Event plurality and quantifier scope across clause boundaries

It is often assumed that quantifiers cannot scope out of tensed clauses, e.g., that in *Someone realizes that everyone is here*, *some* must scope above *every* (Chomsky, 1975; May, 1977; Huang, 1982; Cecchetto, 2004; Ruys and Winter, 2011; Dayal, 2013). Numerous counterexamples to this restriction are known, but no unified analysis of the environments facilitating inverse scope across a tensed clause boundary has been proposed (Fox and Sauerland 1996; Farkas and Giannakidou 1996, henceforth, F&G; Barker 2021; a.o.). This talk attempts to do just that.

We argue that inverse scope across finite clause boundaries (*extrawide scope*, or EWS, following F&G) is always possible in principle, but is constrained by the **plausibility** of interpreting the matrix event as plural. Surface scope (SS) is the default interpretation because of a preference for interpreting the matrix predicate as describing a single event. Thus, this default is overridden in environments that favor plural interpretations of the matrix predicate, which can occur when: [1] temporal adverbials and tense/aspect marking indicate that the event occurs over an extended time interval, [2] event plurality is supplied by the predicate's lexical semantics, or [3] event plurality is supplied by the discourse context. To account for these observations, we adopt a Schein-style (1993) semantics for quantifiers that interacts with the event semantics of predicates and temporal adverbials. For this abstract, we focus on interactions between matrix *some* and embedded *every*.

[1] Regardless of matrix predicate, EWS is facilitated by adverbials that reference an explicit time interval. In particular, *by*-phrases, which express buildup to an end state (Thomas & Michaelis 2009), enable an interpretation of the matrix predicate as culmination of multiple events. The perfect, which often occurs with *by*-phrases, also invokes a time interval, and thus also aids EWS.

(1)   a.   **By the end of the night**, some student had claimed that every professor left. $\forall > \exists$
      b.   **By 8pm**, some mechanic will have checked whether every machine works. $\forall > \exists$

In contrast, punctual adverbials such as *at*-phrases resist EWS interpretations:

(2)   a.   **At exactly 8pm**, some student claimed that every professor left. $*\forall > \exists$
      b.   **Around noon**, some mechanic will check if every machine works. $*\forall > \exists$

[2] F&G propose that predicates like *ensure*, whose subject is responsible for bringing about the truth of their complement, allow inverse scope. This dimension of *ensure*, like *by*-phrases, introduces a buildup towards an end state, namely the realization of the embedded clause:

(3)   a.   A doctor will **make sure** that we give every new patient a tranquilizer. (Reinhart, 1997)
      b.   Some student **ensured** that every professor had a ride. (Farkas & Giannakidou, 1996)

[3] Finally, discourse context alone can facilitate EWS readings, even in the absence of temporal adverbials, with a wide variety of matrix predicates:

(4)   **Context**: On the exam, students had to pick their least favorite scope theory and argue why it's wrong. Afterwards the professor asks the TA if any students cheated. The TA responds:
      TA: They can't have cheated, because they all picked different theories to write about. In fact, some student claimed that every theory of scope was wrong.

Contexts that ameliorate EWS all facilitate a plural interpretation of the matrix eventuality; contexts which force the matrix event to 'culminate' in a result state do exactly this.

Events and quantifier semantics We follow Schein (1993) and Kratzer (2000) in assuming that the lexical entries of quantifiers make reference to events in their nuclear scope, as follows.

(5)   a. $[\![\text{every}]\!] = \lambda P_{\langle e,t \rangle} . \lambda Q_{\langle e,\langle v,t \rangle\rangle} . \lambda e_v . \forall x_e [P(x) \rightarrow \exists e' \sqsubseteq e[Q(x)(e')]]$
      b. $[\![\text{some}]\!] = \lambda P_{\langle e,t \rangle} . \lambda Q_{\langle e,\langle v,t \rangle\rangle} . \lambda e_v . \exists x_e [P(x) \wedge Q(x)(e)]$

Crucially, *every* requires of an event e that each element in its domain is a participant in a subevent $e' \sqsubseteq e$. This, we propose, is the source of the 'culminating' feeling involved in matrix predicates in instances of inverse scope, since it is precisely in cases of cross-clausal inverse scope that the event argument of *every* associates with the matrix event. We derive EWS via cross-clausal QR, while acknowledging the existence of other ways of analyzing scope. Example (6) gives the EWS reading for a past perfect sentence, though for simplicity we ignore the contribution of tense here.

(6) $\llbracket$Some student had claimed that every professor left$\rrbracket_{\text{EWS}} = \exists e_v[\forall x_e \, [\textbf{professor}(x) \rightarrow \exists e' \sqsubseteq e\, [\exists y_e[\textbf{student}(y) \wedge \textbf{claim}(e', y) \, \wedge \text{CON}(e') = \lambda e''_v[\textbf{leave}(e'', x)]]]]]$

Analysis of by-phrases We assume *by*-phrases introduce a transition between a 'buildup' stage and an end state s, which is required to take place at time t' before a 'deadline' t (Thomas and Michaelis, 2009; Altshuler and Michaelis, 2020). To formalize the buildup stage, we assume that *by*-phrases introduce an additional event e' which CULminates into s at t', i.e. e' takes place over some presupposed interval of time t' and causes s to come about.

(7) a. $\llbracket$by 8pm$\rrbracket = \lambda R_{vt} \, . \lambda e_v. \, R(e) \wedge \exists s, t', e'[t < 8pm \wedge \text{RES}(e) = s \wedge \text{CUL}(e')(t') = s]$
     b. $\llbracket$CUL$\rrbracket = \lambda e'_v \, . \lambda t_i \; : \; \exists t'_i[\tau(e') \circ t' \, \wedge \, t' < t] \, . \, \iota s[\text{CAUSE}(s) = e' \, \wedge \, \text{ONS}(s) = t]$

Under the EWS reading, (1a) entails that for each professor there is a corresponding leaving event e and a claiming event e' of which some student is the agent. This plurality of claiming events culminates into the result state. Under the SS reading, only a single claiming event takes place at the onset of the result state. *By*-phrases override a default preference for surface scope because a sum of claiming events, which can occur over a period of time, is a more natural buildup stage than a single instantaneous claiming event. For similar reasons, the punctual temporal adverbials in (2) less readily admit EWS readings: the reference time introduced by the adverbial is too short to be interpreted plausibly as containing (the runtime of) multiple simultaneous claiming events.

Analysis of *ensure*-type predicates We assume that *ensuring* entails the existence of (a plurality of) events of which its subject is the agent, and which together CULminate into the result state denoted by the embedded clause. Again, the introduction of a plurality of events which together culminate into a result state more easily allows for the EWS reading compared to the SS reading, because the complex event introduced by the wide-scoping universal can more easily be construed as taking place over an extended interval of time. Under the SS reading culmination needs to be accommodated by different means.

Conclusion We proposed that the apparent inability to QR out of tensed clauses is illusory: it is always possible, eliminating the need for an inverse scope-blocking mechanism in the grammar, though the plausibility of EWS is context-dependent. Under the proposed analysis, it follows that this behavior is not special to embedded universals under existentials: with *by*-phrases, unembedded universals more easily take widest scope (8a), and embedded universals in the absence of matrix quantifier are more easily interpreted as scoping out of the embedded clause as well (8b).

(8) a. **By the end of the night**, some professor had scolded every student.
     b. **By the end of his PhD**, John had claimed that every theory of scope was wrong.

The *by*-phrase in (8b) allows for readings involving multiple claiming events, one for each theory.

Selected References. Altshuler & Michaelis. 2002. By now: Change of state, epistemic modality and evidential inference. ● Barker. 2021. Rethinking scope islands. ● Cecchetto. 2004. Explaining the locality conditions of QR. ● Farkas & Giannakidou. 1996. How clause-bounded is the scope of universals? ● Fox & Sauerland. 1996. Illusive scope of universal quantifiers. ● Kratzer. 2000. The Event Argument and the Semantics of Verbs. ● Schein. 1993. Plurals and events.