin (2005), where 'BECOME' is replaced by the punctual change of state operator 'INGR' in order to capture the fact that the resulting state sets in immediately with the activity's end. This has lead to the two logical structures for active accomplishments shown in Table 3.

As noted in Van Valin (2005: 33/66), there are also a few lexicalized active accomplishments in English. The verb *devour* is one such example, which denotes an active accomplishment of consumption. Another candidate is the verb *repair* (cf. Rothstein 2012: 72). It is probably no accident that both, *devour* and *repair* originate from *prefixed* Anglo-French and eventually Latin verbs.

An important consequence of distinguishing active from causative accomplishments is that accomplishments are not bound to causation anymore, as they were in the original *Aktionsart* system. In the revised system, causation is basically orthogonal to the Vendlerian classification. In Table 3, this is reflected by fact that CAUSE can combine logical structures of any type.

3.3. Decomposing simple accomplishments

Van Valin (2005: 44) proposes a further decomposition of the BECOME operator in accomplishment structures. This step is motivated *inter alia* by data from Mparntwe Arrernte (Central Australia) which mark the difference between atelic and telic interpretations of deadjectival verbs overtly in the morphosyntax. Corresponding deadjectival verbs in English are *cool*, *darken*, and *dry*, which allow an atelic and a telic interpretation (*cool for an hour* vs. *cool in an hour*) without overt marking. Having this distinction appropriately represented in the semantics is of course not only relevant for languages which encode it overtly, such as Mparntwe Arrernte, but is equally important for languages like English. The class of verbs in question has been dubbed "degree achievements" in Dowty (1979/1991: 88) and has since then drawn considerable interest (e.g. Hay et al. 1999, Kearns 2007, Kennedy & Levin 2008)

(Simple) accomplishments (of states) consist by definition of a non-punctual, extended component and the final establishment of the resulting state. The solution proposed in Van Valin (2005: 44) is to make this event structure explicit by decomposing BECOME into a progression and an ingression component, that is, into the process (PROC) that leads to the result state and the final setting in of that state; in symbols, BECOME = PROC & INGR. For example, the semantic representation BECOME **cool**(x) of the (telic reading of the intransitive) English verb *cool* would be decomposed as in (4), with **cool** representing the meaning of the adjective *cool*.

(4) BECOME **cool**(x) = PROC **cool**(x) & INGR **cool**(x)

The representation in (4) calls for a further elaboration in at least two respects. The first question is how exactly the expression PROC **cool**(x), and more generally PROC $P(x)$ is to be interpreted. As to this question, there is already a tentative proposal in Dowty (1979/1991: 90) whose basic idea is that a degree predicate P such as **cool** is inherently *vague* and can be true at each time t during the process as expressed by the atelic *cool for an hour* if only P be resolved appropriately at each t. The assumption is that at each time, the undergoer has changed from $\neg P$ to P, with varying resolutions of the vague predicate P. As a consequence, BECOME $P(x)$ can be assumed to be true at all times within the interval denoted by *an hour*. From this perspective, it seems more adequate to apply the operator PROC not to **cool**(x) but to BECOME **cool**(x), understood properly. We will return to this point below in Section 3.4 when we discuss more recent proposals for the representation of active accomplishments, and later in Section 4.2.

A second problematic issue of the proposed decomposition in (4) is the connective '&', which stands for 'and then' and thus expresses temporal succession. Taken literally, the logical structure in (4) says that the punctual change of turning cool (expressed by INGR **cool**) occurs *after* the process of cooling (expressed by PROC **cool**) has ended. This is clearly not an appropriate description since the object in question *is* cool *at the very moment* the cooling process comes to an end. In Section 4.2, we will propose an alternative representation that avoids this "and-then anomaly".

3.4. Decomposing active accomplishments

As explained in Section 3.2, the textbook version of active accomplishment structures (cf. Table 3) does not make use of the BECOME operator anymore since the earlier proposal of Van Valin & LaPolla (1997), which had the form **do**(...) & BECOME ..., was replaced by **do**(...) & INGR .... The reason is that it would be wrong to represent the non-punctual change of state as starting only after the activity has ended. However, as observed by Van Valin (2018), replacing '& BECOME' by '& INGR' in the representation of active accomplishments fails to take into account the incremental change of state (incremental consumption or creation, incremental motion to goal) that co-occurs with the activity. Van Valin (2018) therefore suggests reintroducing BECOME, but this time, the non-punctual, incremental component of the accomplishment is conflated with the activity. In the logical structure, this is realized by decomposing BECOME into PROC & INGR, as sketched in the previous section, and by conjoining the PROC component with the activity:

(5) [**do**(...) ∧ PROC ...] & INGR ...

In this representation, the incremental change component of the accomplishment component is now temporally aligned with the activity component.

A not-so-obvious issue of the PROC & INGR decomposition is the choice of the predicates involved. As discussed in Section 3.3 in the context of degree achievements, a first question concerns the type of predicates the operator PROC applies to. Does PROC take a stative or a dynamic predicate? The first option would allow the straightforward decomposition of BECOME *P* into PROC *P* & INGR *P*, with *P* a stative predicate. The predicate to which PROC is applied is identical to the one under BECOME and INGR in this case, but at the price of putting the burden of expressing the incremental change onto the operator PROC. The second option is to regard PROC as an operator that takes an incremental change description and turns it into the description of a

process that consists of ongoing incremental changes of this type.

In Van Valin (2018), the following tentative decompositions are proposed for the accomplishment components of the active accomplishment examples in (1):

(6) a. [**do**$(x, [$**eat**$(x, y)])$ $\wedge$ PROC **consume**(y)] & INGR **consumed**(y)
b. [**do**$(x, [$**draw**$(x, y)])$ $\wedge$ PROC **create**(y)] & INGR **exist**(y)
c. [**do**$(x, [$**walk**$(x)])$ $\wedge$ PROC **cover.path.distance**$(x, (z))$]
& INGR **be-at**(y, x)

In these decompositions, the operator PROC is apparently applied to dynamic predicates and not to stative ones. We have **consume** instead of **consumed** in (6a), **create** instead of **exist** in (6b), and **cover.path.distance** instead of **be-at** in (6c). It is not fully transparent in each of these examples how the predicates under PROC and INGR are related to each other. In fact, it is not so clear what the predicates **consume** and **create** are supposed to mean in (6a) and (6b), respectively, since their only argument is the undergoer *y*, i.e., the entity being consumed or drawn. It seems that the predicates **being.consumed** and **being.created** would come closer to the intended meaning. The case of (6c) is slightly more intricate. As indicated by the predicate **cover.path.distance**, the incremental change concerns the position of the mover *x* on a path leading to the goal *y*.[2] That is, if **be-at** is to be part of the predicate under PROC then the location variable needs to be bound to varying locations that are getting successively closer to the goal (on the path taken).

Suppose the predicate under PROC should express the type of the ongoing incremental change. Then a systematic decomposition of BECOME into a PROC and an INGR component would require that the dynamic predicate under PROC is systematically related to the stative predicate under INGR. Moreover, the operator PROC should have basically the same effect in active accomplishment decompositions as it has in simple accomplishment structures. We will return to these issues in Sections 4.2 and 4.3.

3.5. Interim summary

If we look back at the development of the RRG *Aktionsart* system since its original adaption of Dowty (1979/1991), an interesting observation can be made. Recall that Dowty (1979/1991) was not satisfied with the decomposi-

[2] Note that the variable *z* in (6c) is intended to refer to the *distance* covered, not to the path traversed.

tion by DO, CAUSE, and BECOME as a basis of aspectual distinctions. He noted that the DO of agency is neither relevant for aspectual issues nor did he see how to give it a precise interpretation. The evaluation of CAUSE in the temporal dimension is also problematic. Only the change-of-state operator BECOME turned out to be useful for aspectual classification but was noted to lack the ability to express incremental changes.

In a sense, the successive modifications of the RRG system have addressed all of these issues in one way or another. To do largely away with DO was already proposed in Van Valin (1990, 1993). Moreover, the introduction of active accomplishments has released CAUSE from being responsible for defining accomplishments. In fact, causativity is now seen as a largely independent parameter when it comes to Vendlerian classes (cf. Van Valin 2005: 39). As to the deficiencies of BECOME with respect to capturing ongoing incremental changes, the suggested decomposition into PROC & INGR as well as the corresponding proposal for active accomplishments in Van Valin (2018) aim at coping with this problem as well.

In spite of these improvements, there are still a number of issues in the current representation system, as already mentioned in passing. We will address some of them in Section 4 and sketch possible modifications of the present system. The following section takes up again the important distinction between active and causative accomplishments.

3.6. Some intricacies of distinguishing active and causative accomplishments

Despite the two tests mentioned in Section 3.2, (i) existence of a causative paraphrase and (ii) morphological marking of causation in languages that provide such means, it is not always easy to distinguishing causative from active accomplishments. For instance, verbs of transportation like *carry* in motion to goal constructions such as (7) are potential candidates for active accomplishments even if the relevant logical structure, which has three arguments, is not covered by the two templates in Table 3.

(7) John carried the chair into the room.

As to criterion (ii), languages with causative morphology seem not to mark correlates of sentences like (7) as causative. In Georgian, for example, the concept of carrying someone or something somewhere is expressed by verbs of having (which vary with respect to the animacy of the object) plus a preverb of direction (Aronson 1990: 341f). Using verbs of having, taking or holding