Syntactic variation in the individual

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Fragmented perspectives

writing MGG for 'mainstream generative grammar',

- MGG focus on UG, simplicity $\Rightarrow$
  no acct of constructions, nuts,... Culicover'99,Kay'02,Evans&Levinson09,...
- Competence/performance $\Rightarrow$
  Competence models qualitative, unscientific Stockhof&van Lambalgen'10,...
- MGG $\not\Rightarrow$
  performance models Bever'70;Edelman&Christiansen'03;Wasow&Arnold'05;Bresnan'07;...

> ...many psycholinguists are disenchanted with generative grammar. One reason is that the Minimalist Program is difficult to adapt to processing models. Another is that generative theories appear to rest on a weak empirical foundation...no one interested in human performance can ignore the possible effects of things such as frequency and exposure on ease of processing. (Ferreira'05)

- XG $\Rightarrow$
  YGs are wrong, all X$\neq$Y!

Towards a unified theory

- there are strong, defensible UG claims
  - anticipated in the 60's,
    made much more precise in the 80's, 10's,
    still very much alive!
- For many X, XGs are similar and compatible with UG
  - not just vaguely similar, but exactly, in specifiable respects
  - among these, an infinite family of 'minimalist grammars' (MGs)
- Here: MGs $\Rightarrow$ performance-based models of variation
  - statistical
  - predicts construction-specific effects

3 models compared: union (2L), squared (L^2), & context (X2L) models

Quechua/Spanish

- *parlay*-ta-wan uyariy-ta-wan *praktik*ay-ta muna-ni
  speak-ACC-with hear-ACC-with practice-ACC want-1s
- el *alqo* le mira **borrowing**
  the dog Cl sees
- *a ver*, *trompea*-ku-na (Muysken'00)
  let's see, mistake-REFL-NOM
- *rachak-ta* miro-le al *wambra*, la tortuga tambien (Sanchez'03)
  toad-ACC see-Cl to-the boy, the turtle too
- *a las cinco de la tarde*-ta hamu-saq **alternation**
  at the five of the afternoon-ACC come-1FU

Quechua/Spanish

- mama-j-pa wasi-n-ta-n li-ya-j
  mother-1SG.POSS house-3SG.POSS.DIR-AFFIRM go-PR-1SG
  - Voy a la casa de mi mamá
- De mi mamá en su casa estoy ye-ndo
  GEN 1SG.POSS mother LOC 3SG.POSS house be-1SG go-ing

Cerrón-Palomino'72

- Chay niñuta / niñuta # ne # ne # *le (es)tá queriendo matar*
  That boy boy eh eh Cl is wanting to-kill

...rumitu, runaskuna,... Muysken'04, Sanchez'03

interference, fusion, relexification,... Clyne,Labov,...

Previous ideas

- Functional elements cannot be switched (Joshi'85)
- *[X_{L1} Y_{L2}] where X_{L1} governs/L-marks/. . . Y_{L2} (DiSciullo et al'86)
- Functional head same language as complement (Belazi et al'94)
  - Veo las *houses* Spanish/English (Muysken'00)
  - ?* Veo *the houses*
  - žib li-ya *een glas water of zo* Dutch/Mor Arabic (Nortier'90)
    get for-me a glass water or so

"The literature abounds both with proposals for various specific constraints on code-mixing, and with claims that the general constraints do not hold." (Muysken'00)

Goal 0. Define the tendencies, and explain them.

Previous ideas

(Simp) stems X^0 $<$ compounds $<$ fixed phrases $<$ adjunctions $<$ XP ...

(N$<$V) N $<$ A $<$ Adv $<$ V $<$ Adpositions $<$ Conjunctions $<$ ...

(S$<$DO) S $<$ coord S $<$ Adv S $<$ Adv $<$ dislocated phrases $<$ DO ...

- QS code switching in child elicited narratives, Lamas Quechua (Sanchez'03)

		98.7%	1.3%
V_Q	+	$Infl_Q$	$Infl_S$
		79%	21%
V_S	+	$Infl_Q$	$Infl_S$

	56.6%	3.6%	
V_Q +	DP_Q	DP_S	...null, pronouns, clauses,...

Previous ideas

- QS corpus study, code switches in wayno transcriptions (Muysken'98)

19	12	5	3	1
quote	P-XP	XP-YP	Excl,AdvP-XP	V-XP

- QS borrowing/switching, corpus type freqs (van Hout&Muysken'94)

221	70	33	15	7	6	5	5	2	1	1
N	V	A	S-Adv	Q	Conj	P	Inter	Neg	Man-Adv	Greet

- French/Dutch corpus study (Treffers&Daller'94)

2329	496	388	362	352	33	5	1
N	Inter	Adv	A	V	Conj	P	Pro

"The number of non-constituent switches is very low... There are important theoretical and practical advantages to an approach that considers codemixing and borrowing as fundamentally similar."

Goals

Goal1. Grammar and performance model allowing mixing

> *"The problem. . . to determine how one can switch grammars in mid-tree and still end up with a coherent and interpretable sentence." (Woolford'83)*

Goal2. Extend model to predict mixing points, variations.

> *"We need a probabilistic model to account for the patterns encountered. Communities differ in their choice of strategy, but the difference is rarely absolute: what we find is (sometimes strong) quantitative tendencies towards particular patterns." (Muysken'00)*

Hypotheses

(Struc) Mixing is structurally governed.

Evidence: Constituent bound, cat-preserving, dep-sensitive

(*Mix) In each constituent, a tendency to avoid mixing

Evidence: Speakers know each language, tend to stick to one

(Asym) Even in fluent bilinguals, L1/L2 mix freqs $\neq$ L2/L1

Evidence: Frequency data

(Freq) N<V, lex<func, S<AdvP<direct object DPs...

Evidence: Frequency data

(Vary) Mixing rates vary between utterances, individuals, communities

Evidence: Frequency data

(Borrow) Borrowing, 'relexicalization', happens!

Evidence: 'partially integrated' forms pattern roughly like switches

Any adequate explanation of language mixing should get at least these!

Grammars and universals

- I will use 'MGs', but other grammars similar...

Thm 1. 'Ext convergence' (Vijay-Shanker, Weir & Joshi'87...)

$$\text{CFG} \subset \boxed{\text{TAG} = \text{CCG} \subset \underline{\text{MG} = \text{MCFG}} = \text{MCTAG}} \subset \text{CS} \subset \text{RE} = \text{Aspects} = \text{HPSG},$$

(MCS) HLs are in a MCS class: includes CF, eff recognizable, semilinear, limited cross-dependencies (Joshi'85)

Thm 2. 'Int convergence' (Michaelis'01,'02; Stabler'10;...)

$$\boxed{\text{MG} = \text{MGH} = \text{MT} = \text{DMG} = \text{CMG} = \text{PMG} = \text{SMMG} = \text{RMG} = \text{RMGCF}}$$

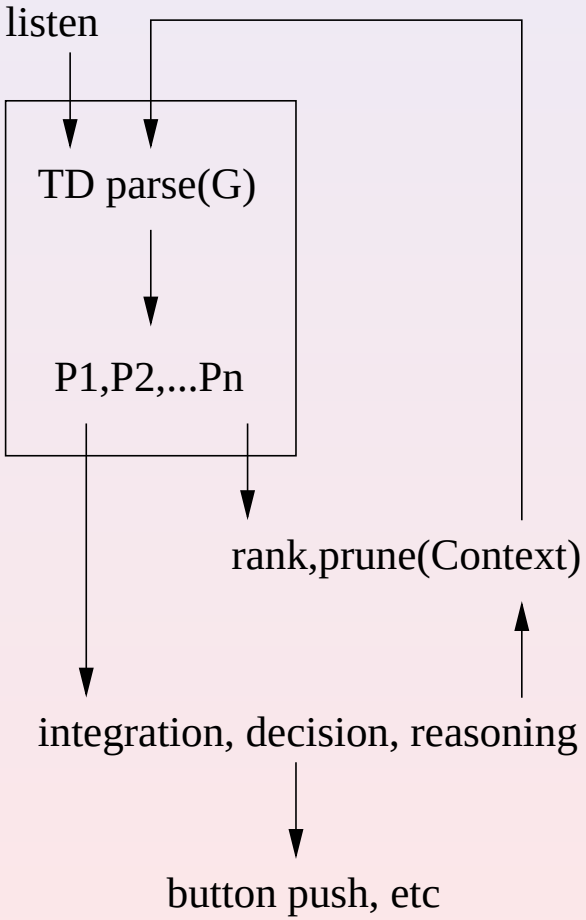
Thm 3. (KuhlmanMohl'07; Kanazawa'09; Michaelis'10)

$$\ldots \text{CF} \subset \boxed{\text{TAG} = \text{CCG} \subset \text{MG}_{\text{wn}} \subseteq \text{MCFG}_{\text{wn}} = \text{ACG}_{(2,3)}} \subset \text{MCFG} \ldots$$

- Goal1: Woolford's problem solved if mixing languages MG definable...

Our recognition/production models

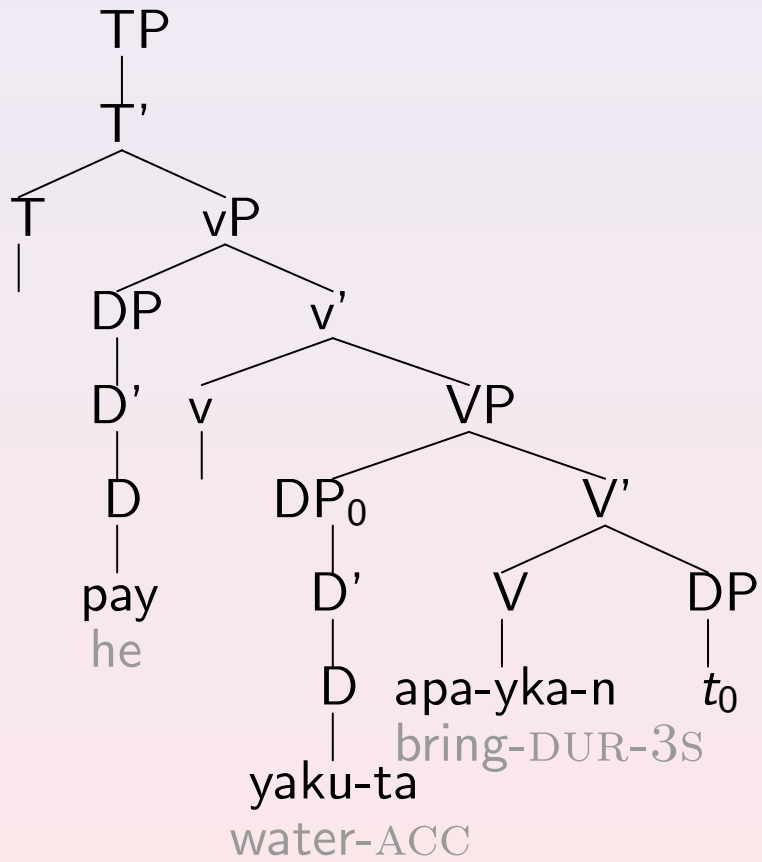
Top-down recognition (Mainguy'10)

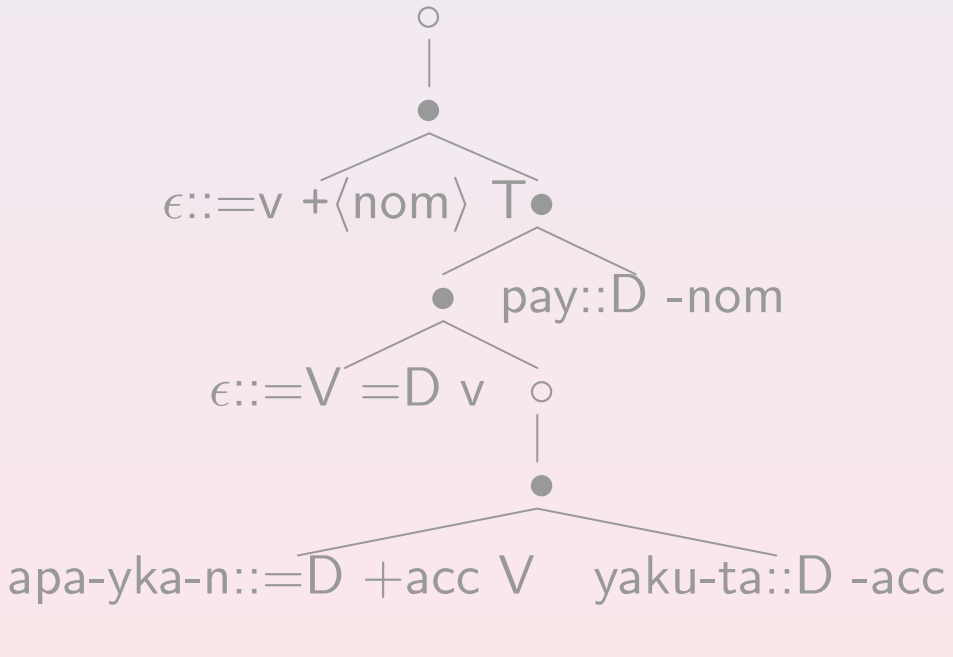


- Sound,complete for every MG
- Complete left context
  (Cf. Roark&Johnson'99;Roark'01,'04;
  Maletti&Satta'10)
- Preliminary good results
  w/out transforms
  (Cf. Schuler'10)

Bottom-up production: MBUTT from LF (Kobele, Retoré & Salvati '07)

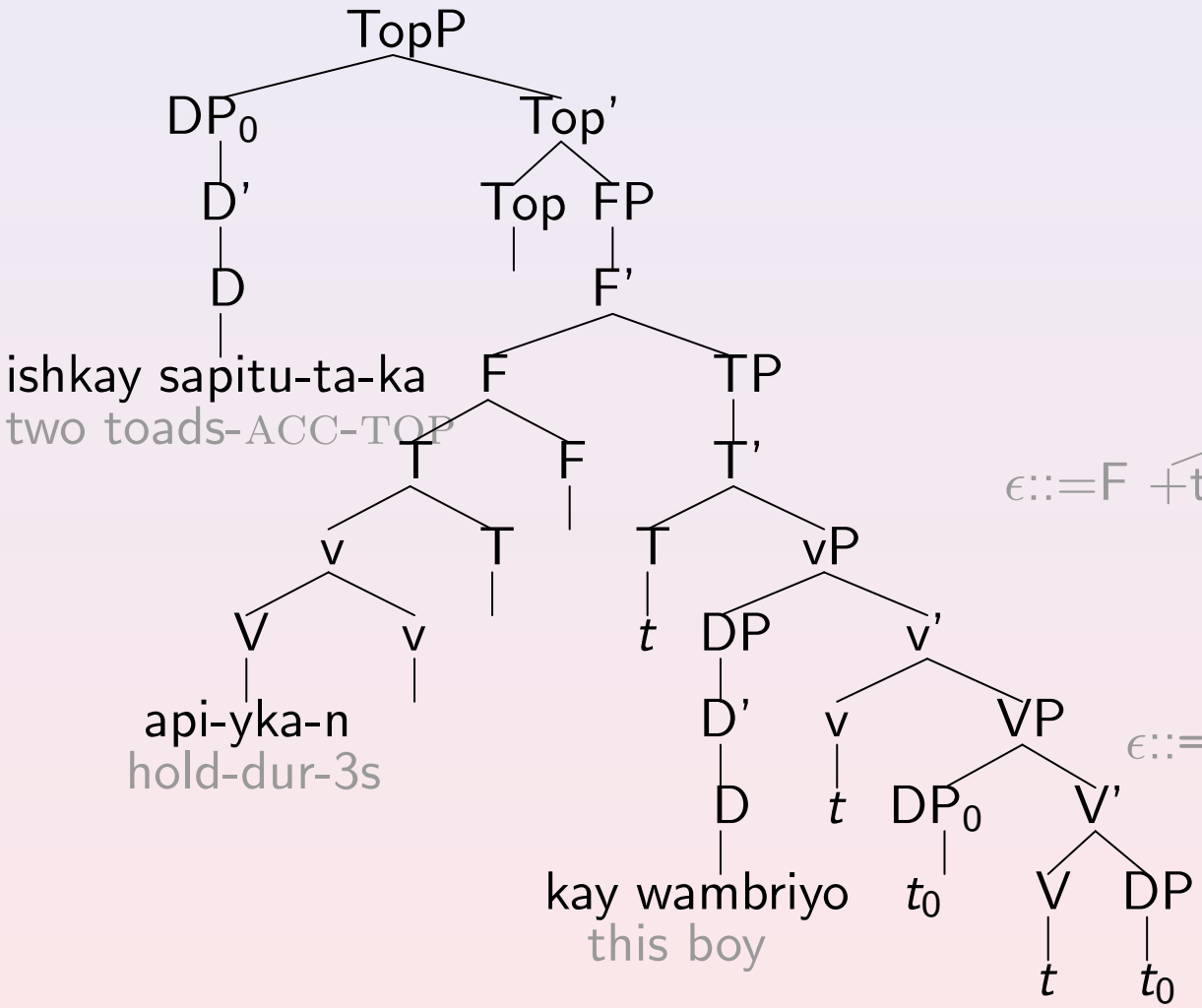
Quechua MG=⟨Lex$_Q$,merge⟩

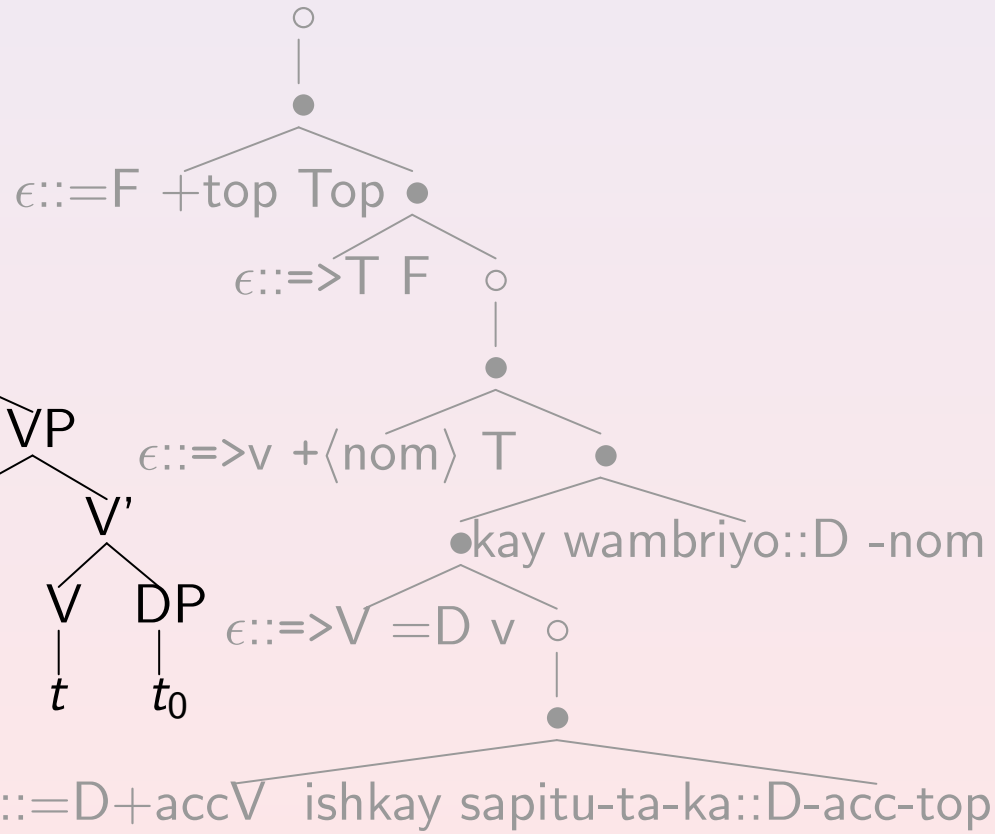




Neutral clause: SOV; case-marking; +def null objects; null 3rd person obj agreement; no indef articles (Coombs et al'76, Sanchez'03)

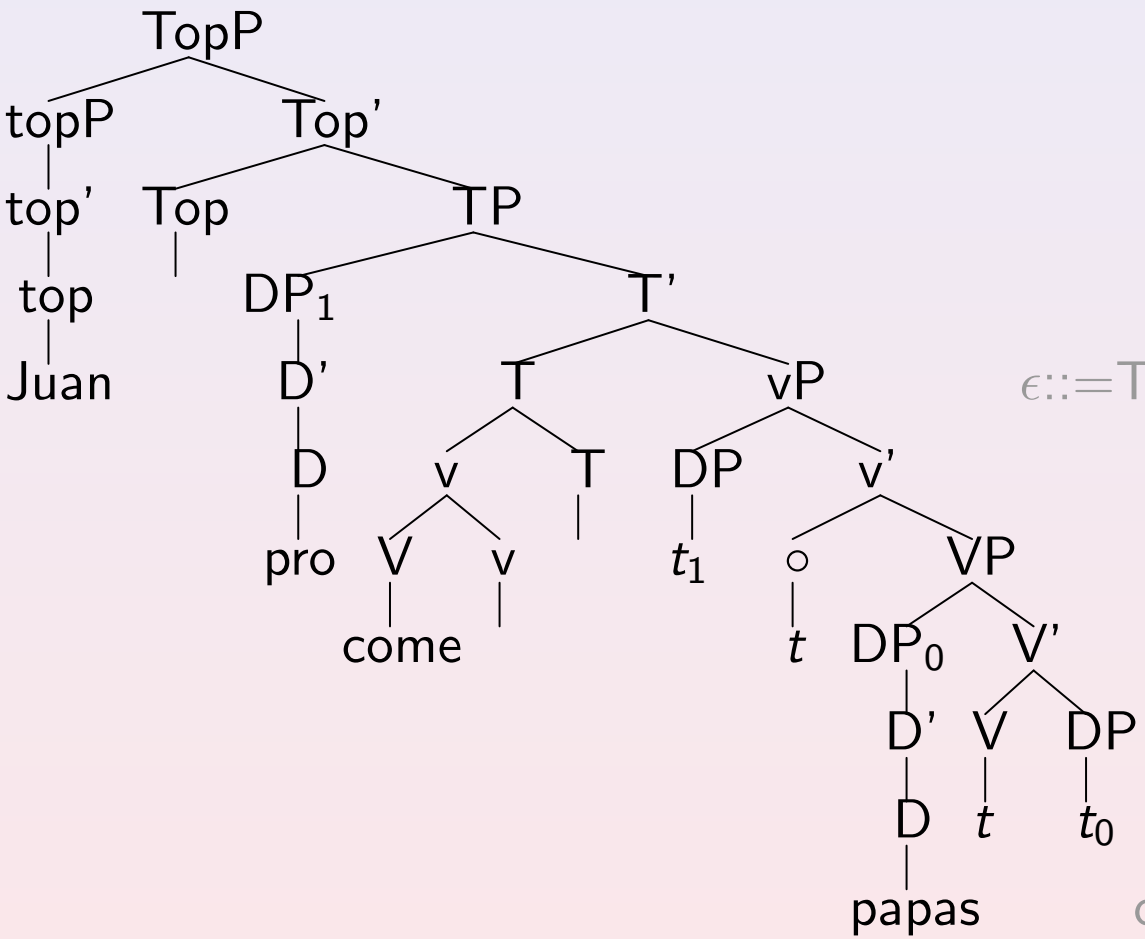
Quechua MG=⟨Lex$_Q$,merge⟩

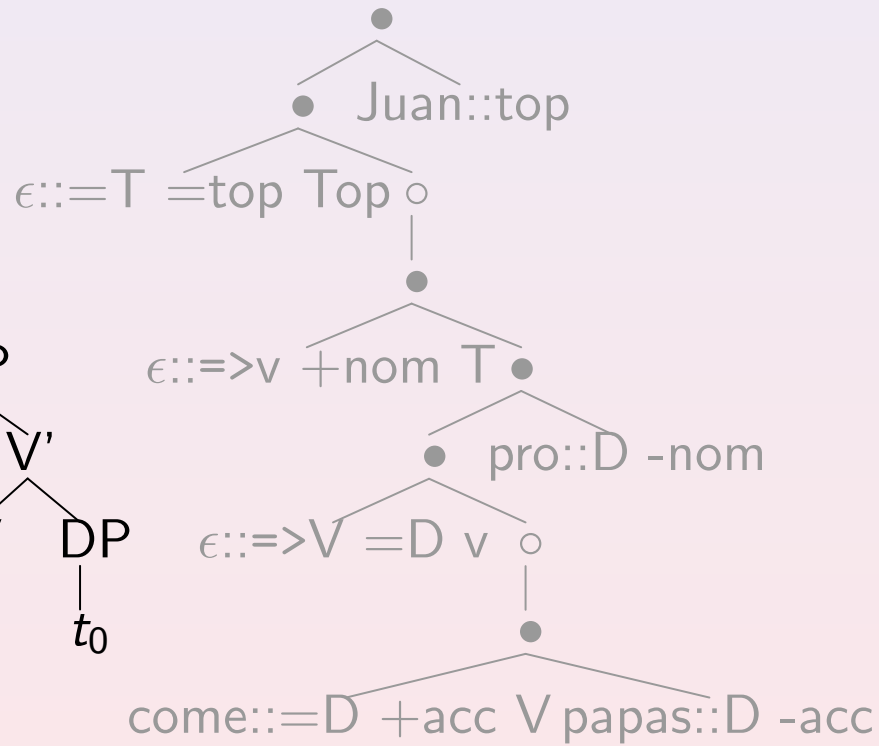




object-topic construction OVS, with O in Top, V in F (Sanchez'03)

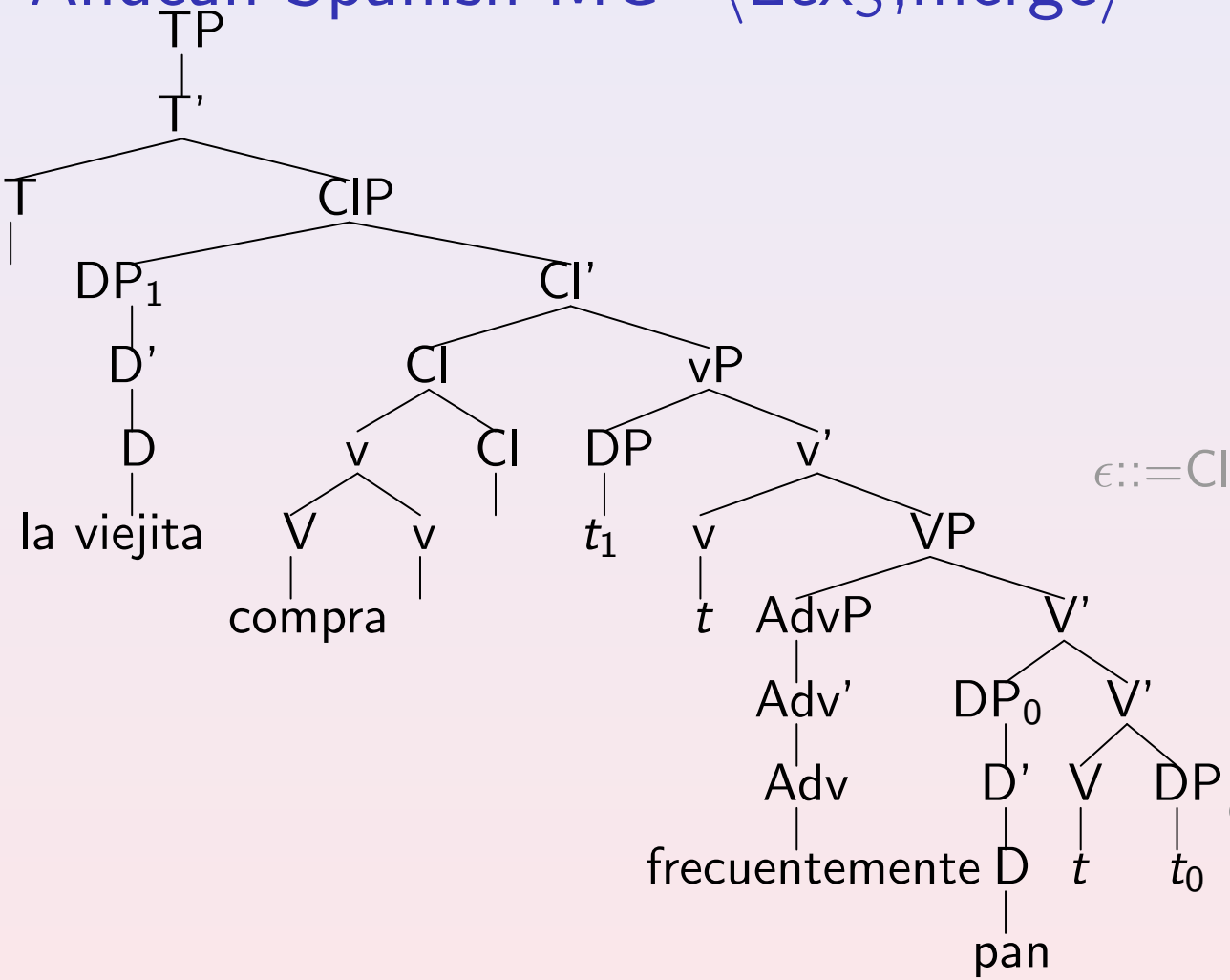
Spanish MG=⟨Lex$_S$,merge⟩

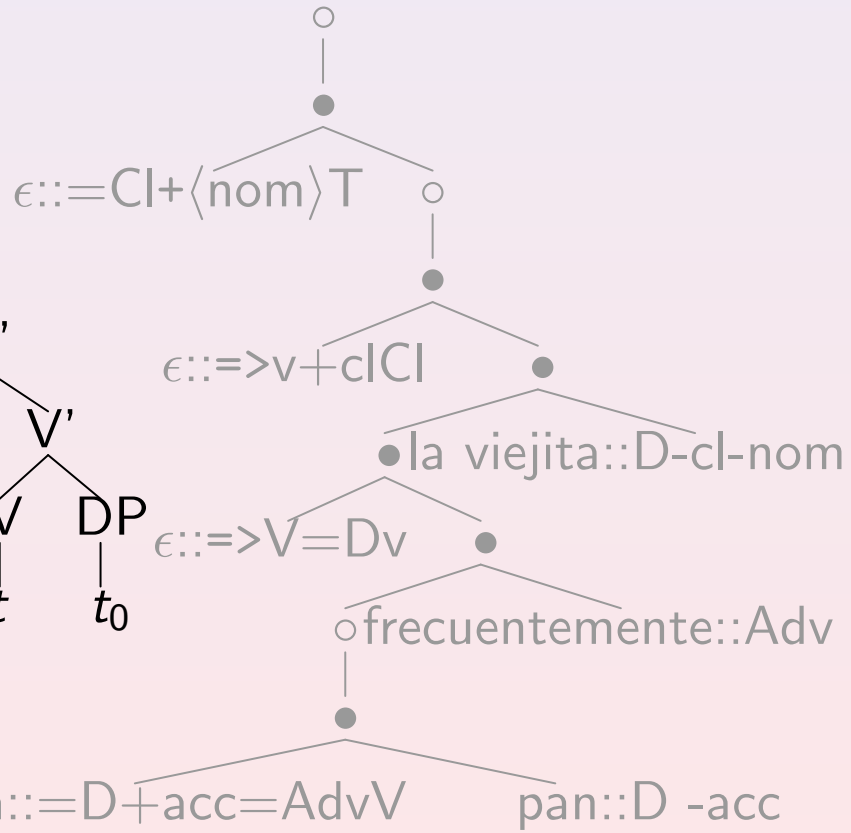




SVO; case-marking; *+def null objects; direct object clitics (all persons, even 3rd); indef article. Ordoñez&Treviño'99 propose that SVO clauses with overt subjects have S in Spec,Top.

Andean Spanish MG=$\langle Lex_S, merge \rangle$

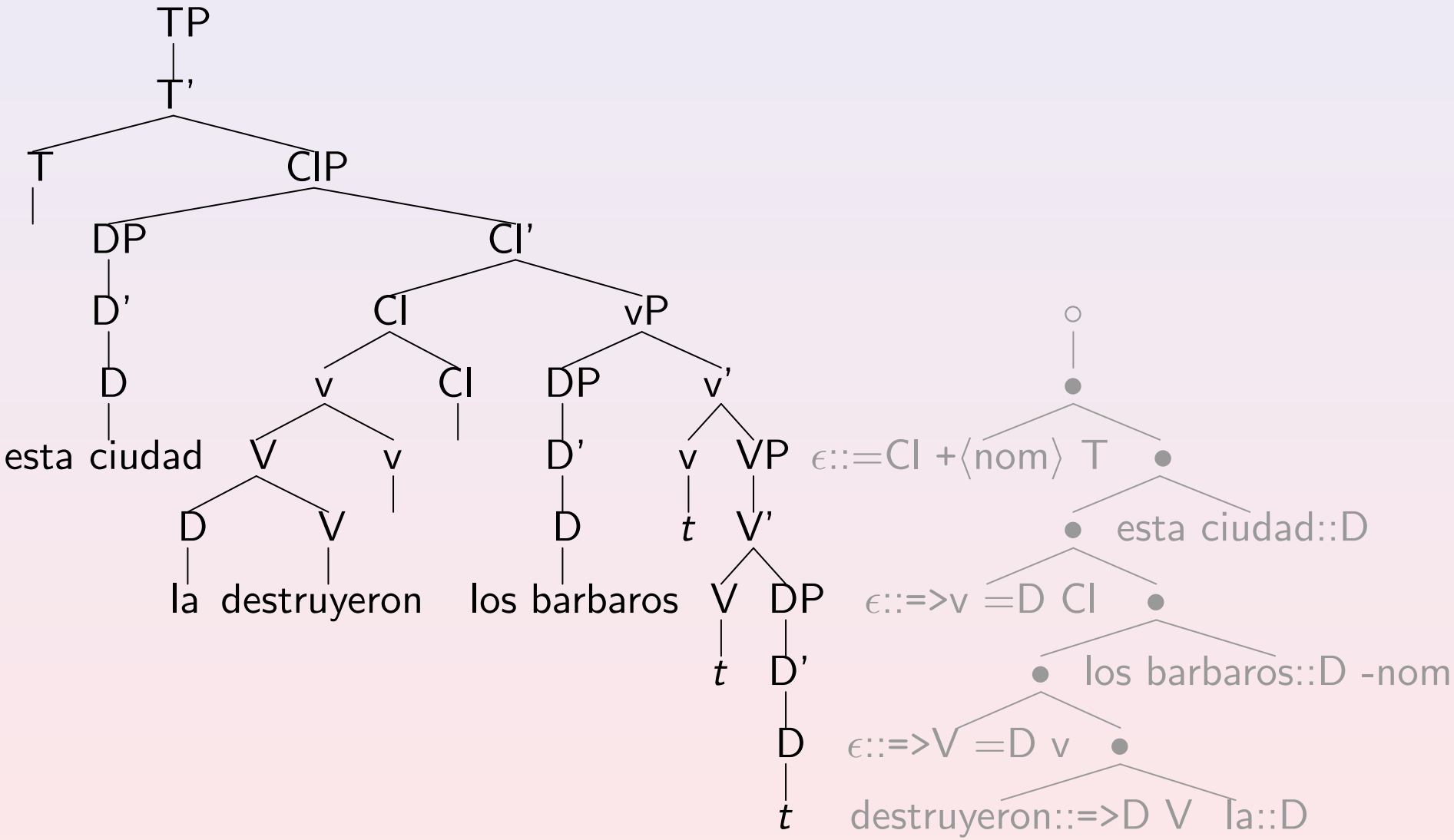




But for Andean Spanish SVO, Sanchez'03 proposes a clitic projection

(Cf. Zubizarreta'99; Sportiche'90,'99...)

Andean Spanish MG=$\langle Lex_S, merge \rangle$



For Spanish OSV, Sanchez'03 proposes "In the case of OSV. . . [i]n Spanish, the direct object moves to Spec of CIP and further up and the verb moves to CI"

2L: Quechua/Spanish

Given grammars of Quechua, Spanish, how to mix?

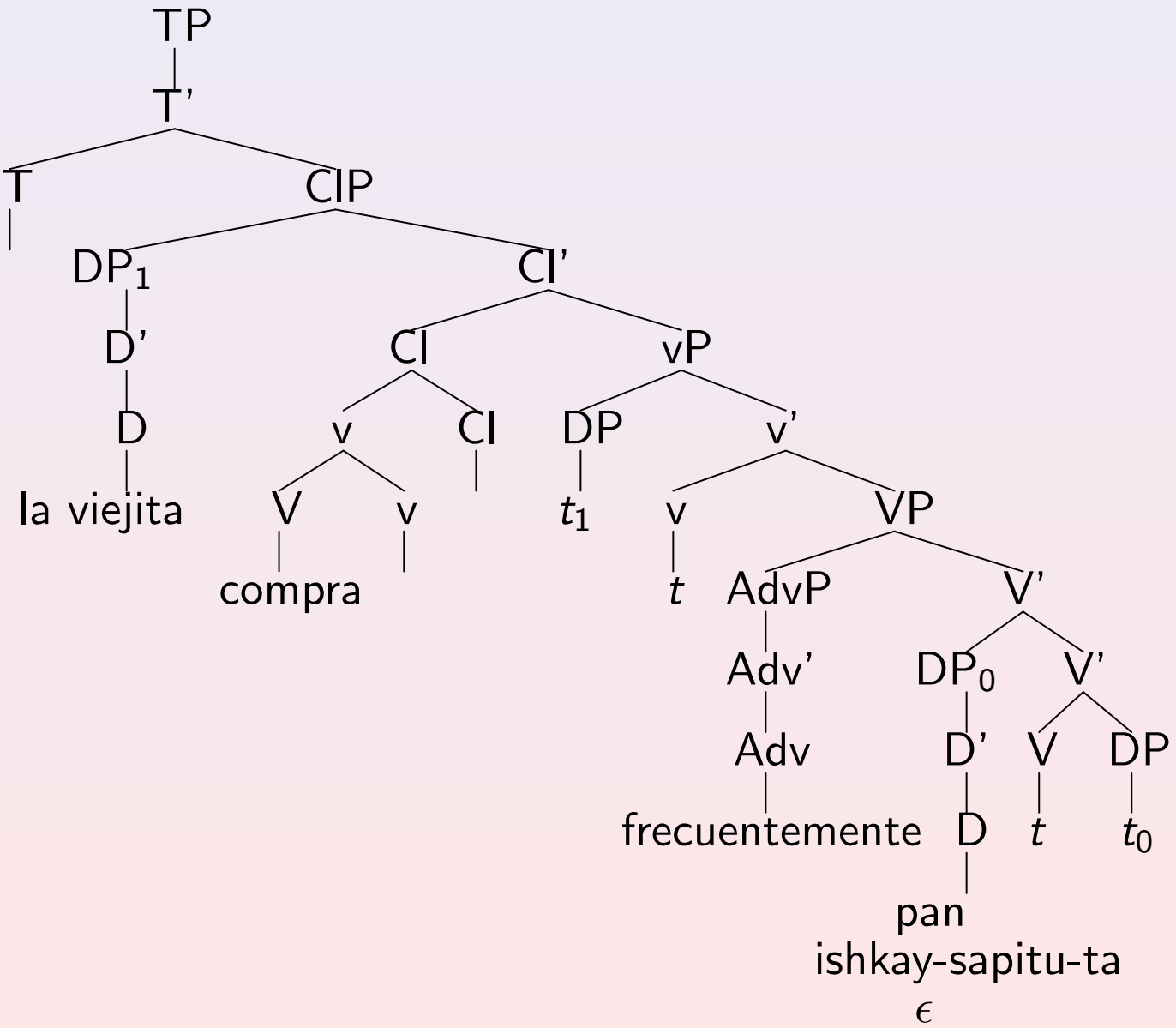
- Simplest idea: No special mechanisms for mixing Woolford'83, Joshi'85, Mahootian'93, MacSwan'04 (and, in a sense we will see, this paper!)

(2L) Simply taking the union of the two lexicons, what mixes predicted?

- **switches of identical category:**

Qu	`ishkay-sapitu-ta::D -acc`
	`ϵ::D -acc`
Sp	`pan::D -acc`

2L: Quechua/Spanish



2L: Quechua/Spanish

- **switching empty functional elements (interference):** difficult!

ϵ::=v +⟨nom⟩ T	ϵ::=Cl +⟨nom⟩ T
ϵ::=F +top Top	ϵ::=Cl +⟨nom⟩ T
ϵ::=V =D v	ϵ::=>v +cl Cl
ϵ::=>T F	ϵ::=>v =D Cl
ϵ::=>v +⟨nom⟩ T	ϵ::=>V =D v
ϵ::=>V =D v	ϵ::=T +top Top
ϵ::=F +top Top	ϵ::=Cl +nom T
ϵ::=>v +w W	ϵ::=Cl +⟨nom⟩ T
ϵ::=>T F	ϵ::=>v =D Cl
ϵ::=>V =D v	
ϵ::=>W +⟨nom⟩ T	

"...to distinguish between the two different underlying representations for the same superficial word order in both languages it is crucial to project CIP in Spanish and not to include Cl as part of the numeration in Quechua." (Sanchez'03)

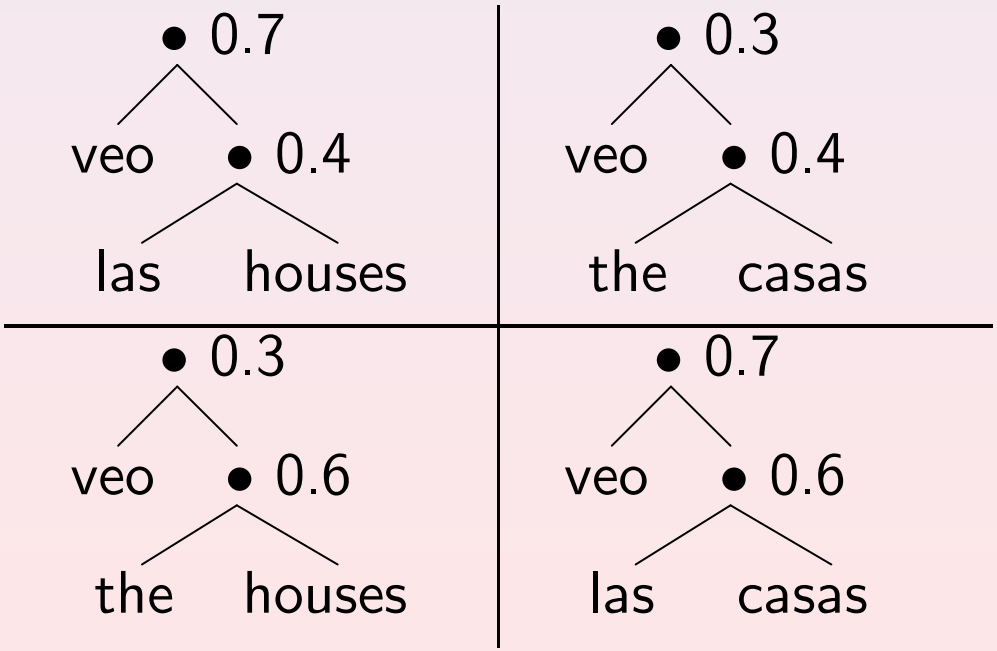
Predicting preferred mixes

To account for our earlier hypotheses (Struc, *Mix, Freq, Asym, Vary):

- **2L** models provide no account of tendencies
- Distinguish features and transfer processes
  (Sanchez'03,van de Craats et al'00, Andersen'83, Mueller'98)
  * "Transfers easiest when 'analogies' good." Not quantitative
- Populations of parameter settings in each individual (Yang'02)
  * Quantitative predictions. Woolford's problem?
- OT constraints (Bhatt'97; Bresnan, Deo & Sharma'07)
  * Particular rankings for language pairs? situational variation?
- Probabilistic grammar (Sankoff&Poplack'81)

L^2: $\langle \mathbf{Lex}_Q \cup \mathbf{Lex}_S \cup \mathbf{M}_{QS} \cup \mathbf{M}_{SQ}$, **merge, P**$\rangle$

- Features of Lex_Q, Lex_S disjoint (indicated by subscripts).
- Construct M_{QS} so the for each V_Q in Lex_Q subcategorizing for D_Q, M_{QS} has the same V_Q subcategorizing for D_S, and similarly for other categories. Conversely for M_{SQ}.
- *P* assigned to derivation steps by features.



L^2: $\langle \mathbf{Lex}_Q \cup \mathbf{Lex}_S \cup \mathbf{M}_{QS} \cup \mathbf{M}_{SQ}$, **merge, P**$\rangle$

(Struc) Mixing is structurally governed.

(*Mix) In each constituent, a tendency to avoid mixing

(Asym) Even in fluent bilinguals, L1/L2 mix freqs $\neq$ L2/L1

(Freq) easier to switch N than V, etc

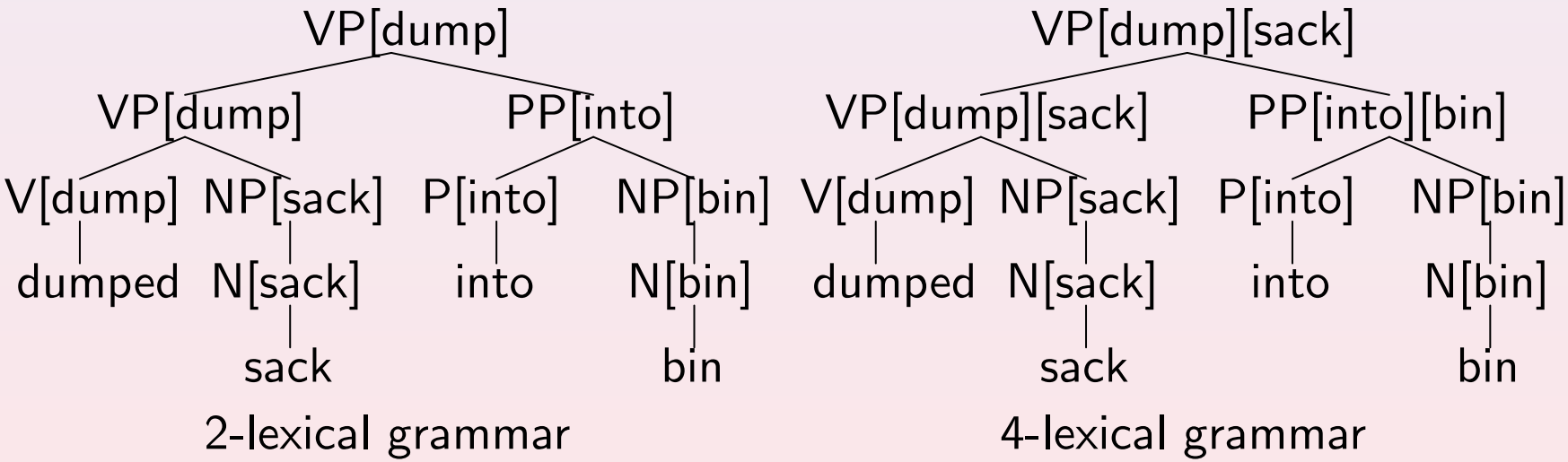
Problems!

- "Particular hypotheses are needed" about how $f_{L1} \neq f_{L2}$! (MacSwan'04)
- **(Vary)** Mixing rates vary with situation
- **(Borrow)** binary Q/S division leaves no place for, e.g. verbs that are neither fully V_Q or V_S
- Misses lexical effects: e.g.
  most freq switched$\neq$most freq; runaskuna >> payskuna, kayskuna

Lexical and context effects in parsing

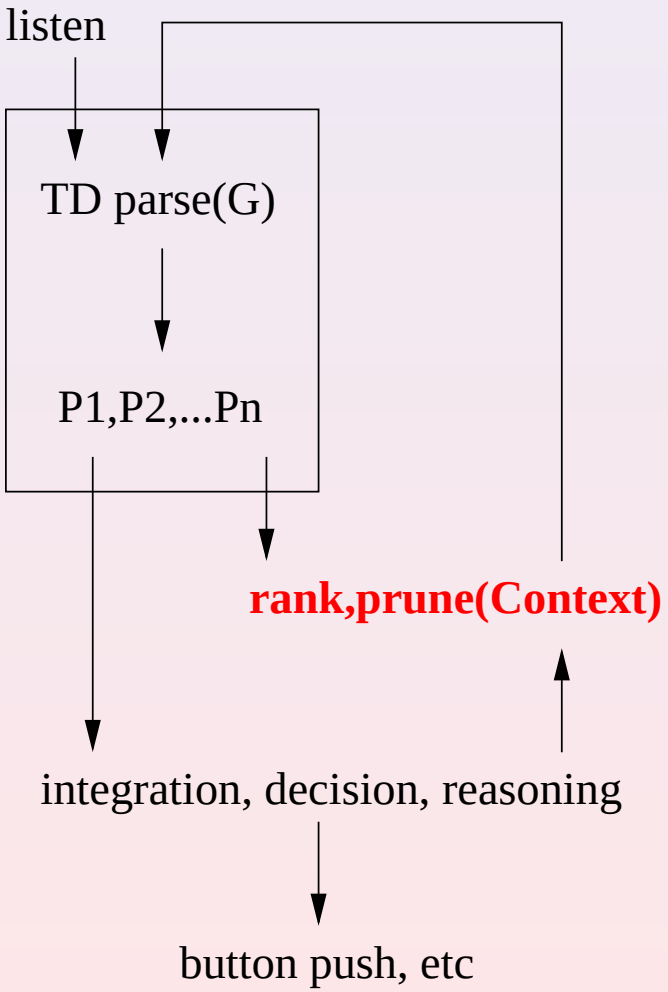
- She {positioned/saw} the dress on the rack (Ford et al'82)
- I bought the TV with the {remote control/prize money}
- She drove down the street in her {car/neighborhood}

k-lexical models of contexts: (Satta'00)



Then even big treebanks provide sparse data! Many hapax legomena.
So we "smooth" P: P(merge(s:α,t:β)) increased by other similar combs, where similarity may be $\propto$ features, semantics, even phon.

Recognition/production models



- Sound,complete for every MG
- **Complete left context available**
  (Cf. Roark&Johnson'99;Roark'01,'04;
  Maletti&Satta'10)
- Preliminary good results
  w/out transforms
  (Cf. Schuler'10)

X2L: Quechua/Spanish

Independently motivated: parsing preferences

(Struc) The syntax controls mixing

(*Mix) Combined heads tend to be same language

(Asym) Probability of Q/S merges can differ from S/Q merges

(Vary) Mixing rate varies with discourse situation

(Borrow) Hapax legomena significantly $\neq 0$!

(Freq) **N<V:** Verbs enter into more head-head relations than N

E.g. Verbs have categories like `=D V`, while nouns are just `N`

S<DO: DO enters into more head-head relations than a complete S

E.g. Ss have cats like `T`, while DOs have cats like `D -acc`

Simp: Simple elements (e.g. individual heads), on average, enter into fewer relations than complexes of heads.

Puzzle: Why generally **lex<func**?

(Sometimes more features, but more abstract in other ways...)

Conclusion: Diverse methods ⇒ unified theory

E.g. quantitative, parsimonious X2L models

Ingredients:
- Linguistically motivated grammar
- Math: alternative notations, parsing options
- Psych: performance/production model
- Corpus validation

Insight: emergent tendencies, clearer and testable

(Struc) Mixing sensitive to cat, deps

(*Mix,Asym) Avoid mixing; L1/L2 freqs $\neq$ L2/L1

(Freq) N$<$V, S$<$DO,...

(Vary) mixing rate $\propto$ ling/non-ling factors

Questions: sharpened but still hard

- (Vary) how do mixing rates vary with context?
- (Borrow) which fusion, relexification,...?

Thanks Jaime Daza, Roger Andersen, Olga Yokoyama, Hilda Koopman, Ed Keenan. See Quechua site http://wp.cdh.ucla.edu/quechua/, in progress!

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