

Event-relative modality: the case of Wolof imperfective *di*
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The puzzle. The morpheme *di* in Wolof (Niger-Congo) is associated with several readings (Robert 1991): an event-in-progress/progressive as in (1); a habitual as in (2); and a future as in (3). In comparison, (5) only receives an episodic, default past interpretation. Interestingly, the availability of these readings depends on *di*'s structural position. In (1)-(3), when *di* is below T, all readings are available, but when *di* is in C (in non-copular sentences), only the future is possible, see (4) (Martinović 2015). Whereas Robert took this as evidence for two distinct lexical items, we provide a unified analysis of *di* to derive the attested readings, and which crucially relies on the event-relativity of modal expressions (e.g., Portner 1998; Hacquard 2006).

- (1) **Progressive reading; low *di*** ((1)-(4) are from Robert 1991; English translations ours.)
Dafa **di** (> dafay) añ, mën-ul ñëw.
do.C.3SG IMPF eat.breakfast can-NEG come
‘*Il est en train de manger, il ne peut pas venir.*’ / ‘*He is eating, he cannot come.*’
- (2) **Habitual reading; low *di***
Dafa **di** (> dafay) jaay.
do.C.3SG IMPF sell
‘*Il vend.*’ = ‘*Il est marchand.*’ / ‘*He sells*’ = ‘*He’s a merchant.*’
- (3) **Future reading; low *di***
Context: devant la maison en construction/in front of a house under construction
Kii mu-a **di** (> mooy) rafet kër!
this.one 3SG-C IMPF pretty house
‘*Elle va être drôlement belle, sa maison, à lui!*’ / ‘*It’s going to be really beautiful, this one’s house.*’
- (4) **Future reading; high *di***
Di-na-∅ gor garab bi.
IMPF-C-3SG cut tree the
‘*(À ce moment là) il abattra l’arbre.*’ / ‘*(At that time) He’s going to cut the tree.*’
[impossible if he is already trying to cut it]
- (5) **Episodic reading; no *di***
Xale yi lekk-na-ñu céeb.
child DEF.PL eat-C-3PL rice
‘*The children ate rice.*’

Progressive and habitual readings. Imperfectives crucially involve a modal component (e.g., Dowty 1979, Portner 1998, Ferreira 2016). Portner argues that this modality is *event-relative*. The modal base is a circumstantial one, $CIRC(e)$, denoting “the set of circumstances relevant to whether e is completed.” The ordering source, meanwhile, is one of non-interruption, $NI(e)$, and denotes the “set of propositions which assert [or entail] that e does not get interrupted.” The propositions in $NI(e)$ serve to order the worlds in $CIRC(e)$. The imperfective universally quantifies over the inertia worlds of e , the BEST worlds in $CIRC(e)$ relative to $NI(e)$, i.e., those in $\cap CIRC(e)$, where e is not interrupted (ideal with respect to an ordering $<_{NI,e}$).

- (6) **Modal component of low *di*:** (progressive/habitual reading; based on Portner 1998)
For a property of events P and event e : $\forall w \in BEST(CIRC, NI, e) [P(e)(w) = 1]$
where $BEST(CIRC, NI, e) = \{w \in \cap CIRC(e) | \neg \exists w' \in \cap CIRC(e) \text{ s.t. } w' <_{NI,e} w\}$

While Portner’s analysis is designed to account for progressives, Ferreira (2016) shows that this basic setup can be straightforwardly carried over to habituals, by assuming that the

imperfective applies to *plural* events in habituais, but *singular* events in progressives. We can thus account for these two interpretations of *di* by adopting the Portner/Ferreira analysis.

Modal variability and syntactic height. Since the progressive/habitual interpretations are not always available for *di*, it must be that not all the components in (6) are lexicalized in *di*. Meanwhile, the availability of certain readings depending on syntactic height is reminiscent of the generalization that epistemic and root modality correlate with modals occupying high and low positions, respectively (e.g., Hacquard 2010). Hacquard proposes that low-scoping modals (below T) only have access to a circumstantial modal base, while high-scoping modals (above T) only have access to an epistemic modal base. She derives this via the event-relativity of modal bases, which are relative to the *vP* event for low modals, yielding a circumstantial modal base, and relative to the speech event for high modals, yielding an epistemic modal base.

Relating this to our semantics in (6), we derive the progressive and habitual readings for low *di* because the modal base is necessarily CIRC. For high *di* then, the modal base is epistemic. For both, we keep the non-interruption ordering source NI, in order to derive the inertia worlds of *e*. The modal component for high *di* is shown in (7).

(7) **Modal component of high *di*:**

For a proposition p and speech event $e : \forall w \in \text{BEST}(\text{EPIST}, \text{NI}, e) [p(w) = 1]$
 where $\text{BEST}(\text{EPIST}, \text{NI}, e) = \{w \in \cap \text{EPIST}(e) \mid \neg \exists w' \in \cap \text{EPIST}(e) \text{ s.t. } w' <_{\text{NI}, e} w\}$

Since the modalities are event-relative, the inertia worlds for low and high *di* will be different. For low *di*, they are continuations of the *vP* event. That is, in all the best worlds w where e is not interrupted given the circumstances of e , e continues and culminates in w . For high *di*, the relevant event is the speech event, deriving an epistemic modal base (i.e., propositions believed by the speaker). The inertia worlds in this case are the best continuations of e which are not interrupted. However, it is not the speech event which is not to be interrupted; rather, the continuations of the speech event e should be those futures of e where the speaker's beliefs do not change (i.e., the circumstances that derive the epistemic modal base from e), so that p is true in all worlds in $\text{BEST}(\text{EPIST}, \text{NI}, e)$. The final piece of the puzzle to ensure a future reading is the temporal component of *di*, to which we now turn.

Temporal component of *di*. Intuitively, all the readings of *di* are future-oriented. For progressives, an event that is ongoing at the reference time culminates in all inertia worlds in the future of the reference time. For habituais, the habit has instantiations in all inertia worlds in the future of the reference time. For futures, an event occurs in the future of the reference time. Abstracting away from the modal component, we propose the following temporal conditions on *di*, where the relation $\text{CONT}(e', e)$ is true if e' is a temporal continuation of e :

(8) **Temporal component of *di*:** For an event e , time t and event predicate P :

$\tau(e) = t \ \& \ \exists e' \exists t' [t' > t \ \& \ \tau(e') = t' \ \& \ \text{CONT}(e', e) \ \& \ P(e') = 1]$

For progressives and habituais, the *vP* event e must have a continuation e' which makes P true in the future t' of reference time t . For high *di*, a continuation e' of the speech event e is such that $P(e')$ is true. That is, for all the speaker believes at t , $P(e')$ will be true at a future time t' . The future reading for low *di* can now be accommodated if we assume that the run time of an event includes its preparatory stages. Under this view, $P(e')$ can be true at $t' > t$ if e' is a continuation of a preparatory stage e . In other words, a preparatory stage e can hold at t , with its continuation holding at a future t' .

In sum, we capitalize on the event-relativity of modality to derive the different readings of *di* in its high and low positions, following ideas from Hacquard (2010). For low *di*, the modal base is circumstantial, deriving a Portner/Ferreira semantics for progressives and habituais. For high *di*, the modal base is epistemic, and only a future interpretation is derived. Future readings of low *di* are accounted for by making reference to preparatory stages of events.