

On the Interface between Grammatical Analysis and Semantic Interpretation

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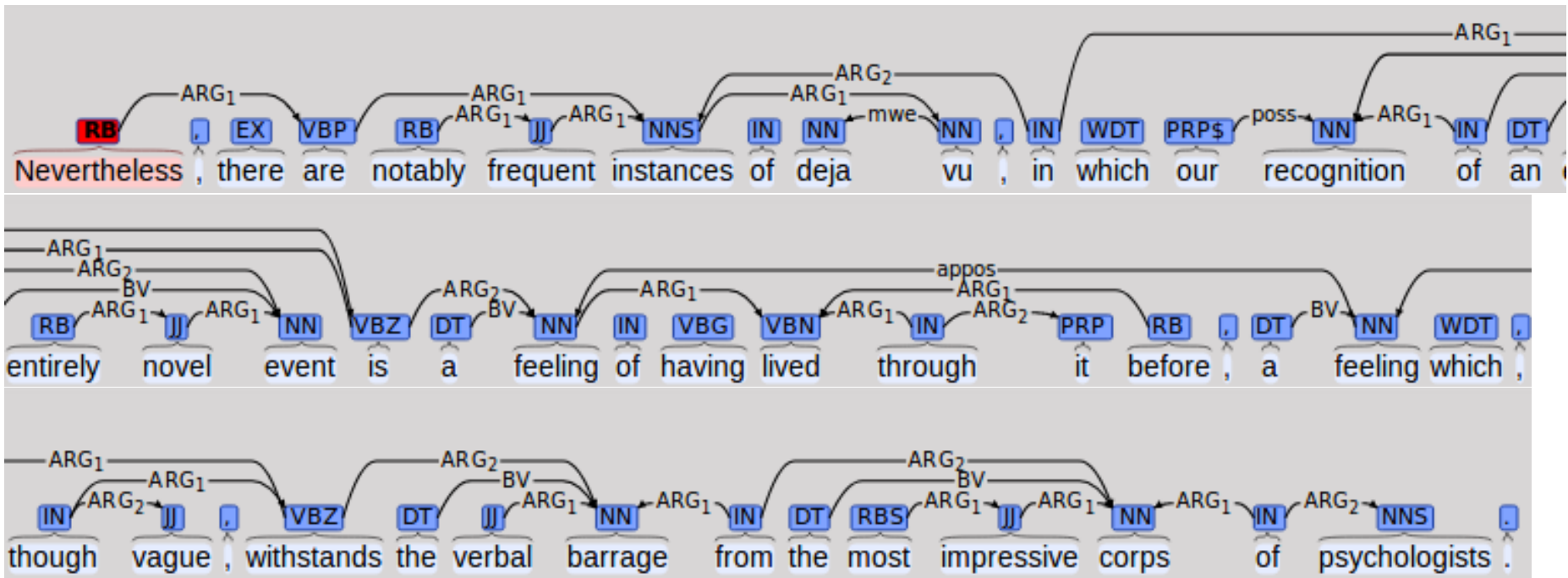
Assumptions shared with some

- Broad-coverage analysis of naturally occurring text
- Eventuality argument in (almost) all predications
- Composition as unification of variables (plus union of preds)



An example from the Brown corpus

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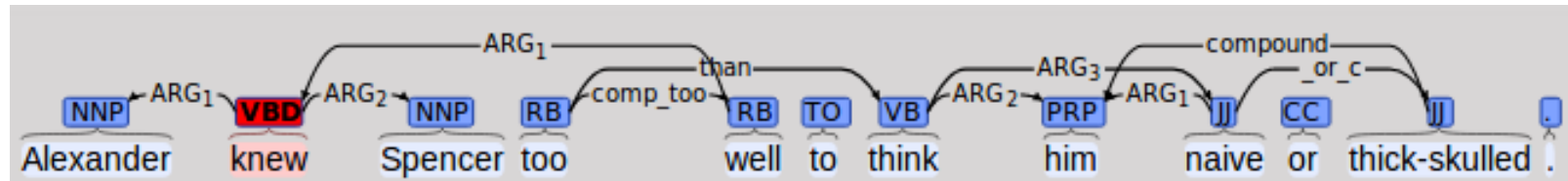
e5:

e5:_nevertheless_a_1(0:13)[ARG1 e3]
e3:_be_v_there(20:23)[ARG1 x7]
_1:udef_q(24:272)[BV x7]
e12:_notable_a_1(24:31)[ARG1 e13]
e13:_frequent_a_1(32:40)[ARG1 x7]
x7:_instance_n_of(41:50)[ARG1 x14]
_2:udef_q(54:62)[BV x14]
x14:_deja+vu_n_1(54:62)[]
e19:_in_p_state(63:65)[ARG1 e20, ARG2 x7]
_3:def_explicit_q(72:75)[BV x23]
e27:poss(72:75)[ARG1 x23, ARG2 x26]
_4:pronoun_q(72:75)[BV x26]
x26:pron(72:75)[]
x23:_recognition_n_1(76:87)[]
e32:_of_p(88:90)[ARG1 x23, ARG2 x33]
_5:_a_q(91:93)[BV x33]
e38:_entire_a_1(94:102)[ARG1 e39]
e39:_novel_a_1(103:108)[ARG1 x33]
x33:_event_n_item(109:114)[]
e20:_be_v_id(115:117)[ARG1 x23, ARG2 x40]
e42:appos(118:272)[ARG1 x40, ARG2 x41]
_6:_a_q(118:119)[BV x40]
x40:_feeling_n_of(120:127)[ARG1 x47]

_7:udef_q(131:162)[BV x47]
x47:nominalization(131:162)[ARG1 e53]
e53:_live_v_1(138:143)[]
e55:_through_p_dir(144:151)[ARG1 e53, ARG2 x56]
x56:pron(152:154)[]
_8:pronoun_q(152:154)[BV x56]
e61:_before_p(155:162)[ARG1 e53]
_9:_a_q(163:164)[BV x41]
x41:_feeling_n_of(165:172)[]
e68:_though_x(180:186)[ARG1 e74, ARG2 e72]
e72:_vague_a_1(187:193)[]
e74:_withstand_v_1(194:204)[ARG1 x41, ARG2 x75]
_10:_the_q(205:208)[BV x75]
e80:_verbal_a_1(209:215)[ARG1 x75]
x75:_barrage_n_1(216:223)[]
e81:_from_p(224:228)[ARG1 x75, ARG2 x82]
_11:_the_q(229:232)[BV x82]
e88:superl(233:237)[ARG1 e87]
e87:_impressive_a_1(238:248)[ARG1 x82]
x82:_corps_n_1(249:254)[]
e89:_of_p(255:257)[ARG1 x82, ARG2 x90]
_12:udef_q(258:272)[BV x90]
x90:_psychologist_n_1(258:272)[]

A second example from Brown

Alexander knew Spencer too well to think him naive or thick-skulled.



e3:

_1:proper_q(0:9)[BV x6]

x6:named(0:9)("Alexander")[]

e3:_know_v_1(10:14)[ARG1 x6, ARG2 x9]

_2:proper_q(15:22)[BV x9]

x9:named(15:22)("Spencer")[]

e16:comp_too(23:26)[ARG1 e15, ARG2 e17]

e15:_well_a_1(27:31)[ARG1 e3]

e17:_think_v_1(35:40)[ARG2 x19, ARG3 e28]

x19:pron(41:44)[]

_3:pronoun_q(41:44)[BV x19]

e26:_naive_a_1(45:50)[ARG1 x19]

e28:_or_c(51:53)[L-HNDL e26, L-INDEX e26, R-HNDL e30, R-INDEX e30]

e30:compound(54:68)[ARG1 x19, ARG2 x31]

_4:udef_q(54:68)[BV x31]

e36:_thick_a_1(54:67)[ARG1 x31]

x31:_skull_n_1(54:68)[]

Some desiderata

- Meaning-preserving semantic composition
- Every morpheme and punctuation mark is analyzed
- Dispreference for words with spaces
 - But some surely exist: *ad hoc, in spite of*
- Bidirectional grammar: generation as well as parsing



Complications in composition

- Semantically empty morphemes
- Constructional contributions to semantics
- Lexical semantics decomposition



Semantically empty morphemes

- Auxiliary **do** as in *When do they leave?* (tense only)
- Copula **be** as in *They are leaving* (tense/aspect only)
- Auxiliary **have** as in *They have left* (tense/aspect only)
- Future **will** as in *They will leave* (tense only)
- Infinitival **to** as in *They tried to leave*
- Complementizer **that** as in *We knew that they snored*
- Particle of verb-particles, as in *we looked the answer up*
- Expletive pronouns **it, there**
- Relative pronoun **that** as in *the book that we found*
- Comparative marker **than** as in *older house than ours*
- Correlative conjunctions as in **neither you nor I**



Constructionally supplied predications

- Compounds (underspecified two-place relation)
- Appositives (analogous to non-restrictive relative clause)
- Nominal gerunds (two-place relation) *the cleaning of the room*
- Instrumental relatives: *some money to go to the movies*
- Nominal adverbials: *We arrived the day they left*
- Absolutives: *We sneaked out, you still droning on*
- Possessive partitives: *that book's is leather*
- Vocatives: *My friend, you should disappear*
- Indefinite adverbials: *She arrived in this country a pauper*
- Implicit conjunction: *They serve fish, meat, pasta*



Lexical semantics decomposition

- Quantified pronominals *everyone, somebody, nowhere, none*
- Possessive determiners *his, my*: quant plus 2-place poss
- Possessive pronouns *ours, hers*: pro plus 2-place poss
- Negative contractions *mustn't, can't*
- Nominal adverbials *here, now*: “this place, this time”
- Comparatives/superlatives *taller, oldest, faster*
- WH-words *who, what, where, how, why, whose*
- Adjectival determiners *next week, last month*

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- WH-words *who, what, where, how, why, whose*
- Adjectival determiners *next week, last month*
- (Semi-)productive morphology
 - Agentive nouns *runner, mover*
 - Denominal adjectives *long eared, bright eyed*
 - Verb prefixes *outrun, unlock, retie*
 - Adjective prefixes *unhappy, non-compliant*
 - Noun prefixes *co-creator, counter-insurgency*

Issues

- Do nominalizations ever need an additional predication?
- When should deverbal nouns have decomposed semantics?
- Should nouns introduce thematic roles?
- How many quantifiers should we have?

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Verbal gerunds: *Him bringing up that idea surprised us*

Nominal gerunds: *No recent sinking of ships was reported*

Frozen nominals: *Rome's destruction by the barbarians*

Opaque nominals: *Frequent bequests of money to the library*

Verbal projections: *To write journal papers is important*

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- When should deverbal nouns have decomposed semantics?
- Should nouns introduce thematic roles?
- How many quantifiers should we have?
their, these, six, enough, either, many a