



(7) CUMULATIVITY (Properties of Individuals):

$$[ \lambda P_{\langle e, t \rangle} : [ \forall g_{\langle e \rangle} [ \forall m_{\langle e \rangle} : [ [ P(g) \& P(m) ] \rightarrow P(g + m) ] ] ] ]$$

Whenever  $g$  and  $m$  are in  $D_e$ , the sum of  $g$  and  $m$  is also in  $D_e$ . Secondly, this sum operation is also defined for events, and, consequently,  $D_s$  can also be assumed to be cumulative:

(8) CUMULATIVITY (Properties of Events):

$$[ \lambda P_{\langle s, t \rangle} : [ \forall e_{1\langle s \rangle} [ \forall e_{2\langle s \rangle} : [ [ P(e_1) \& P(e_2) ] \rightarrow P(e_1 + e_2) ] ] ] ]$$

Following Landman (2000), the basic verb and thematic role predicates are singular predicates that are pluralized with a \*-operator that maps properties and relations into their smallest cumulative extensions. Then, according to Kratzer (2008), lexical verbs like ‘make’ are relations between events and themes, and they are inherently pluralized. Therefore, the semantics for the VP in (5) is proposed to be as follows:

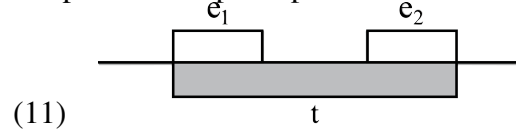
$$(9) \quad [ [ \text{VP} ] ]^{w, t, g} = [ \lambda w : [ \exists e : [ *make(e)(w) \& *Agent(e)(w) = \text{Greg} + \text{Mike} \& *Theme(e)(w) = \text{sandwich}_1 + \text{sandwich}_2 ] ] ]$$

**Deriving Conjoint RTs:** Putting the ingredients together, the denotation of the clause containing the null PFV in (2a), with the structure in (5a), is then calculated as follows:

$$(10) \quad [ [ \text{TP} ] ]^{w, t, g} = [ \lambda w : [ \exists e : [ *make(e)(w) \& *Agent(e)(w) = \text{Greg} + \text{Mike} \& *Theme(e)(w) = \text{sandwich}_1 + \text{sandwich}_2 \& \tau(e) \subseteq g(i) ] ] ] \text{ (where } \neg(t < g(i)))$$

The PFV existentially quantifies over the event variables, and situates the ETs – the times of Greg making a sandwich and of Mike making a sandwich – inside an evaluation interval, which is the RT. The sum of these sub-events’ running times is still contained within the time span of the NONFUT RT – the interval running from a salient point in the past up until the UT.

Then, the combination of the NONFUT tense and the PFV  $\emptyset$  provides an RT large enough to cover both the past-time sub-event and the present-time one simultaneously, as in (11):

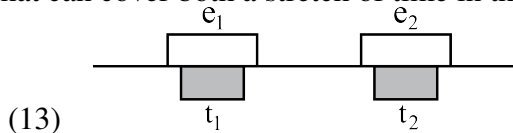


Therefore, the semantics in (10) correctly predicts the possibility of (2a) in the given scenario.

**Deriving Disjoint RTs:** On the other hand, the PROG *dang* flips the inclusion relation of these time intervals, and thus the denotation of (2b), with the structure in (5b), is as follows:

$$(12) \quad [ [ \text{TP} ] ]^{w, t, g, c} = [ \lambda w : [ \exists e : [ *make(e)(w) \& *Agent(e)(w) = \text{Greg} + \text{Mike} \& *Theme(e)(w) = \text{sandwich}_1 + \text{sandwich}_2 \& g(i) \subset \tau(e) ] ] ] \text{ (where } \neg(t < g(i)))$$

Since *dang* puts the RT inside the ET, (12) shows that for each of the sub-events’ running times, there is an RT properly contained within it. Since the past sub-event  $e_1$  of Greg making a sandwich and the present sub-event  $e_2$  of Mike making a sandwich are disjoint in time, the RTs contained within these time spans cannot form an interval. Then, there is no evaluation interval that can cover both a stretch of time in the past as well as the UT, as in (13):



This explains why (2b) entails that G and M engage in sandwich-making simultaneously, as opposed to one of them doing so in the past and the other one now.

Furthermore, since the 2 events are temporally disjoint under the scenario, only the sub-events, but not the plural event, are in the domain of the temporal trace function. This predicts that (2b) is bad when both Greg and Mike were making sandwiches at different times in the past.

**Conclusion:** Previous works on tenseless languages often overlook the role viewpoint aspects play on the RT interval. The data in Vietnamese suggest that even in languages that employ one null tense, there still exists an asymmetry between the PFV and the PROG. The proposed semantics will capture this contrast, and shed light on the interaction between tense, aspect and event plurality cross-linguistically.