Temporal genericity and the contribution of imperfective marking

INTRODUCTION

The correlation of imperfective marking on episodic predicates with a characterizing reading of the sentences in which they occur is a fairly robust cross-linguistic tendency (Comrie 1976, Bybee & Dahl 1989, Dahl 1995, Bybee et al. 1994, and others). Such sentences are said to express a regularity, a non-accidental but exception-tolerating generalization over episodes of the type described by the basic episodic predicate (e.g. the Italian sentence in (1) containing an Imperfetto form of the verb).

(1) Leo gioc-ava a golf
Leo play-IMPF golf.
Leo used to play golf. (Italian; Bonomi 1997: 485 (ex. 28a))

The precise contribution of imperfective marking to generic interpretation has been a long-standing problem in the literature. The most promising existing solution to this problem is what I call the IMPF-as-universal hypothesis, where the primary semantic function of the imperfective is to introduce a strong, universal quantifier over 'relevant' or 'characteristic' intervals or situations (Newton 1979; Bonomi 1997; Delfitto & Bertinetto 1995; Bertinetto & Lenci 2001; Cipria & Roberts 2000). This is a conceptually attractive solution in that it locates the quantificational force associated with a covert operator GEN in an overt piece of morphology, thus systematizing the relation between linguistic form and meaning. At its core, an IMPF-as-universal analysis is parallel to analyses of the generic operator GEN which seek to reduce it to the universal quantifier relativized to the subset of relevant or typical/normal entities within a domain (e.g. Declerck 1991; Eckardt 2000; Heyer (1990)). However, this solution for the relation between generic meaning and imperfective marking is problematic for four reasons, which are very similar to the reasons that justify positing GEN, a dyadic operator like a Q-adverb, but distinct from an overt strong Q-adverb like *always* or *usually*.

a. **Too strong:** Imperfective-marked sentences like (1) tolerate exceptions. The universal quantifier is too strong for this exception-tolerating property.
b. **Extensional:** Imperfective-marked sentences describe non-accidental generalizations with *expected continuation in time*. Most existing accounts of the imperfective, which treat it as triggering a universal quantifier ranging over an extensional domain, cannot account for this intensionality.
c. **Determining restriction:** No explication of whether the set of 'relevant' intervals or 'characteristic' situations is itself understood as the restriction (e.g. a predicate **rel**) or whether these terms refer to a pragmatic mechanism for determining the restriction predicate. In the absence of a theory for determining suitable restrictions, the restriction to "relevant" entities requires an ad hoc weakening of the universal (see Krifka et al 1995 45-46).
d. **Interaction with overt Q-adverbs:** It has been observed that imperfective marking is perfectly compatible with the presence of overt Q-adverbs with varying force (*sometimes*, *never*). If the imperfective is associated with a universal quantifier over relevant intervals/situations, then it is difficult to reconcile the contribution of the imperfective with that of overt Q-adverbs. This has been one of the reasons for positing GEN as a default Q-adverb, whose effect is overridden in the presence of overt Q-adverbs.

This paper argues that it is possible to preserve the association of universal force with the imperfective if we have a precise way of determining the restriction of the quantifier. On the proposal presented here, the restriction is a subset of a *regular partition* (i.e. a set of collectively exhaustive, non-overlapping, equimeasured subsets) of a future-extending interval continuing the reference interval. The partition-measure (the dimension of each of its members) is a free variable whose value is assigned by context. This specification of the restriction of the universal quantifier provides an attractive solution to each of the four problems afflicting IMPF-as universal analyses and a transparent compositional account of the contribution of imperfective marking to the logical form of generic sentences. The outcome is that, at least to the extent that an imperfective-marked generic sentence expresses a regularity across temporal indices, there is no necessity to appeal to the covert operator GEN, since the semantic load of GEN can be assigned to the morphologically overt IMPF in these cases.

SETUP

The formal framework is based on the branching time semantics proposed in Thomason (1970, 1984). A treelike frame consists of a pair $<\mathcal{T}, \prec>$, where $\mathcal{T}$ is a nonempty set of times with dense ordering and $\prec$ is a transitive tree-like relation on $\mathcal{T}$ such that for all $t, u, v \in \mathcal{T}$ if $u \prec t$ and $v \prec t$, then either $u \prec v$ or $v \prec u$ if $u \neq v$. A *history* (or maximal chain) h on $\mathcal{T}$ is a maximal totally ordered subset of $\mathcal{T}$. $\mathcal{I}$ is a non-null domain of intervals i, where i is a proper subset of some history h in $\mathcal{T}$ and for all t_1, t_2, $t_3 \in h$, if t_1, $t_3 \in i$ and $t_1 \prec t_2 \prec t_3$ then $t_2 \in i$. For any $i \in \mathcal{I}$, H_i is the set of histories containing *i*. The function *Inr* assigns to each $i \in \mathcal{I}$ a proper subset of the histories containing i – $H_{i_{inr}}$, which are the inertia futures of i (Dowty, 1979: 152).

(2) **Inertia futures**
$Inr = f : I \rightarrow \wp(H)$
$i \mapsto H_{i_{inr}} \subset H_i$

For any $i \in \mathcal{I}$, a *regular partition* of i, $\mathcal{R}_i$, is a set of intervals $\{j, k...n\}$ such that

(3) a. $\bigcup\{j, k...n\} = i$
b. $\forall j, k \in \mathcal{R}_i \rightarrow j \cap k = \emptyset$ if $j \neq k$
c. $\forall j, k \in \mathcal{R}_i \rightarrow \mu(j) = \mu(k)$ (where $\mu(x)$ stands for the Lebesgue measure of x).

For any $\mathcal{R}_i$, each of its subsets will have the same measure and this measure will be referred to by the term *partition-measure*.

$\mathcal{E}$ is a domain of eventualities. A function τ from $\mathcal{E}$ to $\mathcal{I}$ gives the time span of an eventuality. Basic eventive predicates have an eventuality argument of the sort E while basic stative predicates have an eventuality argument of the sort S. *Sentence radicals* are predicates of eventualities (eventive or stative) arising from such basic predicates with their individual (non-eventuality) arguments saturated (roughly corresponding to the VP-level assuming VP-internal subjects). Aspectual modifiers such as negation, frequency and quantificational adverbs, and quantified PPs apply to predicates of eventualities to yield predicates of intervals. Arguments to aspectual operators are predicates of eventualities – *sentence radicals* (saturated event descriptions) – or of intervals, sentence radicals modified by Q-adverbs and quantified PPs. Instantiation of a predicate is relative to an interval and a history, specified here in terms of the COINcidence relation defined in (4).

(4) $\text{COIN}(P, i, h) = \begin{cases} \exists e\,[P(e) \wedge \tau(e) \circ i \wedge i \subset h] & \text{if } P \subseteq \mathcal{E} \\ P(i) \wedge i \subset h & \text{if } P \subseteq \mathcal{I} \end{cases}$

PROPOSAL

IMPF applies to a predicate (of eventualities/intervals) P and returns a set of intervals i s.t. (a) every inertia future of i contains a j (where i is an initial subinterval of j) and (b) every member k of a contextually determined regular partition of j, $\mathcal{R}^c_j$, COINcides with P. A contextually determined regular partition is one whose partition-measure is determined by the context.

(5) $IMPF : \lambda P \lambda i\, \forall h[h \in H_{inr_i} \rightarrow \exists j[i \subseteq_{ini} j \subset h \wedge \forall k[k \in \mathcal{R}^c_j \rightarrow \text{COIN}(P, k, h)]]]$

Plugging in this meaning of IMPF as the aspectual component of the Italian Imperfetto, for instance, results in the logical form in (6) for the sentence in (1).

(6) [[Imperfetto(Leo-play-golf)]] = 1 iff $\exists i[i < now \wedge \forall h[h \in H_{i_{inr}} \rightarrow \exists j[i \subseteq_{ini} j \subset h \wedge \forall k[k \in \mathcal{R}^c_j \rightarrow \text{COIN}(\lambda e.\text{Leo-play-golf}(e), k, h)]]]]$
$= 1$ iff $\exists i[i < now \wedge \forall h[h \in H_{i_{inr}} \rightarrow \exists j[i \subseteq_{ini} j \subset h \wedge \forall k[k \in \mathcal{R}^c_j \rightarrow \exists e[\text{Leo-play-golf}(e) \wedge \tau(e) \bigcirc k \wedge k \subset h]]]]]$

On this meaning for the imperfective, imperfective-marked sentences may be judged true despite exceptions because the restriction guarantees a regular distribution of P events in time, not an exclusive correlation between some relevant Q events/situations and P events. (1) is true even if Leo played golf, hockey, and cricket during the specified period, or if on some relevant occasions, he failed to play golf, as long as there is a salient contextual partition whose every member ($k \subset j$) overlapped with a golf-playing event involving Leo. This overcomes the *exception tolerance* problem for IMPF-as-universal analyses. Quantification over subintervals of alternative futures of the reference interval captures the intensional *expected continuation* element of the imperfective.

IMPF AND Q-ADVERBS

Characterizing the restriction of the universal quantifier in terms of a regular partition has the additional advantage of maintaining a consistent contribution for both the imperfective and Q-adverbs. Suppose that the meanings of adverbs like *always* or *sometimes* are something like those in (7-a-b). The restrictor of Q-adverbs might be implicit and is pragmatically recoverable from context, or from a focus-determined partition of the sentential material (Rooth 1985, 1992; Von Fintel 1995). Adverbs quantify over sets of eventualities or intervals and return sets of times within which the quantificational relation (inclusion or intersection, as the case may be) holds.

(7) a. $[\![always]\!] = \lambda P_{<i,t>} \lambda Q_{<i,t>} \lambda i$ **every**$(\lambda i'.P(i') \wedge i' \subseteq i, \lambda i''(Q(i''))$
b. $[\![sometimes]\!] = \lambda P_{<i,t>} \lambda Q_{<i,t>} \lambda i$ **a**$(\lambda i'.P(i') \wedge i' \subseteq i, \lambda i''(Q(i''))$

A sentence like (8-a) has the structure in (8-b), i.e. the output of the Q-adverb is the argument to the imperfective; the restriction to the adverb is a set of *Cont*extually relevant events. The output of the Q-adverb is something like (8-c).

(8) a. *A volte* il custode apriva la porta.
Sometimes, the janitor open-IMPF the door.
The janitor sometimes opened the door. (Bonomi 1997)
b. [PAST [IMPF [SOMETIMES [the-janitor-open-the-door]]]]
c. λi **a**$[\lambda e\, Cont(e) \wedge \tau(e) \subseteq i; \lambda e'$ the-janitor-open-the door$(e')]$

The imperfective applies to this predicate of intervals and returns a set of intervals, whose every inertial history contains a larger interval, and every member of a partition on this larger interval

coincides with an interval of the sort in (8-c). The result of the function application is in (9). The final meaning for (8-a) requires introducing in addition the past tense component associated with the Italian Imperfetto.

(9) $[\![\text{IMPF(SOMETIMES(the-janitor-open-the-door))}]\!] = \lambda P \lambda i\ \forall h[h \in H_{i_{inr}} \rightarrow \exists j[i \subset_{ini} j \subset h \wedge \forall k[k \in \mathcal{R}_j^c \rightarrow \text{COIN}(P, k, h)]]]\ (\lambda i\ \mathbf{a}[\lambda e\ Cont(e) \wedge \tau(e) \subseteq i; \lambda e'\ \text{the-janitor-open-the-door}(e')])$

$= \lambda i\ \forall h[h \in H_{i_{inr}} \rightarrow \exists j[i \subset_{ini} j \subset h \wedge \forall k[k \in \mathcal{R}_j^c \rightarrow \text{COIN}(\lambda i\ \mathbf{a}[\lambda e\ Cont(e) \wedge \tau(e) \subseteq i; \lambda e'\ \text{the-janitor-open-the-door}(e')], k, h)]]]$

$= \lambda i\ \forall h[h \in H_{i_{inr}} \rightarrow \exists j[i \subset_{ini} j \subset h \wedge \forall k[k \in \mathcal{R}_j^c \rightarrow \mathbf{a}[\lambda e\ Cont(e) \wedge \tau(e) \subseteq k; \lambda e'\ \text{the-janitor-open-the-door}(e')] \wedge k \subset h]]]$

Thus, Q-adverbs with differing quantificational force can be easily reconciled with the universal quantifier associated with the imperfective if the restriction is taken to be a regular partition and if Q-adverbs are assumed to apply before aspectual operators do.

CONCLUSION: This proposal seeks to associate the *temporal aspect* of genericity at least partially with the imperfective operator (which often receives overt realization, in contrast to the obligatorily covert GEN). It follows earlier proposals that associate with the imperfective a universal quantifier, but proposes a new theory for deriving the restriction of the quantifier. This innovation overcomes several problems afflicting IMPF-as-universal analyses. Finally, the paper will also briefly discuss how the same analysis can naturally account for the event-in-progress (progressive) reading of imperfective marking (a pattern exhibited by imperfective forms in Romance, Semitic, Slavic, Indo-Aryan, and several other languages). This reading arises when the partition-measure (a free variable) for the imperfective is set to infinitesimal dimension.

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