Comparing Alternatives

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An account for

- discourse anaphoric comparatives

  "Mary read 10 books. John read *more*."

- the recurrent ambiguities between comparison, additivity, and continuation

  "Please, sir," replied Oliver, "I want some *more*."

- explicit comparative constructions

  "John is *more* tolerable than Mary."

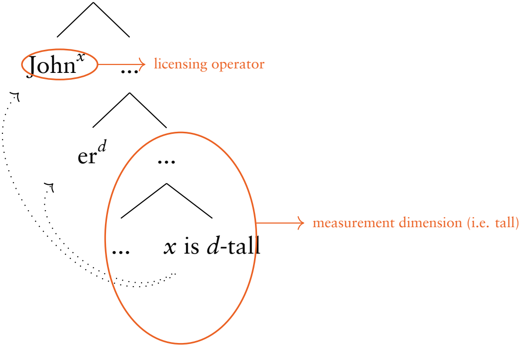
- the internal readings of comparatives

  "Linus was getting *more* morose every day."

A new, unified comparative meaning

that compares structurally derived alternatives

John exceeds an alternative individual on the dimension of tallness



Comparing ~~degrees~~ alternatives

For the majority of the linguistic literature, comparative constructions express a relation between two degrees:

John's maximal degree of tallness exceeds 5'8" (i.e. Mary's height)

John

is

tall

$\lambda d \lambda x . x$ is d-tall

er

$\lambda d' \lambda g \lambda x.$

$\exists d : gdx \wedge d > d'$

than Mary is d-tall

$5'8''$

Implication on *incomplete comparatives*?

A fair hypothesis is the overt standard is replaced by a degree pro-form:

John's maximal degree of tallness exceeds g_1

John

is

tall

$\lambda d \lambda x . x$ is d-tall

er

$\lambda d' \lambda g \lambda x.$

$\exists d : gdx \wedge d > d'$

g_1

⚠ anaphoric context dependency of comparatives $\neq$ degree anaphora.

- ▷ Sensitivity to negation

(1) John didn't read 10^d books. ...

a. # Mary read more$_d$.

b. Mary read more than that$_d$.

- ▷ Sensitivity to predicate meaning

(2) John criticized^d 10 books. ...

a. He ? read / ✓ praised more$_d$.

b. He ✓ read / ✓ praised a lot more than that$_d$.

Anaphora to a degree property instead of a single degree?

- ▷ Some analyses within the traditional approach assumes the standard argument of *er* is a degree property.
- ⚠ No independent evidence to support the idea that a degree property antecedent is not available in (1) and (2).

Ellipsis instead of anaphora?

- ▷ 10 λd [John read *d*-many books] ... Mary read more ~~than~~ John read *d*-many books
- ▷ May explain (2a) using the general parallelism constraint for ellipsis.
- ⚠ ellipsis is not sensitive to negation:
  John didn't read the book. ... Mary did read the book.

Proposal: Anaphoric comparatives compare two things of the same type (i.e. two alternatives) on the given measurement dimension (cf. Heim 1985, Bhatt & Takahashi 2007)

John

$\mathrm{er}_{d',y}$

$$\lambda f \lambda x . \frac{d' = \max(\{d \mid fdy\}).}{\max(\{d \mid fdx\}) > d'}$$

λd

λx $\quad$ x is d-tall

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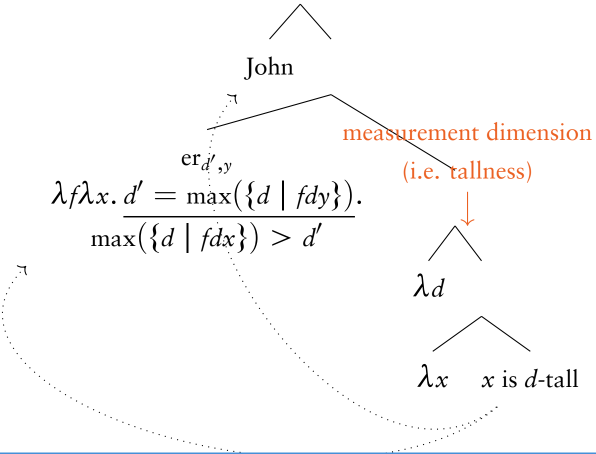

Proposal: Anaphoric comparatives compare two things of the same type (i.e. two alternatives) on the given measurement dimension (cf. Heim 1985, Bhatt & Takahashi 2007)

$$\underline{d' = \max(\{d \mid \text{tall}(d, y)\})}.\; \max(\{d \mid \text{tall}(d, \text{john})\}) > d'$$

John

$\text{er}_{d',y}$

$$\lambda f \lambda x.\, \underline{d' = \max(\{d \mid fdy\})}.\; \max(\{d \mid fdx\}) > d'$$

measurement dimension

(i.e. tallness)

λd

λx x is d-tall

er may be licensed by any scope-takers in the sentence, generating a comparison about the variables they bind:

(3) Mary^{y} is 6 ft$^{d'}$ tall. ... Today I finally met a taller$_{d',y}$ woman. $\rightsquigarrow$
$\big[\, \text{a} \,\big[\, \text{er}_{d',y}\ \lambda x \lambda d \,\big[\, x \big[\, d\text{-tall woman} \,\big]\big]\big]$ determiner

(4) John criticized^{P} five$^{d'}$ books. ... He PRAISED more$_{d',P}$. $\rightsquigarrow$
$\big[\, \text{PRAISED} \ \big[\text{er}_{d',P}\ \lambda P \lambda d \,\big[\, d\text{-many books}\ \lambda z \big[\, \text{He}\ P\ z \,\big]\big]\big]$ predicate

(5) This boat is 20 ft$^{d'}$ long. ... I thought it was longer$_{d',w@}$. $\rightsquigarrow$
$\big[\, \text{I thought}_{w@} \ \big[\, \text{er}_{d',w@}\ \lambda w \lambda d \,\big[\, \text{it was}_{w}\ d\text{-long} \,\big]\big]$ intensional Op

(6) John^{y} criticized^{P} five$^{d'}$ books. ... Mary PRAISED more$_{d',P,y}$. $\rightsquigarrow$
$\big[\, \text{Mary} \ \big[\, \text{PRAISED} \,\big[\, \text{er}_{d',P,y}\ \lambda P\ \lambda x\ \lambda d \,\big[\, d\text{-many books}\ \lambda z \big[\, x\ P\ z \,\big]\big]\big]\big]$
multi licensors[1]

[1] Technically, for this we need to adjust the meaning of *er* to a more general one:
$d' = \max(\{d \mid f d y_0 \ldots y_n\}).\lambda f \lambda x_0 \ldots \lambda x_n.\max(\{d \mid f d x_0 \ldots x_n\}) > d'$

The *only* additional constraint this reanalysis adds:

the antecedent degree of an anaphoric comparative must be the measurement of the target alternative on the given dimension.

- Predicts sensitivity to negation

(7) (John^y didn't read $10^{d'}$ books. ...) Mary read more$_{d',y}$.

$$\rightsquigarrow \frac{d' = \max\{d \mid y \text{ read } d\text{-many books}\}.}{\max\{d \mid \text{mary read } d\text{-many books}\} > d'}$$

presupposition failure!

▷ Sensitivity to predicate meanings follows from pragmatic reasoning

(8) Define relevance:

A proposition p is about a subject matter Q iff

$\forall w, w'$ in the context set: $Qww' \rightarrow pw = pw'$ (Lewis 1988)

(9) a. (John^y criticized^P 10$^{d'}$ books. ...) He$_y$ praised more$_{d',P}$.

⇝ John praised more books than criticized.

(about *John's evaluation*)

b. (John^y criticized^P 10$^{d'}$ books. ...) ? He$_y$ read more$_{d',P}$.

⇝ John read more books than criticized. (about ??)

not an obviously relevant proposition!

An alternative analysis (cf. Hardt & Mikkelsen 2015):

er is anaphoric to an *event*, imposing a parallelism constraint between the antecedent event and the event in the containing clause.

- ▷ Sensitivity to negation : event antecedent in the scope of negation is inaccessible.
- ▷ Sensitivity to predicate meanings: criticizing and reading are not parallel events.

⚠ wrongly predicts *adjectival* comparatives have the same pattern.

(10) John read *War and Peace*. ...

a. Mary read more. $> |\text{wp}|$

b. Mary read a longer book. $>$ length of wp

(11) John didn't read *War and Peace*. ...

a. Mary read more. # $> |\text{wp}|$

b. Mary read a longer book. ✓ $>$ length of wp

(12) John criticized *War and Peace*. ...

a. Mary read more. ? $> |\text{wp}|$

b. Mary read a longer book. ✓ $>$ length of wp

Current analysis: a scope difference

- *er* in amount comparatives obligatorily takes scope at the clausal level (Hackl 2000);
- *er* in adjectival comparatives can take scope inside its containing noun phrase: $[\,\mathrm{a}^x[\,\mathrm{er}_{y,d'}\lambda d\lambda x[\,x\ d\text{-long book}\,]\,]\,]$;
- when *er* takes this NP-internal scope:

satisfied by the length of *Emma*

(13) (John didn't read *Emma*^{y}. ...) Mary read a longer$_{d',y}$ book.
$\rightsquigarrow \dfrac{d' = \max\{d \mid y \text{ is } d\text{-long books}\}.}{\exists x : \text{book}x \wedge \text{john read}x \wedge \max\{d \mid x \text{ is } d\text{-long}\} > d'}$

(14) (John criticized *Emma*^{y}. ...) ~~He$_y$ read a longer book~~$_{d',P}$.
$\rightsquigarrow$ John read a book that is longer than *War and Peace*.

about *books' length*

criticized is outside the scope of comparison

Comparative ambiguities

Discourse anaphoric comparatives in English have a different, additive reading in English:

(15) John bought three apples. ... Mary bought more (apples).

a. ⇝ Mary bought more than three apples. comparison

b. ⇝ Mary bought apples, in addition to what John bought. additivity

In German, this additive meaning can be expressed by *noch*, which also has a different, continuative reading:

(16) Otto had **noch** einen Schnapps getrunken.
Otto had *noch* one Schnapps drunk
"Otto had another Schnapps." additivity

(17) Es regnet **noch**.
It raining *noch*
"It is still raining." continuation

Languages like Romanian allow for a *three-way* ambiguitiy.

(18) Ion e **mai** intelligent decat Petre.
John is *mai* intelligent than Petre.
"John is more intelligent than Petre." comparison

(19) Ion va **mai** citi un roman.
John AUX *mai* read a novel
"John will read another nove." additivity

(20) Ion **mai** merge la biblioteca.
John *mai* goes at library.
"John still goes to the library." continuation

Empirical landscape

- Ambiguitities between comparison, additivity, and continuation are attested in a diverse set of languages (e.g. Spanish, Brazilian Portuguese, French, Italian, Modern Hebrew, Russian, ...)
- None of these languages allows for ambiguity between comparison and continuation to the exclusion of additivity.

An analysis?

- Within the traditional approach to comparatives, unclear how to establish any logical connection between these three meanings (cf. Greenberg 2010)
- Previous analysis in Thomas (2018): requires a reanalysis of comparatives based on scale segments (Schwarzschild 2013)

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Both additivity and continuation can be cashed out as alternative comparisons!

Deriving additivity by summing up the alternatives:

$$\frac{d' = \max\{d \mid y \text{ bought } d\text{-many apples}\}.}{\max\{d \mid \text{john bought } d\text{-many apples}\} > d'}$$

$$\text{john}^{u} \qquad \lambda x.\frac{d' = \max\{d \mid y \text{ bought } d\text{-many apples}\}.}{\max\{d \mid x \text{ bought } d\text{-many apples}\} > d'}$$

$$\text{er}_{d',y}$$

$$\lambda d \lambda x \qquad x \text{ bought } d\text{-many apples}$$

(Mary bought three apples. ...) John bought more apples.

$\rightsquigarrow$ John bought more apples than Mary.

Deriving additivity by summing up the alternatives:

john^u

$$\lambda x. d' = \max\{d \mid y \text{ bought } d\text{-many apples}\}. \max\{d \mid x \oplus y \text{ bought } d\text{-many apples}\} > d'$$

ADD$_y$

$$\lambda f \lambda x. f(x \oplus y)$$

$$\lambda x. d' = \max\{d \mid y \text{ bought } d\text{-many apples}\}. \max\{d \mid x \text{ bought } d\text{-many apples}\} > d'$$

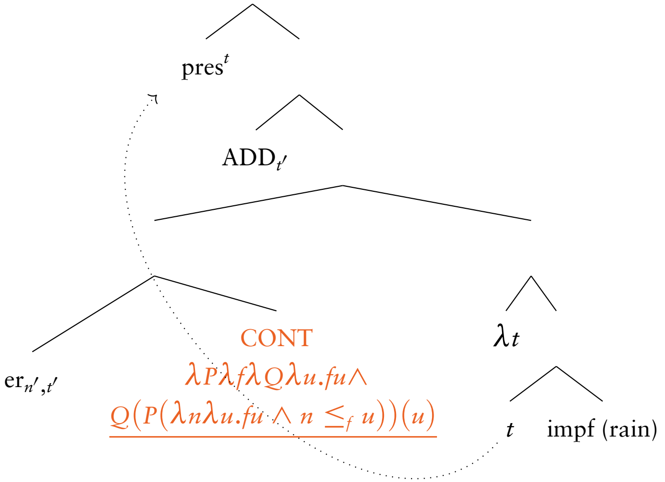
er$_{d',y}$ ...

(Mary bought three apples. ...) John bought more apples.

$\rightsquigarrow$ John and Mary bought more apples than Mary alone.

Deriving continuation as a presupposed additive comparison:

$$\text{impf}(\text{rain})(\text{pres}) \wedge \underline{\text{ADD}_{t'}(\text{er}_{n',t'}(\lambda n \lambda t.\text{impf}(\text{rain})t \wedge n \leq_{\text{impf}(\text{rain})} t))(\text{pres})}$$



$$\mathrm{ADD}_{t'}\left(\mathrm{er}_{n',t'}\left(\lambda n \lambda t.\mathrm{impf}(\mathrm{rain})t \wedge n \leq_{\mathrm{impf}(\mathrm{rain})} t\right)\right)(\mathrm{pres})$$[2]

$$= \frac{n' = \max\left\{n \middle| \mathrm{impf}(\mathrm{rain})t' \wedge n \leq_{\mathrm{impf}(\mathrm{rain})} t'\right\}.}{\max\left\{n \middle| \mathrm{impf}(\mathrm{rain})(\mathrm{pres} \oplus t') \wedge n \leq_{\mathrm{impf}(\mathrm{rain})} (\mathrm{pres} \oplus t')\right\} > n'}$$

[2] $n \leq_f u := fu \models_c fn$; for any two propositions p, q, $p \models_c q$ iff $\forall w \in c : pw \rightarrow qw$.

$\lambda t.\exists e : \mathrm{rain}e \wedge t \subseteq \tau(e)$

$\mathrm{ADD}_{t'}\left(\mathrm{er}_{n',t'}\left(\lambda n \lambda t.\mathrm{impf}(\mathrm{rain})t \wedge n \leq_{\mathrm{impf}(\mathrm{rain})} t\right)\right)(\mathrm{pres})$[2]

$= \underline{n' = \max\left\{n \middle| \mathrm{impf}(\mathrm{rain})t' \wedge n \leq_{\mathrm{impf}(\mathrm{rain})} t'\right\}.}$

$\max\left\{n \middle| \mathrm{impf}(\mathrm{rain})(\mathrm{pres} \oplus t') \wedge n \leq_{\mathrm{impf}(\mathrm{rain})} (\mathrm{pres} \oplus t')\right\} > n'$

$= \underline{n' = \max\left\{n \middle| \exists e : \mathrm{rain}e \wedge t' \subseteq \tau(e) \wedge n \text{ is a subinterval of } t'\right\}}.\max$

$\left\{n \middle| \exists e : \mathrm{rain}e \wedge (\mathrm{pres} \oplus t') \subseteq \tau(e) \wedge n \text{ is a subinterval of } (\mathrm{pres} \oplus t')\right\} > n'$

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$n \preceq_{\lambda t.\exists e:\text{rain}e \wedge t \subseteq \tau(e)} t$

$$\text{ADD}_{t'}\left(\text{er}_{n',t'}\left(\lambda n \lambda t.\text{impf}(\text{rain})t \wedge n \preceq_{\text{impf}(\text{rain})} t\right)\right)(\text{pres})^{2}$$

$$= \underline{n' = \max\left\{n \middle| \text{impf}(\text{rain})t' \wedge n \preceq_{\text{impf}(\text{rain})} t'\right\}}.$$

$$\max\left\{n \middle| \text{impf}(\text{rain})(\text{pres} \oplus t') \wedge n \preceq_{\text{impf}(\text{rain})} (\text{pres} \oplus t')\right\} > n'$$

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$\exists e : \text{rain}e \wedge t \in \tau(e) \models_c \exists e : \text{rain}e \wedge n \subseteq \tau(e)$

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n is a sub-interval of t

$\mathrm{ADD}_{t'}\left(\mathrm{er}_{n',t'}\left(\lambda n \lambda t.\mathrm{impf}(\mathrm{rain})t \wedge n \leq_{\mathrm{impf(rain)}} t\right)\right)(\mathrm{pres})$[2]

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- ▷ Assertion: it is raining now.
- ▷ Presupposition: the raining has continued from an earlier time t'.
- ▷ Implicature: the speaker can't assert that the rain will continue to a time later than now.

Distributed Morphology (Halle & Marantz 1993):

- The terminals of syntactic structures are **morphemes**: sets of features without phonological content.
- **Subset Principle**: a morpheme, i.e. a set of features, is spelt out by the lexical item that matches its greatest subset of features (Halle 2000).

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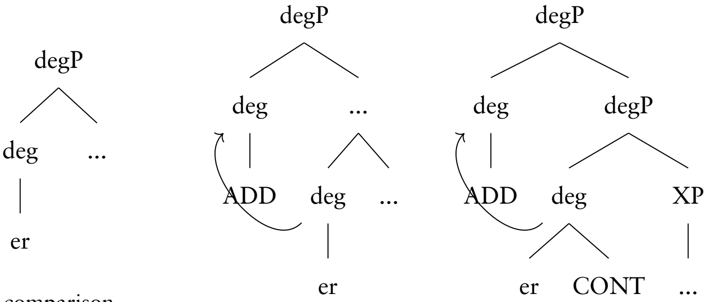

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(b) additivity

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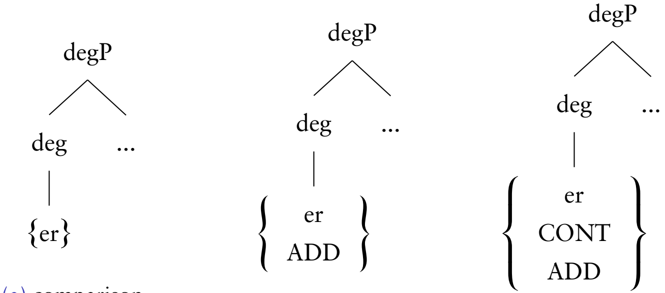

(a) comparison

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(c) continuation

Generating the typological distribution:

Comp./Add. | Cont.	English: $\{er\} \leftrightarrow$ er, $\{er, CONT, ADD\} \leftrightarrow$ still
Comp. | Add./Cont.	German: $\{er\} \leftrightarrow$ mehr, $\{er, ADD\} \leftrightarrow$ noch
Comp. /Add. /Cont.	Romanian: $\{er\} \leftrightarrow$ mai
Comp. | Add. | Cont.	Vietnamese: $\{er\} \leftrightarrow$ hon, $\{er, ADD\} \leftrightarrow$ nūa, $\{er, CONT, ADD\} \leftrightarrow$ van

Explaining the implicational universal:

- α is the phonological realization of both $\{er\}$ and $\{er, CONT, ADD\}$
  $\rightarrow \alpha$ is the item matching the biggest subset of $\{er, ADD\}$
- i.e. Comparison/Continuation $\rightarrow$ Comparison/Additivity/Continuation

Explicit comparatives

Main idea: explicit and (discourse) anaphoric comparatives only differ in the binder of *er*'s implicit arguments.

- Anaphoric comparatives: discourse antecedents:

(21) John read 10 books. ... Mary read more$_{d',y}$.

- Explicit comparatives: semantic objects in the *than*-P:

(22)
$$[[\text{John}[\text{er}_{y,d'}\lambda d\lambda x[x \text{ is } d\text{-tall}]]][\text{than}[\text{Op}^{d''}\lambda d''[\text{Mary is } d''\text{-tall}]]]]$$

Implementation is possible in dynamic semantics.

Dynamic *er*:

$$(23)\quad \mathbf{er}^{m,n}_{n',u'} := \lambda f \lambda u.\mathbf{max}^{m}\big(fmu'\big); \mathbf{max}^{n}\big(fnu\big); n > m; \underline{m = n'}$$

Discourse anaphoric comparatives in dynamic semnatics:

Dynamic *er*:

$$(23)\quad \mathbf{er}^{m,n}_{n',u'} := \lambda f \lambda u.\mathbf{max}^{m}\big(fmu'\big); \mathbf{max}^{n}\big(fnu\big); n > m; \underline{m = n'}$$

Discourse anaphoric comparatives in dynamic semnatics:

$$u \rightarrow \mathrm{j}; \mathbf{max}^{m}\big(\mathbf{tall}(m, u')\big); \mathbf{max}^{n}\big(\mathbf{tall}(n, u)\big); n > m; \underline{m = n'}$$

$$\mathbf{John}^{u} \qquad \lambda u.\mathbf{max}^{m}\big(\mathbf{tall}(m, u')\big); \mathbf{max}^{n}\big(\mathbf{tall}(n, u)\big); n > m; \underline{m = n'}$$

$$\mathbf{er}^{m,n}_{n',u'}$$

$$\lambda n \lambda u \qquad u \textbf{ is } n\textbf{-tall}$$

Dynamic *er*:

(23) $\mathbf{er}^{m,n}_{n',u'} := \lambda f \lambda u.\mathbf{max}^m(fmu'); \mathbf{max}^n(fnu); n > m; \underline{m = n'}$

Discourse anaphoric comparatives in dynamic semnatics:

$$u \rightarrow \mathrm{j}; \mathbf{max}^m(\mathbf{tall}(m, u')); \mathbf{max}^n(\mathbf{tall}(n, u)); n > m; \underline{m = n'}$$

Dynamic *er*:

(23) $$\mathbf{er}^{m,n}_{n',u'} := \lambda f \lambda u.\mathbf{max}^{m}(fmu'); \mathbf{max}^{n}(fnu); n > m; \underline{m = n'}$$

Discourse anaphoric comparatives in dynamic semnatics:

$$u \rightarrow \mathrm{j}; \mathbf{max}^{m}(\mathbf{tall}(m, u')); \mathbf{max}^{n}(\mathbf{tall}(n, u)); n > m; \underline{m = n'}$$

u'	n'
mary	$\mathrm{d_m}$

$\dashrightarrow$

u'	n'	u
mary	$\mathrm{d_m}$	john

Dynamic *er*:

$$(23) \quad \mathbf{er}^{m,n}_{n',u'} := \lambda f \lambda u.\mathbf{max}^{m}\big(fmu'\big); \mathbf{max}^{n}\big(fnu\big); n > m; \underline{m = n'}$$

Discourse anaphoric comparatives in dynamic semnatics:

$$u \rightarrow \mathrm{j}; \mathbf{max}^{m}\big(\mathbf{tall}\big(m, u'\big)\big); \mathbf{max}^{n}\big(\mathbf{tall}\big(n, u\big)\big); n > m; \underline{m = n'}$$

u'	n'
mary	$\mathrm{d_m}$

$\dashrightarrow$

u'	n'	u
mary	$\mathrm{d_m}$	john

$\dashrightarrow$

u'	n'	u	m
mary	$\mathrm{d_m}$	john	$\mathrm{d_m}$

Dynamic *er*:

(23) $\mathbf{er}^{m,n}_{n',u'} := \lambda f \lambda u.\mathbf{max}^{m}(fmu'); \mathbf{max}^{n}(fnu); n > m; \underline{m = n'}$

Discourse anaphoric comparatives in dynamic semnatics:

$$u \rightarrow \mathrm{j}; \mathbf{max}^{m}(\mathbf{tall}(m, u')); \mathbf{max}^{n}(\mathbf{tall}(n, u)); n > m; \underline{m = n'}$$

$$\begin{array}{||c|c|}\hline u' & n' \\ \hline \text{mary} & \mathrm{d_m} \end{array} \dashrightarrow \begin{array}{||c|c|c|}\hline u' & n' & u \\ \hline \text{mary} & \mathrm{d_m} & \text{john} \end{array} \dashrightarrow \begin{array}{||c|c|c|c|}\hline u' & n' & u & m \\ \hline \text{mary} & \mathrm{d_m} & \text{john} & \mathrm{d_m} \end{array} \dashrightarrow \begin{array}{||c|c|c|c|c|}\hline u' & n' & u & m & n \\ \hline \text{mary} & \mathrm{d_m} & \text{john} & \mathrm{d_m} & \mathrm{d_j} \end{array}$$

Dynamic *er*:

$$(23) \quad \mathbf{er}^{m,n}_{n',u'} := \lambda f \lambda u.\mathbf{max}^m(fmu'); \mathbf{max}^n(fnu); n > m; \underline{m = n'}$$

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$$\begin{array}{||c|c|}\hline u' & n' \\ \hline \text{mary} & \mathrm{d_m} \end{array} \dashrightarrow \begin{array}{||c|c|c|}\hline u' & n' & u \\ \hline \text{mary} & \mathrm{d_m} & \text{john} \end{array} \dashrightarrow \begin{array}{||c|c|c|c|}\hline u' & n' & u & m \\ \hline \text{mary} & \mathrm{d_m} & \text{john} & \mathrm{d_m} \end{array} \dashrightarrow \begin{array}{||c|c|c|c|c|}\hline u' & n' & u & m & n \\ \hline \text{mary} & \mathrm{d_m} & \text{john} & \underbrace{\mathrm{d_m} & \mathrm{d_j}}_{n > m} \end{array}$$

Dynamic *er*:

$$(23) \quad \mathbf{er}^{m,n}_{n',u'} := \lambda f \lambda u.\mathbf{max}^{m}(fmu'); \mathbf{max}^{n}(fnu); n > m; \underline{m = n'}$$

Discourse anaphoric comparatives in dynamic semnatics:

$$u \rightarrow \text{j}; \mathbf{max}^{m}(\mathbf{tall}(m, u')); \mathbf{max}^{n}(\mathbf{tall}(n, u)); n > m; \underline{m = n'}$$

u'	n'
mary	d_m

$\dashrightarrow$

u'	n'	u
mary	d_m	john

$\dashrightarrow$

u'	n'	u	m
mary	d_m	john	d_m

$\dashrightarrow$

u'	n'	u	m	n
mary	d_m	john	d_m	d_j

$n > m$

$m = n'$ (else undefined)

Interpreting explicit comparatives requires interpreting the *than*-clause first before the anaphoric resolution.

- **Solution 1:** *than* switches the interpretation order between the matrix comparative clause and the *than*-clause.

$$u' \to \mathrm{m};\ \mathbf{max}^{n}\big(\mathbf{tall}(n', u')\big);$$

$$u \to \mathrm{j};\ \mathbf{max}^{m}\big(\mathbf{tall}(m, u')\big); \mathbf{max}^{n}\big(\mathbf{tall}(n, u)\big); n > m; \underline{m = n'}$$

$$\textbf{john}^{u}\ (\textbf{er}^{m,n}_{n',u'}\ (\lambda n \lambda u.u \textbf{ is } n\textbf{-tall})\ )$$

$$\underset{\lambda p \lambda q.q; p}{\textbf{than}} \qquad \textbf{mary}^{u'}\big(\lambda u'.\textbf{Op}^{n'}\big(\lambda n'.u' \textbf{ is } n'\textbf{-tall}\big)\big)$$

▷ **Solution 2**: the anaphoric resolution is a *postsupposition* (i.e. a dynamic test that can be delayed to the end of the sentence interpretation; see Brasoveanu 2012, Charlow 2016, a.o.)

(24) $\mathbf{er}^{v,m,n}_{n',u'} := \lambda f \lambda u.\exists v; \mathbf{max}^{m}(fmv); \mathbf{max}^{n}(fnu); n > m; \overline{\overline{v=u', m=n'}}$

$$u \to \mathrm{j}; \exists v;\ \mathbf{max}^{m}(\mathbf{tall}(m,v)); \mathbf{max}^{n}(\mathbf{tall}(n,u)); n > m; \overline{\overline{v=u', m=n'}};$$
$$u' \to \mathrm{m}; u' = v; \mathbf{max}^{n}(\mathbf{tall}(n',u'))$$

$\mathbf{john}^{u}$ ($\mathbf{er}^{m,n}_{n',u'}$ ($\lambda n \lambda u.u$ **is** n**-tall**))

than $\quad$ $\mathbf{mary}^{u'}(\lambda u'.\mathbf{Op}^{n'}_{u',v}(\lambda n'.u'$ **is** n'**-tall**$))$[3]

[3] $\mathbf{Op}^{n'}_{u',v} = \lambda f.u' = v; \mathbf{max}^{n'}(fn')$.

- **Solution 2**: the anaphoric resolution is a *postsupposition*
  (i.e. a dynamic test that can be delayed to the end of the sentence interpretation).

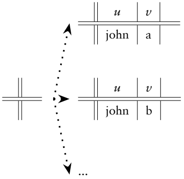
$$u \to \mathrm{j}; \exists v;\ \mathbf{max}^m(\mathbf{tall}(m, v)); \mathbf{max}^n(\mathbf{tall}(n, u)); n > m; \underline{{}^{v=u', m=n'}}\,;$$
$$u' \to \mathrm{m}; u' = v; \mathbf{max}^n(\mathbf{tall}(n', u'))$$

- **Solution 2**: the anaphoric resolution is a *postsupposition* (i.e. a dynamic test that can be delayed to the end of the sentence interpretation).

$$u \to \mathrm{j};\, \exists v;\ \mathbf{max}^m(\mathbf{tall}(m, v));\, \mathbf{max}^n(\mathbf{tall}(n, u));\, n > m;$$
$$u' \to \mathrm{m};\, u' = v;\, \mathbf{max}^n(\mathbf{tall}(n', u'));\underline{{}_{v=u',m=n'}}$$

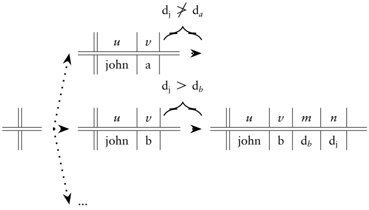
- ▷ **Solution 2:** the anaphoric resolution is a *postsupposition* (i.e. a dynamic test that can be delayed to the end of the sentence interpretation).

$$\begin{gathered}\color{orange}{u \rightarrow \mathrm{j}; \exists v;}\ \mathbf{max}^m(\mathbf{tall}(m, v)); \mathbf{max}^n(\mathbf{tall}(n, u)); n > m;\\ u' \rightarrow \mathrm{m}; u' = v; \mathbf{max}^n(\mathbf{tall}(n', u'));_{\underline{v=u', m=n'}}\end{gathered}$$



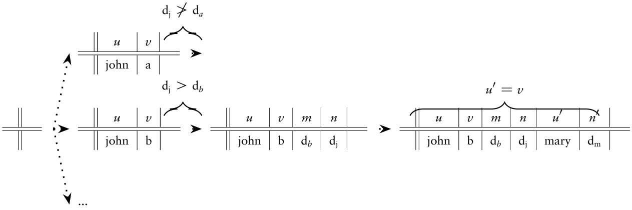
▷ **Solution 2:** the anaphoric resolution is a *postsupposition* (i.e. a dynamic test that can be delayed to the end of the sentence interpretation).

$$u \rightarrow \mathrm{j};\, \exists v;\ \mathbf{max}^m(\mathbf{tall}(m, v));\, \mathbf{max}^n(\mathbf{tall}(n, u));\, n > m;$$
$$u' \rightarrow \mathrm{m};\, u' = v;\, \mathbf{max}^n(\mathbf{tall}(n', u'));\underline{{}^{v=u',m=n'}}$$



▷ **Solution 2:** the anaphoric resolution is a *postsupposition* (i.e. a dynamic test that can be delayed to the end of the sentence interpretation).

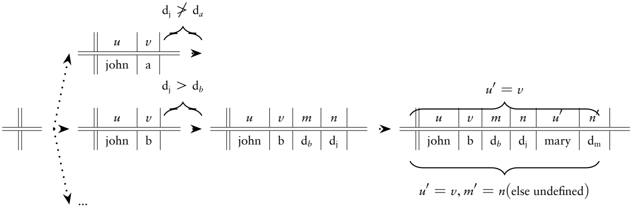
$$u \rightarrow \mathrm{j};\ \exists v;\ \mathbf{max}^{m}(\mathbf{tall}(m, v));\ \mathbf{max}^{n}(\mathbf{tall}(n, u));\ n > m;$$
$$u' \rightarrow \mathrm{m};\ u' = v;\ \mathbf{max}^{n}(\mathbf{tall}(n', u'));\underline{{}^{v=u', m=n'}}$$



▷ **Solution 2:** the anaphoric resolution is a *postsupposition*

(i.e. a dynamic test that can be delayed to the end of the sentence interpretation).

$$u \rightarrow \mathrm{j};\, \exists v;\ \mathbf{max}^{m}\big(\mathbf{tall}(m, v)\big);\, \mathbf{max}^{n}\big(\mathbf{tall}(n, u)\big);\, n > m;$$
$$u' \rightarrow \mathrm{m};\, u' = v;\, \mathbf{max}^{n}\big(\mathbf{tall}(n', u')\big);\underline{\scriptstyle v=u',m=n'}$$



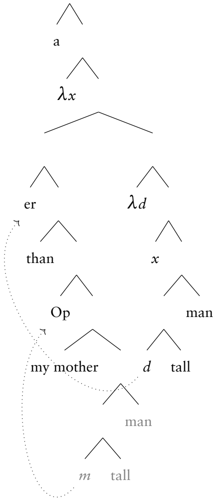
New solutions for some classical issues in comparative semantics.

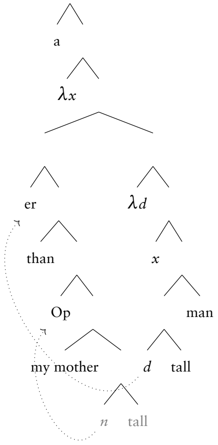
Issue 1: the inference of attributive comparatives.

(25) I have never seen a man taller than my mother. ✓

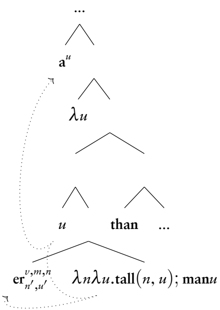
(26) I have never seen a taller man than my mother.
$\rightsquigarrow$ my mother is a man ??

Traditional comparative semantics: both resolutions below are predicted possible; no explanation for the inference in (26).

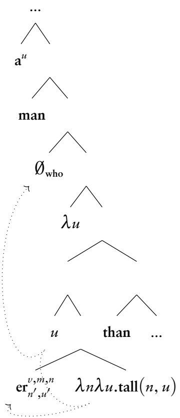




Current analysis: (25) and (26) differ in the scope of comparison.



(a) *a taller man than my mother*
⇝ a comparison between two men,
the target of which is my mother



(b) *a man taller than my mother*
⇝ a comparison between two individuals, the target of which is my mother

Issue 2: interpretation of *than*-clause internal quantifiers.

(27) John is taller than some girl is.

a. $\rightsquigarrow \exists x : \text{girl}x \wedge \text{John's height} > \max \left\{ d \mid x \text{ is } d\text{-tall} \right\}$

b. $\not\rightsquigarrow$ John's height > $\max \left\{ d \mid \exists x : \text{girl}x \wedge x \text{ is } d\text{-tall} \right\}$

(28) John is taller than every girl is.

a. $\rightsquigarrow \forall x : \text{girl}x \wedge \text{John's height} > \max \left\{ d \mid x \text{ is } d\text{-tall} \right\}$

b. $\not\rightsquigarrow$ John's height > $\max \left\{ d \mid \forall x : \text{girl}x \wedge x \text{ is } d\text{-tall} \right\}$

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b. $\not\rightsquigarrow \text{John's height} > \max\left\{d \mid \forall x : \text{girl}x \wedge x \text{ is } d\text{-tall}\right\}$

Problems with the traditional approach:

- ▷ The simple theories automatically generate the unattested narrow scope readings.
- ▷ Generating the wide scope readings requires scoping the embedded quantifiers outside the embedded *than*-clause, which otherwise behaves like an island.

Current analysis: generating wide scope readings without exceptional scope.

$$u \to \mathrm{j};\ \exists v;\ \mathbf{max}^{m}\big(\mathbf{tall}(m, u')\big);\ \mathbf{max}^{n}\big(\mathbf{tall}(n, u)\big);\ n > m;\overset{v=u',\,m=n'}{\underline{\qquad\qquad\qquad}};$$

$$\exists u';\ \mathbf{girl}\,u';\ u' = v;\ \mathbf{max}^{n'}\big(\mathbf{tall}(n', u')\big)$$

$$\mathbf{john}^{u}\big(\mathbf{er}^{v,m,n}_{n',u'}(\lambda n \lambda u.u \textbf{ is } n\textbf{-tall})\big)$$

$$\mathbf{than} \qquad \mathbf{some}^{u'}\ \mathbf{girl}\big(\lambda u'.\mathbf{Op}^{n'}_{v,u'}(\lambda n'.u' \textbf{ is } n'\textbf{-tall})\big)$$

Current analysis: generating wide scope readings without exceptional scope.

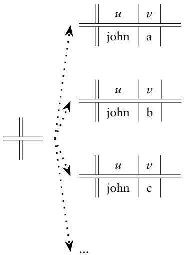
$$u \to \mathrm{j}; \exists v;\ \mathbf{max}^m(\mathbf{tall}(m, u')); \mathbf{max}^n(\mathbf{tall}(n, u)); n > m; \frac{v = u', m = n'}{\exists u'; \mathbf{girl}\, u'; u' = v; \mathbf{max}^{n'}(\mathbf{tall}(n', u'))}$$

Current analysis: generating wide scope readings without exceptional scope.

$$u \rightarrow \mathrm{j};\, \exists v;\ \mathbf{max}^{m}\big(\mathbf{tall}(m, u')\big); \mathbf{max}^{n}\big(\mathbf{tall}(n, u)\big); n > m;$$
$$\exists u'; \mathbf{girl}\, u'; u' = v; \mathbf{max}^{n'}\big(\mathbf{tall}(n', u')\big); \underline{{}^{v=u', m=n'}}$$

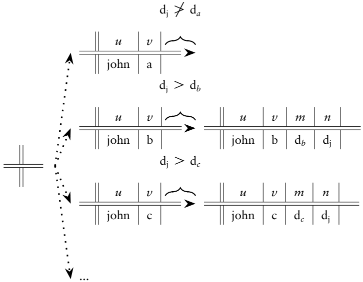
Current analysis: generating wide scope readings without exceptional scope.

$$u \to \mathrm{j}; \exists v;\ \mathbf{max}^{m}(\mathbf{tall}(m, u')); \mathbf{max}^{n}(\mathbf{tall}(n, u)); n > m;$$
$$\exists u'; \mathbf{girl}\, u'; u' = v; \mathbf{max}^{n'}(\mathbf{tall}(n', u'));_{\underline{v=u',m=n'}}$$



Current analysis: generating wide scope readings without exceptional scope.

$$u \rightarrow \mathrm{j};\ \exists v;\ \mathbf{max}^{m}(\mathbf{tall}(m, u'));\ \mathbf{max}^{n}(\mathbf{tall}(n, u));\ n > m;$$
$$\exists u';\ \mathbf{girl}\, u';\ u' = v;\ \mathbf{max}^{n'}(\mathbf{tall}(n', u'));^{\underline{v=u', m=n'}}$$



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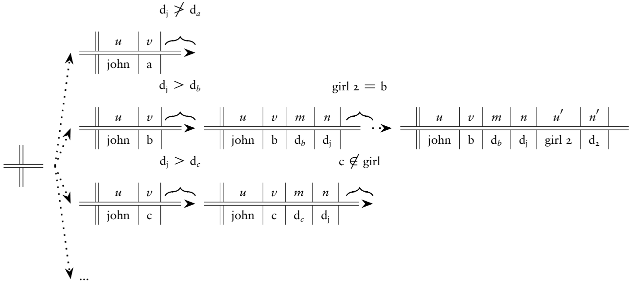
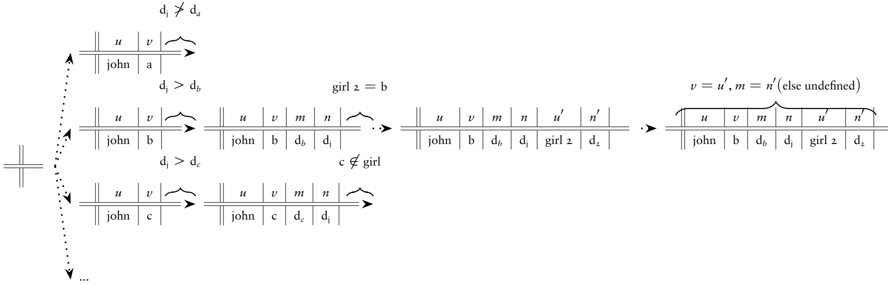
$$u \rightarrow \mathrm{j};\ \exists v;\ \mathbf{max}^{m}(\mathbf{tall}(m, u'));\ \mathbf{max}^{n}(\mathbf{tall}(n, u));\ n > m;$$
$$\exists u';\ \mathbf{girl}\ u';\ u' = v;\ \mathbf{max}^{n'}(\mathbf{tall}(n', u'));\underline{v=u', m=n'}$$



Current analysis: generating wide scope readings without exceptional scope.

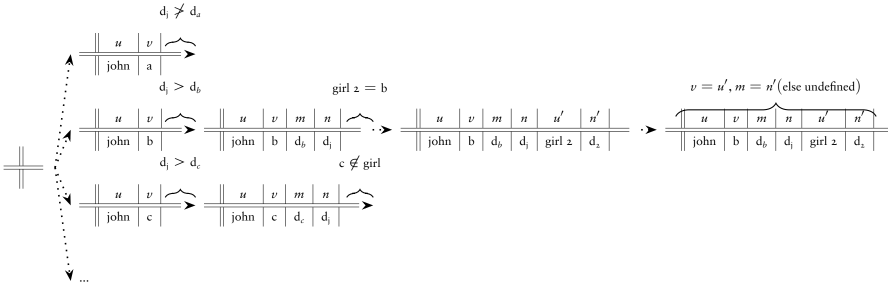
$$u \rightarrow \mathrm{j};\ \exists v;\ \mathbf{max}^{m}(\mathbf{tall}(m, u'));\ \mathbf{max}^{n}(\mathbf{tall}(n, u));\ n > m;$$
$$\exists u';\ \mathbf{girl}\ u';\ u' = v;\ \mathbf{max}^{n'}(\mathbf{tall}(n', u'));\underline{{\scriptstyle v=u',m=n'}}$$



Current analysis: generating wide scope readings without exceptional scope.

John is taller than some girl is $\rightsquigarrow$

$$\exists v;\ \text{John's height} > v\text{'s height};\ \mathbf{some}^{u'}(\mathbf{girl})(\lambda u'.u' = v; \exists n' : u' \textbf{ is maximally } n'\textbf{-tall})$$



Current analysis: generating wide scope readings without exceptional scope.

John is taller than every girl is $\rightsquigarrow$

$$\exists v; \text{John's height} > v\text{'s height}; \textbf{every}^{u'}(\textbf{girl})(\lambda u'.u' = v; \exists n' : u' \textbf{ is maximally } n'\textbf{-tall})$$

$\mathrm{d_j} \not> \mathrm{d}_d$

u	v
john	c
john	d

$= \mathrm{d_j} > \mathrm{d_a}, \mathrm{d_j} > \mathrm{d_b}$, and $\mathrm{d_j} > \mathrm{d_c}$

$\{\mathrm{d_j}\} > \{\mathrm{d}_a, \mathrm{d}_b, \mathrm{d}_c\}$

$\{\text{girl 1, girl 2, girl 3}\} = \{\text{a, b, c}\}$

$v = u', m = n'$ (else undefined)

u	v
john	a
john	b
john	c

u	v	m	n
john	a	d_a	$\mathrm{d_j}$
john	b	d_b	$\mathrm{d_j}$
john	c	d_c	$\mathrm{d_j}$

u	v	m	n	u'	n'
john	a	d_a	$\mathrm{d_j}$	girl 1	$\mathrm{d_2}$
john	b	d_b	$\mathrm{d_j}$	girl 2	$\mathrm{d_2}$
john	c	d_c	$\mathrm{d_j}$	girl 3	$\mathrm{d_2}$

u	v	m	n	u'	n'
john	a	d_a	$\mathrm{d_j}$	girl 1	$\mathrm{d_2}$
john	b	d_b	$\mathrm{d_j}$	girl 2	$\mathrm{d_2}$
john	c	d_c	$\mathrm{d_j}$	girl 3	$\mathrm{d_2}$

...

Additional benefit 1: negative quantifiers

- If quantifiers actually scope out:

(29) John is taller than no girl is
$\not\rightsquigarrow \neg\exists x : \text{girl}x \wedge \text{john's height} > \max\{d \mid x \text{ is } d\text{-tall}\}$
(unattested)

- Current analysis: negative quantifiers are externally static,

(30) No^x girl has a cat. ... # She$_x$ just came in.

therefore provides no antecedent for *er*'s anaphoric resolution.

Additional benefit 2: guarding against impossible narrow scope readings

- ▷ quantifiers still can take narrow scope relative to degree operators:

$$\rightsquigarrow \textbf{max}^m\big(\textbf{every}^{u'}\textbf{girl}\big(\lambda u'.u' \textbf{ is } m\textbf{-tall}\big)\big);$$
$$\textbf{max}^n\big(\textbf{john}^u\big(\lambda u.u \textbf{ is } n\textbf{-tall}\big)\big);\ n > m$$

$$\textbf{JOHN}^{P,u}\Big(\textbf{er}^{Q,m,n}_{n',P'}\big(\lambda P\lambda u.P\big(u \textbf{ is } n\textbf{-tall}\big)\big)\Big)$$

$$\textbf{than}$$

$$\textbf{every}^{P',x,u'}\ \textbf{girl}\big(\lambda P'.\textbf{Op}^{n'}_{Q,P'}\big(\lambda n'.P'\big(\lambda u'.u' \textbf{ is } n'\textbf{-tall}\big)\big)\big)$$

- ▷ $\textbf{max}^m\big(\textbf{every}^{u'}\textbf{girl}\big(\lambda u'.u' \textbf{ is } m\textbf{-tall}\big)\big); \textbf{max}^n\big(\textbf{john}^u\big(\lambda u.u \textbf{ is } n\textbf{-tall}\big)\big); n > m \rightsquigarrow$ John's height > the maximal degree set containing the height of every girl (in a plural dynamic system)

Comparing alternative states

Comparatives have an *internal reading* when in the scope of a lexicalized universal quantifier:

(31) Every year John buys a bigger boat.
$\rightsquigarrow$ The boat John buys in every year is increasingly bigger.

Challenge:

- ▷ a compositional account
- ▷ an account that unifies the internal reading with other uses of the comparative

The internal reading does not quantify over individuals:

(32) Every boy read a poem. $\rightsquigarrow$ $x \in$ boy $\rightarrow$ x read a poem

(33) Every year John buys a bigger boat $\not\rightsquigarrow$
$x \in$ year $\rightarrow$ John buys a bigger boat in year x

Proposal: the internal reading quantifies over pairs (cf. Brasoveanu 2011).

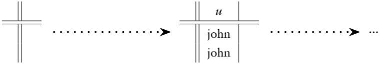
(34) Every year John buys a bigger boat $\rightsquigarrow$
$\forall \langle x, x' \rangle : x, x' \in \text{year} \wedge x \prec x' \rightarrow$
John buys a bigger boat in x' than in x

Upgrading to a pair-based dynamic system:

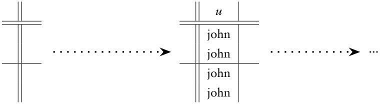
Intead of relations between two single info states, let sentence meanings be updates associating pairs of info states that run in parallel.

Upgrading to a pair-based dynamic system:

john^u (standard dynamic systems)

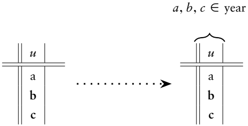


john^u (pair-based dynamic systems)

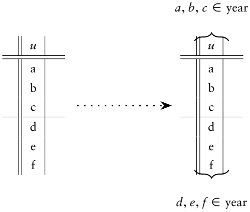


Upgrading to a pair-based dynamic system:

year *u* (standard dynamic systems)

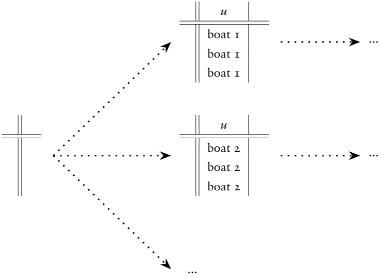


year *u* (pair-based dynamic systems)



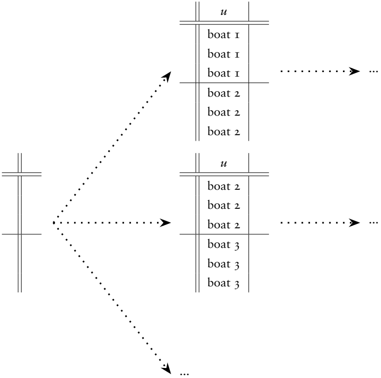
Upgrading to a pair-based dynamic system:

a^u boat (standard dynamic systems)



Upgrading to a pair-based dynamic system:

a^u boat (pair-based dynamic systems)



Upgrading to a pair-based dynamic system:

$\mathbf{max}^n\big(u \textbf{ is } n\textbf{-tall}\big)$ (standard dynamic systems)

d_a is the maximal height of a, d_b is the maximal height of b

u
a
b

$\dashrightarrow$

u	n
a	d_a
b	d_b

$\mathbb{max}^n\big(u \textbf{ is } n\textbf{-tall}\big)$ (pair-based dynamic systems)

d_a is the maximal height of a, d_b is the maximal height of b

u
a
b
c
d

$\dashrightarrow$

u	n
a	d_a
b	d_b
c	d_c
d	d_d

d_c is the maximal height of c, d_d is the maximal height of d

Pair-based distributive quantification:

(35) $\textbf{every}^u := \lambda P \lambda Q.\mathbb{max}^u(Pu); \mathbb{D}_u(Qu)$

(36) $[\text{every}^u \text{ year John}^v \text{ buys a}^z \text{ boat}] \rightsquigarrow$

$$\mathbb{max}^u(\textbf{year}u); \mathbb{D}_u(\textbf{John}^u\textbf{buys a}^z\textbf{ boat})$$

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$\cdot\!\!\rightarrow$

u
2019
2020
2021
2019
2020
2021

Pair-based distributive quantification:

(35) $\textbf{every}^u := \lambda P \lambda Q.\mathbb{max}^u(Pu); \mathbb{D}_u(Qu)$

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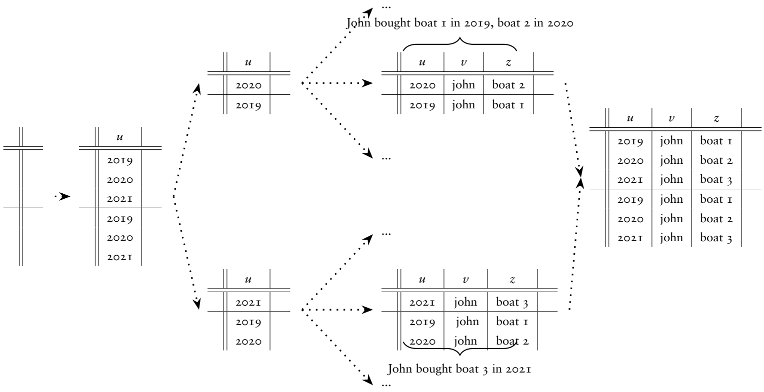
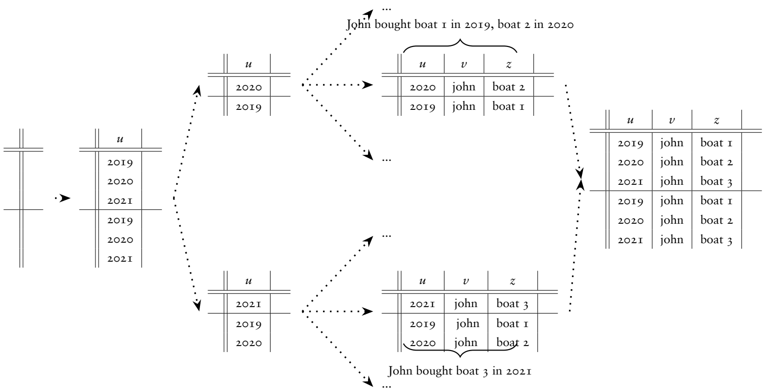


- **john^u buys a^z boat** relates every pair of a later year and its predecessors and the corresponding rows in the output;
- i.e. every later year John buys a boat just like the previous years.



Internal comparisons between a pair

(37) $\mathbf{er}^{n} := \lambda f.\mathbb{max}^{n}(fn); >_{n}$
where $>_{n} := \lambda \langle S, S' \rangle . \{\langle S, S' \rangle \mid S_{n} > S'_{n}\}$ (to be revised)

(38) [every^{u} year John^{v} buys a^{z} bigger^{n} boat] $\rightsquigarrow$
$\mathbb{max}^{u}(\mathbf{year}u); \mathbb{D}_{u}(\mathbf{er}^{n}(\lambda n.\mathbf{John}^{u}\ \mathbf{buys}\ \mathbf{a}^{z}\ n\text{-}\mathbf{big\ boat}))$

Internal comparisons between a pair

(37) $\mathbf{er}^n := \lambda f.\mathbb{max}^n(fn); >_n$
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(38) $[\text{every}^u \text{ year John}^v \text{ buys a}^z \text{ bigger}^n \text{ boat}] \rightsquigarrow$
$\mathbb{max}^u(\mathbf{year}u); \mathbb{D}_u(\mathbf{er}^n(\lambda n.\mathbf{John}^u \mathbf{\ buys\ a}^z\ n\text{-}\mathbf{big\ boat}))$

The biggest boat John bought in 2020 is the d-big boat 2, in 2019 is the d'-big boat 1

u
2020
2019

$\cdots\rightarrow$

u	v	z	n
2020	john	boat 2	d
2019	john	boat 1	d'

$\{d\} > \{d'\}$ $\cdots\rightarrow$

u	v	z	n
2020	john	boat 2	d
2019	john	boat 1	d'

The biggest boat John bought in 2021 is the d"-big boat 3

u
2021
2019
2020

$\cdots\rightarrow$

u	v	z	n
2021	john	boat 3	d
2019	john	boat 1	d'
2020	john	boat 2	d

$\{d''\} > \{d, d'\}$ $\cdots\rightarrow$

u	v	z	n
2021	john	boat 3	d"
2019	john	boat 1	d'
2020	john	boat 2	d

The (dynamic) comparative meanings having been proposed:

(39) $\mathbf{er}^{v,m,n}_{n',u'} := \lambda f \lambda u. \exists v; \mathbf{max}^m(fmv); \mathbf{max}^n(fnu); n > m; \underline{v{=}u', m{=}n'}$

(40) $\mathbf{er}^n := \lambda f. \mathbb{max}^n(fn); >_n$, where
$>_n := \lambda \langle S, S' \rangle . \{\langle S, S' \rangle \mid S_n > S'_n\}$

One lexical entry unifying the two:

(41) $\mathbf{er}^{\perp u,n}_{u',n'} := \lambda f. \exists^{\perp} u; \mathbb{max}^n(fn); >_n; \underline{{}^{\perp}u{=}u', {}^{\perp}n{=}n'}$

introducing the standard alternative into the secondary state

postsuppositional anaphoric resolution

Externally anaphoric comparatives in pairs

(42) (Mary is six feet tall. ...) John is taller.

$\rightsquigarrow \big[\,\text{John}\ \lambda u\big[\,\text{er}^{\perp u,n}_{u',n'}\ \lambda n\,\big[\,u\ \text{is}\ n\text{-tall}\,\big]\,\big]\,\big]$

$= u \longrightarrow \text{j};\ \exists^{\perp}u;\ \mathbb{max}^{n}(u\ \mathbf{is}\ n\textbf{-tall});\ >_{n};\underline{^{\perp}u{=}u',{}^{\perp}n{=}n'}$

Externally anaphoric comparatives in pairs

(42) (Mary is six feet tall. ...) John is taller.

$\rightsquigarrow \big[\, \text{John}\ \lambda u \big[\, \text{er}^{\perp u,n}_{u',n'}\ \lambda n \big[\, u \text{ is } n\text{-tall} \,\big]\,\big]\,\big]$

$= u \rightarrow \text{j};\ \exists^{\perp} u;\ \mathbb{max}^{n}(u \textbf{ is } n\textbf{-tall});\ >_n;\ \underline{{}^{\perp}u{=}u', {}^{\perp}n{=}n'}$

u'	n'	u
mary	d_m	john
mary	d_m	john

u'	n'	u
mary	d_m	john
mary	d_m	a

u'	n'	u
mary	d_m	john
mary	d_m	b

...

Externally anaphoric comparatives in pairs

(42) (Mary is six feet tall. ...) John is taller.

$\rightsquigarrow \big[\,\text{John}\ \lambda u\big[\,\text{er}^{\perp u,n}_{u',n'}\ \lambda n\,\big[\,u\ \text{is}\ n\text{-tall}\,\big]\,\big]\,\big]$

$= u \rightarrow \text{j};\ \exists^{\perp}u;\ \max^{n}\big(u\ \textbf{is}\ n\textbf{-tall}\big);\ >_{n};\ \underline{{}^{\perp}u{=}u',{}^{\perp}n{=}n'}$

u'	n'	u
mary	d_m	john
mary	d_m	john

u'	n'	u
mary	d_m	john
mary	d_m	a

u'	n'	u	n
mary	d_m	john	d_j
mary	d_m	a	d_a

$d_\text{j} \not> d_a$

u'	n'	u
mary	d_m	john
mary	d_m	b

u'	n'	u	n
mary	d_m	john	d_j
mary	d_m	b	d_b

$d_\text{j} > d_b$

...

Externally anaphoric comparatives in pairs

(42) (Mary is six feet tall. ...) John is taller.

$\rightsquigarrow \big[\,\text{John}\ \lambda u \big[\,\text{er}^{\perp u,n}_{u',n'}\ \lambda n\,\big[\,u\ \text{is}\ n\text{-tall}\,\big]\,\big]\,\big]$

$= u \rightarrow \text{j};\ \exists^{\perp} u;\ \mathbb{max}^{n}(u\ \textbf{is}\ n\textbf{-tall});\ >_{n};\ \underline{{}^{\perp}u=u', {}^{\perp}n=n'}$

u'	n'	u
mary	$\mathrm{d_m}$	john
mary	$\mathrm{d_m}$	john

u'	n'	u
mary	$\mathrm{d_m}$	john
mary	$\mathrm{d_m}$	a

u'	n'	u
mary	$\mathrm{d_m}$	john
mary	$\mathrm{d_m}$	b

...

u'	n'	u	n
mary	$\mathrm{d_m}$	john	$\mathrm{d_j}$
mary	$\mathrm{d_m}$	b	$\mathrm{d_b}$

$d_j > d_b$

Externally anaphoric comparatives in pairs

(42) (Mary is six feet tall. ...) John is taller.

$\rightsquigarrow \left[\text{John } \lambda u \left[\text{er}^{\perp u,n}_{u',n'}\ \lambda n \left[u \text{ is } n\text{-tall}\right]\right]\right]$

$= u \rightarrow \text{j};\ \exists^{\perp} u;\ \mathbb{max}^{n}(u \textbf{ is } n\textbf{-tall});\ >_{n};^{\underline{\perp u=u',\ \perp n=n'}}$

u'	n'	u
mary	d_m	john
mary	d_m	john

u'	n'	u
mary	d_m	john
mary	d_m	a

u'	n'	u
mary	d_m	john
mary	d_m	b

...

u'	n'	u	n
mary	d_m	john	d_j
mary	d_m	b	d_b

$d_\text{j} > d_b$

mary $=$ b, $\text{d}_\text{m} = \text{d}_b$ (else undefined)

(43) I thought Mary is quite tall. Today I finally met a taller woman. $\rightsquigarrow$

$$\left[\,\text{a}\ \ \lambda u\left[\,\text{er}^{\perp u,n}_{u',n'}\ \lambda n\left[\,u\left[\,n\text{-tall}\ \ \text{woman}\,\right]\right]\right]\right]$$

(44) John read five books. Mary read more (books). $\rightsquigarrow$

$$\left[\,\text{Mary}\ \ \lambda u\left[\,\text{er}^{\perp u,n}_{u',n'}\ \lambda n\left[\,n\text{-many books}\ \ \lambda z\left[\,u\ \ \text{read}\ z\,\right]\right]\right]\right]$$

(45) John criticized five books. He PRAISED more (books). $\rightsquigarrow$

$$\left[\,\text{PRAISED}\ \ \lambda u\left[\,\text{er}^{\perp u,n}_{u',n'}\ \lambda n\left[\,n\text{-many books}\ \ \lambda z\left[\,\text{He}\ \ u\ \ z\,\right]\right]\right]\right]$$

(46) John was required to donate five books. He ended up donating more (books). $\rightsquigarrow$

$$\left[\,\textsc{ind}@\ \ \lambda w\left[\,\text{er}^{\perp w,n}_{w',n'}\ \lambda n\left[\,n\text{-many books}\ \ \lambda z\left[\,\text{He ended up donating}_w\ \ z\,\right]\right]\right]\right]$$

(47) John criticized five books. Mary PRAISED more (books). $\rightsquigarrow$

$$\left[\,\text{Mary}\ \ \lambda v\left[\,\text{PRAISED}\ \ \lambda u\left[\,\text{er}^{\perp u,\perp v,n}_{u',v',n'}\ \lambda n\left[\,n\text{-many books}\ \ \lambda z\left[\,v\,u\ \ z\,\right]\right]\right]\right]\right]$$

Re-cast the analysis for the internal reading

(48) $\left[\text{every}^u \text{ year John}^v \text{ buys a}^z \text{ bigger}^n \text{ boat}\right]$

$$\begin{aligned}
&\rightsquigarrow \mathbb{max}^u(\mathbf{year}u); \mathbb{D}_u(\mathbf{er}^{\perp u,n}_{u',n'}(\lambda n.\mathbf{John}^u \textbf{ buys a}^z\ n\textbf{-big boat}))\\
&= \mathbb{max}^u(\mathbf{year}u); \mathbb{D}_u(\exists^{\perp}u; \mathbb{max}^n(\lambda n.\mathbf{John}^u \textbf{ buys a}^z\ n\textbf{-big boat});\\
&>_n; \underline{^{\perp}u=u',{}^{\perp}n=n'})\\
&= \mathbb{max}^u(\mathbf{year}u); \mathbb{D}_u(\exists^{\perp}u; \mathbb{max}^n(\lambda n.\mathbf{John}^u \textbf{ buys a}^z\ n\textbf{-big boat});\\
&>_n); \underline{^{\perp}u=u',{}^{\perp}n=n'}
\end{aligned}$$

Re-cast the analysis for the internal reading

(48) $[\text{every}^u \text{ year John}^v \text{ buys a}^z \text{ bigger}^n \text{ boat}]$

$$\rightsquigarrow \mathbb{max}^u(\mathbf{year}u); \mathbb{D}_u(\mathbf{er}^{\perp u,n}_{u',n'}(\lambda n.\mathbf{John}^u \textbf{ buys a}^z\ n\textbf{-big boat}))$$

$$= \mathbb{max}^u(\mathbf{year}u); \mathbb{D}_u(\exists^{\perp}u; \mathbb{max}^n(\lambda n.\mathbf{John}^u \textbf{ buys a}^z\ n\textbf{-big boat}); >_n; \underline{{}^{\perp}u{=}u', {}^{\perp}n{=}n'})$$

$$= \mathbb{max}^u(\mathbf{year}u); \mathbb{D}_u(\exists^{\perp}u; \mathbb{max}^n(\lambda n.\mathbf{John}^u \textbf{ buys a}^z\ n\textbf{-big boat}); >_n); \underline{{}^{\perp}u{=}u', {}^{\perp}n{=}n'}$$

$\exists^{\perp}u$ is vacuous in the scope of $\mathbb{D}$

anaphoric resolution can be satisfied in the output context of $\mathbb{D}$

Re-cast the analysis for the internal reading

(48) [every^u year John^v buys a^z bigger^n boat]

$$\rightsquigarrow \mathbb{max}^u(\mathbf{year}u); \mathbb{D}_u(\mathbf{er}^{\perp u,n}_{u',n'}(\lambda n.\mathbf{John}^u\ \mathbf{buys\ a}^z\ n\textbf{-big boat}))$$

$$= \mathbb{max}^u(\mathbf{year}u); \mathbb{D}_u(\exists^{\perp}u; \mathbb{max}^n(\lambda n.\mathbf{John}^u\ \mathbf{buys\ a}^z\ n\textbf{-big boat}); >_n; \underline{{}^{\perp}u{=}u', {}^{\perp}n{=}n'})$$

$$= \mathbb{max}^u(\mathbf{year}u); \mathbb{D}_u(\exists^{\perp}u; \mathbb{max}^n(\lambda n.\mathbf{John}^u\ \mathbf{buys\ a}^z\ n\textbf{-big boat}); >_n); \underline{{}^{\perp}u{=}u', {}^{\perp}n{=}n'}$$

	u
I	2019
	2020
	2021
I'	2019
	2020
	2021

u
2020
2019

u	v	z	n
2020	john	boat 2	d_2
2019	john	boat 1	d_1

u
2021
2019
2020

u	v	z	n
2021	john	boat 3	d_3
2019	john	boat 1	d_1
2020	john	boat 2	d_2

Anaphora resolved: ${}^{\perp}u = {}^{\top}u, {}^{\perp}n = {}^{\top}n$

	u	v	z	n
J	2019	john	boat 1	d_1
	2020	john	boat 2	d_2
	2021	john	boat 3	d_3
J'	2019	john	boat 1	d_1
	2020	john	boat 2	d_2
	2021	john	boat 3	d_3

Conclusions

An alternative-based account for comparatives provides a more unified view for the meaning of comparison in general.

In this account, the various seemingly different uses of a comparative only differ in how the standard alternative gets bound.

Its implementatioin results in some rethinking on certain assumptions and old issues in degree semantics. Everyone is invited to join the fun and investigate more.

Thank you!

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