

Panyjima aspectual classes: new perspectives on formal models for event structure

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1. ‘Constructionist’ approaches to event structure...and their limits

Well-established formal models for event structure (of the neo-Davidsonian kind or not) have so far mostly focused on languages possessing a large verbal lexicon encoding event structure information. And although decompositional approaches to event structure (i.e. decomposing aspectual verb meaning in terms of aspectual/actional primitives *à la Dowty*, or subevent predicates *à la Parsons*) now abound, they effectively rely on some notion of primitive verbal event structures, i.e. ascribe some inherent (non-derived) elementary event structures to verbal root stems. More recently, languages possessing a limited verbal lexical aspectual component, along with some sort of co-verb or complex predicate construction (e.g. Indo-Iranian and Turkic languages) have become the focus of detailed semantic investigations (see e.g. Butt & Ramchand 2001, Tatevosov 2007, Ramchand 2008). In such works, co-verbs/complex predicates are generally treated by means of aspectual derivation/composition rules applying to a set of primitive lexical event structures (see also Svenonius 2006 and Filip & Rothstein 2006 for similar works on other types of languages). Thus, assuming a maximal tripartite sub-event structure *causation* → <*process, result*> and three primitive event structure types (*State*(*e*) : *e* is a state; *Process*(*e*) : *e* is a process or transition; *Causing*(*e*) : *e* is an initiational process or transition), Ramchand (2008) proposes two event composition rules:

- (1) Causation rule: $e = e_1 \rightarrow e_2$: *e* consists of two subevents such that e_1 leads to or causes e_2 ;
- (2) Telic augmentation rule: $e = \langle e_1, e_2 \rangle$: subevents e_1 and e_2 form an accomplishment (macro) event structure where e_1 is the process portion and e_2 its result state.

But an even more radically constructionist approach would be needed for languages almost lacking a verbal lexicon, and deriving verbal meanings from nominal stems through a specific ‘verbalizing’ morphology. In such languages, some or all of Ramchand’s primitive event structures are *derived*, and therefore require more fine-grained event composition rules. It is the purpose of the present paper to propose such a model for Panyjima, an Australian language of the Pilbara region (Western Australia).

2. Event structures in Panyjima: the data

In Panyjima, like in most Australian languages, verb stems are generally formed by combining a ‘verbalizing’ suffix with a nominal stem (either denoting objects or properties, as Panyjima does have any adjectival nor adverbial syntactic category). Panyjima possesses two productive verbalizing affixes, i.e. the causative/factitive *-ma-L* (CAUS) vs. the inchoative *-(ya)yi-Ø* (INCH). Somewhat like Slavic (im)perfective suffixes, these suffixes frequently give rise to actional/aspectual pairs, cf. (3).

- (3) a. **winya** ‘full’ / **winya-yi-Ø** [full-INCH] ‘get/become full’ / **winya-ma-L** [full-CAUS] ‘fill’
b. **kutu** ‘dead’ / **kutu-wayi-Ø** [dead-INCH] ‘die’ / **kutu-ma-L** [dead-CAUS] ‘kill’
c. **karrara** ‘sick’ / **karrara-yi-Ø** [sick-INCH] ‘become sick’ / **karrara-ma-L** [sick-CAUS] ‘cause to be sick’

A survey of attestations through a corpus of Panyjima utterances (see Dench 1991) confirmed that CAUS and INCH have an aspectual & actional contribution: verbs formed using INCH comprise (i) unbounded, gradual change-of-state verbs, (ii) intransitive, unaccusative verbs (e.g. *die*), (iii) activity verbs non-caused/controlled by the subject (i.e. whose subject is in fact a potential ‘undergoer’ (in the sense of Koenig & Davis 2003); cf. e.g. manner of motion activities) and exclude (a) accomplishments and (b) ‘externally caused’ achievements and activities (i.e., they exclude rule (1) above). Vice versa, verbs formed using the CAUS suffix comprise (a) and (b) (i.e. require rule (1)), and exclude (i), (ii) and (iii) (note that these observations are more fine-grained than those made in e.g. McGregor 2002 or Schultze-Berndt 2000).

We will try and show here that while Panyjima nominal stems express states, the INCH and CAUS verbalizers contribute event structure-building, change-of-state functions, mapping the created event structure onto some property treated as a change-of-state scale. The actional/aspectual

contribution of derived verbal stems will be modelled in a largely compositional manner; we will argue that verbalizers introduce (i) additional (sub)event structure, along with causo-temporal/subevent relations *à la Ramchand* (2008) and (ii) (*comparative*) *measure of change-of-state functions*, as was proposed for deadjectival (DA) verbs (cf. *dry / cool*) in ‘more lexical’ languages by Kennedy & Levin (2008) – indeed many recent theories view event structures in terms of *measure of change-of-state* (see e.g. Piñón 2008), by connecting it with some scalarity/comparison-based devices. Again, the present proposal goes well-beyond existing works within the Australianist literature, which ascribe at most an Aktionsart classificatory function to such affixes (cf. e.g. McGregor 2002:32), without proposing a (compositional or non-compositional) formal analysis for the resulting semantics of the verb thus formed.

As an additional complexity, we will show that the source of the property involved in (comparative) measure of change-of-state function can vary greatly, as it can be constructed from:

- (i) the nominal stem semantics when it is property-denoting (i.e. has an adjective-like meaning); thus in (3b/c) *kutu-wayi-Ø* ‘die’ denotes an achievement predicate because *kutu* ‘dead’ denotes a non-gradual, ‘binary’ property (a fact which can be modelled after Caudal & Nicolas (2005)’s account of achievement predicates in terms of ‘binary’ scales), whereas *winya-yi-Ø* ‘become full’ denotes an accomplishment predicate, because *winya* ‘full’ describes a closed-scale, gradual property (in the latter case, Kennedy & Levin’s (2008) analysis of DA verbs can be applied fairly straightforwardly, as it derives accomplishment verbs from adjectival roots);
- (ii) some (generally eventive) predicate linked with the nominal stem, particularly object-denoting stems combined with the CAUS suffix; cf. *jina* ‘foot, footprint’ → *jina-ma-L* [footprint-CAUS] ‘follow.track’ (lexical inference devices will be required to model such data);
- (iii) some additional affix intervening between the nominal stem and the verbalizer, cf. *warrpala-la-ma-L* [spearthrower-LOC-CAUS] ‘load/put (spear) onto spearthrower’; the LOC affix can then be assumed to contribute some directed motion eventive predicate, which turns out to describe an achievement event; but note that the presence of an overt internal argument is again indicative of some lexical semantic inference.

3. Some elements for a formal treatment of Panyjima event structures

While constructionist theories like Ramchand (2008) can be useful to model the distinction between the CAUS and INCH suffixes (cf. rule (1)), they are by no means sufficient (e.g., they fail to predict the aspectual distinction between (3a) and (3b), or to fully account for (i), (ii) or (iii) above; crucially, most of e.g. Ramchand’s (2008) primitive event structures are in fact derived structures in Panyjima).

We will propose to model the phenomena listed above in terms of measure of change-of-state function building mechanisms, involving (a) classic compositional semantic mechanisms (including scope effects, cf. the intervening LOC affix in (iii)) and (b) Asher’s (2008) *Type Composition Logic* (TCL) – notably the TCL notions of *dependent types* and *dependent type coercion*, which notably serve to derive event predicates from nominal predicates within Asher’s (2008) general theory of typed predication (thus, artefacts are typically conceived of as serving some purpose, or as being the result of some making process; and the corresponding event predicate can be triggered through Asher’s (2008) ‘dependent type coercion’ when building a verb’s semantics from an artefact-denoting stem). Very sketchily, assuming that Kennedy & Levin’s (2008) measure-of-change function *pos* (4) can be used to model event structures in terms of gradual change, we will crucially need to be able to define Φ_{Deg} , a function yielding an appropriate measure of change function m_{Δ} for a given predicate *P* (which acts as the source for the associated scale measuring the change-of-state at stake). Identifying m_{Δ} is trivial in case (i) as it corresponds to the property denoted by the nominal stem, but it needs to be the task of TCL dependent type coercion mechanisms at least in case (ii) (and possibly (iii)), since (ii) depends on complex inferences, involving both the lexicon and discourse, as we will show.

- (4) $\Downarrow \text{pos}_v \Downarrow =_{\text{def}} \lambda g \in D_{m_{\Delta}} \lambda x \lambda e. g(x)(e) \text{ ostnd}(g)$
- (5) $\Downarrow \Phi_{Deg} \Downarrow =_{\text{def}} \lambda P. \exists m_{\Delta} \text{ pos}_v(m_{\Delta}) \ \& \ \text{Measured-Property}(m_{\Delta}, P)$

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