

## Making changes: In search of a learning model for modal innovations

This talk explores the child language predictions of recent generative change theories that rely on L1 learner errors as the explanatory driving force in reanalysis (e.g., Roberts and Roussou 2003; van Gelderen 2004, 2011). We have a wealth of evidence that syntactic and semantic changes are directional in nature (e.g., Bybee et al. 1994); what we don't know is whether child language facts align with reanalysis theory. These theories attribute change to biases (and resultant errors) in the learner, however, no systematic investigation has been undertaken to verify the existence of these biases in child data (though see van Gelderen 2011: 21-6). I show that the issue of directionality is at times parallel in L1A and change (an element of type  $\alpha$  is earlier both in the individual and historically) and at times in opposition (an element of type  $\beta$  is earlier in the individual but later historically). I discuss, for example, how van Gelderen's *Head Preference Principle* shows opposition, while her *Late Merge Principle* shows parallelism. I argue the former type (opposition) is a case of incomplete L1 acquisition where the learner remains at an earlier stage of development, and the latter type (parallelism) is a case of learner overgeneralization/extension which remains uncorrected. I focus on the latter for the remainder.

Modal acquisition and change is a case of parallelism. In both acquisition and change root modal meanings (1a) appear before epistemic modal meanings (1b) (e.g., Wells 1979, Papafragou 1998; Bybee et al. 1994). Cournane (to appear) used a Preference Task to show that preschool learners display the directional bias predicted by generative change theory: 5 y.o. learners overextend root lexemes to epistemic contexts, but not epistemic lexemes to root contexts (2). In an effort to model this, I present the Upwards Overextension Model (UOM), a learning model which extends generative change theory to the proposed domain of explanation: child language. The UOM accounts for the naturalistic trajectory of modal learning (root > epistemic) and predicts directional overextension errors from root to epistemic.

The UOM uses event-relative semantics (Hacquard 2006, 2010) and exploits early underspecification of  $C^0$  (c.f. Hyams and Hoekstra 1996 for Number<sup>0</sup>). Hacquard links modals to two type-appropriate positions in compositional semantics: (I) **low**, above VP which gives agent-linked root meanings (3a), or, (II) **high**, above TP which gives speaker-linked epistemic meanings (3b). Modal lexical items have an event variable  $\{e\}$  which must be locally bound by either Aspect when low, or the speech act on C ( $\lambda e0$ ) when high.

I argue that learners go through three stages: Stage 1 where they are restricted to root modality, Stage 2 where they develop epistemic modality, and Stage 3 where they use statistical learning to refine their modal lexemes. Learners begin with root modals for two reasons: (a) agent-oriented modality is more closely linked to the argument structure, and (b) because of well-known overreliance on direct-linking to the discourse in child language (4a). At Stage 1 learners cannot use the speech-act event on C ( $\lambda e0$ ) to bind the high epistemic modal variable. Only later (with syntactic and metalinguistic development) do they learn to formally encode the speech act (treating utterances as linguistic objects), and make viable the event-binding that licenses the high epistemic modal position (4b).

Overextension errors from Root > Epistemic follow naturally in the UOM since modal lexical items are free to select either VP or TP complements. Once the high position becomes available (Stage 2), but before statistically-based entrenchment refines lexical items that are restricted to low modality (e.g., *can*; Stage 3), children are predicted to overextend in the manner evidenced in Cournane (to appear). Finally, statistical learning (Brooks and Tomasello 1999)

prunes erroneous overextensions; on those rare occasion when pruning fails, overextension errors will become directional innovations from Root > Epistemic.

- 1) *Patrick must be home...*
  - ...because his parents don't let him stay out late. [Root Deontic  $\forall$ , rule-based]
  - ...because his lights are on. [Epistemic  $\forall$ , knowledge-based]
- 2) Preference Task Results from Cournane (to appear)

*Error Rates for Condition Across Groups in the Preference Task*

Condition	Lexical Contrast	Sample Sentence	Target	Competitor Modal	Error Type	Error Rates		
						Adult	Child	
Root	<i>must</i> ~ <i>have to</i>	"He <b>has</b> to put choco-chips in the batter"		<i>Must</i>	Down	<i>must</i> in <i>have</i>	12	12
	<i>might</i> ~ <i>can</i>	"I don't want it, you <b>can</b> drink it"		* <i>Might</i>		<i>might</i> in <i>can</i>	11	10
	Total						<b>23 (18%)</b>	<b>22 (18%)</b>
Epistemic	<i>must</i> ~ <i>have to</i>	"He <b>must</b> be scared of snakes"		? <i>Have to</i>	Up	<i>have</i> in <i>must</i>	1	9
	<i>might</i> ~ <i>can</i>	"She <b>might</b> 've hurt herself on the swings"		* <i>Can</i>		<i>can</i> in <i>might</i>	1	9
	Total						<b>2 (2%)</b>	<b>***18 (14%)</b>

- 3) a. Root: [CP  $\lambda e_0$  [TP Asp<sub>1</sub> Mod e<sub>1</sub>[VP V e<sub>1</sub>]]] (Hacquard 2006)  
The VP event (anchors the modal to the subject and the time provided by Tense)
- b. Epistemic: [CP  $\lambda e_0$  Mod e<sub>0</sub> [TP T Asp<sub>1</sub> [VP V e<sub>1</sub>]]] (Hacquard 2006)  
The speech event anchors the modal to the speaker and the speech time
- 4) a. [CP [TP Asp<sub>1</sub> Mod e<sub>1</sub>[VP V e<sub>1</sub>]]] only one modal position, low
- b. [CP  $\lambda e_0$  Mod e<sub>0</sub> [TP T Asp<sub>1</sub> Mod e<sub>1</sub> [VP V e<sub>1</sub>]]] two modal positions, high and low

Selected References: Brooks, P. and M. Tomasello. 1999. How children constrain their argument structure constructions. *Language*, 75: 720–738. Bybee, J., R.D. Perkins and W. Pagliuca. 1994. *The Evolution of Grammar: Tense, Aspect, and Modality in the Languages of the World*. Chicago: University of Chicago Press. Cournane, Ailis. to appear. In search of L1 evidence for diachronic reanalysis: mapping modal verbs. *Language Acquisition*. van Gelderen, E. (2011) *The Linguistic Cycle: Language Change and the Language Faculty*. Oxford: Oxford University Press. Hoekstra, T & N. Hyams. 1996. Missing Heads in Child Language. Proceedings of GALA II (Groningen Assembly on Language Acquisition). Hacquard, V. 2006. *Aspects of Modality*. Cambridge, MA: Massachusetts Institute of Technology dissertation. Hirst, W., and J. Weil. 1982. Acquisition of epistemic and deontic meaning of modals. *Journal of Child Language*, 9: 659-666. Lightfoot, D. 1979. *Principles of Diachronic Syntax*. Cambridge: Cambridge University Press. Papafragou, A. 1998. The acquisition of modality: implications for theories of semantic representation. *Mind & Language*, 13 (3), 370-399. Roberts, I., & A. Roussou. 2003. *Syntactic Change*. Cambridge: Cambridge University Press. Stephany, U. 1979. Modality. In P. Fletcher & M. Garman (eds.). *Language Acquisition*. 375-400. Cambridge: Cambridge University Press. 2<sup>nd</sup> ed. 1986. Wells, G. 1979. Learning and using the auxiliary verbs in English. In V. Lee (ed.). *Cognitive Development: Language and thinking from birth to adolescence*. 250-270. London: Croom Helm.