Adverbial Adjunct Clauses and their LFs

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Aim: We develop an account of *unexpected future orientations* (UFOs, following Copley, 2008) in both *if*-clauses and temporal *adverbial adjunct clauses* (AACs). We provide a compositional syntax-semantics for three types of AACs which derives the observation that UFOs in temporal AACs are dependent on the main clause, while UFOs can appear independently in *if*-clauses. We compare these to a third class of AACs, exemplified by *because*-clauses (as well as *although*-clauses etc.) which never license UFOs.

Data: In each AAC of (1a-c), the finite verb is in the present tense. However, in (1a), based on Crouch (1993), the simple present in the *if*-clause has a UFO independently of the tense/aspect of the main clause; the temporal AAC in (1b) only receives a UFO when the main clause contains a future modal (e.g., *will*). Finally, the *because*-clause in (1c) can never license a UFO.

(1) a. If John comes out smiling later, then the interview {will go/went/is going} well.
b. When John comes out smiling later, the interview {will go/*went/*is going} well.
c. *Because John comes out smiling later, the interview {will go/went/is going} well.

Proposal in brief: While present and past states of affairs are *settled* (i.e., can no longer be influenced), the future is inherently *unsettled* (Thomason, 1984; Condoravdi, 2001; Kaufmann, 2005). Several recent proposals have taken modal unsettledness to be a licensing condition on the (unscheduled) future (Laca, 2015; Banerjee, 2018a,b; Williamson 2018). Williamson (2018) proposes a covert future operator FUT (see also Giannakidou & Mari, 2018) which carries a presupposition that the *modal context* in which it appears is diverse (unsettled) wrt to whether its prejacent holds at some future time. This is captured by making the denotation assignment function sensitive to a modal context parameter S (a set of world-time pairs shifted to the modal base of the most local modal operator) (see Portner, 2018 for a history of this idea).

(2) a. $[\![\text{FUT}]\!]^S = \lambda p_{\langle s,it\rangle}.\, \lambda w_s.\, \lambda t_i.\, \exists t' > t : \langle w, t'\rangle \in [\![p]\!]^S$
b. *presupposition*: $\exists \langle w', t'\rangle \in S : \exists t'' > t' : \langle w', t''\rangle \in [\![p]\!]^S \wedge$
$\exists \langle w', t'\rangle \in S : \neg \exists t'' > t' : \langle w', t''\rangle \in [\![p]\!]^S$

When a proposition is asserted or presupposed, the proposition is taken to be settled according to a set of worlds (e.g., the speaker's epistemic alternatives or the context set respectively). Kratzer (1981), Kaufmann (2005), Alonso-Ovalle & Menendez-Benito (2008), and others propose that bare assertions contain a covert necessity modal which universally quantifies over the speaker's epistemic state.

(3) $[\![\varnothing_{\Box}]\!]^S = \lambda p_{\langle s,it\rangle}.\, \forall \langle w', t'\rangle \in \text{Epist}_{w*,t*,\textit{speaker}} : \langle w', t'\rangle \in [\![p]\!]^{\text{Epist}_{w*,t*,\textit{speaker}}}$

It is well established that *because*-clauses are asserted, while temporal AACs are presupposed (Hooper & Thompson, 1973; Sawada & Larson, 2004). Thus, neither is able to license FUT. However, when temporal AACs are associated with a time in the scope of a future-licensing modal operator, they can dependently exhibit UFOs. *If*-clauses are neither presupposed nor asserted (Sæbø, 2011), and can license UFOs freely. Indeed, the antecedent of an indicative conditional is required to be possible (von Fintel, 1998), but not certain (Veltman, 1986).

Syntax: Haegeman (2010) argues that the ban on argument fronting in temporal AACs is due to an intervention effect. She notes that *when*-clauses are structurally interrogative: they are fronted by an overt *wh*-item and can have a long-distance construal indicative of A′-movement.

(4) a. John left [when$_1$ [Sheila said [he would leave] t_1]]
b. John left [when$_1$ [Sheila said [he would leave t_1]]] (Larson, 1987)

She further argues that *if*-clauses, which also do not permit argument fronting, are similarly derived by operator movement. Structurally, *if*-clauses appear to be free relatives which can be associated with a correlative pro-form, *then* (Iatridou, 1993; Izvorski, 1996). However, unlike

when-clauses, *if*-clauses cannot have a long-distance construal. (5) lacks a reading on which John's leaving is conditional on Sheila leaving.

(5) John will leave [if [Sheila says [she will]]]

Bhatt & Pancheva (2006) attribute this to a locality condition on the relevant operator, which they propose is an abstractor over worlds (see also Schlenker, 2001). We suggest, however, that the relevant operator is the same as that used in polar question formation. Evidence that this connection is on the right track comes from the observation that *if* also functions cross-linguistically as an interrogative marker for embedded polar questions (Kayne, 1991). Like polar questions, the antecedent of counterfactual conditionals in several languages can be formed by T-to-C movement (Iatridou & Embick, 1994). Starr (2011) independently proposes to unify the semantics for polar questions and conditionals, while Nicolae (2013) tries to reduce the former to the latter. Crucially, polar question formation is a local operation which cannot give rise to long-distance readings. (6) lacks a reading on which John wondered about Shelia's leaving.

(6) John wondered [if [Sheila said [she would leave]]]

In contrast, *because*-clauses (and their kin) can display argument fronting and main clause phenomena generally (Haegeman, 2010).

Semantics: We propose that temporal AACs are PP-like free relatives (Caponigro, 2004) (7a,b). The *when*-clause is interpreted as denoting the unique (maximal) time at which p holds (but cf. Beaver & Condoravdi, 2003). Like nominal free relatives, *when*-clauses are associated with an existential presupposition that there exists some p time (7b). The fact that such a p time is presupposed makes the *when*-clause an unsuitable environment for FUT.

(7) a. $[\![\,[\,\text{when}_1\,[\,p(w)\ldots\,t_1\,]\,]\,]\!]^S = \lambda t_i.\,\langle w,t\rangle \in [\![p]\!]^S$

b. $[\![[_{\textit{Free.Rel}}[\text{when}_1\,[\,p(w)\ldots\,t_1\,]\,]\,]\,]\!]^S = \iota t[\langle w,t\rangle \in [\![p]\!]^S]$

c. $[\![\text{when } p, \varnothing_\Box\ q]\!]^S =$ defined iff $\forall\langle w,t\rangle \in cs : \exists t' \colon \langle w,t'\rangle \in [\![p]\!]^{cs}$, if defined, $= 1$ iff $\forall\langle w,t\rangle \in \text{Epist}_{w*,t*,sp} \colon \langle w,t\rangle \in [\![q]\!]^{\text{Epist}_{w*,t*,sp}} \wedge t = \iota t' \left[\langle w,t'\rangle \in [\![p]\!]^{\text{Epist}_{w*,t*,sp}}\right]$

If-clauses, much like AACs are interpreted as free relatives. However, the variable abstracted over belongs to a different domain. We assume that polar questions denote a singleton set containing the nucleus proposition (e.g., Biezma & Rawlins, 2012 *inter alia*). *If* forms a singleton set by taking a propositional variable q and the nucleus proposition p as arguments (8a). The variable q is abstracted over at the clause edge, forming the singleton set $\{p\}$ (8b), as in question formation (Dayal, 2016). Being a free relative, the *if*-clause denotes the unique member in $\{p\}$ (8c). This of the appropriate type to restrict the modal base of $\varnothing_\Box$ as per the Kratzerian treatment of conditionals (e.g., Kratzer, 2012) (8d).

(8) a. $[\![\text{if}]\!]^S = \lambda q.\,\lambda p.\,q = p$

b. $[\![\,[\,q_1[\,[\text{if } t_1\,][\,p\,]\,]\,]\,]\!] = [\lambda q.\,q = p] = \{p\}$

c. $[\![\,[_{\textit{Free.Rel}}[\,q_1[\,[\text{if } t_1\,][\,p\,]\,]\,]\,]\,]\!] = \iota q[q \in \{p\}] = p$

d. $[\![\text{if } p, \varnothing_\Box\ q]\!] = \forall\langle w,t\rangle \in (\text{Epist}_{w*,t*,\textit{speaker}} \cap p) : \langle w,t\rangle \in [\![q]\!]^{\text{Epist}_{w*,t*,\textit{speaker}}\cap p}$

While *when*-clauses and *if*-clauses restrict quantificational elements in the verbal spine, *because*-clauses never function as restrictors (Johnston, 1994). Rather, *because*-clauses are sentential operators relating two propositions each with its own $\varnothing_\Box$. *Because*-clauses predictably behave like root clauses, not only in exhibiting main clause phenomena, but with respect to licensing of the future: they require the appropriate modal within the *because*-clause in order to license the future operator.

Selected References: Copley, B. (2008). Temporal orientation in conditionals. *Time and modality* • Haegeman, L. (2010). The internal syntax of adverbial clauses. *Lingua* • Johnston, M. (1994). *The syntax and semantics of adverbial adjuncts* • Williamson, G. (2018). The temporal orientation of infinitives. *SuB 23*