



## Motivation

**Goal:** Probe grammatical annotation for learner language

- ▶ Support work on POS tagging & syntactic parsing
- ▶ Support investigation of features for SLA, NLI, proficiency classification

**Contributions:**

- ▶ Present scheme for dependencies, integrated with other annotation layers
- ▶ Test inter-annotator agreement for this scheme

## Annotation Scheme

**Perspective:** annotate as closely as possible to learner production

(1) Now I take very hard my personal stuffs.

⇒ Target form annotation could obscure grammatical properties of the production, e.g., pluralizing a mass noun

### Initial Annotation Layers

1. LEMMA: orthographic/phonetic variants (*excercise* → *exercise*)
2. MORPHOLOGICAL POS: form-based (VV0: *After to start ...*)
3. DISTRIBUTIONAL POS: context-based (VV: *After to start ...*)
4. LEXICAL VIOLATIONS: when nothing else fits for syntactically ungrammatical forms (*I agree \*about me ...*)

### Dependencies

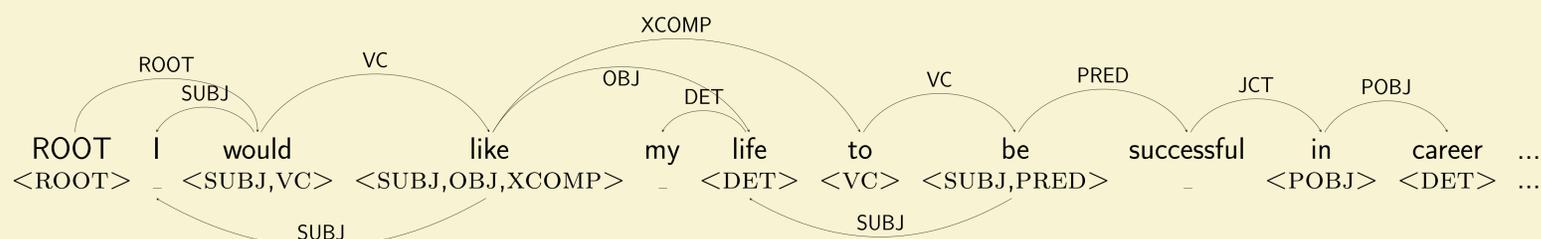
1. MORPHOSYNTACTIC DEPENDENCIES: what is realized?
2. SUBCATEGORIZATION: what is required?  
⇒ Layers model argument structure (e.g., missing argument)

## Evaluation

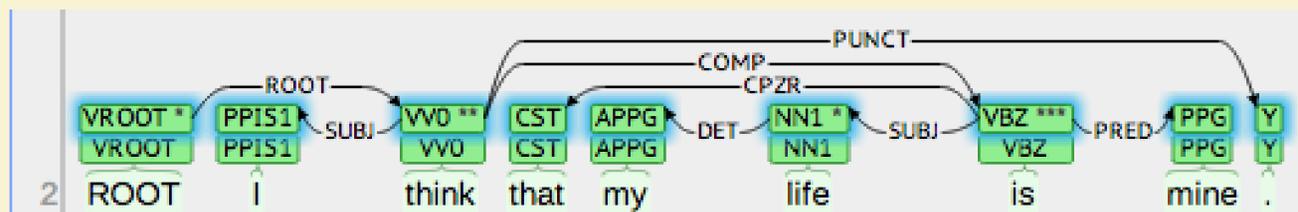
- ▶ **Unlabeled Attachment Agreement (UAA)**
- ▶ **Labeled Attachment Agreement (LAA)**
- ▶ **Label Only Agreement (LOA)**

For dependencies & subcategorization, we use **set-valued** metrics

## Morphosyntactic tree



## Annotation Interface



## Inter-annotator Agreement Study

### Text selection

- ▶ Paragraph excerpts from 3 levels of proficiency
- ▶ Text 1: 19 sentences (333 tokens)
- ▶ Text 2: 22 sentences (271 tokens)

### Annotators

- ▶ 3 undergraduates at IU, trained over one semester
- ▶ Annotated & made detailed notes

### Guidelines

- ▶ ~100 pages outlining general principles, layers, & examples

### Task

- Phase 1: Text 1 annotated, Text 2 annotated
- Phase 2: Individual modifications
- Phase 3: Individual modifications, based on pairwise disagreements
- Phase 4: Annotator meeting, followed by individual modifications

⇒ No feedback from researchers

	Text 1				Text 2			
	Time	Avg.	Min.	Max.	Time	Avg.	Min.	Max.
A	224	11.8	3	25	151	6.9	2	21
B	280	14.7	4	30	170*	8.5	3	20
C	480	25.3	8	60	385	17.5	10	45

## Results

### Bird's eye view

Annotators	lemma		POS <sub>m</sub>		POS <sub>d</sub>		Subcat.		UAA		LAA	
	P2	P4	P2	P4	P2	P4	P2	P4	P2	P4	P2	P4
A, B	93.4	96.9	99.0	98.7	99.2	98.7	85.5	94.0	86.6	97.0	80.0	95.2
B, C	94.4	97.7	99.0	99.5	98.7	99.3	86.1	95.7	86.7	97.1	80.3	96.0
C, A	92.4	96.9	99.7	99.7	98.5	99.3	86.1	96.6	86.9	97.7	82.4	96.7

### Dependencies, Text 1

Ann.	UAA		LAA		LOA	
	P2	P4	P2	P4	P2	P4
A, B	81.8	96.1	73.6	93.4	80.3	95.5
B, C	80.9	96.2	73.4	94.4	79.3	97.1
A, C	83.6	97.6	79.7	96.7	81.8	97.9

### Dependencies, Text 2

Ann.	UAA		LAA		LOA	
	P2	P4	P2	P4	P2	P4
A, B	92.6	98.1	87.8	97.4	89.3	97.8
B, C	93.8	98.3	88.7	97.9	90.2	98.6
A, C	90.9	97.9	85.7	96.8	87.6	97.9

## Qualitative notes

▶ **Syntactic complexity meets learner innovations:**

(2) My most important goals are **pursuing** the profession **to be** a top marketing manager and then **to earn** a lot of money to buy a beautiful house and a good car .

▶ **Under-annotation:** subcategorization & verb raising

▶ **Annotation clarifications:** lexical violations