Semantics and Linguistic Theory 22

May 18 - May 20, 2012
University of Chicago
Chicago, IL, USA

Schedule

Locations:

Talks:	Social Science Research 122
Poster session:	Ida Noyes Hall, 2nd floor, East Lounge
Dinner/reception:	Ida Noyes Hall, 2nd floor, West Lounge

Friday, May 18

8:30–9:00 Coffee

9:00–9:15 Opening remarks

Session 1 *Chair: Jason Merchant*

9:15–9:55 **Roger Schwarzschild** (Rutgers University)
Located vectors and bare comparatives

9:55–10:35 **Dan Lassiter** (Stanford University)
Quantificational and Modal Interveners in Degree Constructions

10:35–11:00 Break

Session 2 *Chair: Malte Willer*

11:00–11:40 **Maria Pinango and Ashwini Deo** (Yale University)
Aspectual verbs and the "coercion" effect

11:40–12:40 Invited talk: **Paul Portner** (Georgetown University)
Mood and Contextual Commitment

12:40–2:30 Lunch

Session 3 *Chair: Ming Xiang*

2:30–3:10 **Raj Singh** (Carleton University)
Implicature Cancellation and Exhaustivity

3:10–3:50 **Shevaun Lewis, Valentine Hacquard and Jeff Lidz** (University of Maryland)
The semantics and pragmatics of belief reports in preschoolers

3:50–4:10 Break

Session 4 *Chair: Judith Tonhauser*

4:10–4:50 **Timothy Grinsell** (University of Chicago)
Social choice theory and linguistic vagueness

4:50–5:30 **Manfred Krifka** (Humboldt University Berlin)
Negated Polarity Questions as Speech Act Denegations

5:45–6:30 Business Meeting

Saturday, May 19

8:30–9:00 Coffee

Session 5 *Chair: Chris Kennedy*

9:00–9:40 **Jakub Dotlacil and Adrian Brasoveanu** (University of California, Santa Cruz)
The Online Interpretation of Sentence Internal Same *and Distributivity*

9:40–10:40 Invited talk: **Louise McNally** (Universitat Pompeu Fabra)
Frequency Adjectives as Distributional Modifiers

10:40–11:00 Break

Session 6 *Chair: Manfred Krifka*

11:00–11:40 **Denis Paperno** (University of California, Los Angeles)
Conjunction is Parallel Computation

11:40–12:20 **Chris Barker** (New York University)
How to sprout

12:20–2:10 Lunch

Session 7 *Chair: Chungmin Lee*

2:10–2:50 **Gregory Kierstead and Scott Martin** (The Ohio State University)
The Hybrid Status of the Reportative Evidential in Tagalog

2:50–3:30 **Judith Tonhauser** (The Ohio State University)
Contrastive topics in Paraguayan Guaraní discourse

3:30–3:50 Break

Session 8 *Chair: Itamar Francez*

3:50–4:50 Invited talk: **Anna Szabolsci** (New York University)
Compositionality without word boundaries

5:00–6:30 Poster Session

6.30–10.30 Dinner

Sunday, May 20

9:00–9:30 Coffee

Session 9 *Chair: Anastasia Giannakidou*

9:30–10:10 **Hedde Zeijlstra** (University of Amsterdam)
What is right to say about light negation?

10:10–11:10 Invited talk: **Jack Hoeksema** (University of Groeningen)
On the natural history of negative polarity items

11:10–11:30 Break

Session 10 *Chair: Chris Barker*

11:30–12:10 **Noah Constant** (University of Massachusetts, Amherst)
Witnessable Quantifiers License Type-e Meaning: Evidence from CT, Equatives and Supplements

12:10–12:50 **Alexander Williams** (University of Maryland)
Null Complement Anaphors as Definite Descriptions

12:50–1:30 **Elizabeth Coppock and David Beaver** (Heinrich Heine University and University of Texas, Austin)
Weak Uniqueness: The Only Difference Between Definites and Indefinites

Poster Session

Sigrid Beck, Vera Hohaus and Sonja Tiemann (Universität Tübingen)
A Note on Phrasal Comparatives

Elena Castroviejo (Centro de Ciencias Humanas y Sociales – CSIC)
Gradation in modified APs

Scott Grimm (Stanford University)
Degrees of Countability: A Mereotopological Approach to the Mass/Count Distinction

Graham Katz, Paul Portner and Aynat Rubinstein (Georgetown University)
Ordering Combination for Modal Comparison

Hadas Kotek, Yasutada Sudo and Martin Hackl (MIT)
Many *Readings of* Most

Dongsik Lim and Chungmin Lee (Centro de Ciencias Humanas y Sociales – CSIC and Seoul National University)
The perspective shift of Korean evidentials and the effect of the context

Giorgio Magri (CNRS, Paris 7, LABEX EFL-PLU)
No need for a theory of the distribution of readings of english bare plurals

Paul Marty[1], Emmanuel Chemla[2] and Benjamin Spector[2] ([1]MIT and [2]Institut Jean Nicod)
Between 3 and 5 *sometimes means* at least 3 – *new ways to detect a new ambiguity*

Katherine McKinney-Bock and Roumyana Pancheva (USC)
A Note on Attributive Adjectives, Distributivity, and Comparison Classes

Yaron McNabb (University of Chicago)
Cross-categorial modification of properties in Hebrew and English

Anne Mucha (Universität Potsdam)
Temporal reference in a genuinely tenseless language: the case of Hausa (Chadic)

Carl Pollard and E. Allyn Smith (OSU and Northwestern)
A unified analysis of the same*, phrasal comparatives, and superlatives*

Paolo Santorio (Australian National University)
Layered Binding in De Se *Reports*

Galit W. Sassoon and Natalia Zevakhina (ILLC-University of Amsterdam and University of Moscow)
Granularity shifting: Experimental evidence from degree modifiers

Stephanie Solt and Nicole Gotzner (ILLC-University of Amsterdam and Humboldt University)
Experimenting with Degree

Alex Silk (University of Michigan)
Modality, Weights, and Inconsistent Premise Sets

Teresa Torres Bustamante (Rutgers)
Real tense and real aspect in mirativity

Daniel Velleman[1], David Beaver[1], Edgar Onea[2], Dylan Bumford[1 3], Emilie Destruel[1] and Elizabeth Coppock[4]
([1]University of Texas, [2]Universität Gottingen, [3]New York University, and [4]Heinrich Heine University)
It-clefts are IT (Inquiry Terminating) Constructions

Masahiro Yamada (University of Kyoto)
Polysemy of Reciprocal

Beibei Xu (Rutgers)
Nandao-*Questions as a Special Kind of Rhetorical Questions*

Alternate Talks

Dongsik Lim and Chungmin Lee (Centro de Ciencias Humanas y Sociales – CSIC and Seoul National University)
The perspective shift of Korean evidentials and the effect of the context

Magdalena Kaufmann and Stefan Kaufmann (Universität Gottingen and Northwestern University)
Epistemic particles and performativity

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Chris Barker

How to sprout

Sluicing without deletion? Case matching provides a well-known argument that sluicing may involve deletion of silent syntactic structure (e.g., Merchant 2001):

(1) a. Someone$_{\text{NOM}}$ spoke to John, but I don't know who$_{\text{NOM}}$/*whom$_{\text{ACC}}$ ~~__ spoke to John~~.

b. John spoke to someone$_{\text{ACC}}$, but I don't know whom$_{\text{ACC}}$ ~~John spoke to __~~.

If the sluice gap contains a copy of the antecedent clause, the case of the WH-word is determined just as in any non-sluiced embedded question. Jäger (2001, 2005) explains how to guarantee case matching without resorting to silent syntactic structure. However, Jäger's (2005:228) analysis does not generalize to sprouting (Chung, Ladusaw & McCloskey 1995):

(2) John left ~~at some time~~, but I don't know when ~~he left __~~.

Jäger's analysis requires the antecedent clause to contain an indefinite, but the essence of sprouting is that there is no overt indefinite or any other overt sluicing trigger.

I will provide a primarily semantic, anaphoric analysis that generalizes smoothly to sprouting cases. Although I will share Jäger's starting point (type logical grammar), my solution will differ from his not only in its empirical coverage, but conceptually and technically as well.

Fragment. Let us reason about syntactic and semantic composition. If two constituents, A and Γ, can combine to form a complex expression in category B (i.e., if $A \cdot \Gamma \vdash B$, where '$\cdot$' indicates normal syntactic composition) and if we remove A, then what remains is an expression that clearly can combine with an A to its left to form a B: we conclude that $\Gamma \vdash A \backslash B$. This is simple categorial grammar. Likewise (but less familiarly), if $\Gamma[A]$ is a syntactic structure containing a specific occurrence of A inside of it, and this composite structure is in category B (i.e., if $\Gamma[A] \vdash B$), then removing A from Γ produces an expression containing an A gap: $\lambda x \Gamma[x] \vdash A \diagdown\!\!\diagdown B$, where '$A \diagdown\!\!\diagdown B$' is the category of a B missing an A somewhere inside of it. I will write $A \circ \lambda x \Gamma[x] \vdash B$, where '$\circ$' is the syntactic operation of plugging A into the gap left in Γ, and where "$\lambda x ... x ...$" keeps track of the syntactic position from which A has been removed.

For instance, if the syntactic structure $John \cdot ((spoke \cdot (to \cdot someone)) \cdot yesterday)$ has category S, and *someone* has category DP_{ACC}, then by the reasoning given above we are able to infer that $\lambda x(John \cdot ((spoke \cdot (to \cdot x)) \cdot yesterday)) \vdash \text{DP}_{\text{ACC}} \diagdown\!\!\diagdown \text{S}$. Since this is the expression that the sluice gap is anaphoric to (and that supplies its semantic content), we correctly predict that the sluice gap will combine only with an accusative WH-word, and not with a nominative one.

We can implement the reasoning developed above in the form of a practical (i.e., decidable) fragment using Genzen sequent inference rules. Although the talk will not presuppose any previous familiarity with type logical grammar, the notation is as in Moortgat 1997:

$$\frac{\Gamma \vdash A \quad \Sigma[B] \vdash Z}{\Sigma[\Gamma \cdot A \backslash B] \vdash Z} \backslash L \qquad \frac{A \cdot \Gamma \vdash B}{\Gamma \vdash A \backslash B} \backslash R \qquad \frac{\Sigma[B] \vdash Z \quad \Gamma \vdash A}{\Sigma[B/A \cdot \Gamma] \vdash Z} / L \qquad \frac{\Gamma \cdot A \vdash B}{\Gamma \vdash B/A} / R$$

$$\frac{\Gamma \vdash A \quad \Sigma[B] \vdash Z}{\Sigma[\Gamma \circ A \diagdown\!\!\diagdown B] \vdash Z} \diagdown\!\!\diagdown L \qquad \frac{A \circ \Gamma \vdash B}{\Gamma \vdash A \diagdown\!\!\diagdown B} \diagdown\!\!\diagdown R \qquad \frac{\Sigma[B] \vdash Z \quad \Gamma \vdash A}{\Sigma[B \sslash A \circ \Gamma] \vdash Z} \sslash L \qquad \frac{\Gamma \circ A \vdash B}{\Gamma \vdash B \sslash A} \sslash R$$

The $\backslash R$ and $\diagdown\!\!\diagdown R$ rules have already been discussed; the other inferences can easily be justified.

We need one additional rule to allow for in-situ scope-taking:

$$\Gamma[A] \equiv A \circ \lambda x \Gamma[x]$$

This rule says that $A \circ \lambda x \Gamma[x]$ is an equivalent way of writing the result of plugging A into the gap in $\lambda x \Gamma[x]$, and that the two forms can be freely intersubstituted.

Example. Then we have the following derivation for a simple sluicing example, *Someone left, but I don't know who* (*bidk* is an amalgam representing *but-I-don't-know*):

$$\dfrac{\dfrac{\dfrac{\dfrac{\dfrac{\dfrac{\dfrac{(\text{someone} \circ \text{DP}\backslash\!\!\backslash \text{s}) \cdot (\text{bidk} \cdot (\text{who} \cdot \text{DP}\backslash\!\!\backslash \text{s})) \vdash \text{s}}{\text{DP}\backslash\!\!\backslash \text{s} \circ \lambda y((\text{someone} \circ y) \cdot (\text{bidk} \cdot (\text{who} \cdot \text{DP}\backslash\!\!\backslash \text{s}))) \vdash \text{s}} \equiv}{\lambda y((\text{someone} \circ y) \cdot (\text{bidk} \cdot (\text{who} \cdot \text{DP}\backslash\!\!\backslash \text{s}))) \vdash (\text{DP}\backslash\!\!\backslash \text{s})\backslash\!\!\backslash \text{s}} \backslash\!\!\backslash R}{\text{DP}\backslash\!\!\backslash \text{s} \circ \lambda z\lambda y((\text{someone} \circ y) \cdot (\text{but} \cdot (\text{who} \cdot z))) \vdash (\text{DP}\backslash\!\!\backslash \text{s})\backslash\!\!\backslash \text{s}} \equiv}{\lambda z\lambda y((\text{someone} \circ y) \cdot (\text{bidk} \cdot (\text{who} \cdot z))) \vdash (\text{DP}\backslash\!\!\backslash \text{s})\backslash\!\!\backslash((\text{DP}\backslash\!\!\backslash \text{s})\backslash\!\!\backslash \text{s})} \backslash\!\!\backslash R \qquad \dfrac{\dfrac{\dfrac{\text{DP} \cdot \text{DP}\backslash \text{S} \vdash \text{S}}{\text{DP} \circ \lambda x(x \cdot \text{left}) \vdash \text{S}} \equiv}{\lambda x(x \cdot \text{left}) \vdash \text{DP}\backslash\!\!\backslash \text{s}} \backslash\!\!\backslash R \qquad \text{s} \vdash \text{s}}{\lambda x(x \cdot \text{left}) \circ (\text{DP}\backslash\!\!\backslash \text{s})\backslash\!\!\backslash \text{s} \vdash \text{s}} \backslash\!\!\backslash L}{\lambda x(x \cdot \text{left}) \circ (((\text{DP}\backslash\!\!\backslash \text{s})\backslash\!\!\backslash \text{s})/\!\!/((\text{DP}\backslash\!\!\backslash \text{s})\backslash\!\!\backslash((\text{DP}\backslash\!\!\backslash \text{s})\backslash\!\!\backslash \text{s})) \circ \lambda z\lambda y((\text{someone} \circ y) \cdot (\text{bidk} \cdot (\text{who} \cdot z)))) \vdash \text{s}} /\!\!/ L}{\lambda x(x \cdot \text{left}) \circ \lambda y((\text{someone} \circ y) \cdot (\text{bidk} \cdot (\text{who} \cdot \text{SLUICEGAP}))) \vdash \text{s}} \equiv$$

$$\dfrac{(\text{someone} \circ \lambda x(x \cdot \text{left})) \cdot (\text{bidk} \cdot (\text{who} \cdot \text{SLUICEGAP})) \vdash \text{s}}{(\text{someone} \cdot \text{left}) \cdot (\text{bidk} \cdot (\text{who} \cdot \text{SLUICEGAP})) \vdash \text{s}} \equiv$$

Starting from the bottom: *someone* "raises" to take scope over the antecedent clause; the remnant of *someone*, i.e., $\lambda x(x \cdot \textit{left})$ raises to take scope over the entire sluice; then the sluice gap raises and tucks in beneath the raised remnant. The final ingredient is to assign to the sluice gap the duplicator meaning $\lambda\kappa x.\kappa x x$. Then the standard (Curry-Howard) semantics for multi-modal type logical grammars (for now, see, e.g., Moortgat 1997 for details) delivers the denotation of the remnant as the content of the sluice gap.

Sprouting. The fragment already generates sprouting examples. In the derivation above, the WH-word *who* needs an S containing a DP gap in order to form an embedded question, and so has category $\text{Q}/(\text{DP}\backslash\!\!\backslash \text{s})$. The WH-word *when* in (2), then, requires a clause with an adverbial gap, i.e., $\text{Q}/(\text{ADV}\backslash\!\!\backslash \text{s})$, where $\text{ADV} = (\text{DP}\backslash\text{S})\backslash(\text{DP}\backslash\text{S})$. But assuming that the empty structure is a right identity for '$\cdot$', i.e., that $\Gamma \cdot () \equiv \Gamma$, we have this simple proof: $\boxed{\dfrac{\text{DP}\backslash\text{S} \vdash \text{DP}\backslash\text{S}}{\vdash (\text{DP}\backslash\text{S})\backslash(\text{DP}\backslash\text{S})} \backslash R}$. In other words, starting with the tautology $\text{DP}\backslash\text{S} \vdash \text{DP}\backslash\text{S}$, if we remove the leftmost constituent from the structure on the left of the turnstyle, the remaining (empty) structure must have category ADV (with the identity function as its Curry-Howard semantic value). This means that we can freely add a silent, identity-function denoting adverb to the antecedent clause. There is no need to posit silent lexical content such as *at some time*, since all the analysis requires is the ability to compute a suitable remnant.

Reassurances. There are many important details not given here but that are ready for the talk, including: how an adaptation of Merchant's mutual entailment condition explains AnderBois' inquisitiveness facts (and also, unlike AnderBois' account, generalizes to sprouting); how to sluice with implicit arguments; decidability results, including a working parser; and presenting in more detail the technical properties of the fragment.

Conclusion. A new explicit account of sluicing with no deletion of silent syntactic structure can handle case-matching facts, sprouting, and more.

Key references: • AnderBois, Scott 2010. Sluicing as anaphora to issues. SALT • Chung, Ladusaw & McCloskey 1995. Sluicing and LF. *NLS* • Jäger, Gerhard 2001. Indefinites and sluicing. AC • Jäger, Gerhard 2005. *Anaphora in TLG*. Springer • Merchant, Jason 2001. *The Syntax of Silence*. OUP • Moortgat, Michael 1997. Categorial Type Logics. *Handbook of Logic and Lg.*

Sigrid Beck, Vera Hohaus & Sonja Tiemann

A Note on Phrasal Comparatives

Introduction. This paper investigates the semantics that a comparative operator combining with a *than*-phrase (as opposed to a *than*-clause) should have. In a recent paper, Bhatt & Takahashi (to app.) make a strong case in favor of Hindi having a particular phrasal *-er* morpheme and against English having this same operator. There are however further suggestions for phrasal *-er* morphemes and their semantics in the literature, cf. e.g. Kennedy (1997). We compare the predictions that the different operators lead to and argue, on the basis of crosslinguistic and language acquisition data, that it has to be decided on a case-by-case basis which operator(s) a particular language employs.

Background. In the analysis of a comparative sentence like (1), choices abound regarding the semantic nature of the *than*-constituent and consequently, the comparative operator *-er*. For example, the *than*-constituent could really be a reduced clause. In that case, the Logical Form (LF) could look as in (2a), employing the operator in (2b), cf. e.g. von Stechow (1984).

(1) *Mary is smarter than John.*

(2) a. [[-er than how$_1$ John is t_1 smart] [2 [Mary is t_2 smart]]]

b. **[[** *-er* **]]** = $\lambda D_{<d,t>}. \lambda D'_{<d,t>}.$ max(D') > max(D)

Two Different Phrasal Comparative Operators. The first possibility for an individual phrasal *-er* goes back to Heim (1985) and has recently been discussed by Bhatt & Takahashi (B&T). Its semantics is in (4). The example in (1) receives the analysis in (5).

(4) **[[** $-er_{phr1}$ **]]** = $\lambda x_{<e>}.\lambda R_{<d,<e,t>>}.\lambda y_{<e>}.$ max(λd.R(d)(y)) > max(λd.R(d)(x))

(5) [Mary [[-er than John] [1 [2 [t_1 is t_2 smart]]]]]

This comparative operator is mobile at the level of LF and hence versatile. It can be used to analyze attributive and adverbial comparatives, and it interacts with other quantificational elements. There are however other proposals in the literature for phrasal *-er* morphemes and their semantics in the literature, e.g. Kennedy (1997):

(6) **[[** $-er_{phr2}$ **]]** = $\lambda R_{<d,<e,t>>}. \lambda x_{<e>}. \lambda y_{<e>}.$ max(λd.R(d)(y)) > max(λd.R(d)(x))

B&T's operator is schoenfinkeled differently from (6). In order to get an interpretable LF, the comparative operator together with its first argument, the *than*-phrase, undergoes movement. Notice that the lexical entry in (6) by contrast is such that it will never be able to undergo movement: (7) specifies the abstract LF required for $-er_{phr2}$. Its sister must be a relational adjective type constituent, α in (7). It combines with a type <e> *than*-phrase next, followed by another type <e> expression, DP_x. This is not a problem with predicative adjectives, where the surface structure provides the required constituents in the required order. But when we try to create such an LF by movement, we fail, cf. (8). Creating a constituent of type <d,<e,t> would require first moving a type <e> constituent DP_x out of the category α, and then moving $-er_{phr2}$ to a position between DP_x and its binder index (an instance of parasitic movement). This is possible, but does not allow the *than*-phrase to be integrated into the required argument slot of $-er_{phr2}$, between the relation and DP_x. Standard theory of movement does not allow us to give $-er_{phr2}$ the required order of arguments for non-lexical <d,<e,t>> relations.

(7) [... DP_x [[*than* DP_y] [$-er_{phr2}$ [$\alpha_{<d,<e,t>>}$ ...]]] ...]

(8) a. SS: [... [*than* DP_y] ... [α ... $-er_{phr2}$ ... DP_x ...] ...]

b. LF: [... [*than* DP_y] ... [DP_x [$-er_{phr2}$ [$\alpha_{<d,<e,t>>}$ ...t_{-er} ... t_{DPx} ...]]] ...]

The semantics in (6) will thus only ever be usable for a comparative that combines a *than*-phrase with a predicative adjective. Attributive adjectives and adverbs cannot make use of $-er_{phr2}$ even when they are followed by a phrasal *than*-constituent. Furthermore, this phrasal comparative does not interact scopally with other operators.

The Crosslinguistic Picture. B&T argue that (unlike English) Hindi has $-er_{phr1}$. The availability of attributive and adverbial comparatives as in (9) and (10) is thus expected.

(9) *Sangeeta ne Ramesh se zyaadaa tez dauri.*
Sangeeta ERG. Ramesh than more fast ran
'Sangeeta ran faster than Ramesh.' (Beck et al. 2009: 40)

(10) *Sangeeta kepaas Ramesh se zyaadaa tez kar hai.*
Sangeeta POSS. Ramesh than more fast car is
'Sangeeta has a faster car than Ramesh.' (Beck et al. 2009: 40)

Hofstetter (2009) employs -*er*$_{phr1}$ in his analysis of Turkish comparatives. And indeed, we find that Turkish has attributive and adverbial comparatives, cf. (11) and (12). Hofstetter (to app.) moreover observes scope interactions between the Degree Phrase and modals.

(11) *Maria Peter'den hızlı koş-tu.*
Maria Peter-ABL. fast run-PAST
'Maria ran faster than Peter.' (Hofstetter 2009: p. 193, ex. 3a)

(12) *Maria Hans'tan pahalı bir araba satın aldı.*
Maria Hans-ABL. expensive a car bought
'Maria bought a more expensive car than Hans.' (Beck et al. 2009: 59)

Samoan, however, seems to be an example of a language which deploys neither -*er* nor -*er*$_{phr1}$ but only -*er*$_{phr2}$. Evidence comes from the lack of attributive comparatives, cf. the ungrammaticality of (13) compared to (14), and from the absence of scope ambiguities in the comparative (as observed by Villalta 2007).

(13) **O le umi atu tusi sa faitau e Malia i lo Ioane.*
TOP. DET. long away book TAP. read ERG. Mary PREP. PART. John
'Mary read a longer book than John.'

(14) *O le tusi sa faitau e Malia e umi atu i lo le tusi a Ioane.*
TOP. DET. book TAP read ERG. Mary TAP long away PREP. PART. DET. book of John
'Mary read a book which is longer than John's book.'

For English, B&T argue against the availability of -*er*$_{phr1}$ and for an analysis of all phrasal comparatives as reduced clausal comparatives with -*er* (cf. also Lechner 2004). In addition to -*er*, English has -*er*$_{phr2}$ at its disposal, an option not considered by B&T. Evidence for this comes from the time course of first language acquisition: We report the results of a corpus study into the time course of acquisition of comparison construction in English and German. An unexpected result of the study is the early acquisition of *than*-phrases in English when compared to German. The acquisitional finding suggests that a simpler analysis, employing -*er*$_{phr2}$, is available for (a subset of) English *than*-phrases which is unavailable in German. Because of the limited range of application of -*er*$_{phr2}$, this analysis predicts that adverbial and attributive comparatives enter a child's grammar at a later stage, once the child has acquired -*er*. The data indeed support such a sequencing.

Conclusions. It is interesting that we find such a clear empirical distinction between -*er*$_{phr1}$ and -*er*$_{phr2}$. This suggests that we were right in taking the two different schoenfinkelizations to be real, along with their different consequences for movement. That in turn lends support to the analysis in terms of parasitic movement that -*er*$_{phr1}$ is based on. The outcome of our discussion is that we need a more differentiated picture than has been developed so far. Simply stating that a language does or does not have phrasal comparatives or individual comparison is insufficient for stating the precise range of predictions. There is good reason to think that languages vary with respect to which phrasal individual comparison they may employ.

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Teresa Torres Bustamante

Real tense and real aspect in mirativity

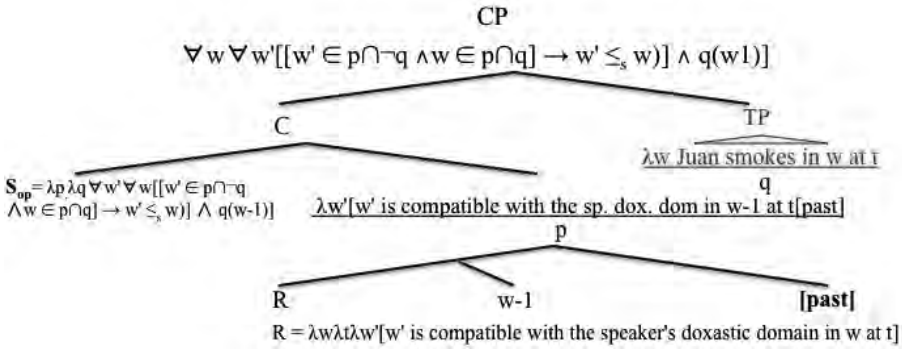
Phenomenon: Mirativity is defined as the grammatical category that encodes the speaker's surprise due to new and unexpected information (DeLancey, 1997). In Spanish miratives (1), the past imperfect and the pluperfect (Andean varieties) are used to express mirativity in the present and the past respectively. Past imperfect mirative only generates habitual/generic meanings, while the pluperfect generates episodic and stative meanings (usually interpreted in the present). There is also a higher degree of surprise for the pluperfect mirative.

(1)	statives	eventives
imperfect	a) ¡Eras alto! be.2s Past.Imp. tall 'You're tall!'(I wasn't expecting you to be tall)	b) ¡Fumabas! smoke.2s.Past.Imp. 'You smoke'(I wasn't expecting you to be a smoker)
pluperfect	c) ¡Habías sido alto! Aux.2s.Past be.PPE tall 'You're tall!' (I thought you weren't tall)	d) ¡Habías fumado! Aux.2s.Past smoke.PPE 'You smoked' (I thought you didn't smoke)

Questions: (i) what is the meaning of mirativity? (ii) what is the role of past tense in mirativity? (iii) why are the statives in the pluperfect case interpreted in the present and not in the past, as expected? (iv) why does the pluperfect carry a stronger sense of surprise?

Proposal - Tense: The surprise associated with mirativity arises as a consequence of the clash between the speaker's previous beliefs and the current state of affairs. I analyze mirativity as an operator S (in the C domain, see Torres 2011 for supporting evidence) that establishes a relationship between the speaker's beliefs and the asserted proposition (2). An accessibility relation R provides the right modal base: a set of worlds w' that are compatible with the speaker's doxastic domain. The past tense is 'fake', in Iatridou's terms (2000), since is not interpreted in the asserted proposition, but it is a real past tense which is interpreted under the modal operator S. The past tense is the time argument of the accessibility relation R (cf. Ippolito 2003 on counterfactuals). [past] represents the speaker's past beliefs up to the speech time in which she realizes that the actual state of affairs contradicts her previous beliefs. A 'real' past tense analysis explains both the form and the meaning the mirative presents (past morphology interpreted outside its T node, as the speaker's past beliefs), S ranks the set of ¬q worlds as worlds that are considered to be more likely than q worlds. Hence the surprise on encountering evidence of q.

(2)



The past morphology in the main clause is a reflex of this modal past, which I analyze as agreement, syntactic evidence for this analysis comes from Albanian. For the imperfect, the proposition q is interpreted in the present, as default tense (1a-b); for the pluperfect, assuming it has a double layer of past tense (cf. Iatridou 2001), one of these layers is interpreted in q (cf. 1d). Here I have outlined my answers to questions (i-ii). In the talk, I will also discuss whether the first clause in S should be treated as a presupposition.

Pluperfect statives seem to pose a problem for the analysis above. Sentences like (1c) do not express surprise about the recent past in which the hearer was tall, but rather, it is about being tall

in the present. I claim that this effect is more apparent than real. Musan (2007) argues that individual and stage level predicates behave differently in past tense clauses, with respect to the lifetime of their subjects. (3a) implicates that Gregory is dead, but not (3b). She explains the effect in (3a) as an implicature arising from maximal informativeness, and argues that the implicature can be blocked under appropriate conditions.

(3a) Gregory was from America (3b) Gregory was happy.

In the same spirit, I propose the following implicature calculation for the stative pluperfect mirative. The extra past tense layer is also active in the main clause of (1c), but in order to avoid lifetime effects, the past reading is suppressed. It is possible to get the past interpretation in the following context: I am in a funeral and I thought the person who died was short. But then I see the coffin is surprisingly large, so I can say "*Oh, Juan había sido alto!"* (Oh, Juan was tall!). (Note that the mirative interpretation is not possible for the imperfect (cf. 1a) in this context because John is dead, the implicature associated with a present tense interpretation of his height cannot be supported). In answer to (iii), then, I claim that the past tense is there in the main clause of the stative pluperfect mirative but suppressed in order to avoid lifetime effects. However, it can also be active, given the right contextual framing.

Proposal - Aspect: Finally, I turn to the intuition that imperfective miratives involve less surprise than pluperfect miratives. I claim that aspect determines the set of propositions against which the assertion is measured. Imperfective goes with generic/habitual statements, as in (4a); perfective with episodic/particular statements as in (4b).

(4a) *Students don't smoke* (4b) *John didn't smoke at the party*.

Since generic statements like (4a) allow for exceptions, the set of worlds in the modal base includes those with students that smoke. The assertion, on seeing a student smoking does not require a revision of prior beliefs. Particular statements like (4b) do not admit worlds in which Juan smoked at the party. The assertion, on realizing that Juan did smoke, therefore involves a counterexpectation. This answer to question (iv) requires further articulation of the structure of the modal domain in miratives. I sketch this in (5), where aspect crucially occurs low in the structure: (5) [S[Asp] R] w-1] Past]]]]

In the talk I will give a compositional semantics for this structure. I will interpret aspectual morphology in the standard way, and use it to determine the type of propositions about which the speaker had beliefs in the past. Aspect thus plays its normal role under the S operator, contributing real meaning to the mirative. It is not fake aspect, such as the one analyzed for counterfactuals (Iatridou 2000, 2009, Bjorkman and Halpert 2011).

Advantages: the current proposal will be compared with earlier accounts of mirativity (Friedman 1980, Ivanova 2007, Peterson 2008) and shown to better handle the role of tense and aspect in generating the effect of surprise associated with mirativity. The cross-linguistic applicability of the proposal for mirativity will also be touched upon, with special reference to Albanian mirativity, which also makes use of the same past tense strategy. Differences between Albanian and Spanish can be reduced to syntactic ones. As for aspect, Albanian also generates generic/habitual meanings for the imperfect, and episodic/result states for the pluperfect, which supports the 'real' aspect analysis I have put forth for Spanish.

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Gradation in modified APs

INTRODUCTION: Some research has been conducted on manner modification of stative predicates (Maienborn, 2005; Geuder, 2006; Katz, 2008), but less attention has been paid to APs modified by deadjectival Advs (Ernst, 2011). The goal of this talk is to present a compositional analysis of graded modified APs such as *how/so extremely expensive*. While the presence of extreme Advs (*extremely, unbelievably, surprisingly*) has been used as an indication of exclamativehood (Elliott, 1974; Zanuttini and Portner, 2003), previous literature (D'Avis, 2002; Castroviejo, 2008) does not provide a satisfactory fleshed-out compositional analysis that explains the interpretations delivered by the AP depending on the characteristics of the Adv and the A ((1)), why certain degree expressions can intensify these APs and others cannot ((2)), why mid-scale Advs are not possible in this configuration ((3)), and why intensified *wh*-interrogatives seem unacceptable ((4)).

(1) a. I can't believe how extremely expensive this laptop is.
b. I know how politically incorrect this decision is.
c. How beautifully phrased these lyrics are!

(2) a. I didn't think this laptop would be so extremely expensive.
b. #I didn't think this laptop would be very extremely expensive.

(3) #How fairly/reasonably/slightly long he can stay under water! (From Elliott 1974)

(4) #How extremely expensive was this laptop?

This paper argues that (*a*) the core A of extreme Advs denotes a property of degrees, (*b*) extreme Advs are themselves gradable, so they introduce an additional degree variable to be bound, (*c*) *how* and *so* target a degree variable, but, unlike *very, too*, etc., they do not impose any truth-conditional restrictions on it, and (*d*) the phrase *how/so Adv A* has two possible bracketings and, correspondingly, two potential interpretations, even though their availability hinges on whether or not the A and the Adv are gradable.

PROPOSAL: Extreme Advs function like manner Advs, but their core A denotes a property of degrees rather than a property of states or events ((5)). For instance, a degree can be extreme, surprising or unbelievable (but see Katz 2005; Nouwen 2005 for a qualification).

(5) a. $[\![\text{extremely}]\!]$: $\lambda A \lambda x.\exists d[A(x,d)$ & **extreme**$(d)]$
b. $[\![\text{extremely expensive}]\!]$: $\lambda x.\exists d[$**expensive**(x,d) & **extreme**$(d)]$

What is special about extreme Advs is that they are themselves gradable. That is, a degree may be extreme to a certain extent. Their degree variable is the one targeted by *how* ((6)).

(6) a. [[how extremely] expensive] this laptop is
b. $\lambda p.\exists d'[p = \lambda w.\exists d[$**expensive**$(w)($**this-laptop**$,d)$ & **extreme**$(w)(d,d')]]$

Certainly, the existence of Advs that do not characterize degrees suggests that a predicate modifier interpretation can also be the outcome of the configuration *how Adv A* ((7)).

(7) a. [how [politically incorrect]] this decision is
b. $\lambda p.\exists d[p = \lambda w.[$**(politically(incorrect))**$(w)($**this-decision**$,d)]]$

In (7), the Adv is not gradable (its effect is to specify a kind of incorrectness), but the A is; hence, the acceptability of the sentence. However, if the Adv – but not the A – is gradable (cf. (8)), the felicitous interpretation is one where *how* targets the degree of Adj-ness of the Adv's core A, as proposed for (6-b), the difference being that *beautiful* here denotes a (gradable) property of states rather than a property of degrees.

(8) a. [[how beautifully] phrased] these lyrics are
b. $\lambda p.\exists d[p = \lambda w.\exists s[$**phrased**$(w)(s,$**these-lyrics**$)$ & **beautiful**$(w)(s,d)]]$

Concerning (2), it can be shown that none of the possible compositional semantics for (2-b) yields a felicitous outcome. In the first interpretation ((9)), we need to accommodate that there

is a set of degrees of being extremely expensive, and that x exceeds a contextually determined standard of this property. In the second one ((10)), the problem experienced has to do with distinguishing various high degrees in a so-called *zone of indifference* (Morzycki, ta).

(9) a. #[very [extremely expensive]]
b. $\lambda x.\exists d[\textbf{(extremely(expensive))}(x,d)\ \&\ d \succ \textbf{stnd}_{(extremely(expensive))}]$

(10) a. #[[very extremely] expensive]
b. $\lambda x.\exists d,d'[\textbf{expensive}(x,d)\ \&\ \textbf{extreme}(d,d')\ \&\ d' \succ \textbf{stnd}_{(extreme)}]$

As for (2-a), while the predicate modifier analysis would be awkward like in (9), *so* is a degree anaphor (referring back to a familiar referent), and the implication that the degree reached is high – which a minimal degree of extremeness is – need not be part of its truth-conditional meaning, so an analysis like (11) shouldn't be problematic. Something along the same lines could be argued for *how*, which introduces existential quantification over d' (e.g. (6-b)), but doesn't need to be responsible for the high degree implication.

(11) $\lambda x.\exists d[\textbf{expensive}(x,d)\ \&\ \textbf{extreme}(d,d_i)]$

The awkwardness of (3) – but see Chernilovskaya (2011) for counterexamples – is spelled out in ((12)): in both cases, we need to accept coercion of non-gradable properties (*fairly long* and *fair*). As predicted by this analysis, the degree argument of *long* cannot be targeted by *how*. Admittedly, *reasonable* can be deemed gradable, but not when applied to a degree of length.

(12) a. $\lambda x\lambda p.\exists d[p = \lambda w.[\textbf{(fairly(long))}(w)(x,d)]]$
b. $\lambda x\lambda p.\exists d'[p = \lambda w.\exists d[\textbf{long}(w)(x,d)\ \&\ \textbf{fair}(d,d')]]$

To account for (4), we can resort again to the zone of indifference. Inquiring about degrees of extremeness requires, on the one hand, the existence of a salient scale or a set of conventional units that make informative answers. On the other hand, as pointed out by Rett (2008), it requires that the speaker is positive that x is expensive. Since these are pragmatic problems, it is expected that in the right context, sentences such as (4) are not ill-formed, which is borne out. Abels (2004) shows that intensified *wh*-questions are possible under presupposition filters.

(13) If it is already this hot down there on the main floor, how unbearably hot must there be up on the balcony?

In (13) the *if*-clause suggests that the speaker knows it is hot. This improves the sentence, because *how unbearably hot* entails that it is hot, so the speaker is interested in more specific information, namely the degree of unbearability of this heat.

BROADER IMPLICATIONS: This proposal is relevant to the much debated issue of whether *wh*-exclamatives fare well with an interrogative semantics or rather they need to have in their semantics an evaluative or exclamative-only morpheme (Zanuttini and Portner, 2003; Abels, 2004; Rett, 2008). It also has implications for a theory of intensification, since a relevant distinction between *so* and *very* has been identified that indicates that there may be non-truth-conditional means of conveying threshold exceeding. Further research includes determining if *very* in *how very expensive* deserves a compositional analysis along the lines presented here.

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Noah Constant

Witnessable Quantifiers License Type-e Meaning: Evidence from CT, Equatives and Supplements

Reinhart's (1997) choice-functional account of indefinites holds that the nominals in (1a) can denote plural individuals of type ⟨e⟩, while those in (1b,c) only permit classic generalized quantifier (GQ) denotations of type ⟨⟨e,t⟩,t⟩. In this paper, I argue for expanding the class of quantificational DP's that allow type ⟨e⟩ meaning to include those in (1b), using new evidence from contrastive topic marking, equatives and supplements. As a class, the quantifiers that support type ⟨e⟩ meaning are WITNESSABLE in that they entail the existence of a witness: $Det(P)(Q) \rightarrow \exists x : P(x) \wedge Q(x)$.

(1) a. {Some | Three | Several | Many | A few} cats
b. {Most | All | More than two | Exactly two} cats
c. {Few | No | Less than three | Not many} cats

English contrastive topics (CT's) are realized with the distinctive intonation pattern in (2), where the topic *Fred* is pronounced with a rising CT contour, and *Amherst* bears a falling focus (F) contour. Pragmatically, utterances with CT's are partial answers; they answer a question concerning the CT-marked topic, but fail to answer a salient question about a different topic (Büring 2003).

(2) A: What about Fred and Mary? Where do THEY live?
B: [FRED]$_{CT}$ lives [in AMHERST]$_{F}$.
L+H* L-H% H* L-L%

Building on Rooth's (2005) arguments, I show that CT-marked quantifiers cannot in general be treated using GQ semantics. The basic problem for GQ accounts like Büring 1997 is that a phrase like [SOME$_{CT}$ grads] in (3) sets up contrasts with different pluralities, not different GQ denotations like 'few grads'. We see one reflection of the problem in B's follow-up, where one instance of CT-marked *some* contrasts with another. This is unexpected if the two DP's denote the same GQ.

(3) A: Where do the grads live?
B: [SOME]$_{CT}$ grads live [in AMHERST]$_{F}$. (And SOME grads live in NORTHAMPTON.)
L+H* L-H% H* L-L%

With Rooth (2005), I treat CT-marked quantifiers using choice function (CF) variables, rather than classic GQ denotations. Thus, *some* can denote a CF variable—a function of type ⟨⟨e,t⟩,e⟩ that given a property, returns some entity having that property. In this case, the alternatives generated by '[SOME]$_{CT}$ grads' are computed by substituting different choice functions in the position of the CT-marked *some*, giving contrasting pluralities of grads, as needed for evaluating CT meaning.

Looking beyond simple indefinites, I propose that CT-marking can serve generally as a diagnostic for type ⟨e⟩ interpretations. In (4a), decreasing quantifiers like *few* fail to license CT intonation, as expected on the view that they lack CF readings, which Reinhart (1997) and others have argued on independent grounds. But surprisingly, the witnessable quantifiers in (4b) which are widely assumed to lack CF readings *do* license CT, indicating that they too can denote ⟨e⟩.

(4) a. #[FEW | Not MANY | Less than ELEVEN]$_{CT}$ grads live [in AMHERST]$_{F}$.
b. [MOST | More than TEN | Exactly TEN]$_{CT}$ grads live [in AMHERST]$_{F}$.

Further support comes from sentences equating two pluralities, as in (5). In this frame, a GQ object is unlicensed, since its nuclear scope would be the property λx[those people are x], which is unsatisfiable by atomic individuals. By contrast, if the object denotes a type ⟨e⟩ plurality, the

sentence will be licensed along the lines of typical equatives like "Cicero is Tully". Examples like (6) which seem to be exceptions to the pattern in (5) are shown using diagnostics from Mikkelsen (2004) to be specificational clauses where the subject denotes a property, not a plurality.

(5) Those people standing over there are {some | most | #few} of my best students.

(6) The winners of last night's election were {none | few} of the people I would have expected.

The third type of evidence comes from supplements, including nominal appositions and non-restrictive relatives. Supplements add parenthetical information about the phrase they anchor to, and their contribution is detached from the rest of the composition process (Potts 2005). In (7), a GQ-denoting subject would have no way of composing directly with the type ⟨e⟩ supplement 'the junior ones'. Even if we allow shifting of the supplement to a property type, the truth conditions still come out wrong; the supplementing proposition would be just that some congressmen are junior, and we would have no way of ensuring that these are the *same* ones who admire Kennedy. On the other hand, if the anchor in (7) contains a CF, then it denotes a particular set of congressman, and the supplement will be equated with the same set that the main clause predicates over.

(7) {Some | Most | #Few} congressmen, (namely) the junior ones, admire Kennedy.

Contrastive topic, equative and supplement constructions all resist GQ-denoting nominals on semantic grounds, and remarkably, these three frames all make the same empirical cut across the class of quantifiers. The fact that all and only witnessable quantifiers survive these contexts is evidence that these quantifiers support non-GQ readings, and type ⟨e⟩ readings in particular. However there is a concern for this approach. If the way quantificational DP's denote individuals is via choice-function semantics, we predict that all witnessable quantifiers will show exceptional wide scope behavior. While quantifiers like *most* do not typically scope out of islands (suggesting additional restrictions on where type ⟨e⟩ readings are available), a range of examples indicate that they do at least have this potential. Suppose ten individuals are competing for a single cash prize, and I ask each contestant what they'll spend the money on if they win. I can report my findings with (8), where *most* scopes out of the *if*-clause. By comparison, *few* can only scope low, giving a reading where multiple-winner scenarios are considered.

(8) If {MOST | #FEW} of them win, they're going to give the money to charity. [one winner]

Overall, the new data discussed here provide support for accounts that share with Reinhart 1997 the feature of distinguishing quantifiers of two different semantic types, over accounts of exceptional wide scope that do without this type distinction (Winter 1997, Brasoveanu and Farkas 2011 and many others). At the same time, these data point to a revision of Reinhart's specific proposal that achieves the goal of predicting which quantifiers allow CF readings from semantic principles.

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Weak Uniqueness: The Only Difference Between Definites and Indefinites

This paper offers a unified analysis of predicative and argumental definites and indefinites, designed to account for: (i) anti-uniqueness effects that exclusive adjectives like *only* and *sole* give rise to with definites, and more broadly, the absence of an existence implication on the predicative use; (ii) the dependency between exclusivity and definiteness shown by the ungrammaticality of **an only student*. Our proposal is that definite and indefinite articles are fundamentally identity functions on predicates and give rise to existence implications in argument position through their association with a discourse referent. They differ only in that definites, unlike indefinites, presuppose a weak form of uniqueness that is independent of existence.

The following examples illustrate the anti-uniqueness effects in question:

(1) a. He is the sole/only student. [1 student]

b. He is not the sole/only student. [1+ students]

While (1a) means that there is only one student, (1b) can mean that there is strictly *more than one* student. (This implication arises only on the *predicative* reading 'not only he is an student', as opposed to the *equative* reading 'he is the same person as the only student'.) This anti-uniqueness implication entails that the cardinality of the predicate *only student* is zero. In other words, there is no existence implication.

This phenomenon is not specific to exclusives; in general, predicative definite descriptions do not presuppose existence. One is not committed to the existence of a queen of the world when declaring *You're not the queen of the world,* nor must one believe that the addressee is attached when asking *Is that your boyfriend?*

We therefore need an analysis of definites on which existence is not implied in the predicative use. Another desideratum for an analysis of predicative definites is that they be treated as predicates of type $\langle e, t\rangle$, as suggested by Strawson (1950), Graff (2001), and Winter (2001). Evidence for this comes from the distribution of the overt copula in Hebrew and verbs like *consider* (Doron 1983). Winter (2001, pp. 153–4) offers a 'Frege-Strawson' analysis of predicative *the* according to which it denotes the identity function on predicates P, defined only if $|P| = 1$. For their argumental use, definites are converted into quantifiers via the introduction of a choice function. This gets the types right, but it predicts that (1b) is self-contradictory, because in (1b), the predicate that *the* combines with has cardinality 0 rather than 1; since there are multiple students, there is no *only student*.

Predicative definites. We propose that definites are initially predicative and presuppose a weak form of uniqueness (*weak uniqueness*), which is an implication from existence to uniqueness: if there is an *F*, then there is only one (cf. Büring to appear; Schwarzschild 1994; Löbner 2000). The existence component comes into play when a definite description is used in an argument position. Effectively, we are *splitting up the existence and uniqueness components of the meaning of the definite article,* so that uniqueness is contributed by all uses of definites, predicative and non-predicative alike, but existence is implied only when definites are used in argument positions. The proposed basic lexical entry for *the* is (2), where W is a contextually given set of worlds.

(2) $\text{THE} = \lambda P : \text{UNIQUE}_W(P) \,.\, P$

(3) $\text{UNIQUE}_W = \lambda P \,.\, \forall w, x, y[w \in W \wedge P(x)(w) \wedge x \neq y \rightarrow \neg P(y)(w)]$

The set of worlds W with respect to which UNIQUE is evaluated will typically correspond to the set of open possibilities in the current state of the discourse.

To analyze anti-uniqueness effects, we use a lexical entry for adjectival *only* based on Coppock and Beaver (2011) which, applied to, say, OWNER, gives:

(4) $\text{ONLY}(\text{OWNER}) = \lambda x.\lambda w : \text{OWNER}(x)(w)\ .\ \forall y[x \sqsubset y \rightarrow \neg * \text{OWNER}(y)(w)]$

where $\sqsubset$ is the proper part-of relation among individuals, $\oplus$ denotes the sum operation over individuals, and $*$ is defined such that $P(x) \rightarrow *P(x)$ and $P(x) \wedge P(y) \rightarrow *P(x \oplus y)$. Crucially, this predicate satisfies the uniqueness presupposition of the definite article for any set of worlds W, so (1b) is correctly predicted to be acceptable. Furthermore, we predict the anti-uniqueness inference, viz. that John is an owner and so is somebody else.

Plural definite descriptions with *only* give rise to analogous implications; (5) means that John and Mary are owners, and there are more as well.

(5) John and Mary are not the only owners.

We assume that plurals denote cumulative predicates, and, following Winter (2001), we propose to apply a *maximum sort* filter to the cumulative predicate before applying *the*.

(6) $\text{MAX\_SORT} \quad = \quad \lambda\mathcal{P}_{\tau p}.\lambda X_{\tau}.\mathcal{P}(X) \wedge \forall Y \in \mathcal{P}\ [X \sqsubseteq Y \rightarrow X = Y]$

This filters out all but the supremum of the part-of ($\sqsubseteq$) lattice. So *the teachers* in a sentence like *These women are the teachers* will denote: $\text{THE}(\text{MAX\_SORT}(*\text{TEACHER}))$. Analyzing *the only owners* as $\text{THE}(\text{MAX\_SORT}(\text{ONLY}(*\text{OWNER})))$, we correctly predict that (5) means that John and Mary are owners, and so are others. The presupposition of *the* is necessarily satisfied here because the description characterizes a unique entity in all worlds.

Indefinites. We propose that the indefinite article, like the definite article, is fundamentally an identity function on predicates. Because definites and indefinites are presuppositional variants, they can compete under *Maximize Presupposition!* (Heim 1991; Schlenker 2011): Facing a choice between *the* and *a,* speakers will choose *the* whenever weak uniqueness is satisfied (regardless of whether the expression is to be used predicatively or as an argument). It is then correctly predicted that **an only woman* is bad, because the exclusive guarantees that weak uniqueness is satisfied.

Argumental descriptions. According to Winter's (2001) analysis, definites are initially predicative but when they are in argument positions, they combine with a choice function. This approach effectively gives us a Russellian analysis of (the existence component of) definite descriptions, because the existence of the choice function is part of the at-issue content.

Under our proposal, the existence implication that arises with a definite or indefinite in an argument position is intimately tied to the presence of a discourse referent to which the description applies. The predicate fundamentally denoted by a definite or indefinite description must be ascribed to the discourse referent. Whether the discourse referent is old or new, whether the ascription is at-issue or presupposed, an existence implication will arise. If the discourse referent is old and the ascription is presupposed, then existence will be a presupposition; otherwise it will be at-issue. For definites, existence is typically presupposed, but we assume that the discourse status of the existence component can be influenced by the question under discussion (Simons et al. 2010).

Summary. Our proposal, motivated by data from predicative nominals and adjectival exclusives, radically minimizes the difference between the definite and indefinite articles. Both make a trivial contribution to the at-issue meaning, and they differ only in one of the presuppositions traditionally associated with definite descriptions. Definites presuppose *weak uniqueness,* which is independent of existence. The existence component is common to definites and indefinites; existence implications arise for both definites and indefinites when they are used in argument positions, as a consequence of their association with a discourse referent to which the description applies.

The Online Interpretation of Sentence Internal *Same* and Distributivity

I. The phenomena. Many languages have lexical means to compare two elements and express identity / difference / similarity between them. English uses adjectives of comparison (henceforth AOCs) like *same*, *different* and *similar* for this purpose. Often, the comparison is between an element in the current sentence and a sentence-external element mentioned previously, as in (1) below. But AOCs can also compare sentence-internally, that is, without referring to any previously introduced element, as in (2): both compared elements are introduced in the current sentence, hence the **sentence-internal** label for this reading.

1. **a.** Arnold saw 'Waltz with Bashir'. **b.** Heloise saw *the same movie*.

2. Each student / The students / All the students saw *the same movie*.

This paper investigates how sentence-internal *same* is processed with three of its licensors (EACH, ALL and THE) and two orders, surface scope of licensors as in (2) above or inverse scope as in *The same student saw each movie*. Our study shows that (*i*) there is no effect of surface vs inverse order, which we take as an argument for a model-oriented view of the processing cost of inverse scope (see [5] a.o.), and (*ii*) ALL is processed faster than EACH and THE, which we take as an argument for a particular semantics of distributive licensors.

II. Experimental method. We used a self-paced reading task to test how easy it is to interpret sentence-internal *same* with 3 licensors, EACH, ALL and THE, in 2 orders, Q+AOC (quantifier precedes AOC) and AOC+Q (AOC precedes quantifier), i.e., $3 \times 2 = 6$ conditions in total. Each condition was tested 4 times, twice in sentences most likely judged as true relative to the background scenarios and twice in sentences most likely judged as false, for a total of 24 items. There were 35 fillers. A total of 29 subjects (27 undergraduate students completing the experiment for extra-credit and 2 volunteers), all native speakers of English, completed the experiment online. For each subject, we randomized the order of the 59 items+fillers subject to the condition that any 2 items were separated by at least 1 filler.

Every item/filler consisted of a scenario introducing 2 sets of entities and a relation between them, e.g., 3 movie critics Bill, Ray and Douglas for a Boston journal, 2 movies 'A pink guitar' and 'A dangerous open closet' and the 'review' relation (which critic reviewed which movie). After reading the scenario, the subjects moved on to a new screen where they read the target sentence word-by-word with the SPACE bar revealing the next word and hiding the preceding one. Here are 3 test items (varied by quantifier): *I think that each/all the/the movie critic(s) working for the journal in Boston reviewed the same movie last week.* Every sentence was followed by a yes/no comprehension question (*Am I right to think that?*); 1 subject was excluded because more than 15% of the questions were incorrectly answered.

III. Statistical modeling and resulting generalizations. 3 outlier subjects with mean log reading times (RTs) more than 2 sd.s from the grand mean are removed. The influence of word length and word position in the sentence was factored out (following [8] a.o.) by running a linear mixed-effects regression, with fixed effects for word length in characters, word position in the sentence (cubic-spline interpolated with 2 knots demarcating the beginning and end of sentences) and their interaction and with subject random effects (intercept and word length and position slopes). We used the log RT residuals for all subsequent analyses.

We then investigated the critical regions of each item and the following 2 words with a series of mixed-effects models. Each item has 2 critical regions: the quantifier word *each / all / the* and the word *same*. In all models, we consider subject and item random effects and spillover variables (log RTs for the 3 regions preceding the critical region) in addition to the fixed effects we were interested in, namely (i) QUANT: factor with 3 levels, ALL (reference

level), EACH and THE; (ii) ORD: factor with 2 levels, Q+AOC (reference level) and AOC+Q.

The main generalizations are as follows (the paper provides more details about modeling etc.). First, the quantifier word and the following 2 words are read more slowly in the Q+AOC (surface scope!) order and there is no effect of QUANT when we examine the AOC+Q subset of the data (it does not make sense to examine the Q+AOC subset because the subjects have not seen both the quantifier and the AOC *same* in those cases). Second, the word *same* and the following 2 words are read more slowly in the AOC+Q order; again, there is no effect of QUANT when we examine the Q+AOC subset (it does not make sense to examine the AOC+Q subset in this case for the same reason as above). Finally, when we sum over the entire sentence, we find that ORD is not significant and remains non-significant even if we split the data by quantifier type; but the effect of QUANT is significant, in particular, sentences with ALL are significantly faster than EACH and THE. When we split the data into 2 subsets based on order, we see that QUANT is only significant in the AOC+Q (inverse scope) order.

IV. Interpretation of results. We did not find any slowdown effect on sentences or quantifiers+following words in the AOC+Q, i.e., inverse scope, order. This is surprising because (*i*) it is assumed that quantifiers must scope over AOCs to license their sentence-internal readings ([2], a.o.) and (*ii*) previous studies of indefinite+quantifier sentences found slower reading times in inverse scope readings ([1], [9]). Our results indicate either that an NP licensor does not need to scope over *same* to license its sentence-internal reading or that inverse scope is not costly in our case. It has been suggested that sentence-internal AOCs can be licensed by cumulative readings ([3], [7]) but crucially, this possibility is only available with non-distributive quantifiers—and we found no effect of order even when restricting ourselves only to sentences with EACH. Since in this case cumulative readings are not a likely option, we conclude that inverse scope, crucial for licensing sentence-internal *same* in the AOC+Q order, does not have any processing cost. This cannot be due to the fact that we use AOCs because other AOCs like *different* do not obviate slowdown in inverse scope readings ([1]).

We take our results to show that taking inverse scope is not costly. What is costly is the reinterpretation of the discourse model, necessary when a quantifier takes inverse scope over indefinites, e.g., *A boy climbed every tree*, or over the AOC *different*, e.g., *A different boy climbed every tree*: in both cases, we must backtrack and allow for multiple boys in the discourse model when we reach the universal quantifier and decide to give it wide/inverse scope. But this is not necessary for *same* in *The same boy climbed every tree*.

Second, we found that sentences with *all* are read faster than EACH and THE. Following [4], we assume that there are (at least) two kinds of distributors licensing sentence-internal readings, using the **dist** and **dist-WHOLE** operators. In (2) above, *each* contributes **dist**, which requires us to consider every pair of students and compare what movies they saw (multiple comparisons). In contrast, *all* contributes **dist-WHOLE**, which requires us to compare all the students and movies at the same time (one comparison). Given that **dist** requires a more complicated interpretive operation than **dist-WHOLE**, we explain the slowdown on *each*. Finally, we assume that *the* can make use of **dist-WHOLE** just like *all*, but it is likely that definites are read more slowly in the AOC+Q order because definites are worse inverse-scope takers than *all*-quantifiers ([6]).

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Scott Grimm

Degrees of Countability: A Mereotopological Approach to the Mass/Count Distinction

Theories of nominal semantics traditionally focus on two grammatical categories of countability, mass and count; however, many language families (e.g. Nilo-Saharan, Celtic, Slavic) morphologically recognize three countability categories. Welsh, for instance, not only has substance nouns which are "mass" (*dwr*, 'water'), and nouns with a singular-plural contrast (*llyfr/llyfr-au*, 'book/books'), but also has nouns of an intermediate category with a collective-singulative contrast (*tywod/tywod-yn*, 'sand/grain.of.sand'; *picwn/picwn-en*, 'wasps/a wasp'). I refer to these noun types as SUBSTANCE, COUNT and AGGREGATE, respectively. A clear semantic generalization underpins aggregates across a variety of languages: the referents of these nouns canonically "come together" in some fashion, in contrast to count noun referents, which canonically appear as individual entities. Welsh and the other systems examined here imply that semantic countability is, contrary to standard assumptions, not a binary contrast between mass and count, but rather scalar. Welsh and others divide the scale into three classes, whereby aggregates are morphologically recognized in a distinct fashion from typical countable or uncountable nouns. English divides nouns into two classes, aggregates being split between them. Standard theories, based purely on a part relation over elements in a model, face difficulties in accounting for the broader cross-linguistic data. This paper demonstrates that the data instead calls for enriching part structures with connection relations. This approach delivers a semantic basis for a scalar approach to countability while avoiding several recalcitrant problems in standard theories.

The distinction between count and mass terms is commonly related to the properties of being *atomic* (1) or *divisive* (2), respectively, defined over a part structure. Assimilating aggregates to one predicate type or the other makes a variety of wrong predictions. If aggregates were simply atomic, pluralization would be expected to be possible, as with regular count predicates; however, direct pluralization of aggregate terms only results in a "different kinds of" reading (cf. *wines*). Instead, pluralization of an aggregate requires the singulative form: *grawn/gron-yn/gron-ynn-au* 'grain'/'a single grain'/'grains'. Analyzing aggregates instead as divisive would not only be false for, e.g., *wasp*, but also predict the singulative could then apply to other divisive predicates, namely substances (e.g. *water*), contrary to fact. Further, divisiveness is itself problematic for many nouns that are uncountable in English, such as *sand* or *furniture*. Such nouns have clear minimal parts and, while grammatically uncountable, are logically countable: *Mary counted the sand/furniture/*water.* It is striking that all equivalents of such nouns in Welsh fall into the aggregate class.

(1) Atomic(x) relative to P = $P(x) \rightarrow \neg\exists y[y < x \wedge P(y)]$

(2) Divisive(P) = $[P(x) \rightarrow \forall y[y < x \rightarrow P(y)]]$

Recent work in philosophy has shown that standard mereology can be profitably extended with connectedness relations, resulting in "mereotopology" (Smith 1996, Casati and Varzi 1999 *inter alia*). The basic connectedness relation C holds when two individuals (in the mereological sense) touch at least on their boundaries. This relation interacts with the pure mereological relations *overlap*, O, and *part*, ≤: if two individuals overlap and/or one is part of the other, it implies that they are connected. One fundamental motivation for the mereotopological approach is to distinguish between individuals forming integrated wholes and those forming only arbitrary collections. I relate count nouns to integrated wholes in a spirit similar to Moltmann (1997), but adopt the stricter notion of Maximally Strongly Self-Connected (MSSC) relative to a property (Casati and Varzi 1999). An individual satisfies MSSC relative to a property if every (interior) part of the individual is connected to the whole and anything else which has the same property and overlaps it is once again part of it. This guarantees that an integral whole will both be unique and not overlap with any other individual with the same property, although it may of course touch distinct individuals of the same type. Turning to connection relations, they may come in a variety of strengths. The two primary

types, stated in (3), are Strongly Connected, two individuals are connected via overlapping, and Externally Connected, two individuals are not connected by overlapping but by touching.

(3) (a.) $\text{StrongC}(x, y) = \text{O}(x, y)$ (b.) $\text{ExtC}(x, y) = \text{C}(x, y) \wedge \neg\text{O}(x, y)$

Different semantic classes of nominal predicates can be distinguished through which connectedness relations may or must hold among the individuals in their denotation, which I formalize as conditions on allowable covers over the domain of reference of a predicate. I will illustrate with the three core types. Let R be a realization relation holding between individuals and a kind/concept (Krifka 1995) and let $\{C \in C\}$ be a set of covers over the domain, with covers composed only of individuals with a property P abbreviated as C_p. (4) asserts that if an individual realizes a count predicate (*dog*), then there exists a cover containing that individual which is composed of MSSC individuals. This prevents strongly connected (overlapping) individuals from being in the extension of a count predicate. In contrast, substance predicates require their extension to be comprised of individuals which are strongly connected to other individuals of the same substance, as given in (5). This is satisfied, for instance, by a section of a pool of water—it overlaps other sections of the pool, which are again water. Also, since connectedness is implied by parthood, the whole pool is strongly connected to its parts which are water. Aggregates are a hybrid of the first two categories. Granular aggregates, defined in (6), have extensions which include both MSSC individuals and individuals which are externally connected to (viz. touching) other individuals of the same type. *Sand*, for example, is true of single grains (MSSC individuals), clumps of sand, which can be divided into multiple externally connected individuals, or combinations of the two. This analysis brings out the similarity between substances and granular aggregates, namely their referential domains include clusters of tightly connected individuals, but also shows how they differ, both in the type of connection and in granular aggregates' inclusion of natural minimal parts.

(4) $R(x, P_{\text{Count}}) \rightarrow \exists C_p[x \leq C_p \wedge \forall y[y \in C_p \rightarrow \text{MSSC}(y)]]$

(5) $R(x, P_{\text{Substance}}) \rightarrow \exists C_p[x \leq C_p \wedge \forall y[y \in C_p \rightarrow \exists y'[y' \in C_p \wedge y' \neq y \wedge \text{StrongC}(y, y')]]]$

(6) $R(x, P_{\text{Gran.Agg}}) \rightarrow \exists C_p[x \leq C_p \wedge \forall y[y \in C_p \rightarrow \exists y'[y' \in C_p \wedge y' \neq y \wedge \text{ExtC}(y, y')] \vee \text{MSSC}(y)]]$

Other types of aggregates parallel (6) but with different connection relations, such as Proximately Connected, which holds when two entities are co-located and near one another, appropriate for collective aggregates such as insects or berries. Ordering predicate types by the strength of the connection relation then generates a scale of individuation, which languages divide up into grammatical categories of countability: substance < granular aggregate < collective aggregate < count.

This proposal side-steps recalcitrant problems for traditional accounts. First, many substance nouns do not lend themselves to be infinitely divisible into the same type of stuff. *Soup*, for instance, may contain meatballs that, while part of the soup, are not in themselves soup, contrary to (2). The characterization of substance terms given in (5), however, accords with this scenario: any individual portion of a soup which in itself qualifies as soup will be strongly connected to another such individual. Second, defining count nouns through atomicity (1) stumbles with nouns such as *fence*, since a part of a fence can again be thought of a fence (Rothstein 2010). Defining count nouns in terms of MSSC entities does not face this problem, but rather guarantees that an utterance of *a fence* makes reference to the largest connected entity which satisfies being a fence, intuitively the correct result.

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Timothy Grinsell

Social choice theory and linguistic vagueness

Why are some gradable adjectives–like *tall*–vague, while other gradable adjectives–like *empty*–are not? To answer this question, we must look to Congress.

We look not to its laws, but to its voting patterns. This paper applies social choice theory, the branch of economics concerning aggregated preferences, to linguistic accounts of vagueness. Social choice theorists noted long ago that cycles (or intransitivities, e.g. A is preferred to B is preferred to C is preferred to A) may arise in a decision-making body like Congress whenever such a body tries to choose among three or more options (Arrow 1951). Surprisingly, the same results obtain whenever a single individual aggregates multiple criteria into a single decision (Arrow and Reynaud 1986). This paper explains vagueness as a result of cycle-avoidance in language use. Specifically, vagueness is a strategy for avoiding cycles when using predicates, like *tall*, that invoke multiple criteria in their semantics.

Cycles paralyze decision making, so Congress and individuals should avoid them. However, Arrow's Impossibility Theorem shows that, under minimal assumptions, avoiding cycles is impossible (Arrow 1951). Arrow suggested four weak assumptions for ensuring rational decision making in a collective body and, later, in individual decision making. For voters and candidates, these assumptions, in simplified form, are (1) **Range**: voters may order the candidates in any way; (2) **Unanimity**: if all voters prefer one candidate, the final decision should reflect this; (3) **Independence of irrelevant alternatives**: in deciding between two candidates, voters should evaluate those candidates without regard to other candidates that might be introduced later; and (4) **Nondictatorship**: one voter's preferences shouldn't override the preferences of other voters. For an individual making a multicriterial decision, replace 'voter' with 'criteria' and 'candidate' with 'alternative.' (For the technical spell-out of these assumptions, see (Arrow and Raynaud 1986:18-21).)

Multicriterial decision making is evident in the semantics of so-called 'multidimensional' gradable adjectives, like *clever* (see Egrè and Klinedinst 2011:10; Sassoon 2011). An adjective like *clever* might involve multiple criteria like language skills and mathematical talent, and in such a case, the Arrowian assumptions are reasonable: an individual should be ranked independently–and without constraint–according to her language skills and her mathematical talent; if both language skills and mathematical talent weigh in favor of calling an individual 'clever,' she should be so-called; if the speaker is comparing the cleverness of A to the cleverness of B, the cleverness of C should not matter; and neither language skills nor mathematical talent should be the sole determinant of whether someone is 'clever.' Of course, these assumptions, and the attendant decision procedure, may be more or less conscious for an ideal speaker (see Arrow and Raynaud 1986).

This paper proposes to extend the multicriterial model to adjectives like *tall*. Assume, following (Klein 1980), that the possible descriptors for an individual are (T)all, (N)ot tall, and (U)nsure. Traditionally, an adjective like *tall* is taken to have only one dimension on which to rank the alternatives T, N and U, that of HEIGHT (Kennedy 2007). However, there are two such dimensions, each corresponding to a locus of context sensitivity. Drawing on evidence from implicit comparison, Kennedy provides the following semantics for *tall* in its positive form: $[\![tall]\!] = \lambda g \lambda x.g(x) \geq s(g)$. In this denotation, s is a context-sensitive function (with g the measure function denoted by the adjective) that (1) provides a standard of comparison (for present purposes, a contextually determined comparison class) and (2) ensures that the individual 'stands out' (in some contextually determined way) with respect to that standard. The two loci of context sensitivity are the comparison class and the

[2]stand-out' relation, and these comprise the two criteria in the semantics of adjectives like *tall*.

To see how cycling may result from these two criteria, assume that each point of contextual sensitivity is a criterion in the decision-making procedure (that is, in the semantics of the predicate). In the utterance *John is tall*, the relevant alternatives for describing John are T, N, and U. Suppose John is in a class of four same-aged children. The heights of the children are as follows:

(1) Child 1 (50cm)————————————John (98cm)–Child 2 (99cm)–Child 3 (1m)

Let's say that the speaker, considering the relevant comparison class for John, cannot decide between the alternatives T and U. Designate this scenario T∼U. Likewise, the speaker cannot decide between the alternatives U and N: U∼N. However, given the alternatives T and N and John's relevant comparison class, the speaker chooses T>N. Now assume that the 'stand out' relation, another criterion, strictly ranks the alternatives N>U>T. That is, John definitely does not 'stand out' in a way that suggests he is tall.

Thus, in terms of the first context-sensitive criterion–the comparison class–the speaker prefers T>N. However, where the comparison class criterion is equivocal between U and N (U∼N), the 'stand out' criterion ranks N>U. Similarly, where the comparison class criterion is equivocal between T and U (T∼U), the 'stand out' criterion ranks U>T. So, if the 'stand out' criterion breaks the 'ties' created by the comparison class criterion, N>T. But the comparison class criterion ranked T>N. We have achieved an intransitivity–a cycle. (For a similar example, see (van Deemter 2010:47-51).)

The potential cycling in doubly context-sensitive adjectives pairs with another linguistic fact: 'relative' gradable adjectives like *tall* display vagueness, while 'absolute' adjectives like *empty* do not (Kennedy and McNally 2005; but see Burnett 2011). While the syntactic and semantic tests distinguishing relative from absolute adjectives are not crucial here, (Kennedy 2007)'s generalization is: absolute adjectives do not have the second contextually sensitive criterion, the 'stand out' relation. Notably, without multiple criteria, the decision-making procedure about whether to use an absolute adjective like *empty* is not subject to cycling.

These facts suggest that the phenomenon of vagueness arises as a mechanism to avoid cycling. Therefore, it only arises where the semantics of the adjective incorporates at least two criteria. First, vagueness avoids cycling by violating an Arrowian assumption, that of the Independence of irrelevant alternatives. Recall that cycles result when a decision-making procedure respects all of Arrow's assumptions; by violating an assumption, the decision-making procedure can preserve transitivity. As (van Rooij 2011) has recently pointed out in his discussion of PRAGMATIC GAPS, the addition of a third entity can affect the semantic judgment between two unrelated entities (van Rooij 2011:68-69). Thus, the violation of Independence, needed on other grounds for adjectives like *tall*, avoids cycling. Second, the need to avoid cycling does not arise for adjectives without multicriterial semantics; therefore, vagueness does not occur with these adjectives, *contra* the reasons given in (Kennedy 2007). This explains the relative/absolute adjective dichotomy with regard to vagueness.

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On the natural history of negative polarity items

Jack Hoeksema

Some 50 years of work on polarity items has brought us many theories and classifications of polarity items. This talk will provide an overview of the various accounts and classifications found in the literature, such as the extended Zwarts hierarchy: antimorphic > anti-additive > downward entailing > nonveridical, all based on entailment properties of the contexts in which the items may appear. I will consider extensions of this model to deal with presuppositions, in particular Strawson-entailment (von Fintel 1999), and will argue that some polarity items are also sensitive to conversational implicatures. I will argue against concentric classifications such as the Zwarts hierarchy, and will argue that a proper treatment of the full range of polarity items yields a more complicated picture. Theories that allow for multiple licensing (or anti-licensing) requirements, such as those of Linebarger and Giannakidou, will be compared to "silver bullet" theories such as those of Zwarts and Von Fintel, that assume one licensing property per item.

Graham Katz, Paul Portner & Aynat Rubinstein

Ordering Combination for Modal Comparison

Background. On Kratzer's well-known analysis (Kratzer 1981, forthcoming), comparative modal predicates such as *more likely* and *more permissible* are treated in terms of the relation **better possibility** which itself is defined in terms of an ordering on possible worlds induced by contextual factors. As is familiar, a contextually-determined *modal base* $f(w)$ picks out the accessible worlds ($\cap f(w)$), and these are ordered by a set of relevant propositions—the *ordering source* $g(w)$—such that for any two worlds v, z in $\cap f(w)$, $v \leq_{g(w)} z$ ("v comes at least as close to the ideal $g(w)$ as z does") iff every ordering source proposition which holds in z also holds in v. One way of defining comparative possibility is given in (1).

(1) p is **at least as good a possibility** as q in w with respect to f and g iff
there is no accessible world in $q - p$ that is more ideal (higher ranked by $\leq_{g(w)}$) than every accessible world in $p - q$; p is a **better possibility** than q iff p is at least as good a possibility as q but not vice versa. (Kratzer, forthcoming)

A number of challenges have called into question the viability of the ordering-based approach in general (e.g., Portner 2009, Yalcin 2010, Lassiter 2011). In this talk, we address two puzzles which exemplify important features of these challenges, and present solutions to these puzzles which point toward a deeper understanding of comparative modality. Our main idea is to introduce mechanisms for constructing derived ordering sources used to interpret modal expressions. The resulting ordering sources model (i) how expectations or requirements "add up", and (ii) how ranked sets of expectations or priorities are combined.

Challenge 1: Expectations adding up. Lassiter (2011) argues that Kratzer's approach to comparative likelihood yields unintuitive results in cases such as (2), in which the number of expectations satisfied seems central to determining what is likely.

(2) [Context: Bill is extremely predictable. He almost always drives to and from work, arrives home by 6 p.m., and has macaroni for dinner.] It is more likely that Bill will have something other than macaroni for dinner than it is that he will both fail to be home by 6 p.m. *and* fail to drive his car.

(2) would typically be taken to be true here. But the **better-possibility** relation induced by $\leq_{g(w)}$ (where the ordering source $g(w)$ contains the three expectations that Bill drives, that he is home by 6, that he has macaroni), does not predict the truth of (2), because certain worlds in which Bill fails to have macaroni are not related by $\leq_{g(w)}$ to certain worlds in which he fails on the other two expectations. The judgement that (2) is true appears to be based on a different, derived, ordering source: one that models the intuition that the more expectations in $g(w)$ are satisfied, the better.

(3) **Expectations/priorities adding up**
For any ordering source A, $OS_{add\text{-}up}(A) =_{def.} \bigcup_i p_i$,
where $p_i =_{def.} \{w :$ at least i propositions in A are true in $w\}$.

The **better-possibility** relation induced by the derived ordering source $OS_{add\text{-}up}(g(w))$ correctly models truth judgements about (2), since worlds in which only one expectation fails are more highly ranked according to $\leq_{OS_{add\text{-}up}(g(w))}$ than those in which two fail. We claim such derived ordering sources are often the basis for statements of comparative modality.

Challenge 2: Multiple orderings. Comparative modality is also often sensitive to multiple orderings. The truth of (4) in the context given, for example, is sensitive to the likelihood of outcomes as well as their desirability (Goble 1996, Lassiter 2011):

(4) [Context: A doctor must choose one of two medicines—A or B—to administer to a critically ill patient. A has a small chance of producing a total cure and a large chance of killing the patient. B is sure to save the patient's life, but will leave him slightly debilitated.] It is better to administer medicine B than to administer medicine A.

We propose that cases such as this are to be analyzed in terms of a **better-possibility** relation based on an ordering source derived from a prioritized sequence of ordering sources (cf. Kratzer 1981, von Fintel and Iatridou 2008). For (4), there is a stereotypical ordering source that models the likelihood of outcomes (OS_1) which takes priority over an ordering source capturing desirability of outcomes (OS_2). In (5) we define a general merging operation for ordering sources which gives priority to the considerations encoded in the first.

(5) **Ordered merging of expectations/priorities**
$g_1 * g_2 =_{def.} g_1 \cup \{\bigvee\{\bigwedge x | x \in c_{n+1}\} \vee ((\bigvee\{\bigwedge x | x \in c_n\}) \wedge y),$
where for $n \geq 0$, c_n is the set of all subsets of g_1 of cardinality n, and $y \in g_2\}$

This operation of *-merging is analogous to the lexicographical *-combination of posets: the secondary ordering g_2 only plays a role in ordering a pair of worlds when the primary g_1 doesn't determine a linear ordering between them

For concreteness, we characterize the context of (4) in (6). L1 and L2 are expectations about biological processes (e.g., "the patient's endocrine system produces the normal variant of gutsophine"; "the patient's immune system reacts to medicine A"), and knowledge about the interaction of L1 and L2 with medicines A and B is encoded in the modal base:

(6) Modal base: taking B leads to survival of the patient but not full recovery,
taking A when L2 occurs leads to death,
taking A when ¬L2 and ¬L1 occur leads to death,
taking A when ¬L2 and L1 occur leads to complete recovery, ...
OS_1: $OS_{add\text{-}up}(\{L1, L2\}) = \{ L1 \wedge L2, L1 \vee L2 \}$
(The most likely worlds are those in which both L1 and L2 happen;
The least likely are those in which neither happen.)
OS_2: { The patient lives, The patient is perfectly healthy }
(The most desirable worlds are those in which patient lives perfectly healthy;
the least desirable are those in which patient dies.)

Given (6), the merged ordering source OS_1*OS_2 ranks highest those worlds in which L1 and L2 both occur and yields a **better-possibility** ordering according to which (4) is true.

Summary. We show how two problems for ordering semantics can be solved through the use of ordering sources derived by adding up and merging of simpler ordering sources. These proposals have application to other puzzles which arise with expressions of comparative modality and weak necessity, and future work should extend them to the compositional treatment of gradable modals, and to quantitative expressions of probability and possibility.

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Magdalena Kaufmann & Stefan Kaufmann

Epistemic particles and performativity

Summary: The German discourse particles *ja* and *doch* both mark the information expressed by their host sentence as somehow given, obvious, or uncontroversial (McCready & Zimmermann 2011 call them 'epistemic particles'). Two things are puzzling: (*i*) despite its 'epistemic' nature, *doch* can appear in imperatives and with performative modals; (*ii*) despite their similarity, *ja* is unacceptable in imperatives and forces a descriptive reading of modal verbs. We explain (*i*) by the assumption that performativity arises for modalized propositions in particular contextual constellations. Particles signal specific contextual constellations, which may affect the availability of performative readings. To account for (*ii*), we offer a novel analysis for *ja* and *doch* that explains the inviolable ban against *ja* (but not *doch*) from performative modal contexts in terms of monotone vs. non-monotone inferences. Our account contrasts with explanations for violable effects discussed and derived elsewhere (in particular Grosz, t.a.).

Meaning of *ja* and *doch*: It is generally agreed that discourse particles don't contribute to the truth-conditional content, but it is still under dispute if they trigger presuppositions, express conventional implicatures, or convey expressive meaning of yet another sort. In this talk we focus on the content of the particles' meaning. We are not entirely convinced by the arguments against a presuppositional analysis (cf. Zeevat 2002, McCready & Zimmermann 2011) and will for the moment treat them as presuppositions (with e.g. Grosz t.a.). We focus on unstressed *ja* and *doch*. The literature on *ja* and *doch* offers various formulations of 'given'/'old'/'uncontroversial', but thus far no formal analysis claims to capture all usages of either. Both range from marking something as mutual joint belief to marking that the speaker S has just realized something about her immediate environment (*doch* can replace *ja* in (1) which changes the flavor only slightly; its appearance in speaker-surprise cases like (2) depends on focus structure, Grosz t.a.).

(1) Wir haben ja schon gesagt, dass wir hingehen, aber brauchen wir das Auto?
we have JA already said that we to.there, but need we the car
'As we've already established, we'll go there, but do we need the car?'

(2) Oh, du hast ja ein Loch im Ärmel!
oh, you have JA a hole in.the sleeve
'Oh, you have a hole in your sleeve!'

We propose that both particles express that S takes p to be easily derivable in the utterance situation (from information already available or the extra-linguistic settings), but with a slight difference in degree of strength. *doch* imposes the additional requirement that its host sentence be contextually incompatible with another salient piece of information (Karagjosova 2004, Egg 2010, Grosz t.a.). We say 'ϕ presupposes ψ' to mean that an utterance of ϕ commits S to the belief that ψ is mutual joint belief (cf. Stalnaker 2002), i.e. upon S's utterance of ϕ it becomes mutual joint belief that S believes that ψ is mutual joint belief (in short, $C_{S,H}B_SC_{S,H}\psi$).

(3) *ja*(p) uttered in c presupposes that in any situation like c any rational agent who tries to find out whether p will find out that p (from information available or immediate surroundings).

(4) *doch*(p) uttered in c presupposes that
   a. in a situation like c, **normally**, a rational agent who tries to find out whether p will find out that p (from information or immediate surroundings), and
   b. there is a salient q s.t. (at least given mutual joint belief) it is incompatible with p and, before the utterance, either S or H could not exclude q.

Performativity: Kaufmann (2011) claims that imperatives (*i*) denote modalized propositions and (*ii*) carry presuppositions which are satisfied in just those contexts in which modal verbs receive performative interpretations. For a proposition of the form *It is best according to f and g that you do p* (f a suitable modal base, g a deontic, bouletic, or teleological ordering source, cf. Kratzer 1991; in short, $\Box^{f,g}p$), the relevant contexts are those in which the following is entailed by mutual joint belief between S and H.

(5) a. S has perfect knowledge of f and g:

$f, g \in \{r \in D_{s((st)t))} \mid \forall p[p \in r \leftrightarrow B_S(p \in r)]\}$ **Authority Condition** (AC)

b. When uttering the imperative, S believes that H is not already independently determined to either do p or not do p. **Epistemic Uncertainty Condition** (EUC)

c. There is a salient decision problem $\Delta_c \subseteq Pow(W)$ s.t. the ordering source g provides the relevant criteria and the imperative picks out a solution for Δ_c.

Ordering Source Restriction (OSR)

[simplified to ignore imperatives unrelated to action, see Kaufmann 2011]

Together, these ensure that the following are also mutual joint belief:

(6) a. S considers it possible that H does not know $\Box^{f,g}p$ independently of the imperative. (Else, because of (5c), S would believe that H will do p independently of the imperative, which would be incompatible with (5b).)

b. Because of (5c), a rational agent will try to find out whether $\Box^{f,g}q$ for all $q \in \Delta_c$.

Combining particles and performativity: Assume that S and H take each other to be competent speakers of German who meet the standards of rational behavior. Consider first *ja*:

(7) If *ja*($\Box^{f,g}p$) is uttered felicitously in c, the following is mutual joint belief in c:

a. If H tries to find out whether $\Box^{f,g}p$, H will find out $\Box^{f,g}p$. from *ja*, cf. (3)

b. H does not know $\Box^{f,g}p$ independently of the imperative. (6a)

c. H tries to find out whether $\Box^{f,g}p$. (6b)

d. H knows $\Box^{f,g}p$ independently of the imperative. (7a),(7c)

Thus under straightforward assumptions about the rationality and competence of S and H, from the combination of performative modality and *ja* we derive the contradiction between (7b) and (7d). Therefore we predict *ja* to be unavailable in imperatives and with performative modals. None of the conditions in (5) need to hold if a modal is used descriptively, hence the conflict need not arise for such cases. Now, consider *doch*:

(8) If *doch*($\Box^{f,g}p$) is uttered felicitously in c, the following is mutual joint belief in c:

a. S believes defeasibly that, if H tries to find out whether $\Box^{f,g}p$, she will find out that $\Box^{f,g}p$. from *doch*, cf. (4a)

b. There is a salient q s.t. (at least with respect to mutual joint belief) q is incompatible with $\Box^{f,g}p$ and before the utterance, H could not exclude q. from *doch*, cf. (4b), and (5a)

c. H does not know $\Box^{f,g}p$ independently of the imperative. (8b)

d. H tries to find out whether $\Box^{f,g}p$. (6b)

With *doch*, the inference from (8d) and (8a) to 'H knows $\Box^{f,g}p$ independently of the imperative' is defeasible and, in this context, blocked by (8b). The *doch*-speaker is committed to the belief that even though H should have been able to find out $\Box^{f,g}p$ herself, she failed to. The *doch*-move is correctly predicted to be felicitous. The prediction of a slight derogatory flavor ('H failed to see an obvious solution') strikes us as correct, too.

Conclusion We offer an account for *ja* and *doch* as interacting with the contextual constellations observed with performative modality/imperatives. The meaning of *doch*, but not of *ja* allows to block a defeasible inference that would render the particle infelicitous in the constellations required for performative modality/imperatives. Future research should investigate differences between various modals (*can/must/should*) as well as a precise account of what is meant by 'trying to find out' (logical reasoning, awareness, ...).

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Gregory Kierstead & Scott Martin

The Hybrid Status of the Reportative Evidential in Tagalog

Potts (2005) discusses the class of conventional implicatures (CIs), which project in the sense of Simons et al. (2010): e.g., in (1) the implication of the appositive *a doctor* persists even when embedded under the modal *maybe*:

(1) Maybe Susan, a doctor, is from Texas.

As (1) is only felicitous if the appositive contains new information, Potts argues that it is not a presupposition. He also argues that its content is "scopeless" because it must be interpreted in the global context: (1) cannot mean that maybe Susan is a doctor.

In Tagalog, the reportative evidential *daw* is associated with an implication that the proposition expressed by its prejacent has been previously reported. We give instances from our original fieldwork data of *daw* embedded under a modal, where an implication associated with the evidential is new but still projects. We believe this constitutes the first clear evidence of an evidential with a projective implication (as defined by Simons et al.) in any language: McCready and Ogata (2007) and Lee (2011) propose instances of projective evidentials, but their data do not demonstrate projection under embedding. Further, our data also show that *daw* participates in scope interactions with respect to embedding operators, an environment not previously attested (although Harris and Potts (2009) discuss CIs scoping within attitude verbs). This full pattern is summarized by (2):

(2) Baka tumahol daw si Fido.
Maybe bark RPT NM Fido
'Maybe Fido barked, as it was reported that he did.' (P)
'Maybe it was reported that Fido barked.' (NS)
'It was reported that maybe Fido barked.' (WS)

Depending on context, (2) can have a projective reading (P) where it is possible Fido barked but the report that Fido barked is implied in the global context (only). An interpretation with *daw* taking narrow scope (NS) is also available, under which the reportative implication falls within the scope of the modal. Finally, a wide scope *daw* interpretation (WS) is available, where the reported proposition is that maybe Fido barked.

We reject Schwager's (2010) account of *daw* as a presupposition on the grounds that examples like (2) are perfectly felicitous in an out-of-the-blue context (as *daw* generally is), and thus presuppositional accounts require widespread accommodation and lack explanatory value. Moreover, it is impossible to capture the pattern in (2) in Potts's framework, since *daw* is not scopeless. Building on our own recent work, we propose a novel analysis of *daw* as a hybrid between a CI and scope-taking operator in a dynamic semantics that allows utterance components to contribute to either the root ('global') common ground (CG) or to the embedded ('local') one. Following Amaral et al. (2007) and AnderBois et al. (2010), our approach remedies a serious flaw in Potts's semantics by allowing anaphora between the root and embedded meaning "dimensions." This new framework, which updates and improves on Heim (1982) by being fully compositional, can additionally model discourse anaphora and other types of presupposition.

We assume the standard types e (of entities) and p (of propositions). Proffered contents (type k) are functions from contexts to contexts, where a context is a function from a sequence of n entities to a pair of propositions (type $\mathrm{c} =_{\mathrm{def}} \mathrm{e}^n \to (\mathrm{p} \times \mathrm{p})$). We write a proffered content as $\lambda_{c\mathbf{x}^{\overline{c}}} \langle p, q \rangle$, where (1) c is a context, (2) $\mathbf{x}^{\overline{c}}$ is a sequence of entities

whose length is the arity of c (written $\overline{c}$), and (3) p and q are the contributions to the root and embedded CGs, respectively. Discourse referents (DRs) are modeled as natural numbers (type n): $\mathbf{x}_i$ is the i-th member of the sequence $\mathbf{x}$.

We give a mostly standard dynamic treatment to the intransitive verb *tumahol*, nominative marker *si*, and proper name *Fido*:

$$\textsc{tumahol} =_{\text{def}} \lambda_{nc\mathbf{x}^{\overline{c}}} \langle \mathsf{true}, \mathsf{bark}\, \mathbf{x}_n \rangle \qquad \textsc{si} =_{\text{def}} \lambda_N N \qquad \textsc{fido}_i =_{\text{def}} \lambda_D . D\, i$$

The dynamic property TUMAHOL (type $\mathrm{d} =_{\text{def}} \mathrm{n} \to \mathrm{k}$) only contributes to the embedded CG, $\textsc{fido}_i$ is a dynamic generalized quantifier (GQ) that passes the DR i to a dynamic property (suppressing here the requirement that the root CG entails that $\mathbf{x}_i$ is Fido), and the nominative marker SI is semantically the identity function. We model *daw* to both take scope and have its reportative implication project:

$$\textsc{daw}_S =_{\text{def}} \lambda_{QDc\mathbf{x}^{\overline{c}}} \langle \mathbf{rt}\, (Q\, D\, c\, \mathbf{x}), \mathsf{report}\, (\mathbf{em}\, (Q\, D\, c\, \mathbf{x})) \rangle$$

$$\textsc{daw}_P =_{\text{def}} \lambda_{QDc\mathbf{x}^{\overline{c}}} \langle \mathbf{rt}\, (Q\, D\, c\, \mathbf{x})\ \mathsf{and}\ \mathsf{report}\, (\mathbf{em}\, (Q\, D\, c\, \mathbf{x})), \mathbf{em}\, (Q\, D\, c\, \mathbf{x}) \rangle$$

where **rt** and **em** give the root and embedded CG, respectively. Both *daw*s are polymorphically typed: either Q is a dynamic GQ and D a dynamic property, or else Q is a unary property of proffered contents and D a proffered content. The scoping $\textsc{daw}_S$ passes through the root CG given by its arguments, and contributes to the embedded CG the proposition that their embedded CG contributions were reported. The projective $\textsc{daw}_P$ contributes the report to the root context, while passing through both CGs contributed by its arguments. The modal BAKA passes through its argument's root CG, contributing the proposition that its argument's embedded CG contribution is possible:

$$\textsc{baka} =_{\text{def}} \lambda_{kc\mathbf{x}^{\overline{c}}} \langle \mathbf{rt}\, (k\, c\, \mathbf{x}), \mathsf{maybe}\, (\mathbf{em}\, (k\, c\, \mathbf{x})) \rangle$$

These lexical entries allow the three readings for *daw* in (2) to be derived:

$$\textsc{baka}\ \textsc{daw}_P\ (\textsc{si}\ \textsc{fido}_i)\ \textsc{tumahol} \equiv \lambda_{c\mathbf{x}^{\overline{c}}} \langle \mathsf{report}\, (\mathsf{bark}\, \mathbf{x}_i), \mathsf{maybe}\, (\mathsf{bark}\, \mathbf{x}_i) \rangle \qquad \text{(P)}$$

$$\textsc{baka}\ \textsc{daw}_S\ (\textsc{si}\ \textsc{fido}_i)\ \textsc{tumahol} \equiv \lambda_{c\mathbf{x}^{\overline{c}}} \langle \mathsf{true}, \mathsf{maybe}\, (\mathsf{report}\, (\mathsf{bark}\, \mathbf{x}_i)) \rangle \qquad \text{(NS)}$$

$$\textsc{daw}_S\ \textsc{baka}\ (\textsc{si}\ \textsc{fido}_i)\ \textsc{tumahol} \equiv \lambda_{c\mathbf{x}^{\overline{c}}} \langle \mathsf{true}, \mathsf{report}\, (\mathsf{maybe}\, (\mathsf{bark}\, \mathbf{x}_i)) \rangle \qquad \text{(WS)}$$

In the (P) reading, the implication that maybe Fido barked is contributed to the embedded CG, and the report of his barking to the root CG. The other two readings leave the root CG untouched, yielding the two possible scopings of $\textsc{daw}_S$ with respect to BAKA.

In sum, this work makes both an important empirical contribution and an important theoretical one. Our fieldwork has produced new data showing that *daw* is the first known instance of an evidential that can both project and take scope beneath other operators. Our novel formal analysis preserves desirable attributes from Heim, contributing compositionality and the ability to capture the behavior of CIs in addition to anaphora and presuppositions. Most importantly, our framework is the first we are aware of that is capable of accounting for the hybrid status we observe for *daw* in our empirical work, further contributing to the understanding of non-presuppositional projective meaning.

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Many Readings of *Most*

The literature recognizes at least three distinct readings of *many*, cardinal, proportional, and reverse proportional (RP) (Westerståhl 1984, Partee 1988, Büring 1996, Herburger 1997, Cohen 2001).

(1) Many Scandinavians are Nobel prize winners
   a. |Scandinavian Nobel prize winners| is large$_C$ *(Cardinal)*
   b. |Scandinavian Nobel prize winners|/|Scandinavians| is large$_C$ *(Proportional)*
   c. |Scandinavian Nobel prize winners|/|Nobel prize winners| is large$_C$ *(RP)*

In this paper, we observe that the same multiple ambiguity of *many* exists with *most* as well. Furthermore, we identify a new reading of *most*, which we call the *"fragile" superlative reading*. We claim that this finding lends support to Hackl's (2009) decompositional analysis of *most* as being composed of *many* and the superlative morpheme *-est*.

>1/2 and superlative readings of *most*: Two readings of *most* are discussed in the literature: a reading similar to *more than half*, henceforth >1/2 reading, (2), and a superlative reading, (3) (Szabolcsi 1986, Heim 1999, Hackl 2009, Kotek et al. 2011).

(2) John talked to most of the students *(>1/2)*
   ≈ |students John talked to| > |students John did not talk to|

(3) John talked to the most students *(Superlative)*
   ≈ for all salient alternatives *x* to John : |students John talked to| > |students *x* talked to|

RP superlative reading of *most*: Although previously unnoticed in the literature, *most* has a third reading, which we call a RP superlative reading. Consider (4), the RP reading of which compares proportions of semanticists from different countries.

(4) Of China, the Netherlands, and the US, the Netherlands has the most semanticists

Suppose that there are many more semanticists in China and the US combined than in the Netherlands. Hence the >1/2 reading is false. Also assume that more come from the US than from the Netherlands, which makes the superlative reading false. Suppose further that the proportion of Dutch semanticists out of the Dutch population is larger than the corresponding proportions among the US and Chinese populations. In this situation, (4) is judged true. This reading, we claim, is similar to the RP reading of *many*.

"Fragile" superlative of *most*: In addition to the above mentioned three readings of *most* (>1/2, superlative, RP superlative), we observe that there is yet another reading of *most*. This reading most prominently manifests itself in "strong" environments, for example in the subject position of individual-level predicates (Kratzer 1995, Diesing 1992). As Kotek et al.'s (2011) experiments show, a superlative reading of *most* in subject position is generally latent and its acceptability varies across speakers. We observe that speakers who can access a superlative reading of (5), where the main predicate is stage-level, accept it in a situation like, 9 in CA, 4 in MA, 4 in IL, 4 in TX, ..., regardless of the number of comparisons.

(5) Most of the students are in California

For the parallel example (6), however, speakers report a "breaking point" in the judgment, i.e. in this case after 5-6 comparisons have been made, the sentence becomes false. Consider the situation, 9 from CA, 4 from MA, 4 from IL, 4 from TX, ...

(6) Most of the students are from California

This "fragile" superlative reading of (6) is characterized by sensitivity to the number of comparisons, and to the distance between the numbers compared, unlike the previously recognized "regular" superlative reading of (5), which is truth conditionally insensitive to both of these factors.

Analysis: Hackl (2009) proposes a decompositional analysis of most as *many+-est*, which we adopt there. He assumes that *many* and *-est* have the semantics in (7), and are base-generated as sisters. Notice in particular that (7a) is a cardinal semantics for *many*.

(7) a. $[\![\text{many}]\!] = \lambda d.\lambda x.|x| \geq d$
   b. $[\![\text{-est}]\!](C)(P)(x) \Leftrightarrow \exists d[P(d)(x) \wedge \forall y \in C[y \neq x \Rightarrow \neg P(d)(y)]]$

Hackl assumes that in order to solve a type-mistmach, *-est* undergoes covert movement. He attributes the $>1/2$ and superlative readings of *most* to the scope of *-est* and different comparison classes C that *-est* takes. Roughly put, if *-est* moves DP-internally, a $>1/2$ reading is derived with C set to pluralities of students closed under i-sum formation. If *-est* moves into the matrix clause, on the other hand, a superlative reading is derived, with the comparison class C comprising of all relevant individuals.

(8) a. $[\![$John talked to most of the students$]\!] \Leftrightarrow \exists d \exists X[\text{students}(X) \wedge \text{John talked to } X \wedge |X| \geq d \wedge \forall Y \in C[Y \neq X \Rightarrow \neg\, |Y| \geq d]]$

b. $C = {}^*[\![\text{student}]\!]$

(9) a. $[\![$John talked to the most students$]\!] \Leftrightarrow \exists d \exists X[\text{students}(X) \wedge \text{John talked to } X \wedge |X| \geq d \wedge \forall y \in C[y \neq \text{John} \Rightarrow \neg\, \exists Y[\text{students}(Y) \wedge y \text{ talked to } Y \wedge |Y| \geq d]]]$

b. $C \subseteq D_e$

Adopting Hackl's decompositional analysis, we suggest that the different readings of *most* are derived from different readings of *many*. Specifically, we propose that cardinal *many* is used to derive the familiar $>1/2$ and superlative readings of *most* as in (8) and (9), while the RP *many* (1c), yields the RP superlative reading of *most*, and the proportional *many* yields the fragile superlative reading. While the RP superlative reading of *most* follows rather straightforwardly in the present analysis, assuming that *many* has the RP semantics, the fragile reading merits some discussion.

Deriving the fragility: Why does the proportional *many*+*-est* give rise to the fragile reading? We claim that this is because the proportional *many* is "cardinally evaluative", as illustrated in (10).

(10) $[\![\text{Many}_p\ As \text{ are } Bs]\!] \Leftrightarrow [|A \cap B|/|A| > r_C] \wedge [|A \cap B| > s_C^A]$

Here r_C is the contextually determined standard for large proportions, and s_C^A is the contextually determined standard for large cardinalities relative to A. For our purposes, it is crucial that s_C^A is relativized to A. Notice that we are departing from the standard truth conditions for the proportional *many*, (1b), where the second conjunct of (10), i.e. the cardinal evaluativity, is absent. However, its effect is hard to observe with the proportional *many*, as situations where the proportional truth conditions, i.e. the first conjunct of (10), are true are often ones where the cardinal evaluativity is also satisfied (cf. Partee 1988). However, we claim that the superlative construction brings its effects to the surface in the form of the fragility effect. To corroborate this proposal, we observe a similar context sensitivity between the cardinal *many*, whose truth conditions are equivalent to the second conjunct of (10), and the fragile superlative reading of *most*.

Consider the following sentence, whose truth conditions we assume are $[|\text{blue dots}| > s_C^{\text{dots}}]$.

(11) In this picture of dots, there are many blue ones

Suppose that there are 9 blue dots, and n non-blue dots. As n increases, there is a breaking point at which the sentence becomes false. Crucially, we observe that this pattern of judgments mirrors that of the following sentence with *most* under the fragile superlative construal, in the sense that they become false in the same situations.

(12) Most of the dots are blue

Suppose now that there are 9 blue dots, 4 yellow dots, 4 red dots, etc. As explained above, the fragile superlative reading becomes false after 5 or 6 comparisons in such a situation. Our observation is that the point at which (12) becomes false is the same point at which (11) becomes false. Interestingly, the judgments for (12) are also affected by the composition of the non-blue dots, and so are the judgments for (11). Suppose that there are 9 blue dots, 2 yellow dots, 2 red dots, etc. Compared to the earlier situation, both (11) and (12) stay true with more comparisons than 5 or 6.

In order to explain this parallelism, we propose that *-est* only operates on the proportion argument of $many_p$ and retains its cardinal evaluativity. Thus, the truth conditions for the fragile superlative reading of (12) look as follows.

(13) For all non-blue colors c, $[|\text{blue dots}|/|\text{dots}| > |c \text{ dots}|/|\text{dots}|]$ and $[|\text{blue dots}| > s_C^{\text{dots}}]$

Notice that (13) entails (11), which captures the parallel judgments.

Manfred Krifka

Negated Polarity Questions as Speech Act Denegations

(Abstract for talk)

Ladd (1981) has observed an ambiguity in questions like like the following:

(1) Isn't there a vegetarian restaurant around here?

In one reading, the speaker expresses a bias that there is a vegetarian restaurant. Ladd proposed to treat the two readings as resulting of a scope ambiguity of negation. In the clearly biased case, negation is "somehow outside the proposition under question". In the other case, it is within the proposition; for example, it licenses NPIs (*Isn't there any vegetarian restaurant around here?*). In other languages, the scope difference may appear overtly. In German, the positively biased reading is rendered with a syntactically "high" negation, whereas the other has a negative determiner *kein* indicating propositional negation (cf. Büring & Gunlogson 2000):

(2) a) *Gibt es hier nicht ein vegetarisches Restaurant?*
b) *Gibt es hier kein vegetarisches Restaurant?*

Reading (b) is unproblematic. There are a number of proposals to explain reading (a), but they all come with problems, as I will argue. For example, Romero & Han (2002) assume that the negation either scopes over or under a verum operator, a modal operator informally rendered by FOR-SURE (= FS). This results the propositions FS('there is a v.r.') and ¬FS('there is a v.r.'), which should generates a bias towards the proposition. I argue that this is not the case, as the corresponding alternative question, *Is it for sure that there is a vegetarian restaurant, or not?* does not seem to generate this bias. I will also discuss proposals by Rooy & Šafářová (2003), Reese (2006), Venhuizen (2011) and AnderBois (2011).

My own proposal will that the high negation in scopes over a speech act. In this, it is similar to **denegation** of speech acts, as in *I don't promise to come* (cf. Hare 1970). Such negations over speech acts were modeled in Cohen & Krifka (2011) in a formal framework that assumes that participants in a conversation enact changes of commitment states. For example, if c represents the **development of commitments** up to the current point in conversation, then an assertion of *There is a vegetarian restaurant around here* by speaker s adds to c the responsibility of s with respect to the addressee a for the truth of the proposition 'there is a v.r.', for short. In general, assertion of a sentence radical denoting a proposition φ can be rendered as follows:

(3) $c + ASS_{s,a}(\varphi) = \{c, [s \text{ is responsible to a for truth of } \varphi],$
$[\varphi \text{ becomes part of the common ground of s and a}]\}$

It depends on the nature of the uptake of this move by the addressee whether this is illocutionary act achieves its perlocutionary purpose; a can either accept it or reject it.

To treat acts like grants and denegations, Cohen & Krifka propose to represent conversations by sets of commitment developments with a minimal element (the root) and other elements that represent the possible continuations. Such sets are called **commitment spaces**. If C is such a set, √C is its root, $c \leq c'$ renders that c′ is a possible continuation of c (a transitive relation), and A is a speech act, then the update of C with a simple speech act consists of all the elements in C that can follow the root of C updated with A:

(4) $C + A = \{c \in C \mid [\surd C + A] \leq c\}$

Denegation of a speech act A is defined more strictly than in Cohen & Krifka (2011), as removing from C all the continuations of an update with A. For example, *I don't promise to come*, uttered by s to a at C, excludes the speech act that would be expressed by *I (hereby) promise to come*, uttered by s, and all its continuations.

(5) $C + {\sim}A = \{c \in C \mid \neg\, \exists c'[c' + A] \leq c\}$

The second ingredient for the treatment of "high" negations in polarity questions is to distinguish between regular questions and speech-act questions. I assume that in a **regular question** (*yes/no*, *wh* or alternative) the question operator is applied to a question sentence radical, assumed here to denote a **set** of propositions Φ. The resulting speech act leaves the root of the input commit space C intact, but restricts its further developments to those at which one of the propositions in Φ is asserted by the addressee. The addressee can reject this move; if he doesn't, he is forced to make one of these assertions in the next move (or an assertion that implies one of these assertions, to account for indirect answers).

(6) $C + QU_{s,a}(\Phi) = \{\sqrt{C}\} \cup \{c \in C \mid \exists p \in \Phi[\sqrt{C} + ASS_{a,c}(p)] \leq c\}$

In contrast, in a **speech act question** the question operator applies to another speech act, as follows:

(7) $C + QUEST_{s,a}(A_{a,s}) = \{\sqrt{C}\} \cup C + A_{a,s}$

This restricts the commitment space in such a way that the act $A_{a,s}$ is enforced as the next move. As with other speech acts, a can reject this, or accept it, in which case a must perform $A_{a,s}$. It can be derived that s performs such an act when uncertain whether the effects of $A_{a,s}$ already hold or should hold in the commitment space C, which leads to the conversational implicature that s has at least slight doubts whether a will perform $A_{a,s}$.

While QU is expressed syntactically (e.g., by AUX inversion), QUEST can be expressed prosodically (by rising intonation). It can apply to assertions (cf. Gunlogson 2002 for "declarative questions"), but also to a wide variety of other speech acts, e.g. to commands:

(8) a. *There is a vegetarian restaurant around here?*
b. A: *Open the window!* B: *Open the window? But it's cold around here!*

In addition, there is a "incredulity" prosody, optionally accompanied by an incredulous-looking face (Crespo-Sendra e.a. 2010) that conventionally implicates that s does not believe that the speech act in question can be performed by a. The corresponding operator will be rendered as QUEST-I.

Speech act questions can also apply to (regular) questions, which is especially clear with incredulity prosody:

(9) A: *Is Butan in Africa?* B: *Is Butan in Africa?? Everyone knows that it's in Asia!*

In addition, I assume that *QUEST(-I)* can apply to assertions and trigger AUX inversion just as *QU*. The following syntactic structures indicate one way how this can be captured; here, ForceP stands for the syntactic category corresponding to speech acts (cf. Rizzi 1997).

(10) a. [$_{ForceP}$ *QU* [$_{Force'}$ [$_{Foce0}$ *is*] [$_{IPQ}$ *there _ a vegetarian restaurant around here*]]]
b. [$_{ForceP}$ *QUEST(-I)* [$_{Force'}$ [$_{Force0}$ *is*] [$_{ForceP}$*ASS* [$_{IP}$ *there _ a vegetarian restaurant around here*]]]

In (a), s restricts C such that its root √C is followed by an assertion by a of one of the propositions in the set {'there is a v.r.', ¬'there is a v.r.'}. In (b), s restricts C such that √C is followed by a's assertion of 'there is a v.r.'; this comes with the implicature (conversational with *QUEST*, conventional with *QUEST-I*) that s believes that a will reject this move. Hence, we explain the bias of s towards ¬'there is a v.r.'. As (b) is distinct from (a) only with the prosody of *QUEST-I*, we get this reading reliably only with incredulity prosody.

In the case of "high" negation, I assume denegation of the embedded assertion:

(11) [$_{ForceP}$ *QUEST(-I)* [$_{Force'}$ [$_{Force0}$ *is*] [$_{NegP}$ *n't* [$_{ForceP}$ *ASS* [$_{IP}$ *there _ a veg. restaurant a round here*]]]]]

(12) $C + QUEST(-I)_{s,a}(\sim ASS_{a,s}(\text{'there is a v.r.'})) = \{\sqrt{C}\} \cup C + \sim ASS_{a,s}(\text{'there is a v.r.'})$

That is, s restricts the acts of a to the denegation of the assertion by a of 'there is a v.r.'. Again, this comes with the (conversational or conventional) implicature that s believes that a will reject this move, which explains the bias towards 'there is a v.r.' In this case, the operator QUEST (without incredulity prosody) will achieve the reading as well, as asking for a negated proposition is dispreferred.

The presentation will conclude with a short discussion of question tags (as in *isn't there?* vs. *is there?*), which will be treated as elliptical questions adding their bias to the preceding assertion.

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Daniel Lassiter

Quantificational and Modal Interveners in Degree Constructions

SZ93 and H01 independently note identical scopal restrictions on universal quantifiers in amount *wh*-questions and comparatives, respectively. SZ93's proposal explains the restrictions on quantifier scope in degree constructions, but seems to predict wrongly that strong modals should also be restricted. I argue that (1) recent proposals on which modals are scalar operators rather than quantifiers explain why they are not affected by SZ93's constraints; and (2) this explains a puzzling difference between strong modals and mid-strength modals (*should, ought, want*) — the former show ambiguities but the latter apparently do not. The scalar theory predicts different truth-conditions for the two LFs with strong modals, but equivalent truth-conditions with mid-strength modals.

SZ93 point out that standard assumptions predict two readings for amount comparatives with *every*, but one of these readings is not attested. However, this reading does arise with certain modals.

(1) How far did everyone run? (how far$_i$ > *everyone* > t_i)
"For what d: everyone ran at least d-far (i.e. how far did the person who ran **least** run)?"

(2) How far do we have to (must we, are we required to) run? (how far$_i$ > *have to* > t_i)
✓ "For what d: we run ≥ d-far in all accessible w (i.e., what is the **minimum** requirement)?"

Independently, H01 makes the same point for comparatives: (4) is a possible reading but (3) is not.

(3) Jim ran 5 miles. Everyone else ran exactly 1 mile farther than that. (CC$_i$ > *everyone* > t_i)
"The person who ran the **least** ran 6 miles (but some ran farther)."

(4) Jim ran 5 miles. We have to run exactly 1 mile farther than that. (CC$_i$ > *required* > t_i)
✓ "The max d s.t. we run ≥ d-far in all acc. w is 6 miles (we must run **at least** that far)"

H01 proposes to explain (3)-(4) using an LF-constraint banning quantificational DPs from taking scope between a degree operator and its trace. The constraint does not, however, explain *why* modals and quantifiers should behave differently in this respect if modals are indeed quantifiers over worlds. It also does not account for a counterexample involving indefinites noted by H01 herself (fn. 11): by the proposed constraint, the only reading of (5) should have the existentials taking wide scope.

(5) Jaffrey is closer to an airport than it is to a train station. (CC$_i$ > *an airport* > t_i)
"The closest airport is closer than the closest train station"

SZ93 give a theory which predicts the contrast between (1)/(3) and (5). Their general claim is that intervention constraints are due to restrictions on which operations are available in various semantic domains. In the case of degree expressions, SZ93 argue that the relevant restriction applies specifically to expressions which make use of the operations *meet* (≈ intersection) and *complement*. This predicts that universal quantification, negation, conjunction, etc. should not be able to appear directly below a degree operator, as for example in (1)/(3). However, existential quantifiers, which do not make use of the meet operation, are predicted to be acceptable in this position, as in (5).

As SZ93 point out, this account does not at first glance illuminate the difference between modal and quantificational interveners: *have to* and the like are usually treated as universal quantifiers over accessible worlds, and so the constraint should apply equally here. SZ93 suggest briefly that the solution is that "the scopal properties of these verbs are not Boolean in nature"; this amounts to proposing that these verbs do not have a quantificational semantics. In fact, non-quantificational

semantics for modals and intensional verbs has been proposed recently by a number of authors [G96,vR99,Le03,Y10,La11] in order to account for the fact that many modals are gradable and various other puzzles. On the most general version of this account, modals, like gradable adjectives, are scalar expressions which relate propositions to their degrees of likelihood/goodness/etc., or (in the positive form) compare them to a threshold. For example, La11 proposes that *must/have to* ϕ is true iff (a) ϕ receives a very high value on a deontic scale, and (b) all relevant ways of realizing $\neg\phi$ have to a low value. I'll summarize this (roughly) as "$good(\phi) > \theta_H \wedge good(\neg\phi) < \theta_L$", where *good* relates propositions to deontic degrees and θ_H/θ_L are the relevant High and Low thresholds. This predicts the LFs in (6), which express the "precise" and "minimum requirement" readings of (4).

(6) a. $good(\mathbf{max}[\lambda d(\text{we run} \geq d \text{ mi.})] = 6) > \theta_H \wedge good(\mathbf{max}[\lambda d(\text{we run} \geq d \text{ mi.})] \neq 6) < \theta_L$
≈ "It's great if we run exactly 6, and terrible if more or less" ($required > \text{CC}_i > t_i$)

b. $\mathbf{max}(\lambda d[good(\text{we run} \geq d \text{ mi.}) > \theta_H \wedge good(\text{we run} < d \text{ mi.}) < \theta_L]) = 6$
≈ "It's great if we run 6 or more, and terrible if less" ($\text{CC}_i > required > t_i$)

Crucially, neither scoping makes use of the meet operation in the form of universal quantification or otherwise, and so the ambiguity is generated in a way compatible with SZ93's theory of intervention constraints. This is our first result: an independently motivated proposal explains the acceptability of (2) and (4) as due to the fact that *have to* is a scalar expression rather than a universal quantifier.

An important puzzle remains: *should, ought, want,* and *supposed to* do not seem to have intervention readings. (Epistemics don't either, but this is probably an ECP effect [H01, cf. vFI03]).

(7) Jim ran 5 miles. We should/ought to/want to run exactly 1 mile farther than that.

(7) has a "precise desire/obligation" reading, but no "minimum" reading. Glossing over some details, G96 and La11 argue essentially that *should* ϕ is true iff ϕ is significantly better than its negation: $good(\phi) >_s good(\neg\phi)$, and similarly for *ought* and *want*. This predicts for (7):

(8) a. $good(\mathbf{max}[\lambda d(\text{we run} \geq d \text{ mi.})] = 6) >_s good(\mathbf{max}[\lambda d(\text{we run} \geq d \text{ mi.})] \neq 6)$
≈ "Running 6 miles exactly is better than another distance" ($should > \text{CC}_i > t_i$)

b. $\mathbf{max}(\lambda d[good(\text{we run} \geq d \text{ mi.}) >_s good(\text{we run} < d \text{ mi.})]) = 6$
≈ "≥ 6 is better than < 6 and, for no $d > 6$, $\geq d$ is better than $< d$" ($\text{CC}_i > should > t_i$)

(8a) expresses a preference for 6 miles precisely, while (8b) says essentially the same thing in a more complicated way: running ≥ 6 is better than < 6, but when $d > 6$ running $\geq d$ miles is not better than $< d$. Given the overall theory of deontic scales in [G96,L11], these clauses taken together boil down to a requirement that 6 is good and more than 6 is fairly undesirable; that is, that the preference is for 6 and no more. As a result the LFs are equivalent and there is no detectable ambiguity.

In sum, SZ93's theory of weak islands accounts for scope restrictions in comparatives and — together with a recent scalar semantics for modals — explains why modals are able to intervene and why a coherent class of modals exemplified by *ought, should* and *want* do not show overt ambiguities.

References [vFI03] von Fintel & Iatridou, Epistemic Containment, *LI*. [G96] Goble, Utilitarian deontic logic, *Phil. Studies*. [H01] Heim, Degree operators & scope. [La11] Lassiter, *Measurement & Modality*, NYU diss. [Le03] Levinson, Probabilistic model-theoretic semantics for *want*, *SALT 13*. [vR99] van Rooij, Some analyses of *pro*-attitudes. [SZ93] Szabolcsi & Zwarts, Weak islands and an algebraic semantics for scope taking, *NLS*. [Y10] Yalcin, Probability operators, *Phil. Comp.*

The semantics and pragmatics of belief reports in preschoolers

Children under 4 years old seem to interpret sentences with belief verbs by evaluating the truth of the complement clause with respect to the actual world [1-4]. For example, suppose Mary left her keys on the kitchen table, but John moved them to the drawer while she wasn't looking. Adults would say that (1) is true in this situation, but 3-4 year-olds would say it is false.

(1) Mary thinks that the keys are on the kitchen table.

This result is often taken to reflect a lack of conceptual understanding of false belief [e.g. 1,2]. We propose an alternative explanation: the developmental change we observe in the comprehension of attitude verbs is due to changes in *pragmatic competence* rather than in *conceptual* [1,2], *syntactic* [3] or *semantic* [1] representations. Specifically, we argue that children's non-adult-like judgments reflect an over-reliance on parenthetical interpretations of 'think', which arise due to a failure to grasp the relevance of belief in context.

In adult speech, attitude verbs can be demoted to *parenthetical* status, serving an evidential-like function, while their clausal complement carries the "main point" of the utterance [5-8]. For example, in a dialogue like (2), B's utterance is a felicitous answer to A's question only with a parenthetical interpretation of 'think'.

(2) A: Where are the keys?
B: Mary thinks they're on the kitchen table.

Such uses are frequent in adult speech [9], and children's early productions of 'think' are almost exclusively parenthetical in function [9,10]. Under our **Parenthetical Hypothesis**, children often choose the parenthetical reading in comprehension as well: they judge sentences like (1) based on the truth of the complement clause, even in the absence of an appropriate context like (2A).

In **Experiment 1**, we sought to rule out an alternative explanation based on extra-linguistic processing limitations. Although a growing body of evidence suggests that infants as young as 7 months can *represent* false beliefs [e.g. 11,12], children may nevertheless have difficulty *processing* them. According to the **Conflict Hypothesis**, false beliefs are difficult because they introduce a conflict with the child's own beliefs or with a bias to assume beliefs are true.

In a truth-value judgment task, children watched videos of hide-and-seek stories and judged sentences about them uttered by a puppet. In a representative story, Donald Duck hides under the bed and another duck hides behind the curtain. The feet of both remain visible, but are indistinguishable. In half the stories the participants watch the hider hide (*Knowledge* condition); in the other half the screen is obscured during this stage, so the participants are ignorant of the hider's location (*Ignorance* condition). Mickey comes in to look for Donald and notices the feet in one of the locations. He guesses that they are Donald's, and decides to look there. We counterbalanced the truth of the complement clause, which determined whether the seeker's guess was correct (*True Belief* (*TB*) vs. *False Belief* (*FB*) scenarios). The truth of the target sentence was manipulated as a factor. Table 1 shows scenarios and sample target sentences for each condition. Each child saw 12 stories (3 per condition). The *Ignorance* condition is critical: the **Conflict Hypothesis** predicts that children's judgments should be adult-like, since there is no conflict between the character's belief and the child's belief. By contrast, the **Parenthetical Hypothesis** predicts that children should respond at random, since they will have no way to evaluate the truth of the complement clause.

We tested 14 children aged 3;10-4;2. Children's accuracy was significantly above chance in *TB* scenarios and significantly below chance in *FB* scenarios (see Table 1), replicating the usual

findings with 4-year-olds. Crucially, children's accuracy was no different from chance in the *Ignorance* condition. This clearly contradicts the prediction of the **Conflict Hypothesis**, but is consistent with the **Parenthetical Hypothesis**.

In **Experiment 2,** we investigated the source of children's "parenthetical" interpretations. Children could be limited to an evidential-like semantic representation of belief verbs at this stage (the **Deviant Grammar Hypothesis** [9,13]). Alternatively, children might have an adult-like semantic representation for 'think', but tend to interpret it parenthetically for pragmatic reasons, e.g. by misconstruing the relevant Question Under Discussion (QUD) in situations involving belief (the **Pragmatic Hypothesis**)**.** For example, in the story described above, children may take the QUD to be "Where is Donald hiding?", and thus respond to the truth of the complement clause of the target sentence, "Mickey thinks that Donald is hiding under the bed."

The design and setup of Experiment 2 were identical to Experiment 1, except that in each story *two* seekers look for the hider in different locations, emphasizing the relevance of the seekers' beliefs. The **Deviant Grammar Hypothesis** predicts that this manipulation should have no effect on children's responses, while the **Pragmatic Hypothesis** predicts that the increased salience of the seekers' beliefs will cause children to generate adult-like responses more often.

We tested 15 children aged 3;10-4;4. Since the target sentences and intended responses were identical in Experiments 1 and 2, the results can be compared directly. Analysis with a logistic linear mixed effect model revealed a main effect of the number of seekers: children's performance in Experiment 2 improved across all conditions compared to Experiment 1 (see Table 1). This improved performance is not consistent with the prediction of the **Deviant Grammar Hypothesis**, but is consistent with the **Pragmatic Hypothesis**.

We conclude that 4-year-olds have adult-like semantic representations of 'think' available to them, but frequently prefer a parenthetical interpretation when the relevance of belief is not particularly salient. If these findings can be extended to younger children, they will substantially change our understanding of the timeline of acquisition of attitude verbs: syntactic and semantic representations of attitude verbs would have to be in place earlier.

Table 1: Experiment design and results (**+** = significantly above chance, **-** = sig. below chance)

Scenario Type	**Sent. Truth**	**Example sentence**	**Results**	
			Exp 1	**Exp 2**
Knowledge: TB	T	*Mickey thinks that Donald is under the bed.*	100%$^{+}$	96%$^{+}$
	F	*Mickey thinks that Donald is behind the curtain.*	71%$^{+}$	86%$^{+}$
Knowledge: FB	T	*Mickey thinks that Donald is behind the curtain.*	29%$^{-}$	50%
	F	*Mickey thinks that Donald is under the bed.*	21%$^{-}$	64%
Ignorance	T	*M. thinks that D. is under the bed/behind the curtain.*	55%	76%$^{+}$
	F	*M. thinks that D. is behind the curtain/under the bed.*	55%	83%$^{+}$

[1] Johnson & Maratsos (1977). *Child Development.* **[2]** Perner et al. (2003). *Child Development*. **[3]** de Villiers & Pyers (2002). *Cognitive Development*. **[4]** Sowalsky et al. (2009). *GALANA 2008*. **[5]** Urmson (1952). *Mind*. **[6]** Hooper (1975). In *Syntax and Semantics, Vol. 4.* **[7]** Rooryck (2001). *Glot International.* **[8]** Simons (2007). *Lingua.* **[9]** Diessel & Tomasello (2001). *Cognitive Linguistics*. **[10]** Shatz et al. (1983). *Cognition*. **[11]** Kovács et al. (2010). *Science*. **[12]** Baillargeon et al. (2010). *TICS.* **[13]** Johnson & Wellman (1980). *Child Development.*

The perspective shift of Korean evidentials and the effect of the context

Korean direct evidential *-te-* introduces the implication that the speaker has direct perceptive evidence regarding the eventuality denoted by the prejacent (the proposition abstracted from the context of the evidential marker): either the speaker directly perceived the eventuality denoted by the prejacent, or at least the speaker inferred the eventuality denoted by the prejacent from her direct perceptive evidence. However, when used in a question, as noted by many authors, including Lim (2010), Lee C. (2011) and Lee J. (2011), *-te-* introduces the implication that the addressee, rather than the speaker, is expected to have direct perceptive evidence regarding the prejacent, as in (1), which we call the *perspective shift* of *-te-*:

(1) a. John-i cip-ey ka-te-la.
John-Nom home-Loc go-Dir.evi-Decl 'John went home'
Implication: the speaker directly perceived (i.e. saw or heard) that John went home

b. John-i cip-ey ka-te-nya?
John-Nom home-Loc go-Dir.evi-Q 'Did John go home?'
Implication: the addressee is expected to answer based on her direct perceptive evidence

Lim (2010) accounts for this puzzle by assuming that a question with evidentials is a set of characters rather than a set of propositions, and accordingly assuming that *-te-* is a function taking a proposition as its argument and returns a character (Kaplan 1989). However, he does not discuss another case of perspective shifts of *-te-*, that is, where *-te-* is used with the reportative evidential *-lay-* (see 2), which is observed by Lee C. (2011):

(2) (Scenario: Mary told the speaker that (she saw that) John went home)
John-i cip-ey ka-te-lay.
John-Nom home-Loc go-Dir.evi-Rep.evi 'John went home'
Implication: Mary, the source of the speaker's reportative evidence, directly perceived that John went home

One might explain the case like (2) by assuming a verb of saying *ha-* and the declarative ending is phonologically contracted as *-lay*, and therefore analyzing (2) somewhat in parallel with (3):

(3) ??Mary-nun John-i cip-ey ka-te-la-ko ha-ess-e.
Mary-Top John-i home-Loc go-Dir.evi-Decl-Comp say-Past-Decl
(Intended) 'Mary told that (she saw that) John went home'

However, as indicated in (3), *-te-* in the embedded sentence is not so acceptable (unlike what is reported in Lee J. 2011). Furthermore, unlike the verb of saying *ha-*, *-lay* in (2) cannot be the target of the negation. Therefore, the negation *an* in (4a) can only negate the prejacent, whereas *an* (4b) can negate the verb of saying. Both facts suggest to us that the implication introduced by *-lay* is different from that of the verb of saying, and that *-lay* is a grammaticalized ending introducing reportative evidentiality:

(4) a. John-i cip-ey an ka-te-lay.
John-Nom home-Loc Neg go-Dir.evi-Rep.evi
'John did not go home' (with evidential implication)

b. Mary-nun John-i cip-ey ka-ess-ta-ko an ha-ess-e.
May-Top John-Nom home-Loc go-Past-Decl-Comp Neg say-Past-Decl
'Mary told that John went home' (with evidential implication)

This said, in this paper we try to account for the perspective shift of *-te-* in the question like (1b) and in the case where *-te-* is used with another evidential like (2) in a unified way. To do so, we note that both in (1b) and (2) the utterer of the sentence is different from the asserter of the sentence (which can further be regarded as an evidence holder). First, given the rather standard

semantics of questions (Karttunen 1977, *i.a.*), a question denotes a set of answers, meaning that the entire question is uttered by the questioner, but the assertion is 'delayed' until the addressee picks up one of the answers as a true answer in the context. Similarly, the asserter of the proposition *that John went home* in (2) is different from the utterer of the sentence, who simply 'delivers' what she heard by uttering the sentence with the reportative evidential *-lay*.

Given this, similarly to McCready's (2006) propsal, we propose that Korean evidentials introduce a kind of context-shifting operator (Anand and Nevins 2004), which only changes the asserter of the sentence to the evidence holder salient in the context. This can be formalized as (5), where OP is an operator introduced by an evidential marker (either direct or indirect), ϕ is the prejacent, *a* is the asserter of ϕ, and *e* is the evidence holder salient in the context:

(5) $\text{Op}([[\phi]]^{<a,\ldots>}) = [[\phi]]^{<e,\ldots>}$

In the declarative like (1a), since the evidential marker is direct, the evidence holder is the asserter, which is also the utterer, hence no shift, even though the operator in (5) is introduced in (1a). In the question (1b), the contextually salient evidence holder can be the addressee, and therefore the operator can 'overwrite' the asserter of the answer as the addressee, and therefore, the addressee can be regarded as the evidence holder of each answer in the question. Finally, in cases like (2), the prejacent of *-lay* contains the direct evidential *-te-*, and then the asserter of the prejacent is 'overwritten' as the evidence holder, from whom the utterer of (2) has the reportative evidence.

This proposal, which adopts the notion of the context shifting operator, gives us a way to account for the puzzle regarding Korean *de se* anaphor *caki* pointed out by Lim (2011). According to him, when *-te-* is used, the long-distance *de se* anaphor *caki* can refer to the attitude holder even when the attitude holder does not have the relevant *de se* knowledge, such as in (6):

(6) (Scenario: Bill and John are close friends to each other. Their children are also close friends to each other, and go to the same school. Once Bill and John were invited to the school. In the school, when both Bill and John were looking at a class in a distance, they saw one kid making troubles during a class. Later Bill came to Tom, the teacher, and told him to scold the kid who was making troubles in the class. However, John also found that, unbeknownst to Bill, the kid was actually Bill's Son. Later John said…)

Bill_i -i	Tom-eykey	caki_i atul-ul	honnay-la-ko	ha-te-la.
Bill-Nom	Tom-Dat	self son-Acc	scold-Imp-Comp	say-Dir.evi-Decl

(intended) 'Bill_i told Tom to scold self_i 's son' (with evidential implication)

This can be accounted for if we regard Bill as the asserter of the embedded sentence, and *-te-* 'overwrites' the asserter of the embedded proposition with the evidence holder, who is John the speaker. Since John actually has the relevant knowledge regarding the relation between Bill and *caki*, and by the operator introduced by *-te-* John can be regarded as the asserter of the embedded proposition, we can assume that the relevant *de se* knowledge is provided by the evidence holder (the utterer), and therefore *caki* is licensed.

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Giorgio Magri

No need for a theory of the distribution of readings of english bare plurals

■ **Introduction.** English bare plurals (BPs) can have (at least) three readings: generic, existential and Condoravdi's (1997) reading. The distribution of these readings is constrained by a variety of grammatical factors: argument type (ILP vs SLP distinction); syntactic scope (wide vs narrow); focus assignment; argument type (subject vs object); etcetera. Various authors have thus developed rich theories of the distribution of readings of English BPs, that consist of a number of different operators (GEN, Chierchia's DKP, existential closure, etc.) and a number of grammatical constraints on these operators. I argue that such a theory is not needed. I submit that all English BPs come with the same covert determiner $\emptyset$, no matter their readings; that $\emptyset$ has existential force, yielding BPs' existential reading; while other readings arise through a mechanism of pragmatic strengthening modeled on Spector's (2007) pragmatics for the semantics of plural morphology.

■ **Spector (2007).** In upward entailing environments (UEEs), plural morphology triggers a plurality inference: (1a) says John bought at least two books. This plurality inference disappears in downward entailing environments (DEEs): (1b) denies he bought any, not that he bought two. In nonmonotonic environments (NMEs), the plurality inference survives in the positive component of meaning: (1c) says that three boys bought at least two books; but it disappears in the negative component: (1c) denies anyone else read any book, not just that anyone else read more than one.

(1) a. John bought books.
b. John didn't buy books.
c. Only three boys bought books.

(2) a. $[\![\text{(at least) two}]\!]$ above $[\![\text{PL}]\!] \leftrightarrow [\![\text{(at least) one}]\!]$ b. (at least) two above PL — (at least) one

In order to account for pattern (1), Spector (2007) assumes that PL is semantically equivalent to *(at least) one* so that both are asymmetrically entailed by *(at least) two*, as in (2a) (where arrows stand for entailment). Furthermore, PL and *one* are Horn-mates and differ only because the former is not a Horn-mate of *two* while the latter is, as in (2b) (where dotted lines stand for Horn-mateness). In DEEs like (1b) there are no implicatures, so that PL reveals its plain semantics, whereby it is equivalent to *one*. In UEEs, *one* triggers the scalar implicature that *two* is false, whereby the "only one" reading. Through a mechanism of *double strengthening* detailed in Spector (2007) and Fox (2007), PL in (1a) thus triggers the implicature that this implicature of *one* is false, whereby the "more than one" reading. The correct meaning for the NME (1c) is easily derived. Crucially, the "more than one" inference of PL is parasitic on the "not more than one" implicature of *one*.

■ **Proposal.** The BP *dogs* is generic in UEEs (3a). This readings disappears in DEEs: (3b) does not just deny that dogs are generally carnivorous. In NMEs, the generic reading survives in the positive component of meaning: (3c) says dogs in three countries are generally carnivorous; but disappears in the negative component: (3c) doesn't just deny dogs are elsewhere generally carnivorous.

(3) a. Dogs are carnivorous.
b. It is false that dogs are carnivorous.
c. In only three countries, dogs are carnivorous.

(4) a. $[\![\text{all}]\!]$ above $[\![\emptyset]\!] \leftrightarrow [\![\text{some}]\!]$ b. all above $\emptyset$ — some

As patterns (1) and (3) are formally analogous, I suggest to extend Spector's account to English BPs, as follows. Every English BP, no matter its reading, is headed by a phonologically null determiner $\emptyset$, i.e. *dogs* stands for [$\emptyset$ *dogs*]. The determiner $\emptyset$ is semantically equivalent to *some* so that both are asymmetrically entailed by *all/most/generally*, as in (4a). Furthermore, $\emptyset$ and *some* are Horn-mates and differ only because the former is not a Horn-mate of *all* while the latter is, as in (4b). In DEEs (3b) there are no implicatures, so that $\emptyset$ reveals its plain existential semantics. In UEEs, *some* triggers the implicature that *all/generally* is false, whereby the "only some" reading. Again through double strengthening, $\emptyset$ in (3a) thus triggers the implicature that this implicature of *some* is false, whereby the universal/generic reading. The NME (3c) falls into place.

■ **Prediction.** This proposal predicts BP's generic reading to be parasitic on the not-all implicature of the corresponding overt indefinite. The distribution of BP's generic/existential readings thus depends on the distribution of the not-all implicature of overt indefinites, as stated in (5). The

distribution of the latter implicature is constrained in a complicated way (beyond the scope of this paper). And this is the source of the complicated distribution of BP's readings. Thus, (5) says that there is no need for a dedicated theory of the distribution of BP's readings; we need instead a theory of the availability of the not-all implicature for overt indefinites, and that's all we need.

(5) An occurrence of the BP [$\emptyset$ NP] has a generic (existential) reading iff the corresponding overt indefinite [*some* NP] triggers (doesn't trigger) the not-all implicature out of the blue.

The talk shows that (5) is indeed borne out on a number of classical cases, such as the following.

■ **Case #1.** Readings of BP subjects correlate with predicate type (Carlson 1972): *dogs* has generic reading with the ILP *carnivorous* in (6a) and existential reading with the SLP *play* in (6b).

(6) a. *Dogs* are carnivorous — a′. *Some dogs* are carnivorous.
b. *Dogs* were playing in the backyard. — b′. *Some dogs* were playing in the backyard.

This pattern (6a)/(6b) conforms to (5): out of the blue, *some dogs* triggers the not-all implicature in (6a′) but not in (6b′). This pattern (6a)/(6b) thus follows straightforwardly from (4).

■ **Case #2.** BP objects can be existential independently of predicate type, as in (7a)-(7b). This conforms to (5): out of the blue, *some dogs/lawyers* trigger no not-all implicature in (7a′)-(7b′).

(7) a. John bought *books*. — a′. John bought *some books*.
b. John knows *good lawyers*. — b′. John knows *some good lawyers*.
c. John hates/loves *lawyers*. — c′. John hates some/loves *some lawyers*.

The intensional BP object *lawyers* in (7c) is instead construed generically. This pattern again conforms to (5), as *some lawyers* does trigger the not-all implicature in (7c′).

■ **Case #3.** Existential BPs only have narrow scope, as in (8a), thus lacking scope ambiguities.

(8) a. Every boy read *books*. ($\forall\exists$, $^*\exists\forall$) b. Every boy read *some books*. ($\forall\exists$, $\exists\forall$)

Again, this pattern conforms to (5). I argue that when *some books* has wide scope wrt to *every boy* in (8b), it triggers the not-all implicature, as in "Some books are such that every boy read them." That is not necessarily the case when *some books* has narrow scope in (8b), as in "For every boy there are some books he read." When wide scoped, the BP *books* in (8a) thus only gets the generic reading, while the existential reading is only available when the BP is narrow scoped.

■ **Case #4.** Surprisingly, BP subjects of ILPs get the existential reading if embedded under another universal operator: (9a) can mean that for every man *there are* women related to him (Fox 1995).

(9) a. *Jewish women* are related to every jewish man.
b. *Some jewish women* are related to every jewish man.

In conformity with (5), *some women* in (9b) triggers no implicature when scoped below *every man*.

■ **Case #5.** The BP *typhoons* in (10a) can be construed as existential or generic (Wilkinson 1991).

(10) a. *Typhoons* arise in this part of the pacific. b. *Some typhoons* arise in this part of ...

In conformity with (5), *some typhones* in (10b) does or does not trigger the not-all implicature, depending on whether the sentence is construed as about typhoons or about this part of the pacific.

■ **Other readings. (a)** The BP *students* in (11a) is neither generic nor existential, rather equivalent to the definite *the students* (Condoravdi 1997). By (4), the reading predicted for this BP is existential plus the negation of the implicature triggered by *some students* in (11b). The latter implicature is that it is false that the students on campus were aware, not that all students in general were. The predicted meaning of (11a) is thus that the students on campus were aware, as desired.

(11) a. In 1985 there was a ghost haunting the campus. *Students* were aware of this fact.
b. In 1985 there was a ghost haunting the campus. *Some students* were aware of this fact.

(b) For the kind-reading, I assume (as Diesing 1992 and Chierchia 1995) that BPs are ambiguous between kind-denoting terms and predicates with the null determiner $\emptyset$; my proposal only applies to the latter. **(c)** To account for extreme narrow scope *existential* BPs (Carlson 1972), I assume that $\emptyset$ can take narrower scope than overt indefinites. My proposal crucially predicts that extreme narrow scope *generic* BPs cannot exist (as the alternative with the overt indefinite is unavailable).

Paul Marty, Emmanuel Chemla & Benjamin Spector

***Between 3 and 5* sometimes means *at least 3* – new ways to detect a new ambiguity.**

Bare numerals, when used as quantifiers, are known to be ambiguous between an 'exact', upper-bounded reading, and an 'at-least' reading. As explained below, under certain natural assumptions, the mechanisms responsible for this ambiguity are expected to yield a similar ambiguity for modified numerals of the form *between n and m*. While this ambiguity seems to be at odds with naïve intuitions, we provide experimental evidence for its existence. Our contribution is thus both theoretical and experimental. On the theoretical side, we show that some abstract semantic mechanisms which might be thought to overgenerate in fact make correct predictions. On the experimental side, we present two different experimental designs which we argue are able to detect ambiguities.

Theoretical Background. There is no agreement in the literature regarding the *source* of the ambiguity of bare numerals. The traditional, neo-Gricean view, takes the 'at-least' reading to be the basic, literal reading of bare numerals, and the 'exact' reading to be derived as a scalar implicature. According to some other views, numerals are intrinsically ambiguous between the two readings (e.g., Geurts 2006) or only have an exact reading as far as their literal meaning is concerned (Breheny 2008). We assume that both readings are derived from a more basic, predicative reading (cf. (1)), by means of two general type shifting operations which turn it into a determiner (of type $\langle\langle e,t\rangle,\langle\langle e,t\rangle,t\rangle\rangle$), *existentialisation* and *maximization* (cf. (2) – this is similar in spirit but not in letter to Geurts' proposal; while the specifics of our implementation do not really matter given our main goal in this paper, we provide them for the sake of explicitness).

(1) Basic predicative meaning: $[\![\text{three}]\!] = \lambda x.\#x = 3$ (where $\#x$ denotes the number of atoms which are part of the (possibly) plural individual x, given standard mereological assumptions)

(2) Type shifting operations:
- a. Existentialization: $\mathbf{E}\,(P_{\langle e,t\rangle}) = \lambda Q.\lambda R.\exists x(P(x) \wedge Q(x) \wedge R(x))$ $\quad_{\langle\langle e,t\rangle,\langle\langle e,t\rangle,t\rangle\rangle}$
- b. Maximization: $\mathbf{M}(P_{\langle e,t\rangle}) = \lambda Q.\lambda R.P(\max\{y : Q(y) \wedge R(y)\})$ $\quad_{\langle\langle e,t\rangle,\langle\langle e,t\rangle,t\rangle\rangle}$

(where max, when applied to a set of plural individuals, returns the unique member of that set, if there is one, such that every member of the set is part of it, e.g., $\max\{x, y, x \oplus y\} = x \oplus y$).

The two readings of *Three linguists are bald* are derived as follows:

(3)
- a. Applying existentialization gives rise to the at-least reading:
  $[\![[(\mathbf{E}(\text{three}))\ \text{linguists}]\ [\text{are bald}]]\!] = \exists x(\#x = 3 \wedge [\![\text{linguists}]\!](x) \wedge [\![\text{bald}]\!](x))$
  $\rightsquigarrow$ True iff at least three linguists are bald, assuming linguists and bald are distributive predicate. (If 5 linguists are bald, one can find a plural individual x made up of 3 of them making the above formula true).
- b. Applying maximization gives rise to the exact reading:
  $[\![[(\mathbf{M}(\text{three}))\ \text{linguists}]\ [\text{are bald}]]\!] = [\![\text{three}]\!]\,(max\{y : [\![\text{linguists}]\!](y) \wedge [\![\text{bald}]\!](y)\})$
  $\rightsquigarrow$ The maximal plural individual made up of linguists who are bald contains 3 atomic parts, i.e. exactly 3 linguists are bald.

Now, let us assume the following basic predicative meaning for *between n and m*:

(4) $[\![\text{between 3 and 5}]\!] = \lambda x.3 \leq \#x \leq 5$

Applying existentialization and maximization to *between 3 and 5* yield the following results for *Between 3 and 5 linguists are bald*:

(5)
- a. Existentialization makes the sentence equivalent to *At least 3 linguists are bald*:
  $[\![[(\mathbf{E}(\text{Between 3 and 5}))\ \text{linguists}]\ [\text{are bald}]]\!] = \exists x(3 \leq \#x \leq 5 \wedge [\![\text{linguists}]\!](x) \wedge [\![\text{bald}]\!])$
  $\rightsquigarrow$ True iff three or more linguists are bald. Suppose for instance that 7 linguists are bald. Then there is a plurality made up of bald linguists whose cardinality is between 3 and 5.
- b. Maximization gives rise to the 'standard', expected reading:
  $[\![[(\mathbf{M}(\text{Between 3 and 5}))\ \text{linguists}]\ [\text{are bald}]]\!] = [\![\text{betw 3 and 5}]\!]\,(max\{y : [\![\text{ling.}]\!](y) \wedge [\![\text{bald}]\!](y)\})$
  $\rightsquigarrow$ The maximal plural individual made up of linguists who are bald satisfies the property *between 3 and 5*, i.e the number of bald linguists is at least 3 and at most 5.

The two sets of experiments below provide evidence for this predicted (but intuitively surprising) ambiguity.

Experiments 1a, 1b, 1c: picture-matching task using graded judgements. These experiments were sentence-picture matching tasks, in which subjects had to tell us, using a continuous scale, the extent to which the sentence was a correct description of the picture. Answers were coded as the position of the response on the scale, from 0% for a rejection and 100% for acceptance of the sentence as a correct description. The pictures were arrays of dots with different colors. All three experiments contained control sentences of the form *At least x/At most y dots are red*, which are not ambiguous. Judgments for these control sentences were as expected: there were small discrepancies for *at most* sentences that are in line with previous results (e.g., Katsos & Cummins 2010), but the overall mean accuracy is 81% (if accuracy = 'raw score' for expected true answers, and '100 - raw score' for expected false responses).

In **Exp. 1a** (16 subjects), the target sentences were of the form *Between n and (n+2) dots are red*, with $n = 3$ or $n = 4$. For the target sentences, we distinguished 3 types of conditions as follows. **(a) False**: the sentence is false on both readings in (5), i.e. the picture contains fewer than n red dots. **(b) True**: the sentence is unambiguously true (n, $n+1$ or $n+2$ red dots in the picture). **(c) Target**: (5-a) is true but

(5-b) is false (more than $n+2$ red dots). In the **target** condition, we obtained a rating (33%) intermediate between the **false** (5%) and **true** (85%) conditions (pairwise comparisons: all ts > 3.2, ps $< .01$). Such a result is expected if the sentence is indeed ambiguous between two readings, only one of which being true in the **target** condition (see also Chemla & Spector 2011).

In order to confirm our interpretation, we ran a control **experiment 1b** (11 new subjects). We used exactly the same design, except that we replaced the previous target sentences with new ones of the form *The number of red dots is comprised between n and n + 2*, which can only be given the upper-bounded reading, even with the above analysis. We obtain the following ratings: **false** = 3%, **true** = 86%, **target** = 10%, with no significant difference between **false** and **target** Furthermore, a 3×2 ANOVA that compared mean responses in Exp. 1a and 1b revealed a significant interaction between condition (true/false/target) and experiment/type of target sentence: $F(2, 75) = 5.96, p < .01$. This result suggests that the two constructions are different, and confirm that the first kind of *between* sentences, but not second kind, is ambiguous.

Finally, in **Exp. 1c** (11 new subjects), we kept exactly the same design but replaced the target sentences with sentences containing bare numerals, of the form *n dots are red*. As expected, we obtained an ambiguity type of pattern **false** = 4%, **true** = 99%, **target** = 78% (the target condition now corresponds to pictures with more than n red dots, i.e. pictures making the at-least reading true but the exact reading false). All pairwise comparisons yield significant differences (all ts > 3.7, ps $< .01$).

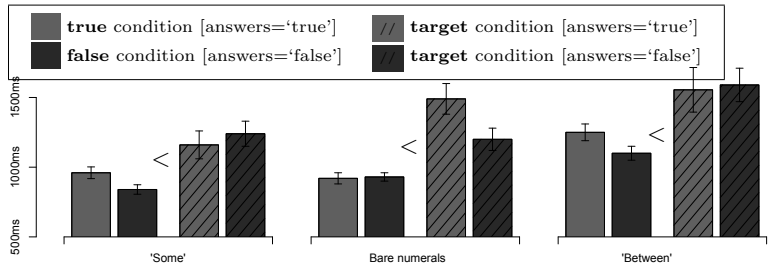
Our results also show that the lower-bounded reading is less salient in the case of *between n and m*-sentences than in the case of sentences involving bare numerals, since the **target** conditions got a significantly lower rating in the former case than in the latter case. This result is in line with introspective judgments: (5-a) had never been observed before. This difference should receive an independent explanation, e.g., a pragmatic one: using 'between n and m', instead of a more simple expression (such as a bare numeral or an 'at least'-numeral), in order to convey the 'at least' reading might be a violation of Grice's maxim of manner.

Experiment 2: response time study. Our second study was also based on a sentence-picture matching task, but aimed at gathering response time data. Instead of using a continuous scale, we asked 33 subjects to provide binary answers (*true* or *false*). Our experimental hypothesis was the following: when a sentence is ambiguous between two readings $R1$ and $R2$, response times will be greater (everything else being equal) when the picture makes $R1$ true and $R2$ false than in cases where the picture makes either both $R1$ and $R2$ true or both $R1$ and $R2$ false. Quite generally, if several responses are in principle acceptable, participants will hesitate between them and get slowed down, no matter which response they eventually choose. Notice that this hypothesis does not require awareness of the ambiguity, but merely requires that different aspects of the stimulus push participants in different directions, making the decision process harder to terminate.

For our target sentences, we thus expected response times to be higher for the **target** condition than for the other two unambiguously true/false conditions. In order to motivate this interpretation of our results, we also tested other cases which are known to lead to similar ambiguities, namely sentences involving scalar implicatures (*some dots are red*) and sentences involving bare numerals (*n dots are red*). We constructed similar **false**, **true** and **target** conditions by varying the number or proportion of red dots in the picture.

Results: The response times given in the figure below confirm our expectations. For the three types of ambiguities, we found that correct responses to the **true** ( ) and **false** ( ) unambiguous conditions were faster than the 'true' ( ) and 'false' ( ) responses to the **target** condition (ts > 2.4, ps $< .01$): the first two bars are always shorter than the last two.

Two comments are in order. **(i)** These results are orthogonal to differences that have already been noticed. For instance, in the **target** conditions for scalar implicatures, we also detect a difference between the RTs for true and false answers (readings with scalar implicatures are slower, as in Bott & Noveck 2004 and subsequent studies). **(ii)** These differences could not be accounted for only in terms of the properties of the relevant pictures, independently of the sentence they are paired with (for instance, the fact that in **target** conditions, the picture contained more dots that in the **true** and **false** conditions), since all the pictures were also tested with clearly unambiguous sentences (*At least/At most*) and no similar difference was found.



Response times for correct answers in the unambiguous **true** and **false** conditions, and for both 'true' and 'false' answers in the **target** condition.

Main result:
answers in **target** condition
are slower than in
the two other conditions.

Conclusion. Plausible formal semantic approaches to bare and modified numerals predict the possibility of a lower-bounded reading for 'between n and m'-sentences, despite the presence of an explicit upper-bound. We offered two types of experimental evidence which confirm this surprising prediction.

Katherine McKinney-Bock & Roumyana Pancheva

A Note on Attributive Adjectives, Distributivity, and Comparison Classes

Schwarzschild (2006, 2009) observes that adjectives like *heavy* are obligatorily distributive when attributive, but not when predicative:

(1) The boxes are heavy
√ *distributive* (each box is heavy); √ *collective* (the boxes are heavy as a group)

(2) The twelve heavy boxes
√ *distributive* (each box is heavy); * *collective* (the boxes are heavy as a group)

His explanation is that a non-monotonicity requirement on attributive modification rules out the collective reading. The dimension of weight is not allowed to be monotonic on the part-whole relation determined by the noun. The collective reading would be monotonic (the smaller a subset of boxes, the less it weighs), therefore, the adjective can receive only a distributive reading, which is non-monotonic on the part structure of the noun (the weight of individual boxes does not vary depending on the size of any subset of boxes).

Proposal: We take non-monotonicity to *follow* from the independently determined distributivity of certain attributive adjectives. In addition to dimension adjectives (e.g. *heavy, tall*), evaluative adjectives (e.g. *pretty*) also result in obligatory distributive readings when in attributive position but can be collective when predicative. This is so, we suggest, because, when attributive, dimension and evaluative adjectives compose with a degree head DEG that selects for a covert *for*-phrase, which denotes the comparison class for the adjective. The *for*-phrase contains a type noun which is elided under identity with the head noun, as in (3). The null *for*-phrase determines distributivity:

(3) The twelve heavy (for a box) boxes. √ *distributive* (each box is heavy <u>for a box</u>)
* *collective* (the boxes are heavy <u>for a box</u>)

Predicative adjectives do not merge with a syntactic *for*-phrase, and instead have a variable set by context, which allows for the weight of the boxes to be interpreted relative to either *box* or *boxes* (or, for that matter, other entities). Both collective and distributive readings are available.

Evidence: To motivate the syntactic distinction between attributive and predicative dimension and evaluative adjectives, first, we look to the observation that these adjectives are interpreted relative to a comparison class that can be specified in an overt for-phrase (Klein 1980, Kennedy & McNally 2005, Kennedy 2007, a.o.).

(4) a. John is tall for a man. b. That painting is beautiful for a painting.

Even when a *for*-phrase is non-overt, a standard observation takes dimension and evaluative adjectives to be interpreted relative to a comparison class (see Kennedy 2007). In the absence of an overt *for*-phrase, both attributive, (5), and predicative adjectives, (6), have an interpretation that is dependent on a comparison class. There is a distinction between the comparison classes with predicative and attributive adjectives, however, where attributive adjectives have an interpretation that is dependent upon the head noun and predicative adjectives have a more 'open' interpretation, more dependent upon context (Higginbotham 1985: 563).

(5) That is a big butterfly. *That is a butterfly, and it is big for a butterfly*

(6) That butterfly is big. *That butterfly is big (for an X [not necessarily a butterfly])*

We take the *for*-phrase to be *syntactically present* (and silent) in the case of attributive dimension and evaluative adjectives. Past proposals argue that *for a man* modifies the adjective directly, restricting its domain, and then the degree head merges.

(7) [DEG [*big* for a man]] (cf. Kennedy 2007; Bale 2008; Schwarz 2010)

With this constituent structure, the adjective and *for*-phrase [*tall for a man*] shouldn't be incompatible with the degree head containing a Measure phrase, i.e. *six feet*. Instead, we propose that Measure phrases are introduced by a degree head, MEAS (cf. Kennedy & Svenonius 2007)

that is in complementary distribution with another type of head, DEG, whose presence is marked by the silent for-phrase: (8) [[DEG for a man] *big*]

(9) $[\![\text{DEG}]\!] = \lambda P_{<e,t>} . \lambda G_{<dt,et>}. \lambda D. \lambda x: P(x). \exists D' [G(D')(x) \wedge D' \subseteq D \wedge D \subseteq S_{(P,c)}(G)]$

$[\![\textit{for a house}]\!] = \lambda x.$ x is a house $\quad [\![\text{big}]\!] = \lambda D_{<d,t>}. \lambda x.$ x's size $\in D$

Evidence for this constituent structure comes from the observation that, in addition to *for*-phrases, as in (10), modification by measure phrases, as in) John is tall for a man. (11), is permissible. However, these two types of adjective modification cannot co-occur, (11):

(10) John is tall for a man. (11) John is six feet tall. (12) *John is six feet tall for a man.

Now, when looking at plural nouns such as those in (1) and (2), the *for*-phrase takes a noun which sets the comparison class and derives the effect seen with GAA. More specifically, we propose that the adjective merges underneath the plural phrase (#P, cf. Borer 2005), and so, the identity condition on ellipsis resolution dictates that the silent noun in the for-phrase is not structurally specified for number. Then, if a plural phrase merges higher, we can obtain the plural noun. The structure is as follows:

(13) [$_{\text{PluralP}}$ Plural [$_{\text{NP}}$ [$_{\text{AP}}$ [DEG for a box] heavy] box]]

We further observe that higher syntactic placement of the attributive adjective results in the return of the collective/distributive ambiguity (Ouwayda 2011).

(14) The heavy twelve boxes √ *distributive;* √ *collective*

On the collective reading, (13) does not meet the non-monotonicity requirement, which fits better the view that this requirement is a consequence of the specific syntax and semantics of attributive modification rather than a constraint that rules out an otherwise potentially available reading. To account for the return of collective readings with higher placement of the attributive adjective (cf. (3)), we propose that [[DEG [*for N*]] *heavy*] moves above the plural phrase, and the noun is elided under identity with either a type noun (not specified for number) or a noun specified for number. Ellipsis of the plural noun in the *for*-phrase is licensed based on the assumption that the antecedent should not contain the ellipsis site, and so [DEG *for* boxes heavy] moves outside of the Plural head. Attachment outside of the Plural operator allows for the collective reading (see 14), and attachment inside of the Plural operator allows for the distributive reading (as in 13).

(15) [[$_{\text{AP}}$ [DEG for boxes] heavy] [$_{\text{PluralP}}$ Plural [$_{\text{NP}}$ box]]

Evaluative adjectives like *pretty* similarly do not fit the view that non-monotonicity derives the requisite distributivity. In (15), a collective reading of *pretty* would meet the non-monotonicity requirement and yet such a reading is not allowed:

(16) *Context: ugly pieces of gravel come together to form a beautiful mosaic*
#The pretty rocks formed a mosaic.

We propose that the requisite distributive reading with attributive adjectives stems *independently* of non-monotonicity, derived from the presence/absence of a *for*-phrase, as above, and that non-monotonicity of is a consequence of distributivity.

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Yaron McNabb

Cross-categorial modification of properties in Hebrew and English

At the center of the study of gradable predicates is the question of whether these expressions should be analyzed as relations between individuals and degrees or as context-sensitive properties. The debate extends to modifiers of gradable predicates, which can be analyzed as operating on degrees or as operating on worlds and contexts (Klein 1980, Kennedy & McNally 2005). The Hebrew intensifier *mamaš* 'really' has a wide syntactic distribution and the ability to modify gradable and non-gradable properties alike, suggesting that some modifiers do not operate on degrees but rather have a more flexible semantics, in contrast with true degree modifiers, like *very* and *slightly*.

A survey of 934 tokens of *mamaš* 'really' from online corpora shows that it modifies a large number of expressions: gradable and non-gradable adjectives (1-2), adverbs (3), PPs (4), VPs (5), and NPs (6):

(1) *ze haya sirton* **mamaš** *xamud*
this was video **really** cute
'This was a really cute video.' Gradable Adjective

(2) *hem* **mamaš** *me?orasim*
they **really** engaged.3PL.M
'They are really engaged.' Non-gradable Adjective

(3) *ha-ški?a mitraxešet* **mamaš** *?axšav*
the-sunset happening **really** now
'The sunset is happening right now.' Adverb

(4) *ha-malon* **mamaš** *be-merkaz roma*
the-hotel **really** in-center Rome
'The hotel is right in the center of Rome.' PP

(5) *dani* **mamaš** *takaf ?et moti*
dani **really** attacked ACC moti
'Danny really attacked Moti.' VP

(6) *eyn zahav hu* **mamaš** *mixre zahav*
spring gold is **really** mine gold
'The Golden Spring (= Eyn Zahav Park) is a real gold mine.' NP

When *mamaš* combines with a gradable predicate (1), it functions like *very*, boosting the degree of the gradable property (Kennedy & McNally 2005). When it combines with a non-gradable predicate (2-4), it acts as a PRECISIFIER or points to a prototypical or a clear case of whatever property it modifies. When it combines with a VP (5), it says something about the evidence or epistemic force of the proposition in addition to the high degree or intensity meaning.

Mamaš shares many characteristics with its English counterpart, *really*, in that both have a degree modifier reading as well as a propositional epistemic one. The degree reading is available when these expressions occur in a structure including a gradable (or a potentially gradable) predicate. Otherwise, they are used to comment on the truth or the appropriateness of the description of the property, relation, or event. The dual purpose of *really* convinced Paradis (2003) and Constantinescu (2011) that *really* has two structure-dependent meanings: It is a degree modifier or precisifier when it combines with predicates and an evidential marker or epistemic operator when it occurs at the sentential level. However, subjective modals and other expressions (e.g. *possibly*)

cannot be embedded in the complement of factive verbs, verbs of telling and in conditionals (Lyons 1977, Papafragou 2006, Portner 2009), as in (7), whereas *really* and *mamaš* can, as in (8).

(7) ?It is surprising that Superman **must** be jealous of Lois.

(8) **Context:** Danny is always even-tempered and restrained.
ze maftia še dani **mamaš** *takaf ʔet moti*
this surprising that dani **really** attacked ACC moti
'It's surprising the Danny really attacked Moti.'ever

I therefore argue that *mamaš* is better characterized as a modifier of properties (of individuals, situations, or propositions). Thus, all meanings (degree modification, pricisification, and epistemic force) are accounted for with uniform semantics, in which *mamaš* and *really* take a property of individuals, situations, or propositions, and modify this property such that it is true in all possible contexts, as shown in (9) (cf. the analysis of *definitely* in Barker (2002) and of similar degree modifiers in Washo and Italian by Beltrama & Bochnak (2011)).

(9) Let C be the set of all possible contexts c.
Let P be a property of σ, σ is an individual, a situations, or a proposition.
$[\![$ *mamaš / really* $]\!] = \lambda P \lambda \sigma \lambda c.P(\sigma)$ in $c \in C$ iff $\neg \exists c'[P(\sigma)$ in $c' = 0]$

When *mamaš* and *really* modify gradable predicates, as in *cute* in (1), the intensifying reading is derived from the semantics in (9), whereby the video is cute in all possible contexts because it is above the standard of cuteness is all of these contexts. When these modifiers combine with non-gradable predicates, as in *engaged* in (2), the prototypical meaning is derived by inferring that the property of being engaged applies in all possible contexts, even in the most strict ones, for example, in those scenarios in which being engaged requires having had a ceremony in the presence of family members, as is the case in some traditional societies. And when these expressions combine with VPs, they are ambiguous between modifying the situation and modifying the proposition. In (5), for example, if the attacking event is true is all possible contexts, it is appropriate to describe it as a clear case of an attacking event (and not, e.g., an annoying or bothering event) as well as infer that the speaker has sufficient evidence to confidently describe the event as such, thereby indirectly deriving the epistemic reading.

In conclusion, *mamaš* and *really* represent a class of vague modifiers of properties that exists side by side with true degree modifiers. While degree modifiers are constrained in their distribution due to their sensitivity to the scale structure of the gradable predicates they modify, non-degree modifiers have a wider distribution and a variable semantic contribution depending on the type of property they modify. The flexible semantics of non-degree modifiers generates the types of meanings discussed in this study, namely, intensification, precisification and epistemic force.

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Anne Mucha

Temporal reference in a genuinely tenseless language: the case of Hausa (Chadic)

INTRODUCTION: A central question concerning languages without overt tense morphology is whether they encode tense covertly. Matthewson (2006) analyzes St'át'imcets as involving a covert tense morpheme that restricts the temporal reference to non-future and interacts with a modal marker to yield future-oriented readings. This paper argues that tense is not structurally represented in the morphologically tenseless language Hausa (Chadic, Afro-Asiatic), and that tense interpretations in Hausa are better accounted for on Smith et al.'s (2007) pragmatic analysis. At the same time, the modal analysis of future can be maintained for Hausa, which expresses future by a combination of modality and event time-shifting. Crucially, these meaning components are transparently coded by distinct overt morphemes in Hausa, unlike in St'át'imcets (Matthewson 2006) and Guaraní (Tonhauser 2011).

DATA: The central prediction of Matthewson's covert tense approach is that future time reference must be marked by an overt future marker. This prediction is not borne out for Hausa, where future reference is sometimes possible without grammatical marking; cf. (1).

Context question: What do you think Bill will be doing when I come home tomorrow?

(1) Bill ya- w s g be .
Bill 3SG.M-CONT play tomorrow (CONT = continuous)
"Bill will be playing tomorrow."

The future reading of (1) shows that there is no covert tense morpheme that would restrict the reference time to [-FUT]. Still, future time reference in Hausa mostly involves the future marker *zā*, which deviates from the inflectional aspect/mood paradigm (2a) in that it always precedes the weak subject pronoun at the edge of AspP (2b).

(2) a. Hàwwa **ta-** w s
Hawwa 3SG.M-CONT play
"Hawwa is playing."

b. Hàwwa **z** **tà** w s .
Hawwa z 3SG.F.SBJV play
"Hawwa will play." (SBJV = subjunctive)

Crucially, *zā* cannot co-occur with continuative or completive aspect (3), (4). Whenever *zā* is present, the weak subject pronoun must be in the so-called SUBJUNCTIVE as in (2).

(3) ***Z** - w s
Z 3SG.F-CONT play
Intended: "She will be playing."

(4) ***Z** w s
Z 3SG.F.COMPL play
Intended: "She will have played."

Future time reference is close to obligatory with *zā*, i.e. sentences with *zā* do not allow for non-future modal readings (5).

(5) ? Wataƙīlà **z** **sù** wurin ai ī yanzù.
Perhaps ZA 3PL.SBJV PREP work now
Intended: "They will probably be at wor right now." (no present reading available)

What is obligatorily shifted with *zā* is the EVENT TIME (ET), and not the REFERENCE TIME (RT). Thus, *zā* is also compatible with past RTs as in (6).

(6) Context: A wrong weather forecast for the preceding day.
Jiyà **z à** yi ruwa, àmm bà à yi ba.
Yesterday z 4P.SBJV do rain, but NEG.COMPL do NEG
"Yesterday, it was going (predicted) to rain, but then it didn`t."

The ANALYSIS consists of the following ingredients: (i.) The INFL-head in Hausa does not contain a covert tense pronoun/operator that would specify RT. The temporal interpretation of Hausa clauses is obtained by means of the default pragmatic principles proposed by Smith et al. (2007), which derive RT from aspect and aktionsart of the verbal predicate. The pragmatic principles assign completive and continuous sentences default past and present readings, respectively, but, being pragmatic, they can be overridden by contextual information, e.g.

yielding a future interpretation for continuous (1). **(ii.)** The future marker *zā* is a modal operator encoding universal quantification over possible worlds, and the so-called subjunctive is reanalyzed as PROSP(ECTIVE) aspect. The reanalysis is inspired by Schuh's (2003) claim that the Hausa subjunctive only encodes "dependent subsequent inception" of an event, locating this event after RT, and that the eventual interpretation of the subjunctive depends on a higher quantificational element. We model this dependency by treating the subjunctive/prospective as a deficient aspect that does not state the existence of an event, leaving the event argument of the predicate open (7). Unlike full-fledged aspectual heads, which existentially bind the event argument and map event properties to propositions (8), the prosp(ective) head in (7) maps events properties to functions from events to propositions.

(7) $[\![\text{Prosp}]\!]^{RT} = \lambda P_{<l,st>}.\boldsymbol{\lambda e}.\ \lambda w.\ [\boldsymbol{\tau(e) > RT} \wedge P(e)(w)]$

(8) $[\![\text{Completive}]\!]^{RT} = \lambda P_{<l,st>}.\ \lambda w.\ \boldsymbol{\exists e}\ [\tau(e) \subseteq \boldsymbol{RT} \wedge P\ (e)(w)]$ (Kratzer 1998)

(iii.) Due to its deficiency, the prospective is the only aspect compatible with *zā*, which requires arguments of type <l,<s,t>>, mapping them onto propositions (9). Hence, *zā* is located in a higher position, from where it closes off the open event argument of *Prosp*. As all other aspects map onto type <s,t>, combining them with *zā* will incur a type mismatch. **(iv.)** The fact that *zā*+*PROSP* expresses the future-oriented attitudes of intention and prediction falls out by treating *zā* as a modal operator quantifying over worlds from a (presupposed) realistic modal base (MB) with a bouletic or inertial ordering (O):

(9) $[\![z\ ]\!]^{RT} = \lambda P_{<l,<st>>}.\lambda w.\forall w'[w' \in O(w)(MB(w)(\boldsymbol{RT})) \rightarrow \exists e[P(e)(\boldsymbol{RT})(w')]$
defined iff MB is realistic and O inertial or bouletic.

With (9), the interpretation of the future sentence (2b) proceeds as in (10). ModP and AspP are headed by *zā* and the prospective *tà*, respectively: [$_{ModP}$ z [$_{AspP}$ tà [$_{vP}$ Hàwwa w s]]]

(10) $[\![\text{vP}]\!] = \lambda e.\lambda w.\ [\text{play}\ (e)(w) \wedge \text{agent}\ (\text{Hàwwa})(e)(w)]$

$[\![\text{AspP}]\!]^{RT} = [\![\text{Prosp}]\!]^{RT}\ ([\![\text{vP}]\!])$
$= \lambda e.\lambda w.\ [\text{play}\ (e)(w) \wedge \text{agent}\ (\text{Hàwwa})(e)(w) \wedge \boldsymbol{\tau(e) > RT}]$

$[\![\text{ModP}]\!]^{RT} = [\![z\ ]\!]^{RT}\ ([\![\text{AspP}]\!]^{RT}) = \lambda w.\forall w'[w' \in O(w)(MB(w)(\boldsymbol{RT})) \rightarrow$
$\exists e[\text{play}(e)(w') \wedge \text{agent}(\text{Hàwwa})(e)(w') \wedge \boldsymbol{\tau(e) > RT}]$

$[\![\text{IP}]\!]^{RT} = [\![\text{ModP}]\!]^{RT}\ (w_0) = 1$ iff $\forall w'[w' \in O(w_0)(MB(w_0)(\boldsymbol{RT}) \rightarrow$
$\exists e[\text{play}(e)(w') \wedge \text{agent}(\text{Hàwwa})(e)(w') \wedge \boldsymbol{\tau(e) > RT}]]$

(2b) is correctly predicted to be true iff in all those worlds from the realistic base at the contextually given time RT in w_0 that are compatible with some agent's plans or intentions or the normal course of affairs, there is an event of Hàwwa playing that takes place after RT.

SUMMARY: There is no covert tense morpheme in Hausa. This lends support to the claim that tense is dispensable for temporal interpretation and that INFL, rather than tense, is a universal category of natural language (Wiltschko & Ritter 2010). The Hausa data also provide strong evidence for the claim that future marking (universally) involves a combination of modality and aspectual time shifting, as these components are encoded separately in Hausa.

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Conjunction is Parallel Computation

I propose a new, game theoretical, analysis of conjunction which provides a single logical translation of *and* in its sentential, predicate, and NP uses, including both Boolean and non-Boolean cases. In essence it analyzes conjunction as parallel composition, based on game-theoretic semantics and logical syntax by Abramsky (2007).

I aim to account i.a. for conjunctions of quantified NPs in the context of group predicates:

(1) *Every man and every woman kissed (each other)* in the reading 'For every man x and for every woman y, x and y kissed (each other)', or 'every man-woman pair kissed.' In a model with n men and m women, this requires $n \times m$ kissings.

Proposals on the interpretation of conjoined NPs include algebraic Boolean operations (Keenan and Faltz, 1985), mereological sums (Link, 1983), and combinations of sums with type shifting (Hoeksema, 1988). Examples like (1) are challenging for all of these proposals. The straightforward order-theoretic approach to Boolean compounding of quantifiers assigns *every man and every woman* the type of an ordinary generalized quantifier, and predicts (1) to be equivalent to **every man kissed (each other) and every woman kissed (each other)*. Translation of *and* as mereological sums is not directly applicable in (1) because of a type mismatch: mereology is defined on entities but not on quantifiers. Hoeksema's solution comes closer to adequacy; *and* is interpreted as Linkian sums, but the two NPs scope out of the conjoined structure, predicting correct truth conditions for (1).

Hoeksema's solution, however, fails for two reasons. First, it runs contrary to independent evidence that quantifiers normally don't scope out of a conjoined structure. Second, Hoeksema's technique falsely predicts availability of scope dependency between the two quantifiers. In fact, conjoined quantifiers are generally scope-independent, compare:

(2) a. Three boys kissed three girls. **no conjunction**

b. Three boys and three girls kissed (each other). **conjoined quantifiers**

(2a) but not (2b) has the scope dependent reading 'there are three boys such that each of them kissed three girls' (triples of girls kissed may vary with the boy). (Both (2a) and (2b) have a scope-independent group reading 'a group of three boys was engaged in kissing with a group of three girls' whereby each of the boys may have kissed fewer than three girls).

(3) a. Every man kissed almost every woman
Scopal dependency: each man kissed a vast majority of women; the set of women kissed may vary arbitrarily with the man, to the degree that e.g. there might be few or no women that all men kissed.

b. Every man and almost every woman kissed each other
No scopal dependency: there's a fixed majority of women that all men kissed.

Desiderata for an adequate analysis of conjunction include compositionality, capturing scope independence of conjoined quantified NPs, and semantic generalization of the meaning of *and* across its various uses (branching (Sher, 1990) satisfies all but the last desideratum). My proposal relies on game-theoretic semantics (GTS), a theory designed to treat scope independence, where different types of meanings (quantifiers, sentences) can be represented uniformly as games. I propose to analyze sentences like (1) through paraphrases like

(4) Take an arbitrary man x and take an arbitrary woman y; they kissed each other.

'Take an arbitrary x' is an informal description of the game theoretic semantics for the universal quantifier $\forall x$. Note that the paraphrase translates NP conjunction by sentential *and*, and is similar to paraphrases for non-Boolean conjunction in Schein (1993). As the paraphrase suggests, the quantifier meaning is taken to be an instruction ('take an x') rather than a function onto truth values (as in generalized quantifier theory).

So my analysis is dynamic, more specifically game-theoretic (Hintikka, 1979). In game-theoretic semantics (GTS) sentences are interpreted as instructions for evaluating truth of a statement, formalized as games with two players, Verifier and Falsifier. An atomic formula ϕ is a trivial game in which the Verifier wins iff ϕ is true in the classical sense. Quantifiers denote moves in the game. $\exists x$ instructs the Verifier to pick a value for the variable x, and $\forall x$ is an instruction for the Falsifier to assign a value to x. (Note that $\forall x$ is a minimal game, too.) Truth in GTS is a notion secondary to verification procedure but is equivalent to classical truth in first order logic. A formula is true iff it denotes a game in which the Verifier has a winning strategy, i.e. Verifier can win no matter how Falsifier plays.

I propose to treat conjunction uniformly as parallel composition, an operation on games that Abramsky (2007) symbolizes as $||$. In the game $\phi \,||\, \psi$, both ϕ and ψ are played in parallel, without temporal or causal relation between ϕ and ψ, and the Verifier wins iff she wins in both subgames. In addition to parallel composition, Abramsky proposes a sequential composition operator $\cdot$. Note that $\phi \,||\, \psi \equiv \psi \,||\, \phi$, but $\phi \cdot \psi$ does not equal $\psi \cdot \phi$. I assume that quantifiers combine with predicates via sequential combination (provably $\forall x \cdot \phi \equiv \forall x \phi$, $\exists x \cdot \phi \equiv \exists x \phi$), and interpret coordination of both sentences (*it rains and it is cold*) and quantifiers (*every man and almost every woman*) by parallel composition. For sentential coordination, parallel composition ($\phi \,||\, \psi$) is truth-conditionally equivalent to standard conjunction: both ψ and ϕ must be true to make $\phi \,||\, \psi$ true. Boolean predicate conjunction is analogous to the sentential case, given that predicates are interpreted as sentential formulas with an open variable: $[\![\text{everyone dances and sings}]\!]^{M,g} = \forall x.(\texttt{sing}(x) \,||\, \texttt{dance}(x))$.

Formalizing the paraphrase in (4), the compositional logical translation of (1) is

(5) $[\![\text{Every man and every woman kissed each other}]\!]^{M,g} = [\forall^{[MAN]} x \,||\, \forall^{[WOMAN]} y] \cdot \mathbf{kissed}(x, y)$
(notation for quantifier restriction $Q^{[A]}$ from Peters and Westerståhl (2006, p. 87).

The complex NP *every man and every woman* is translated as $\forall^{[MAN]} x \,||\, \forall^{[WOMAN]} y$ which is a combination of semantic values for *every man* ($\forall^{[MAN]} x$) and *every woman* ($\forall^{[WOMAN]} x$).

Parallel composition is designed to be a representation of scope independence, so the proposal immediately covers examples like (2b) and (3b) which crucially involve quantifier independence. In (3b), for instance, $[\![\text{almost every woman}]\!]^{M,g}$ can be formalized as a game where the Verifier picks a sufficiently big subset WOMAN$' \subset$WOMAN, and the Falsifier picks an arbitrary $x \in$WOMAN$'$; since parallel games are independent, the set of women involved in kissing doesn't vary with men.

Parallel combination is a compositional, unified translation of *and* in sentential and NP conjunction. Originally proposed in the game-theoretic framework, the idea of parallel composition is in principle compatible with other dynamic theories such as DPL (Groenendijk and Stokhoff, 1991). However, combining quantified NPs with $||$ is more natural in GTS, where both universal and existential quantifiers are interpreted dynamically, than in DPL, where universal quantification is static.

Aspectual verbs and the "coercion" effect

Background: It has been proposed that aspectual verbs like *begin* carry a selectional restriction and must combine with an event-denoting complement as in (1-a) (Pustejovsky 1995, Jackendoff 1997). Evidence in support of this restriction comes from the observation that even in sentences where the complement denotes an individual of the ordinary sort, only an eventive interpretation is obtained. That is, (1-b) can only be interpreted as making reference to some event involving a book with John as its agent. The contrast in (1-a) and (1-b) has been investigated in the experimental literature as an instance of the broader phenomenon of **type coercion**. The hypothesis is that complements denoting ordinary individuals must change their semantic type to that of events in order to resolve the type-mismatch with aspectual verbs.

(1) a. John began/continued/finished *writing the book*.
b. John began/continued/finished *the book*.
c. John read/dropped *the book*.

As it turns out, when sentences like (1-b) are compared with sentences like (1-c), processing cost is observed for the (1-b) set (McElree et al., 2001, Pylkannen & McElree, 2007, Husband et al., 2011, Katsika et al., 2012). The manifestation of this rather robust effect has in return been taken to support the type-shifting approach as providing not only a semantically sound but also a psychologically viable understanding of aspectual verbs.

Problem: The approach to aspectual verbs outlined above faces a challenge from data such as in (2). Specifically, in addition to the agentive readings of the subject denotation, as in (1-a-b), transitive uses of aspectual verbs give rise to at least two other readings for their subject denotations – the patientive/undergoer reading (2-a-b) and the constitutive part reading (2-c-f). The patientive readings have traditionally been classified as involving the raising versions of aspectual verbs (Perlmutter 1970, also Pustejovsky 1997). [$\surd$ marks web-attested examples.]

(2) a. John *began* to bleed.
b. The paint *began* to peel. ($\surd$)
c. A little porcelain pot *finished* the row. ($\surd$)
d. Defoe (1661–1731) *begins* the list of writers of the period of people's influence...($\surd$)
e. This conclusion *finished* the first day's activities and the staff adjourned.($\surd$)
f. On the Indian side, Dharamsala *begins* the Himalayas.

Consideration of this broader range of data indicates that aspectual verbs (at least the core class consisting of *begin*, *start*, *finish*, *end*, *continue*) must be analyzed as semantically neutral with respect to the ontological categories they make reference to. Contra the assumptions of the type-mismatch and repair approach, their basic meaning generalizes over (at least) events and individuals (and is extendable straightforwardly to intervals and locations). Accordingly, we submit that the assumption that aspectual verbs select for eventive complements whose initial, medial, or final sub-events they make reference to, is too narrow a characterization of their semantic behavior. We present an analysis that makes explicit how a generalized meaning of an aspectual verb interacts with the semantic properties of its arguments, leading to the 'agentive/patientive readings of the subject denotation on the one hand, and the 'constitutive-part' readings on the other.

Analysis: The ontology includes objects (type e) and events (type v). The variables, $t, t', t''...$ range over individuals of any sort: i.e. object or events and T ranges over **totally ordered sets** of objects and events. The basic schema that we propose for aspectual verbs is illustrated here with the lexical entry for *begin* in (3-a) and *finish* in (3-b). *begin* combines with some totally ordered

set T of individuals of any simple type σ and an entity t of any simple type τ and returns the proposition that there is some function f such that the value of f at the least element of T is t.

(3) a. $[\![\text{begin}]\!] = \lambda T_{(\sigma,t)} \lambda t_{\tau}\ \ \exists f_{(\sigma,\tau)}[f(\mathbf{inf}(T)) = t]$
b. $[\![\text{finish}]\!] = \lambda T_{(\sigma,t)} \lambda t_{\tau}\ \ \exists f_{(\sigma,\tau)}[f(\mathbf{sup}(T)) = t]$

Since *begin* and its kin require a totally ordered set as their first argument (the complement), any simple-type expression that they combine with is shifted via the operator **set**. **set** maps an individual of any type to some set of its parts totally ordered along a contextually given parameter $c(\leqslant_c)$. For any individual t then,

(4) $\mathbf{set}(t) =_{def} \{t' | t' \leqslant_c t\ \&\ \forall t'', t''' \in \mathbf{set}(t)[t'' \prec t''' \vee t''' \prec t'' \vee t'' = t''']\}$

Thus, $\mathbf{set}$(the book) may, modulo context, map the book to the set of its chapters, the set of its sentences, or to the set of its (totally ordered) subnarratives.

Accounting for the readings: The core data with agentive readings of the subject denotation (as in 1a-b) as well as the broader range of readings seen in (2) can be accounted for uniformly from the assumptions above.

The agentive reading (1a-b) can arise when the complement of *begin* is event-denoting as in *John began writing the book*. Here, **set** maps the event of writing the book to the set of its totally-ordered sub-events. *begin* combines with this set and with the individual John, and the resulting proposition is that some function relates the initial sub-event of **set**(writing the book) to the individual John – for instance, the agent function.

(5) a. $[\![\text{begin writing the book}]\!] = \lambda T_{(\sigma,t)} \lambda t_{\tau}\ \ \exists f_{(\sigma,\tau)}[f(\mathbf{inf}(T)) = t](\mathbf{set}(\text{writing the book}))$
$= \lambda t_{\tau}\ \ \exists f_{(\sigma,tau)}[f(\mathbf{inf}(\mathbf{set}(\text{writing the book}))) = t]$
b. $[\![\text{John begin writing the book}]\!] =$
$\lambda t_{\tau}\ \ \exists f_{(\sigma,\tau)}[f(\mathbf{inf}(\mathbf{set}(\text{writing the book}))) = t]\ (\text{John}_e)$
$= \exists f_{(\sigma,\tau)}[f(\mathbf{inf}(\mathbf{set}(\text{writing the book}))) = \text{John}_e]$

In the case of *John began the book*, **set** maps the book to the set of its constitutive parts (physical or narrative). *begin* combines with this set and with the individual John and relates the least element of this set to the individual John via some function. We call this underspecified function the *traverser* function. The **patientive** readings in (2a-b) can be derived similarly in a transparent way.

The **constitutive part** reading (2 c-f) arises when the function that relates the subject denotation to the set complement is identity. In the case of *The little porcelain jar finished the row*, **set**(the row) is the ordered set of the individuals making up the row starting from some end. Assuming identity as the relevant function, the porcelain jar is asserted to be the greatest element of this set.

Accounting for the processing cost: In cases like *John began the book*, our analysis shifts the processing burden from the application of type-shifting to the simpler and more widely observed operation of ambiguity resolution. The parser, upon receiving the string corresponding to the subject and combining it with the aspectual verb, expects to compose it with the ordered set provided by the complement. The nature of this set, and consequently, the function that relates the distinguished element of this set with the subject denotation, remains undetermined. The cost occurs from the resolution of the ambiguity that is required by the presence of multiple possible readings. No special event has to built via type-shifting, no mismatch has occurred, and no repair is required.

Carl Pollard & E. Allyn Smith

A unified analysis of *the same*, phrasal comparatives, and superlatives

Recent years have showed a renewed interest in the issues of giving a compositional analysis of a number of scope-related phenomena, such as the so-called *parasitic scope* inherent in *same* and *different* (Barker 2007) and the analysis of phrasal comparatives such as *Anna has more money than Bill* (Bhatt and Takahashi 2007). So far, these analyses do not extend to one another, despite the number of properties that they share (cf. Heim 1985). We give a new unified analysis that is easily extended to all of the phenomena mentioned by Heim (including superlatives) that preserves the advantages of previous proposals, such as compositionality and a simplistic syntax-semantics interface.

Barker 2007 focuses on the internal (non-deictic) reading of sentences like (1) in which Anna and Bill have read some book in common, laying out various past analyses of *same* that were either non-compositional (not respecting surface syntax) or pragmatic, and showing that neither kind makes the correct predictions. He presents an analysis in which *same* is a kind of quantificational adjective whose scope target does not exist until a plural NP in the sentence undergoes QR, which creates an intermediate adjunction site for the (parasitic) raising of *same*.

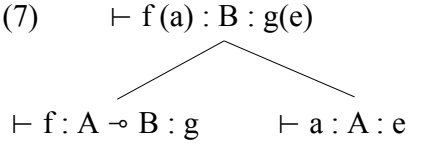
(1) Anna and Bill read the same book
(2) Anna read the same book as Bill

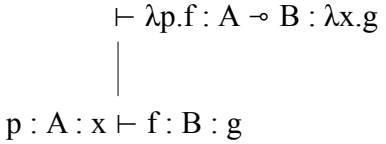
He gives a full analysis of examples like (1) and many others using a categorial grammar with continuations. Besides some possible theoretical shortcomings (such as the ad hoc structural postulate that is required), one empirical shortcoming is the assumption that *same* (or *the same*, since the presence of the definite is left for future work) is dependent upon a plural-denoting expression. Example (2) shows that the plural need not be a continuous string.

This discontinuity is just like a certain kind of phrasal comparative, called the *associate-remnant* comparative, such as (3), where *Clara* is the remnant (following *than*). This sentence has two readings as in (4) and (5). In (5), *Anna* is the associate, and in (6), it is *Bill*.

(4) Anna owes more to Bill than Clara.
(5) Anna owes more to Bill than Anna owes to Clara.
(6) Anna owes more to Bill than Clara owes to Bill.

Our analysis uses a curry-esque style of categorial grammar (like lambda grammar or abstract categorial grammar, cf. de Groote 2001) in which the syntactic component is divided in two: the tectogrammar, which is the locus of argument structure, and the phenogrammar, which deals with word order and morpho-syntactic issues. Both the phenogrammar and semantic components are lambda calculi, and the tectogrammar is a linear logic. All three components work in lock-step, and for this analysis, only two rules are required: function application (merge) and hypothetical proof (analogous to 'move'). These are given in (7) and (8), respectively.

(7)


(8)


Here, the turnstile (⊢) separates any non-discharged hypotheses on the left from the rest of the

expression, and the three parts are separated by colons (pheno : tecto : sem). The linear logic "lollipop" (⊸) indicates a function in the tecto component, in the way that → does for the other components. Thus, for example, if you isolate the tecto component, which has category types like NP and S, ⊢S (with nothing to the left of the turnstile) indicates a stand-alone sentence, while NP ⊢ S indicates a sentence that is missing an NP somewhere within it, and ⊢ NP ⊸ S is the type of an intransitive verb that is looking for an NP argument to yield a sentence. The semantics is exactly as it usually is, and the phenogrammar has only one basic type, *string*, from which one can build functions from strings to strings, etc. Strings are concatenated using a (+) operator to yield correct sentence word orders.

Turning now to the analysis of (4), the lexicon required is as in (9), where *G* is a variable of type <*d,et*>, *z,u,s* and *t* are variables of type *string*, and *r* is a variable of type <*string,*<*string, string*>>, which is why *r* appears in the entry for *more* with two arguments: *MORE* and *s*. We also make use of *traces* that introduce hypotheses on both sides of the turnstile, such as (9g).

(9) a. *Anna:* ⊢ ANNA : NP : a
b. *Bill:* ⊢BILL : NP : b
c. *Clara*: ⊢CLARA : NP : c
d. *owes:* ⊢ λz.λu.λs.s+OWES+z+u : NP⊸(Deg⊸(NP⊸S)) : λx.λd.λy.owe'(x)(d)(y)
e. *more*: ⊢ λr.λs.λt.r(MORE)(s)+t : (Deg⊸(NP⊸S))⊸(NP⊸(Th[NP]⊸S)) :
λG.λx.λy.more'(G)(x)(y)
where [[more]](G)(x)(y) is true iff **max**(λd.G(d)(x)) > **max**(λd.G(d)(y))
f. *than:* ⊢λs.THAN+s : NP⊸Th[NP] : λx.x
g. p : NP : x ⊢ p : NP : x

We see in *more*'s tecto type that it takes something missing a degree and an NP argument and returns something that takes two NP arguments (one of which is *than*-marked), which is what is required for phrasal comparison. The derivation is slightly different for the two readings, but in essence, *owes* combines with two traces, one of each of the degree and NP types. Then it combines with the argument that is neither the associate nor the remnant, followed by two rounds of hypothetical proof as the various hypotheses/traces are discharged. That leaves something that is looking for a degree argument and an NP argument once again, which is the kind of thing that *more* is looking to combine with. The result of that application yields something looking for two NPs, at which point the associate and remnant are taken as arguments, giving a complete sentence. The sentence missing a degree and an NP would be a regular sentence without a comparative, so it does not have a second argument position for whatever is in the *than* phrase. However, just as in other instances of parasitic scope, this scope position is created as a result of another operator, here, *more*. We exploit this connection to give parallel analyses of internal readings with *same* and superlatives in the talk (since space prevents full analyses of all three here). Finally, we show that the same technology can extend the essence of Barker's proposal to the examples that he doesn't cover, namely those in which the plural entity is discontinuous, showing further advantages of distinguishing a phenogrammatical component in the grammar.

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Paolo Santorio

Layered Binding in *De Se* Reports: Abstract

1. Synopsis. Since Heim (1994), it is known that *de se* attitude reports give rise to problematic phenomena for classical Binding Theory (BT). I argue that we should solve the problem by upgrading our technology for variable binding. Variables occurring in attitude reports carry two different indices: one (basic index) tracks identity facts in the actual world, the other (higher-order index) tracks identity facts in the worlds quantified over by the attitude verb. BT only looks at basic indices, while—in consonance with some recent approaches to attitude reports—attitude verbs bind higher-order indices. I show how the picture can be implemented compositionally and survey the prospects of generalizing it to similarly puzzling BT phenomena in Free Indirect Discourse.

2. The puzzle. *De se* attitude reports are problematic for classical BT. Focusing on a version of the problem discussed by Sharvit (2011), consider (1):

(1) McCain convinced Palin to vote for herself.

(2) [McCain convinced Palin$_2$ [1 [*PRO*$_1$ vote for herself$_2$]]]

(1) has a reading on which *herself* is read *de re*. On standard assumptions about *de se* reports (see Chierchia (1989), Anand (2006))), the LF for this reading is given by (2): notice that *PRO* and *herself* must carry different indices, lest the latter receive a *de se* interpretation. Yet standard BT predicts that the indexing pattern in (2) is ungrammatical, as it exemplifies a violation of Condition A (on which a reflexive pronoun must be covalued with a c-commanding NP in its local domain). A converse problem obtains with (3), whose standard LF (on the *de re* reading of *her*) is in (4):

(3) *McCain convinced Palin to vote for her.

(4) [McCain convinced Palin$_2$ [1 [*PRO*$_1$ vote for her$_2$]]]

(3) is ungrammatical, yet standard BT allows the indexing pattern in (4) (since it satisfies Condition B, on which a non-reflexive pronoun must not be covalued with a c-commanding NP in its local domain). The problem generalizes beyond (1)–(4): analogous issues obtain with subject-control verbs and when the controller of *PRO* is a trace.

3. Layered binding: basics. Early solutions to the problem are effectively criticized by Sharvit (2011). Sharvit proposes instead to extend the notion of covaluation used in BT to cover cases where a reflexive pronoun denotes the 'self' of an attitude holder. This proposal seems empirically adequate, but contains an element of stipulation: it would be striking if BT made *ad hoc* provisions for *de se* reports. This motivates the search for a smoother and more conservative account.

I start from the following diagnosis. The source of the problem is that variable indices in *de se* reports are used to track two kinds of identity facts. On the one hand, they track which actual individuals the attitude is about. On the other, they track who the attitude holder takes those individuals to be. Problems arise when there is a mismatch between facts of the two kinds.

This points towards a semantic solution: we must track separately the two kinds of identity facts. We can do this by switching to a new technique of variable binding, which I call 'layered binding'. Layered binding allows us to equip variables with multiple sets of indices. The first set tracks actual identity facts, while the second tracks identity facts within attitude worlds. Hence each variable appearing in an attitude report comes with two indices. For example, the LF of (1) is:

(5) [McCain convinced Palin$_1$ [$\lambda^{\langle a,b\rangle}$. [$PRO^a_1$ vote for herself$^b_1$]]]

Indices in subscript position—call them 'basic indices'—determine covaluation facts used by BT. Indices in superscript position—call them 'higher-order indices'—determine, roughly, the 'mode of presentation' the attitude holder associates to the objects in her attitude state (more details below).

This immediately solves the problem for BT generated by (1)–(4). (1) is ruled in as grammatical on its *de re* reading. By assumption, covaluation facts are determined by basic indices: hence *herself* is covalued with an NP in its local domain, namely *PRO*. (3) is is ruled out for analogous reasons.

4. Implementation. Following recent accounts (Cumming (2008), Santorio (2012), Ninan (2012)), I start from the idea that attitude verbs work as assignment-shifters and hence bind all variables appearing in their scope. Variables bound in this way range over counterparts of the relevant individuals in the relevant worlds. Here are the resulting truth-conditions for a sample sentence:

> $[\![$Jason$_1$ hopes to kiss her$_5]\!]^{w,g}$ = true iff for all w' compatible with Jason's hopes, the counterpart of $g(1)$ in w' kisses in w' the counterpart of $g(5)$ in w'.

The innovation is that attitude verbs manipulate one of two sets of indices, i.e. higher-order indices. Accordingly, the semantics employs two assignments g_x and g_y: each of them handles a different set of indices. Only one of them is shifted by attitude verbs:

> $[\![S$ believes [that p]$]\!]^{w,g_x,g_y}$ = true iff for all $\langle w', g'_y\rangle$ compatible with S's beliefs, $[\![$p$]\!]^{w',g_x,g'_y}$

The double layer of indices allows variables that are covalued at the basic level to range over different sets of counterparts. Thus the truth-conditions of (1) are (simplifying, and assuming that the higher-order indices on *PRO* and *herself* are, respectively, *a* and *b*):

> $[\![(1)]\!]^{w,g_x,g_y}$ = true iff for all w' compatible with what McCain convinced Palin to do, the *a*-counterpart of Palin in w' votes in w' for the *b*-counterpart of Palin in w'.

The account generalizes naturally to cases involving quantification and to subject-control verbs.

5. Extras. Sharvit (2011) points out that an account of BT phenomena in *de se* reports should generalize to similar, but somewhat different, BT phenomena in Free Indirect Discourse (FID). I conclude by arguing that the prospects for this generalization look encouraging. The basic asymmetry in the data is captured on the assumption that FID operators bind basic rather than higher-order indices.

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Galit W. Sassoon & Natalia Zevakhina

Granularity shifting: Experimental evidence from degree modifiers

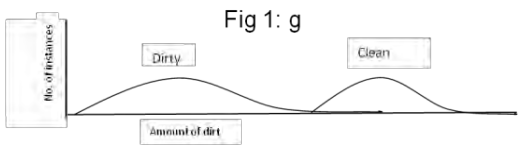
This paper presents an account of degree modifiers and two studies that test its predictions.

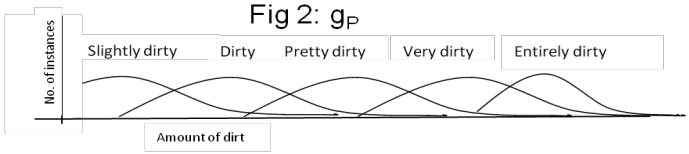
Objects count as *clean* iff they are free of dirt, and count as *dirty* iff they are covered with at least a minimum amount of dirt. Hence, *dirty* is a minimum-standard („partial') adjective and *clean* is a maximum-standard („total') adjective (Kennedy & McNally 2005). Supposing that modifiers like *slightly* („minimizers') and *completely* („maximizers') are not semantically vacuous, we hypothesize that they trigger a shift from a default coarse granularity level g to a finer level g_p, the one pedants use in judging cleanliness (Toledo & Sassoon 2011). For example, pedants consider every small grain of dust important. Non-pedants don't. They consider easily visible dirt important, and ignore the rest (Lewis 1979). Hence, in contexts of utterances such as *The car is* {*dirty, clean*}, it is normally appropriate to ignore almost invisible dirt. However, an utterance of *The car is* {*slightly dirty, completely clean*} is appropriate iff the criterion for the application of the adjective is more pedantic: almost invisible dirt counts. It is true iff *The car is* {*dirty, clean*} is true given this pedantic criterion. On this account, *slightly dirty* conveys „almost invisible dirt and possibly more' ($[\text{slightly dirty}]_g = [\text{dirty}]_{g_p} \supset [\text{dirty}]_g$), and *completely clean* conveys „free even of almost invisible dirt' ($[\text{completely clean}]_g = [\text{clean}]_{g_p} \subset [\text{clean}]_g$).

For Kennedy & McNally (2005) and Kennedy (2007), the scale range denoted by minimizers begins at the scale minimum, while we hypothesize that it begins at the denotation minimum (see also Rothstein & Winter 2005). The difference shows up with total adjectives. On our account, minimizers/maximizers modifying total adjectives as in, for example, *slightly/completely full* render relevant previously ignored differences between denotation members (maximally full entities relative to g), and they typically pick the least full/fullest of them, respectively.

Krifka (1997, 2002) uses Bidirectional Optimality Theory (Blutner 1998, 2000) to model the coupling between round numbers and round interpretations, and more generally, between short expressions and coarse interpretations and between long expressions and precise interpretations. This account straightforwardly predicts that modified adjectives will be interpreted with higher standards of precision (finer scales) than unmodified (bare) adjectives (alternative accounts of imprecision are silent about the coupling between expression complexity and precision level).

Thus, inspired by Krifka's (1997) analysis of numerals, we hypothesize that adjectives and their modifiers are associated with a probability distribution over the scale range they denote, representing the probability that they would reference each point in the scale (cf. fig. 2). Peaks represent typical contexts of use; e.g., maximizers typically pick the maximum. We propose that the denotation of adjectives modified by minimizers (henceforth „minimized'; e.g., *slightly dirty*) overlaps with (is a superset of) the range denoted by the bare adjective (e.g., *dirty*). Yet, we typically do not use minimized adjectives to refer to medium or high degrees because we rather use other expressions (*dirty, very dirty, entirely dirty,* etc.) Similarly, the denotation of bare adjectives like *clean* overlaps (is a superset of) that of their maximized forms, e.g., *completely clean*. Yet, we typically use bare adjectives to refer to lower degrees than maximized adjectives.





Therefore, we argue that, e.g., *slightly* has an „at least' reading. Evidence comes from the fact that the typical intonation contour of utterances such as *The floor is not slightly dirty, it is very dirty* is characteristic of metalinguistic negation, suggesting that the logical negation of a minimized adjective cannot be used to refer to high degrees. High degrees are part of the

minimized adjective denotation (e.g., *slightly dirty*). Moreover, negated minimized adjectives such as *not slightly dirty* are a bit odd, except when modified with a marker of unexpectedness as in *not even slightly dirty*, which is perfectly felicitous. The reason is arguably that minimized adjectives refer to a wide range, covering up to a whole adjectival scale except for only the zero (lower closure). It is unlikely for an entity to fall outside this range.

Finally, we hypothesize following Lewis (1979) that a shift from default to finer standards of precision is a natural discourse move, but the opposite shift is not. For example, we may state that the Netherlands is flat, presupposing default coarse granularity, and then point out that it is actually a bit bumpy by shifting to a finer criterion, taking as evidence bumps we previously ignored. However, we cannot state that the Netherlands is bumpy and smoothly proceed to say that it is actually flat, thereby ignoring bumps that we previously regarded as relevant evidence.

Two studies of inferences from modified to bare adjectives and vice versa provide experimental evidence for the granularity shifting account of degree modifiers presented above.

Exp1 tested two context types, e.g., (C1) *Nick thinks that x is dirty. Nick's mother thinks that x is slightly dirty. Would Nick agree that x is slightly dirty?* and (C2) *Nick thinks that x is slightly dirty. Nick's mother thinks that x is dirty. Would Nick agree that x is dirty?* Participants were asked to provide an answer on a scale ranging from 1 (certainly not) to 5 (certainly yes). Items included 17 partial adjectives × 3 minimizers (*slightly, somewhat, a bit*), 17 total adjectives × 3 maximizers, and as many fillers as target items, with 25 English speaking participants per item.

The results confirmed our expectations. First, all mean answers per item were in the positive range (above 3), suggesting that the range denoted by modifiers begins at the denotation minimum. This also shows that „at most' implicatures are relatively minor. Significantly more negative than positive answers would have supported the view that *slightly dirty* is interpreted as conveying "at most slight amount of dirt" (*dirty* only given fine-grained granularity: $[\text{dirty}]_{g_p}$ & $[\neg\text{dirty}]_g$), and the view that *clean* is interpreted as "at most clean" (*clean* only given coarse granularity: $[\text{clean}]_g$ & $[\neg\text{clean}]_{g_p}$). A majority of positive answers speaks against these views.

Second, the mean answers for items of C2 (M=4.6, SD=.32) were significantly more positive than those for C1 (M=4.1, SD=.26; non parametric Wilcoxon signed-ranks test yields W=-4959, $n_{s/r}$ =101, z=-8.4 p<.001), supporting the granularity shifting account. C1 involves moving from coarse (*dirty/clean*) to pedantic (*slightly dirty/completely dirty*) granularity. Speakers directly infer from an utterance of *the floor is dirty* the entailment that *the floor is slightly dirty*. However, since the floor could be dirtier than a floor that Nick would typically call *slightly dirty*, the answers for C1 are only weakly positive ("maybe/probably yes"), because there is room for doubt; a "certainly yes" answer would suggest that Nick uses the words in an atypical way. By contrast, in the reversed context C2, since shifting from pedantic to coarse granularity is not acceptable, *slightly* triggers an irreversible shift to finer granularity. Hence, in support of Lewis (1979), the bare adjective *dirty*, affected by the shift, is interpreted pedantically too; it is interpreted as equivalent to its minimized form. So speakers infer from *the floor is slightly dirty* that *the floor is dirty* with greater certainty than vice versa. The answers for C2 are "probably/certainly yes" (4-5). Similar reasoning holds for, e.g., *clean* and *completely clean*.

Exp2 focused on *slightly* and *completely* with a 7-point scale, and 5 groups of 6 adjectives differing by their standard and scale type (partial ±max, total ±min, and relative). Exp2 replicated the significant results of Exp1. In addition, the answers for *slightly* were less positive with total than partial adjectives (U=12.5, z=3.4, p<.001). Still, all answers were (weakly) positive (M=5.5, SD=.99 for total items), supporting a denotation-minimum account where, e.g., *slightly full* implies *full*. We will also discuss results for *slightly* vs. *completely* and adjectives vs. numerals.

Roger Schwarzschild

Located vectors and bare comparatives

The Hindi example in (1) below from [a] has three features of interest here:

(1) John Bill-**se** lambaa hai
John Bill-se tall.M.SG be.PRES.SG
'John is taller than Bill'

(i) The standard marker *-se* is a **spatial** postposition. The PP *Bill-se* could be used to translate 'the arrow goes from Bill to John'. *(ii)* There is no comparative morpheme on *lambaa* that would correspond to the *–er* on 'taller'– so (1) is a **bare comparative**. (*iii)* The postposition *-se* governs a DP – there is no underlying clause – so (1) is a **phrasal** comparative.

My proposal addresses (1) and other recently discussed examples with the features just mentioned. At its heart is an analysis of degrees as located vectors ([d][g]). The idea is that a scale is a set of points with a direction. A vector points upward if its **endpoint** is above its **origin** on the scale. "from Bill" describes vectors that point upwards, whose origin includes Bill. "John tall" describes vectors on the height scale whose endpoint includes John. The combination in (1) describes the existence of a vector on the height scale that goes upward from Bill to John.

(2) A **degree** is a four-tuple consisting of: a field, an ordering, an endpoint and an origin, represented as: $\langle \text{FIELD}(d), >_d, \text{END}(d), \text{ORIG}(d) \rangle$.
FIELD(d) is a set of entities that are ordered by $>_d$. END(d) and ORIG(d) are equivalence classes ordered by $>_d$.

(3) tall(x,d) = 1 *iff* FIELD(d) is the set of entities with a height; ORDER(d) orders entities by height; END(d) includes x.

If John is 5ft tall, *tall* pairs him with any height vector whose endpoint includes all and only 5ft tall individuals.

(4) $[\![\textit{from}]\!] = \lambda x\, \lambda d.\ x \in \text{ORIG}(d) \ \wedge \text{END}(d) >_d \text{ORIG}(d)$

Assuming an ∃-type shift applied to the PP we get:

(5) $[\![\exists\ \textit{from Bill}]\!] = \lambda P\, \exists d.\ \text{Bill} \in \text{ORIG}(d) \ \wedge \text{END}(d) >_d \text{ORIG}(d) \wedge P(d)$

(6) LF: John λx [from Bill] λd [x is d-tall]

(7) ~ There is an upward vector whose origin includes Bill. It's a height vector and its endpoint includes John.

Since (3) says nothing about ORIG(d), *tall* pairs John with both upward pointing and downward pointing vectors. The Navajo version of (1) uses a postposition meaning 'beyond'. There is another postposition used to express 'less tall than Bill'. We can capture this by assigning the less-than postposition a meaning like (4) except that the vectors point downwards ($\text{ORIG}(d) >_d \text{END}(d)$). A similar analysis may apply to *hoo* ([f]) which can mark 'John' in the Japanese version of (1) and which also has a spatial 'towards' use (*hidari no hoo* 'to the left')

This analysis differs from [d] and[g]'s analyses of full comparatives by assigning the standard-PP a meaning just like the one [h] assigns to *above the house*. [h] appeals to measure phrase modification as a key argument for a vector analysis. Similarly, differentials in bare-comparatives (eg [b]:(33) 'Bill 6 in. with him.beyond' for '6 inches taller than Bill') may describe the length of the vectors introduced by the PP.

[d] leaves for future work cases like (8) below which differs from (1) in the role of the standard. In (8), the degree predicate 'many' assigns cardinalities, but the cardinality of SS itself is not at issue (contrast Bill's height in (1)). Following [a], I assume the bracketed PP moves to take parasitic scope, indicated in pseudo-English in (9):

(8) LGB-o_i, [SS-yori] ooku-no hito-ga t_i yonda (from [a], ex 58)
LGB-ACC SS-from many-GEN people-NOM read-PAST
'More people read LGB than SS'

(9) LGB SS-from λd λx d-many people read x

The resulting <d,<et>> expression in (9) is **improper**: books are paired with vectors that encode not their cardinality, but the cardinality of the people who read them. I propose a Derived Degree Relation Rule (DDRR) that can apply to an improper degree relation to produce a proper one. Here's the intuition: If we think of the popularity of a book as measured in terms of number of readers, then we are moving from a relation between a book and a cardinality-degree that its readers have, to a relation between a book and a popularity-degree that it has. Once we make that move, the rest of (9) can be interpreted as in previous examples, crucially employing the meaning in (4) for the standard marker *yori* 'from'.

(10) If α is type <d,<et>>, then $\text{DDRR}(\alpha) = \alpha'$

$\alpha'(x,d) = 1$ *iff* $\text{FIELD}(d) = \{y: \exists d' \ \alpha(y,d') = 1\}$

$a >_d b$ *iff* $\forall d_1 \forall d_2 \ (\alpha(a,d_1) = \alpha(b,d_2) = 1 \rightarrow \text{END}(d_1) >_{d1} \text{END}(d_2))$

$x \in \text{END}(d)$

Once DDRR applies in (9) (and the PP is moved for type reasons), we get (11):

(11) There is a vector that originates with SS and goes upward. It is on a scale that orders entities that are read by people, with higher points corresponding to higher readership. LGB is at the end of the vector.

Before ∃-type shifting in (5) above, the PP is a predicate of degrees (<d,t>). This fact leads to an analysis of a Navajo phenomenon seen in (12):

(12) John [Bill bi lááh 'át'éego] nineez
John [Bill 3O-BEYOND 3S-be-SUBORD $\text{ni}_{\text{ABSOLUTE.ASPECT}}$-3S-CLASS-tall
'John is tall and he is taller than Bill'

[c] demonstrates that when the root for *tall* is marked with absolute aspect, the PP+copula is an adverbial adjunct (when *tall* has comparative aspect, the PP is an argument) and a POSitive operator is present, accounting for the evaluativity in the gloss in (12). If POS has a domain restriction represented as C, the PP can function as a Davidsonian adverb predicated distributively of C:

(13) John [Bill-BEYOND be-SUBORD](C) POS_C tall

(14) $[\![\text{POS}_C \textit{ tall}]\!]^c = \lambda x \exists d.\ d \in C \wedge \text{END}(d) >_d \mathbf{s_c} \wedge x \in \text{END}(d) \wedge >_d$ is height based

(15) [Bill-BEYOND be-SUBORD](C) $\rightsquigarrow \forall d\ (d \in C \rightarrow d \in [\![\textit{Bill}\ \text{BEYOND}]\!])$

(12) says: There is a vector on the height scale, its endpoint is above the contextual standard for tallness in c, its endpoint includes John and it is a vector that points upward from Bill.

The analysis in (13)-(15) improves on one mentioned in [c], addressing problems noted there and, with (10), it might cover an example meaning "I earned less money than you". [e]'s analysis of Ulwa independently motivates deriving a comparative meaning by restriction of the domain of POS.

[a] Bhatt Takahashi 2011 NLLT
[b] Bogal-Allbritten 2008 thesis
[c] Bogal-Allbritten 2011 ms.
[d] Faller 2000 CSLI pub
[e] Francez Koontz-Garboden 2011 ms under review
[f] Matsui Kubota FAJL5 proceedings
[g] Winter 2005 *Linguistics and Philosophy*
[h] Zwarts 1997 *Journal of Semantics*

Modality, Weights, and Inconsistent Premise Sets

Alex Silk (University of Michigan)

This paper investigates certain data that appear to motivate complicating the semantics for weak necessity modals. I argue that the standard Kratzer semantics can capture the relevant data while minimizing the semantic differences between weak ('should', 'ought') and strong ('must', 'have to') necessity modals. The resulting analysis clarifies what sorts of propositions figure in premise sets, and illuminates previously puzzling semantic and pragmatic properties of weak/strong necessity modals.

Weights and priorities. Suppose your only goals are to go for a run (now) and to watch a movie (now). You can't do both, but you want to go for a run much more than you want to watch a movie. Call this case 'WEIGHTED GOALS'. Intuitively, (1) is true, and (2) is false.

(1) In view of your goals, you should go for a run.
(2) In view of your goals, you should watch a movie.

WEIGHTED GOALS might seem to call for an ordering source like the following: $g(w) = \{$*You run; You watch a movie*$\}$. But since you can't simultaneously go for a run and watch a movie, *run*-worlds are $\lesssim_{g(w)}$ incomparable to *movie*-worlds. Given a standard semantics for 'should' on which it universally quantifies over the set of $\lesssim_{g(w)}$ best accessible worlds, this incorrectly predicts that (1) and (2) are false. The different strengths of your goals don't seem to be represented in the standard semantics.

Some have taken this problem to be insurmountable for the standard semantics (e.g., [2: 61–64]). To capture priorities among premises perhaps one might revise the standard semantics by introducing (among other things) a weighting relation that ranks propositions in the ordering source. But such complications are, I argue, unnecessary. The problem is that we don't have a nuanced enough characterization of the contents of your goals in WEIGHTED GOALS. Goals (norms, etc.) don't usually come in form of categorical imperatives. Instead they often come with "conditions of applicability," conditions under which they're to be pursued. In WEIGHTED GOALS the ordering source should instead be something like $g^*(w) = \{$*You run* $\leftrightarrow$ *you don't want to do anything else more*; *You watch a movie* $\leftrightarrow$ *you don't want to do anything else more*$\}$. This correctly generates that (1) is true and (2) is false. Rather than introducing a semantic mechanism that weights categorical premises, we can encode features of the priorities in question into the premises themselves, i.e., via applicability conditions.

Weak and strong necessity. Intuitively, 'Should ϕ' expresses that ϕ is necessary. Yet it's well established that though 'should' is logically stronger than possibility modals like 'may', it's weaker than modals like 'must'. What isn't well established is how to capture this difference in strength. I argue that applicability conditions play a crucial role in explaining the weak/strong necessity distinction.

First, I raise concerns for certain existing accounts of this distinction. On the account in [1], whereas 'must' quantifies over the $\lesssim_{g(w)}$ best worlds, 'ought' quantifies over the $\lesssim_{g(w)}$ best worlds that are also best in view of some additional measure, represented by a secondary ordering source. A worry with this account is that little is said about how primary and secondary ordering sources are determined independently of the truth conditions of the relevant 'should' and 'must' sentences, i.e., in a manner that doesn't simply involve reverse engineering them from relevant truth value judgments.

Rubinstein [3] attempts to capture the intuitions driving the analysis in [1] without introducing secondary ordering sources. On Rubinstein's view strong necessity modals quantify only over the best worlds as determined by the conversationally agreed upon values of modal base $f_{cg}(w)$ and ordering source $g_{cg}(w)$, whereas weak necessity modals conventionally signal that for the prejacent to be necessary the modal must be interpreted w.r.t. certain non-common-ground assumptions, i.e., a monotonic

update of $f_{cg}(w)$ or $g_{cg}(w)$. This signal, SigW, is argued to be a type of conventional meaning that is projective, not-at-issue, and antibackgrounded. Rubinstein's account nicely highlights previously underappreciated sensitivities to common ground assumptions in weak/strong necessity modals. However, I argue that it isn't clear whether SigW passes the tests she considers, or whether there's independent attestation of the proposed kind of meaning component. This gives us reason to reconsider the idea that the relevant difference between 'should' and 'must' is truth conditional.

I defend this idea and argue that we can still retain Rubinstein's core insights concerning the common ground and the weak/strong necessity distinction. Consider (3) (*cf.* [3: 141]).

(3) [Context: I want to go to Harlem. There are several ways for me to get there.]
   a. Me: Traveling quickly would be nice.
      You: Sounds good. You should (?must) take the A train.
   b. Me: Traveling quickly is most important, more important than safety or anything else.
      You: Sounds good. You must (?should) take the A train.

Though Rubinstein suggests that the non-common-ground assumption that the necessity claim in (3a) depends on concerns the goal of traveling quickly described in the ordering source, it's unclear why this goal shouldn't be in $g_{cg}(w)$ after my utterance. Rather the extra assumption seems to concern whether there are competing goals and, if there are, how to rank their relative importance. My utterance in (3a), as in (3b), establishes in the common ground my *conditional* goal of traveling quickly, i.e., that I travel quickly iff I have no stronger competing goals. What is not settled in (3a), but *is* settled in (3b), is whether this goal's applicability conditions obtain, i.e., what the *modal base* is like.

I suggest that herein lies the important difference between 'should' and 'must' and their relation to the common ground: Roughly, 'must' presupposes that the applicability conditions of certain relevant norms, goals, etc. hold, whereas 'should' makes a subjunctive claim about what *would* be necessary in the relevant sense *were* those applicability conditions to hold. More formally, where D selects the maximal elements of a preordered set, and where $\mathcal{C}_{g(w)}$ is the set such that, for each premise in $g(w)$, it either contains that premise's applicability condition or its negation:

(4) a. $[\![\text{Must } \phi]\!]^{c,w} = 1$ iff $\forall w' \in D\left(\bigcap f_{cg}(w), \lesssim_{g_{cg}(w)}\right) : [\![\phi]\!]^{c,w'} = 1$
   b. *Presupposition*: $\bigcap f_{cg}(w) \subseteq \bigcap \mathcal{C}_{g_{cg}(w)}$

(5) a. $[\![\text{Should } \phi]\!]^{c,w} = 1$ iff $\forall w' \in D\left(\bigcap \left(f_{cg}(w) \cup \mathcal{C}_{g_{cg}(w)}\right), \lesssim_{g_{cg}(w)}\right) : [\![\phi]\!]^{c,w'} = 1$
   b. *Presupposition*: $\bigcap \left(f_{cg}(w) \cup \mathcal{C}_{g_{cg}(w)}\right) \neq \varnothing$

This analysis has various desirable features. First, it captures how 'Must ϕ' asymmetrically entails 'Should ϕ'. Second, it makes correct predictions concerning the relative felicity of 'should' and 'must' in a variety of contexts. E.g., since your 'must' claim is felicitous and true in (3b), using the weaker 'should' would violate a Gricean quantity maxim; hence 'must' is preferred. In (3a) the presupposition of 'should' but not 'must' is satisfied; even after my assertion is accepted, it still isn't common ground that the applicability condition for my goal of traveling quickly holds; hence 'should' is preferred. Third, the analysis suggests a natural explanation for the cross-linguistic phenomenon of expressing weak necessity through CF-marking on a strong necessity modal ([1]). Fourth, it provides a uniform explanation for the behavior of weak and strong necessity modals that generalizes across modal flavors. E.g., it can capture the surprising data point that, for deontic as well as epistemic readings, 'Must ϕ but $\neg\phi$' is inconsistent in a way that 'Should ϕ but $\neg\phi$' isn't.

[1] **von Fintel & Iatridou** (2005), What to do if you want to go to Harlem, MS. [2] **Lassiter** (2011), *Measurement and modality*, Ph.D. thesis. [3] **Rubinstein** (2011), Projective signals of weak necessity modals, Projective Content Workshop.

Raj Singh

Implicature Cancellation and Exhaustivity

This paper is concerned with the question of whether implicatures are cancellable, and with how the answer to this question might adjudicate between neo-Gricean theories of implicature (e.g., Horn 1972, Geurts 2010) and the grammatical theory of implicature (e.g., Chierchia et al. 2008).

1. Background: Implicature Cancellation and Exhaustivity: It is commonly assumed that an essential feature of implicatures is that, unlike entailments, they can be *cancelled* (e.g., Horn 1972).

(1) John ate some of the cookies. In fact, he ate {# none / all} of them.

Magri (2009, 2011) (henceforth **M**) argues that the oddness of texts like (2) (from Schlenker (2006)) teach us that implicature computation is mandatory and uncancellable.

(2) # Mary gave the same grade to all her students. She gave some of them an A.

If the second sentence in (2) ($\exists$) is obligatorily interpreted with its scalar implicature ($\neg\forall$), then the oddness can be explained as a consequence of a contradiction between the strengthened meaning of the second sentence ($\exists \wedge \neg\forall$) and an entailment of the first sentence ($\exists \equiv \forall$), much like (3).

(3) # Mary gave the same grade to all her students. She gave only some of them an A.

If implicatures could be cancelled, the contradiction in (2) could be avoided by cancelling the implicature. Since (2) seems as doomed to oddness as (3), **M** argues that implicatures must be computed and, once generated, cannot be cancelled. To make sense of the apparent cancellability of implicatures, as in (1), he argues that what looks like cancellation is really just the hearer treating the stronger alternative as irrelevant, in which case no implicature is expected (on any theory). (The hearer is unable to treat $\forall$ as irrelevant in (2) because of a constraint on relevance **M** proposes; for space considerations we do not discuss this here). Since it is commonly assumed that an essential property of pragmatic inferences is that they are cancellable (Grice 1967), **M** suggests that the best way to make sense of the mandatoriness of implicature computation is to assume that implicatures are computed by a silent exhaustive operator, exh (with a meaning assumed to be essentially that of *only* – see e.g., Fox 2007), together with the assumption that sentences are *always* exhaustified (parsed with exh). If **M** is correct, the pattern in (1)-(3) argues in favor of the grammatical theory of implicature. To our knowledge, there is no neo-Gricean account of this pattern.

2. Contributions of this paper: This paper aims to: (**A**) Provide empirical support for **M**'s claim that when an alternative is relevant the corresponding implicature cannot be cancelled. (**B**) Argue that, contra **M**, the conclusion in (**A**) does *not* undermine neo-Gricean theories of implicature. Specifically, we will argue (against the common interpretation) that the neo-Gricean Maxim of Quantity actually entails that implicatures must be computed. If this is right, there is no need to assume exh in the account of (1)/(2). (**C**) Provide evidence that ignorance inferences that are independent of exhaustivity are also mandatory and uncancellable, thereby supporting the conclusion that neo-Gricean reasoning is mandatory and uncancellable independent of whether exh is responsible for implicature computation. (**D**) Derive Hurford's Constraint (HC, Hurford 1974) on disjunctive sentences. HC has been used to motivate the existence of exh, but it has no obvious pragmatic motivation. We will argue that the data that motivated HC can be *derived* (without having to stipulate HC) as consequences of (**C**) together with the assumption natural languages do in fact have access to exh; without exh and (C) the data lack a principled explanation.

A. Relevance and Cancellation: M proposed that cancellation should be reanalyzed as the effect of ignoring an alternative by treating it as irrelevant, but did not provide evidence independent of his purposes to support this. When we force an alternative to be relevant (e.g., by asking a question that makes it relevant), **M**'s suggestion that cancellation is impossible seems to be supported.

(4) A: How many of the cookies did John eat?

B: # He ate some of them. In fact, he ate all of them.
(5) A: What did Mary eat at the party?
B: # She ate beef or pork at the party. In fact, she ate both.
B. Cancellation and Quantity: While it is commonly assumed that implicatures should be cancellable, we argue that this assumption is actually inconsistent with the neo-Gricean Maxim of Quantity (NG-MQ). Here is a statement of NG-MQ modelled after (e.g., Gamut 1991, Fox 2007): *If S, S' are alternatives, both are relevant, and the speaker knows that both are true, then if S' is stronger than S, the speaker must assert S'*. If it turns out that the speaker used S instead of S', then so long as they are alternatives and are both relevant, it follows deductively (by modus tollens) that the speaker does not know that S'. Together with the further assumption that the speaker is opinionated about S', it follows that $\neg S'$. What is important is that there is no room for cancellation here; if the maxim is right, implicatures follow as deductive consequences of the assumption that the speaker is following the maxim. That is, it follows from NG-MQ that the only way for S' to not become an implicature of S is for S' to be treated as irrelevant when S is asserted. Thus, neo-Gricean theories of implicature fare just as well on (1) and (2) as **M**'s exhaustivity-based proposal.
C. Ignorance Inferences Cannot be Cancelled: Sentences 'A or B' and 'if A, B' are known to give rise to inferences that the speaker is ignorant about A ($\neg\Box_S A \wedge \neg\Box_S \neg A$; abbreviate this as $I_S(A)$) and is ignorant about B (e.g., Gazdar 1979, Sauerland 2004). If, as argued above, neo-Gricean reasoning is mandatory, then, contrary to standard assumptions (e.g., Gazdar 1979), ignorance inferences (I-INFs) should also be mandatory and uncancellable. Here is some evidence that they are (see also Sauerland 2004, Singh 2010, Magri 2011):
(6a) John has two or more sons. # In fact, he has more than two sons.
(6b) # If John is married to an American, he has two sons. # In fact, he has two sons.
Since the ignorance inferences of 'A or B' and 'if A, B' arise whether or not they are parsed with exh (Fox 2007), (6a,b) show that neo-Gricean reasoning is mandatory whether or not exh exists.
D. Deriving Hurford's Constraint We have argued that an explanation of the data above does not demand the existence of exh. The existence of exh has, however, been supported by a pattern of data surrounding Hurford's Constraint (HC, Hurford 1974) and its obviation (e.g., Chierchia et al. 2008). HC states that disjunctions 'A or B' are odd if one of the disjuncts entails the other.
(7) # John was born in Paris of France ($P \vee F$; note that, given common knowledge, $P \vee F \equiv F$)
Gazdar (1979) noted that HC is obviated when the entailing disjuncts are scalar alternatives of one another (see also Simons 2000); if HC is correct, then (8) is a puzzle.
(8) John ate some or all of the cookies (henceforth $\exists \vee \forall$; note that $\exists \vee \forall \equiv \exists$)
It has been argued that the puzzle can be solved with the assumption that embedded implicatures exist and are computed by exh (e.g., Chierchia et al. 2008). Specifically, assuming HC is correct, its obviation in (8) can be explained by the assumption that the first disjunct is parsed with an exh (resulting in parse $[[exh(\exists)] \vee \forall]$), which in turn breaks the entailment between the disjuncts (since the first disjunct now means $\exists \wedge \neg\forall$). For this account to work HC needs to be stipulated as primitive, but without any obvious motivation for the constraint the explanation remains unsatisfactory.
The result in **C** allows us to capture the contrast *without* having to stipulate HC. Recall that disjunctions $X \vee Y$ mandatorily give rise to I-INFs $I_S(X)$ and $I_S(Y)$. In (7) one of the I-INFs, $I_S(F)$, contradicts the assertion $\Box_S(P \vee F) \equiv \Box_S(F)$ (we assume assertion of X licenses the inference $\Box_S(X)$). In (8) we would expect contradiction also, since the I-INF $I_S(\exists)$ contradicts the assertion $\Box_S(\exists \vee \forall) \equiv \Box_S(\exists)$. However, if exh exists, the first disjunct can be parsed as $exh(\exists)$, and there is no contradiction between the I-INFs $I_S(\exists \wedge \neg\forall)$, $I_S(\forall)$, and the assertion $\Box_S(exh(\exists) \vee \forall) \equiv \Box_S(\exists)$.

Stephanie Solt & Nicole Gotzner

Experimenting with Degree

Summary. It is generally agreed that the interpretation of gradable adjectives (GAs) such as *tall* and *dark* in some way makes reference to **degrees**. But what exactly degrees are, and which adjectival forms invoke them, remain open to debate. Focusing on what notion of degree – if any – underlies the semantics of GAs in their positive (unmodified) form, we argue that experimental research can help to resolve these questions. Our results provide evidence that the interpretation of the positive form involves degrees organized into a scale with a distance metric, and in particular are inconsistent with proposals that scales are derived from an ordering on a comparison class (e.g. Bale 2008).

Theories of GAs. According the **delineation** approach of Klein (1980), GAs denote partial one-place predicates that induce a three-way partition on a comparison class C. A notion of degree can be added to this to account for measure phrases (e.g. *6 feet*), but plays no role in the semantics of the positive form. In contrast, **degree**-based theories (Cresswell 1976, von Stechow 1984, a.o.) take GAs to express relationships between individuals and degrees on a scale; the semantics of all adjectival forms, including the positive, are stated in terms of degrees. Here the specifics differ. Some authors (e.g. von Stechow) consider degrees and scales to be something abstract (**abstract degree** theory), while others (e.g. Cresswell) adopt the more concrete view that scales are constructed from comparison classes, as follows: an ordering is established on a comparison class relative to the dimension in question (e.g. height), with the equivalence classes under this ordering constituting the degrees of the scale (**derived degree** theory). Bale (2008) extends the derived degree approach with the proposal that for adjectives associated with a numerical system of measurement (e.g. *tall*), measurements themselves (e.g. *6 feet*) enter into the underlying ordering as individuals, with the result that the derived scale is isomorphic to that associated with the measurement system (e.g. height in feet).

Different Predictions. What has not been fully recognized is that these theories differ in how they allow the truth conditions of the positive form to be stated, and thus in the predictions they make as to how speakers' application of the adjective will vary across contexts. The delineation approach is most easily reconciled with truth conditions such as (1a), which is not based on degrees; such a definition leads us to expect that speakers will consistently call a fixed proportion of a comparison class (say, the top third) *tall*, etc. The derived degree approach also supports (1a) (which can be restated in degree terms; Bale 2011) as well as (1b) (Bale 2008). But since this approach derives only an ordinal level scale lacking a distance metric (Kranz et al. 1971), it does not allow truth conditions of the form in (1c). For (1c), we require a scale at the interval or ratio level. This is possible in the abstract degree theory, where we can assume a more informative scale whose structure is independent of that of the comparison class. More generally, the derived degree theory predicts that whether an entity is classified as *tall*, etc. relative to a comparison class C must be determined on the basis of its **ordinal degree** – the rank order of its equivalence class in the ordering on C. This limitation does not hold for the abstract degree theory, which allows a notion of **absolute degree**. Finally, Bale's mixed theory predicts a difference in behavior between adjectives that are associated with a numerical measurement system (e.g. *tall*) and those that are not (e.g. *dark*); only the former should have access to absolute (rather than ordinal) degrees.

(1) $[\![$ John is tall $]\!]^C$=1 iff...

a. ...John is among the tallest n% of the Cs

b. ...$HEIGHT(j)$ is among the top n% of heights of Cs

c. ...$HEIGHT(j) \succ mean_{x \in C}(HEIGHT(x))$

We test these predictions experimentally, following a method developed by Barner & Snedeker (2008) and Schmidt et al. (2009), in which subjects are presented with arrays of pictures representing comparison classes with varying distributions, and asked to indicate which pictures could be described by a given adjective.

Experiment 1. The first experiment involved 4 adjectives - *large*, *tall*, *dark* and *pointy* - each paired with an array of 36 pictures spanning 11 'degrees' of size/height/etc. (respectively: eggs varying in size; cartoon characters varying in height; gray squares varying in shade; triangular shapes varying in angle). Four distributions of pictures over degrees were tested: Gaussian (largest # of eggs in medium sizes; fewer very small or very large); left skewed, right skewed, moved (Gaussian distribution shifted to overall greater sizes/etc.). The study was conducted online via Amazon MTurk in 4 versions (n=194).

A linear mixed model revealed that the average # of items classified as *large/tall/ dark/pointy* was significantly different across conditions ($p<0.001$). This indicates that judgments of gradable adjectives such as *large* cannot be based simply on picking the top $n\%$ of a ranking of comparison class members on the dimension in question (cf. 1a); rather, degrees are necessary. There was also a significant difference ($p<0.001$) across conditions in the average 'cut-off points' for *large* etc. (the degree of the smallest item called *large*, etc.). Thus *large* etc. also cannot be identified with a fixed segment of the range of degrees corresponding to the comparison class, per (1b).

Experiment 2. While Experiment 1 rules out the truth conditions in (1a,b), it leaves open the possibility that the interpretation of gradable adjectives is nonetheless based in some way on ordinal rather than absolute degrees – consistent with the derived degree theory. We address this possibility in Experiment 2. For each of the 3 adjective/picture pairs *large* (eggs), *tall* (cartoon characters) and *dark* (gray squares), a baseline distribution was constructed in which a target set of items represented the 4th of 6 ordinal degrees of the relevant dimension. This was compared with a rank-equivalent distribution, featuring a target set of items identical in ordinal degree (4 out of 6) but lower in absolute degree (i.e. smaller/shorter/less dark). The # of items in the target set, and the # of items greater in degree, was held constant across distributions. The study was executed online via MTurk (n=170).

The derived degree theory predicts no difference between baseline and rank-equivalent distributions in the proportion of target set items checked. However, we found a significant difference between these two conditions (baseline 59%; rank equiv. 7%; $p<0.001$), indicating that a scale constructed on the basis of equivalence classes under an ordering on a comparison class is not sufficient to account for speakers' judgments. Rather, we require a notion of absolute degree on a scale with a distance metric (e.g. absolute size), which supports truth conditions such as (1c). Importantly, the adjective *dark* (which lacks a common numerical unit of measure) behaved the same in this respect as *large* and *tall* (for which there are such measures), suggesting that the existence of a measurement system is not responsible for the availability of the necessary scale structure.

Conclusions. Whether an entity is considered *large*, *dark* or *tall* is not based simply on its position in a ranking of members of a comparison class it belongs to, but rather must reference its degree of size, etc. This is most consistent with a degree- rather than delineation-based theory of gradability. Furthermore, the relevant notion of degree is one in which the underlying scale includes a distance metric. Nor do we find evidence that the existence of a distance metric depends on the availability of a numerical system of measurement (per Bale 2008). Overall these findings support a view of degrees and scales as something abstract, and not one in which scales are derived from comparison classes.

Compositionality without word boundaries

Anna Szabolcsi

In the past ten-fifteen years various theories have converged on the view that words are not distinguished building blocks in syntax or morphology. If that is correct, then we do not expect word boundaries to be either lower bounds or upper bounds for compositional semantics. In fact, there are already many interesting analyses in the semantics literature that decompose or extend words in the above sense. The talk presents case studies in quantification that further illustrate the benefits of that approach, and highlights some questions that it confronts us with.

Judith Tonhauser

Contrastive topics in Paraguayan Guaraní discourse

The empirical basis of current formal semantic/pragmatic analyses of *contrastive topics* are languages where expressions that denote a contrastive topic are prosodically or morphologically marked, such as English, German, Korean and Japanese (e.g. Jackendoff 1972, Roberts 1996, Lee 1999, Büring 1997, 2003, Hara 2006, Wagner ms). Such analyses cannot account for contrastive topics in Paraguayan Guaraní discourse since in this language neither prosody nor the contrastive topic clitic *=katu* identify the contrastive topic. This paper develops an alternative, formal pragmatic analysis of contrastive topics in Guaraní. The paper also illustrates the methodology of exploring highly context-dependent meanings on the basis of corpora and data elicited from linguistically untrained native speaker consultants.

Data and empirical generalizations: The Guaraní clitic *=katu* is syntactically optional and does not contribute to the truth conditions of the utterance in which it occurs. Dictionaries typically translate *=katu* with (Spanish translations of) discourse particles such as 'well', 'indeed', 'but' or 'rather', further illustrating its highly elusive meaning. The hypothesis that *=katu* is a contrastive topic marker is based on an extensive analysis of corpus examples containing *=katu*, such as (1), and data collected in fieldwork in Paraguay with five native speakers.

(1) [Sambo's father ate 35 mbeju (cassava root starch pattie), his mother ate only 20 mbeju,]
ha Sámbo**=katu** ho'u 54 mbeju.
and Sambo=CONTRAST 3.eat 54 mbeju
'and Sambo ate 54 mbeju.' (Tetaĝua: 81)

A *contrastive topic* is an expression that is part of the theme of an utterance (the part of the utterance that is congruent with the current question under discussion (QUD)) and whose denotation is contrasted with that of members of an (implicit) set with respect to a higher QUD (e.g. Büring 2003). *Sambo* in (1) is a contrastive topic: *Sambo* is part of the theme of the utterance (which answers the implicit current QUD 'What did Sambo eat?') and Sambo is implicitly contrasted with his father and his mother with respect to the implicit higher QUD 'Who ate what?'.

In contrast to contrastive topic markers in the well-studied languages mentioned above, *=katu* does not mark the contrastive topic of the utterance in which it occurs: *=katu* is a second-position clitic, and the contrastive topic need not be the expression it cliticizes to (prosody is shown to also not identify the contrastive topic). In the discourse consisting of (2A)/(2B), *Estádos Unídos* 'USA' is the focus of (2B), since it is the answer to the current QUD in (2A), while *Bob* is the contrastive topic (Bob contrasts with Juana with respect to the higher QUD 'Who was born where?'). In the discourse (2A′)/(2B), on the other hand, *Bob* is the focus and *Estádos Unídos* 'USA' is the contrastive topic. As shown, *=katu* cliticizes to *Bob* in both discourses.

(2) Who was born where?
A: Juana was born in Argentina. Where was Bob born?
A′: Juana was born in Argentina. Who was born in the United States?
B: [Bób]**=katu** o-nasẽ [Estádos Unídos]-pe.
Bob=CONTRAST 3-born States United-in
'Bob was born in the United States of America.'

The paper provides empirical evidence that an utterance with *=katu* is acceptable only if the common ground contains **I)** a salient alternative to the contrastive topic and **II)** a set of alternatives to the focus. Utterances like (3) are unacceptable because no individual other than Julia is salient, while utterances like (4) are unacceptable since there are no alternatives to the focus (i.e. of somebody buying something other than milk).

(3) (In a context where Julia is the only salient third person.)
#Júlia mbo'ehára ha ha'é**=katu** chokokue (avei). [acceptable without =*katu*]
Julia teacher and she=CONTRAST farmer too
(Intended: Julia is a teacher and she is a farmer (too).)

(4) Context: Maria runs into Celina in the supermarket and says:
#Ché**=katu** a-joguá-ta kamby! [acceptable without =*katu*]
I=CONTRAST 1sg-buy-going.to milk
(Intended: I am going to buy milk.)

Formal pragmatic analysis The contribution of =*katu* to the meaning of an utterance is given in (5). Crucially, (5) does not assume that the contrastive topic of the utterance is identified prosodically, morphologically or syntactically.

(5) An utterance *U* containing =*katu* is felicitous only if *U* is part of a (possibly implicit) contrastive topic strategy.

The contrastive topic strategy, defined in (6), makes use of the contrastive semantic value $[\![U]\!]^{CT}$, defined in (7) and adapted from Büring's work, which in turn builds on Rooth's (1992) focus semantic value $[\![U]\!]^{f}$.

(6) An assertion *U* in discourse *D* is part of a **contrastive topic strategy** iff
   a. The question move M_1 that immediately dominates *U* has a non-empty set of distinct sister question moves $\{M_2,...,M_i\}$.
   b. There is an question move M' that immediately dominates the moves M_1, M_2,...,M_i.
   c. There exists a $[\![U]\!]^{CT}$ such that for every M in $\{M_1, M_2,...,M_i\}$, $[\![M]\!] \in [\![U]\!]^{CT}$.

(7) A **contrastive topic semantic value** $[\![U]\!]^{CT}$ of utterance U is a set of sets of propositions obtained by first abstracting over (part of) the theme of U (to create a set of propositions $\{U_1, U_2,...,U_n\}$, and then creating the focus semantic value $[\![U_i]\!]^{f}$ for each U_i ($1 \leq i \leq n$).

The analysis correctly predicts that **example (1)** is acceptable: assuming the QUD for U is M_1 'What did Sambo eat?', a set of sister question moves can be plausibly accommodated (per (6a), e.g. M_2 'What did Sambo's father eat?', M_i 'What did Sambo's mother eat?'), as well as a mother question move (per (6b), e.g. M' 'Who ate what?'). Following Hamblin (1973), the meaning of a question is a set of possible answers. Then, per (6c), we can obtain a $[\![U]\!]^{CT}$ by abstracting over *Sambo* (which is part of the theme of U) and *35 mbeju* (the focus), such that for every M in $\{M_1, M_2, M_i\}$, $[\![M]\!] \in [\![U]\!]^{CT}$, namely $[\![U]\!]^{CT}$ = {{Sambo ate 54 mbeju, Sambo ate cassava root, Sambo ate a chicken leg...}, {Sambo's father ate 35 mbeju, Sambo's father ate cassava root, Sambo's father ate a chicken leg,...}, {Sambo's mother ate 20 mbeju, Sambo's mother ate cassava root, Sambo's mother ate a chicken leg,...}, ...}. **Examples (3) and (4)**, on the other hand, are correctly predicted to be unacceptable since they fail (6c) and (6a), respectively.

As in other languages, the contrastive topic strategy can be largely implicit in Guaraní, as in example (1). Evidence that =*katu* presupposes a contrastive strategy, as given in (5), comes from elicited discourses in which the question moves are all or mostly explicit, as well as utterances where =*katu* occurs under the scope of a modal, in the antecedent of a conditional or the complement of a propositional attitude verb like –*mo'ã* 'think/believe'.

Implications: Guaraní =*katu* is a contrastive topic marker but differs from other such markers in e.g. not presupposing the adversative/polarity implication. The proposed pragmatic analysis extends the formal treatment of contrastive topics to Guaraní, a language under-represented in semantic/pragmatic research, and allows for a cross-linguistic comparison of contrastive topics.

It-clefts are IT (Inquiry Terminating) Constructions

We analyze the semantics of a range of constructions which we refer to as Inquiry Terminating (IT) constructions. In English, these include it-clefts and exclusives such as *only, just* and *mere(ly)*. Despite their differences, IT constructions have much in common. We claim they are always focus-sensitive, have closely related semantics, and have a uniform discourse function: they always mark utterances that give a complete answer to (what the speaker takes to be) the Current Question (CQ). We give a new account of the meaning of clefts that captures both their similarities and their differences to other IT constructions.

Explananda Surface similarities between it-clefts and exclusive sentences are easy to see. Both "It is X that P" and "Only X P" require an intonational focus somewhere in X, and both are used when X P and nobody else P. But there are significant differences as well. Some are shown in the following minimal pairs, which show changes in acceptability when an exclusive sentence is replaced by a cleft.

(1) a. Not only did LARRY laugh, but MARY laughed too.
b. #It wasn't LARRY who laughed, but MARY laughed too.

(2) a. Mary ate pizza and she only ate pizza.
b. #Mary ate pizza and it was pizza she ate. (cf. Horn 1981)

(3) Alice: Only Larry laughed.
#Bob: Yes, but Mary laughed too.

(4) Alice: It was Larry who laughed.
Bob: Yes, but Mary laughed too.

On our account, the similarities are not accidental, but are due to the uniform semantics outlined below. The differences are due to differences in *at issueness* between their semantic components.

The min-max approach to IT-constructions We adopt and extend the approach of Coppock and Beaver (2011), on which the meanings of exclusives are specified in terms of two focus-sensitive operators, MAX_S and MIN_S. (CQ_S indicates the Current Question, modeled per Roberts 1996 as a set of propositions; the relations ($\geq_S$) and ($>_S$) indicate a salient partial ordering of the alternatives in CQ_S. Throughout, a subscripted S indexes the current context.)

(5) a. $\text{MIN}_S(p) = \lambda w\,.\,\exists p' \in CQ_S\ [p'(w) \wedge (p' \geq_S p)]$
b. $\text{MAX}_S(p) = \lambda w\,.\,\forall p' \in CQ_S\ [(p' >_S p) \rightarrow \neg p'(w)]$

We extend this account by showing that the meanings of *all* IT-constructions — clefts as well as exclusives — can be captured in these terms, as exemplified in (6a–b).

(6) a. $\text{ONLY}_S(p) = \lambda w : \text{MIN}_S(p)(w)\,.\,\text{MAX}_S(p)(w)$
b. $\text{CLEFT}_S(p) = \lambda w : \text{MAX}_S(p)(w)\,.\,\text{MIN}_S(p)(w)$

One difference between the two operators is apparent: $\text{ONLY}_S(p)$ presupposes what $\text{CLEFT}_S(p)$ asserts, and vice versa. There is one further important difference. 'Only' can make salient several different orderings of alternatives (including e.g. ordering in terms of rank or importance); a cleft makes salient one particular ordering, consisting of a boolean lattice among alternatives.

Advantages of this approach There are several advantages to our account of clefts. First, it increases the generality of the min-max approach, and highlights a previously unremarked similarity among what we are calling IT-constructions. But also, it solves several empirical problems with earlier accounts.

The first problem concerns projection. Much evidence suggests that the exhaustivity of a cleft

is presupposed (Halvorson 1978, Delin & Oberlander 1995, Percus 1997). The problem is that it appears not to project — for instance, (7) does not presuppose (7a). Büring (ms.) suggests a solution: a cleverly designed exhaustive presupposition, such as his proposed conditional presupposition (7b), can be allowed to project without running afoul of the data. Our solution to the problem follows Büring but, unlike Büring's approach, ours also avoids the other problems described below.

(7) It was not Larry who laughed.

a. Nobody other than Larry laughed. [Not presupposed]

b. If Larry laughed, then nobody else did. [Presupposed on Büring's proposal]

The second problem concerns the *focus sensitivity* of clefts — that is, the fact that intonation rather than syntax determines what part of a cleft's meaning is exhaustified. On most accounts, the entire pivot is exhaustified; these accounts give incorrect predictions on examples like (8), where the focus and pivot are not coextensive.

(8) It's $\overbrace{\text{John's } \underbrace{\textsc{eldest}}_{\text{focus}} \text{ daughter}}^{\text{pivot}}$ who was at the party, along with 200 other people.

We show that presupposing $\textsc{max}_S(p)$ has all the advantages of the conditional presupposition, with the further advantage of capturing focus sensitivity through its dependence on the Current Question. We prove that *when* pivot and focus are coextensive, the two presuppositions are equivalent; but when pivot and focus are not coextensive, they differ in their predictions — and $\textsc{max}_S(p)$ leads to the correct ones.

The role which we give to focus also lets us solve a third problem, concerning the existential presupposition. Büring has claimed that clefts do not consistently trigger an existential presupposition, based on sentences like Bob's reply in (9a) — which, as he points out, does not presuppose (9b). But in other examples of clefts, a not-at-issue existential inference of some sort clearly does arise.

(9) a. Alice: I know John and Mary spoke on the phone. But who called whom?
Bob: It was John that called Mary.

b. $\not\twoheadrightarrow$ Someone called Mary. c. $\rightarrow$ Someone called someone.

We argue that clefts do indeed trigger an existential inference, but that it comes about indirectly and is not always derivable from existential quantification over the coda. The focus structure of the cleft constrains the CQ; futhermore, the rules of discourse require a speaker to reject a CQ that he knows to be trivial; thus, any move that does not reject the CQ will implicate that (as far as the speaker knows) a nontrivial answer to the CQ exists. In the case of (9), the existential inference predicted — once we take prosodic focus into account — is not (9a) but (9b). This prediction is consistent with our intuitions.

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Alexander Williams

Null Complement Anaphors as Definite Descriptions

Sentences like *Ron won* and *Tipper is ready* involve Null Complement Anaphors (NCAs). They have an initial paraphrase involving a pronoun: *Ron won it* and *Tipper is ready for it*. This talk pursues the idea, defended in Condoravdi and Gawron 1996, that NCAs have the semantics of definite descriptions, not pronouns or demonstratives. I first argue that this idea disarms an argument in Gauker 2011, that NCAs mandate enrichments to Kaplan's (1989) notion of "context." I then observe that it challenges the proposal that pronouns themselves have the semantics of descriptions. The latter proposal can be maintained, however, if it is plausible to say that NCA descriptions are unlike pronominal descriptions in being complete: they include a restriction, provided by the governing verb. I close with a new puzzle: contrary to a general pattern, a class of NCA verbs represented by *notice* can be anteceded by a clause, but not by a DP denoting a situation.

Condoravdi and Gawron (1996) observe that the NCA of (e.g.) *win*, when in the scope of quantifier, patterns with descriptions and not pronouns: (1a) can mean what (1b) does, with what is won varying by man, but (1c) cannot (cp. Partee 1989). The failure of (1c) shows that a pronoun, to support donkey anaphora, requires an explicit noun phrase antecedent (Heim 1982, Elbourne 2005); (1c) constrasts with (2). But the NCA in (1a), like the descriptions in (1b), can support donkey anaphora without an antecedent of suitable form—it can support what I will call *mule anaphora*, involving a stronger breed of donkey. Condoravdi and Gawron therefore propose that the NCA has the semantics of a description, anchored to the local subject. For them *won* in (1a) means 'won x's bet'. They take the content of the description to be contextually accommodated.

Attractively, this conclusion answers a challenge presented in Gauker 2011. Gauker objects to the dominant view that "incomplete predicates," which includes all predicates with an NCA, are equivalent to a "complete" counterpart with an overt pronoun or demonstrative. He observes that the NCA for *ready* in (3a) does not pattern with the overt pronoun in (3b): (3a) but not (3b) is easily used to describe a situation in which Tipper and Al are ready for different things. Nor do NCAs pattern with demonstratives, since (4a) but not (4b) is contradictory (except on a 'metalinguistic' reading). In response Gauker proposes a substantial enrichment to the Kaplanian *context of interpretation* (Kaplan 1989), and an unusual semantics for ready. But the enrichment is unwarranted, if we assimilate NCAs to descriptions, as suggested. Then *ready* with an NCA means something like 'ready for the task' or perhaps 'ready for x's task'. This description is interpretively more labile than the pronoun in (3) and yet leads to contradiction in (4)—or so I will argue.

Yet this conclusion in turn challenges the compelling idea that pronouns themselves have the semantics of descriptions (Cooper 1979, Heim 1990, Elbourne 2005). If both the NCA in (1a) and *it* in (1c) are like descriptions, why do the two sentences contrast? Why should the NCA-description but not the pronominal-description support mule anaphora? I will first suggest an answer to why NCAs *can* serve as mules, and then come to the question of why pronouns cannot.

The availability of an NCA is lexically specific. In addition, the domain of reference for an NCA is often more limited than that of an overt complement (Fillmore 1971). For example, while one can win either a contest or a prize, *Ron won* can only mean that Ron won some salient contest. These two facts make it plausible to suppose that any selectional limits are expressed as a restriction on the description, so that x *won* means something like 'x won the contest' or perhaps 'x won x's contest'. This will explain the successful mule anaphora in (1a). Likewise if x *is ready* means something like 'x is ready for the task' or 'x is ready for x's task', we explain (3) and (4).

Why then does the pronoun fail in (1c)? We might take the contrast with (1a) and (1c) to show that pronouns are *not* descriptions. Only NCAs are. In that case the traditional idea of why donkey anaphora fails in (1c) would be at the ready: a pronoun requires a salient discourse referent, and only an antecedent noun phrase provides one. But I will suggest one way to maintain the description

theory of pronouns. Suppose we say that a freely available pronoun, unlike a lexically specified NCA, does not have its implicit restriction set by the verb, and remains incomplete. Then the *it* in (1c) just means 'the ϕ', with ϕ anaphoric. Evidently the anaphora fails, despite the *entailment* that anything won is a contest or a prize. We can follow Elbourne (2005) in requiring that the nominal anaphor ϕ have an overt nominal antecedent. In the talk, I weigh the plausibility of these two options.

I close with a new puzzle for any theory of NCAs, which may hit the description theory hardest. (1a) is an instance of a broader fact, established in Hankamer and Sag 1976 and Grimshaw 1979. When an NCA governed by verb V has an overt antecedent, it need not match the form of an overt complement to the V, (5). But there is an unfamiliar exception to this pattern, involving a class of NCA verbs represented by *notice* and *forget*. These can be anteceded by a declarative clause, (6), but *not* by a DP, (7). (The intended antecedents are bolded.) This cannot be explained by implicating ellipsis of a complement clause under identity with the antecedent (Hankamer and Sag 1976, Grimshaw 1979, Depiante 2000). So it seems to require unprecedented restrictions on the semantics of NCAs, perhaps on the *semantic type* of an antecedent. I briefly sketch some possibilities and their shortcomings, opening the topic for speculation.

Examples

(1) a. Every man who put two chips on 17 won.
b. Every man who put two chips on 17 won the bet / his bet.
c. # Every man who put two chips on 17 won it. (intended: $[\![it]\!]$=the bet)

(2) Every man who placed a bet on 17 won it.

(3) a. Tipper is ready and Al is ready.
b. Tipper is ready for it and Al is ready for it.

(4) a. ⊥ Tipper is ready and Tipper is not ready.
b. Tipper is ready for this and Tipper is not ready for that.

(5) a. Mo stole a book, and I don't approve (*that Mo stole a book).
b. Ro wants to know the name of the suspect, but Syl doesn't care (*the name).

(6) a. Did you know **that the Earth is spherical**? – Yes, I noticed.
b. Every man who knows **that the Earth is spherical** hopes that his kids won't notice/forget.

(7) a. Were you aware of **the sphericality of the Earth**? – Yes I noticed ??(that).
b. Every man who is aware of **the Earth's sphericality** hopes that his kids won't notice/forget ?*(it).
c. **Nothing** was forgotten by the person who had first noticed ?*(it).

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Beibei Xu

Nandao-Questions as a Special Kind of Rhetorical Questions

Introduction. This paper addresses the syntax and semantics of a special kind of Rhetorical Questions (RQs) in Mandarin, i.e. questions with *nandao* "hard-say" (*nandao*-Q). *Nandao*-Qs necessarily have rhetorical question readings (1, 2). To derive this, I propose that *nandao* is a WH-word which takes a question denoting a single proposition and turns it into a set with the complement proposition. This analysis differs significantly from earlier proposals for deriving RQ meanings as asserting the negation of the proposition denoted by its IP (cf. Sadock [1], Han [2], a.o.).

The Distribution of *Nandao* in Mandarin. First, *nandao* cannot appear in direct declarative sentences (3) nor can it be embedded in [-wh] verbs, e.g. *xiangxin* "believe", which requires a declarative clause as its complement (4). Secondly, *nandao* cannot appear in A-not-A kind of Y/N-Qs (5). Although *nandao* can appear in (2) which has a WH-word (*shui* "who") in it, I claim that these are not true WH questions. In Mandarin, many WH-words can have indefinite pronoun interpretations including *shui* "whoever", *shenme* "whatever", and so on (cf. Li and Thompson [3]). But there is one WH-word which doesn't have an indefinite pronoun interpretation, i.e. *weishenme* "why". Any interrogative sentence with *weishenme* will be a true WH-Q where *nandao* cannot appear (6). Such incompatibility suggests: (2) is not a WH-RQ, but a Y/N-RQ with indefinite WH-word; *Nandao* cannot transfer WH-Q into WH-RQ. The other piece of evidence is found in the distribution of question particles in Mandarin. There are two types of question particles. One is designated for Y/N-Qs including *me* and *ma*. The other type is designated for WH-Qs including *ne* (cf. ibid.). The Q particle *ma* in (2) shows that it is a Y/N-RQ but not a WH-RQ. The incompatibility of *nandao* and *ne* again shows that *nandao* is incompatible with WH-Qs (7).

The Syntax and Semantics of *Nandao*. Guerzoni [4] and George [5] assume there is a covert *whether* or *Q* operator in direct Y/N-Qs. They both mirror the meaning of *whether* or *Q* operator from the semantics of other WH-words. Both of them treat *whether*/*Q* operator to denote an existential quantifier ranging over the two polarities (positive/negative) [4] or the two truth values (1/0) [5]. Unlike *whether/Q* operator, *nandao* can only exhibit a negative meaning. With this spirit, I propose that in *nandao*-Qs, there is no covert *whether* in SpecCP, and the SpecCP will be filled by *nandao*. The semantics of *nandao* is given in (8) and a compositional analysis of (9) is given in (10). In (10), at CP, *nandao* denotes an existential quantifier to range over only the negative truth value, which makes the proposition denoted by IP be false. This key step reverses the polarity of the question nucleus denoted by IP. And abstraction over *h* makes the complement proposition be the only member of the answer set.

Explanations of Mandarin Data. The syntax and semantics of *nandao* suggests that *nandao* be a WH-word with [+wh] feature. So, it cannot appear in declaratives or be embedded under [-wh] verbs. The incompatibility of *nandao* with WH-Qs is due to the fact *nandao* and other WH-words (e.g. *shui*) cannot occupy the same SpecCP. The explanation of incompatibility of *nandao* and A-not-A Y/N-Qs is rather a semantic one. I show in (11) and (12) that a logical crash is responsible for such incompatibility. In the talk, I will also address the possibility of an analysis of A-not-A questions in terms of Alternative Questions and explore the viability of a semantic explanation for the incompatibility of *nandao* and WH-Qs.

Conclusion. Denoting a set of singleton answer, *nandao*-Qs confirm what we know about RQs: they are interrogative in form but assertive in force. The analysis of *nandao* given here

explains its interesting distributional patterns. It also locates the switch from question to assertion in the meaning of *nandao*: if the set of possible answers is necessarily a singleton, the *nandao*-Qs cannot represent a state of uncertainty that ordinary questions do. In the talk I will further argue that the present proposal derives the RQ effect in a simpler way than the one proposed by Han [2].

(1) Nandao Zhangsan bu xiang chuqu wan (me)?
Hard-say Zhangsan not want out-go play Q
"Doesn't Zhangsan want to go out to play?"
(=Zhangsan wants to go out to play.)

(2) Nandao shui bang-guo ni (ma)?
Hard-say who help-EXP you Q
"Who helped you?"
(=No one helped you.)

(3) ∗Nandao Lisi hui lai.
Hard-say Lisi will come
"Lisi will come." (≠Lisi will not come.)

(4) Zhangsan xiangxin (∗nandao) Lisi hui lai.
Zhangsan believe hard-say Lisi will come
"Zhangsan believes that Lisi will come."

(5) *Nandao Zhangsan chi mei chi fan?
Hard-say Zhangsan eat not eat rice
"Did Zhangsan have meal or not."

(6) ∗Nandao Zhangsan weishenme qu xuexiao?
hard-say Zhangsan why go school
"Why does Zhangsan go to school?"
((Intended but n/a) There is no reason for Zhangsan to go to school.)

(7) Nandao shui bang-guo ni ma/*ne?
hard-say who help-EXP you Q Q
"Who helped you?" (=No one helped you.)

(8) $[[nandao]]=\lambda Q_{\langle s,\langle t,t_t\rangle\rangle}\lambda h_{\langle s,t_t\rangle}\exists r_t(r=0 \wedge h=\lambda w'(Q(w')(r)))$

(9) $[_{CP}$ Nandao $[_{C'}$ $[_C]$ $[_{IP}$ it is raining]]]
(10) IP: $raining(w)$ C: $\lambda q_t\lambda p_t[p=q]$
C': $\lambda q\lambda p[p=q]raining(w)$
$\Rightarrow\lambda p[p=raining(w)]$
CP: $\lambda Q\lambda h\exists r(r=0 \wedge h=\lambda w'(Q(w')(r)))$
$\lambda w\lambda p[p=raining(w)]$
(intensionalized over C')
$\Rightarrow\lambda h\exists r(r=0 \wedge h=\lambda w'[r=raining(w')])$
$\Rightarrow\lambda h(h=\lambda w'(raining(w')=0))$
$\Rightarrow\{\lambda w'(raining(w')=0)\}$ or {It is not raining}

(11) $[_{CP}$ Nandao $[_{C'}$ $[_C]$ $[_{IP}$ it is raining or not raining]]]
(12) IP: $raining(w)\vee\neg raining(w)$ C: $\lambda q_t\lambda p_t[p=q]$
C': $\lambda q\lambda p[p=q](raining(w)\vee\neg raining(w))$
$\Rightarrow\lambda p[p=(raining(w)\vee\neg raining(w))]$
CP: $\lambda Q\lambda h\exists r(r=0\wedge h=\lambda w'(Q(w')(r)))$
$\lambda w\lambda p[p=(raining(w)\vee\neg raining(w))]$
$\Rightarrow\lambda h\exists r(r=0\wedge h=\lambda w'[r=(raining(w)\vee\neg raining(w))])$
$\Rightarrow\lambda h(h=\lambda w'(raining(w)\vee\neg raining(w)=0))$
***CRASH** (as $raining(w)\vee\neg raining(w)$ is a tautology which can never be false)
$\Rightarrow\{\varnothing\}$

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Masahiro Yamada

Polysemy of Reciprocal

In many languages a morpheme that is responsible for a reciprocal interpretation appears in a sentence that does not describe a reciprocal situation. A question is whether this is a case of polysemy (one lexical item with two related meanings) or homonymy (unrelated lexical items). We take the Japanese verbal suffix *–aw* that appears both in reciprocal and non-reciprocal sentences as a case study and argue for the polysemy view of this suffix. We provide a formal implementation to support the claim and demonstrate the compositional analysis to derive the two interpretations.

It is typologically common that "the reciprocal construction may encode more than one type of real-world situation (Lichtenberk 1985; 19)". The Japanese verbal suffix *–aw* appears in reciprocal (1)a and non-reciprocal pluraction (2) sentences. Assuming what Langendoen (1978) called Weak Reciprocity ($\forall x \exists y(R(x)(y) \ \& \ x \neq y) \ \& \ \forall y \exists x(R(x)(y) \ \& \ x \neq y)$) to be the core interpretation of reciprocal, the reciprocal interpretation of (1)a would be (1)b, which can be folded by Sternefeld's (1998) n^*-operator as in (1)c (see Sauerland 1998, Beck 2001). On the other hand, the non-reciprocal interpretations have been described in various ways, such as *collaboratively, alternately, one after another, competing with each other* in English translations (Ishii 1989, Nishigauchi 1992, Nakao 2003, Bruening 2006). The previous works on the Japanese verbal reciprocal mentioned the non-reciprocal sentences with *–aw* but did not discuss it in detail. Indeed, the actual interpretation of a single sentence varies in different contexts. However, the shared meaning among these translations is pluraction (Lasersohn 1995, Beck and von Stechow 2007, Faller 2007) by the plural referent reffered by the subject NP and should be captured by the n^*-operator as well.

(1) a. Kodomo-tachi-ga tasuke-**at**-ta.
child-PL-NOM help-**RECIP**-PAST
'The children helped each other.'

b. $\forall x(x \in \text{kids} \rightarrow \exists y(y \in \text{kids} \ \& \ x \text{ helped } y \ \& \ \neg x \circ y)) \ \&$
$\forall y(y \in \text{kids} \rightarrow \exists x(x \in \text{kids} \ \& \ x \text{ helped } y \ \& \ \neg x \circ y))$

c. $^{**}[\lambda x.\lambda y.\ \text{help}(x)(y) \ \& \ \neg x \circ y](\text{kids})(\text{kids})$

(2) Kodomo-tachi-ga Yasu-o tasuke-**at**-ta.
child-PL-NOM Yasu-ACC help-**RECIP**-PAST
'The children helped Yasu one after another.'

The verbal suffix *–aw* appears in a nominal element *aite* (lit. *ai-te* 'match-hand') whose rough meaning is 'a partner (of something contextually determined)'. The nominal *aite* also has various but related meanings, which can be specified by an additional elements such as a compound (3)a or a Genitive modifier (3)b. Similarly, the interpretation of

non-reciprocal sentences with *–aw* can also be specified by adverbial elements as in (4).

(3) Yasu-wa Hiroki-no {a. kyoosoo- b. kootai-no} **aite** da.
Yasu-TOP Hiroki-GEN {a. competition, b. alternate-GEN} match.hand COP.NPAST
'Yasu is Hiroki's {a. competitor/rival, b. alternate}.'

(4) Kodomo-tachi-ga {a. **kisotte**, b. **junbanni**} Yasu-o tasuke-**at**-ta.
child-PL-NOM {a. **competing** b. **alternately**} Yasu-ACC help-**RECIP**-PAST
'The children helped Yasu {a. competing with each other, b. alternately}.'

We propose that the non-reciprocal interpretation has a context dependent variable of a state *VS* and that the event property denoted by (2) is (5)a (see Schwarzschild 1996 for Cover), which is further folded by the *n**-operator as in (5)b. The *VS(x)(y)(e)* requires there be a state *s* present throughout the event *e*, where *s* is a substantive plurality (Kratzer 2003, Ch.4) of non-overlapping individuals *x* and *y*. The paring of *x* and *y* must be meaningful by itself and it is not enough to have a mere sum of two individuals. The precise way of paring is determined by the utterance context such as *x is a competitor of y* or *x is an alternate of y*.

(5) a. λE. $\forall$x(x$\in$ kids&Cov$_1$(x) $\rightarrow$
$\exists$y$\exists$e(y$\in$ kids&Cov$_2$(y) & e$\in$ E&Cov$_3$(e) & help(Yasu)(x)(e) & VS(x)(y)(e))) &
$\forall$y(y$\in$ kids&Cov$_2$(y) $\rightarrow$
$\exists$x$\exists$e(x$\in$ kids&Cov$_1$(x) & e$\in$ E&Cov$_3$(e) & help(Yasu)(x)(e) & VS(x)(y)(e))) &
$\forall$e(e$\in$ E&Cov$_3$(e) $\rightarrow$
$\exists$x$\exists$y(x$\in$ kids&Cov$_1$(x) & y$\in$ kids&Cov$_2$(y) & help(Yasu)(x)(e) & VS(x)(y)(e)))

b. λE. ***[λx.λy.λe. help(Yasu)(x)(e) & VS(x)(y)(e)](kids)(kids)(E)
where VS(x)(y)(e)=1 iff $\exists$s(s<e & s is a state of x and y being a pair & $\neg$x$\circ$y)

The reciprocal interpretation can also be modeled using the *VS* and we propose two type shift variants of the lexical meaning of *–aw* in (6). When the predicate that *–aw* suffixes is a transitive verb, the most explicit way of paring the two individuals is interpreting them as the coarguments of the predicate. In consequence the *VS* functions as the non-overlapping condition of the reciprocal interpretation. Under this view, *-aw* in the non-reciprocal sentences functions as a semantic transitivizer in the sense that it creates a function from a relation of two individuals to an event property based on the intransitive verb it takes. At the same time, it reduces the syntactic valence of the main predicate by one by feeding it the subject argument twice.

(6)a. [[**aw**]] = λR$_{eevt}$.λX.λE. ***[λx.λy.λe. R(x)(y)(e) & VS(x)(y)(e)](X)(X)(E) [Reciprocal]

b. [[**aw**]] = λP$_{evt}$.λX.λE. ***[λx.λy.λe. P(x)(e) & VS(x)(y)(e)](X)(X)(E) [Non-Reciprocal]
where VS(x)(y)(e)=1 iff $\exists$s(s<e & s is a state of x and y being a pair & $\neg$x$\circ$y)

Hedde Zeijlstra

What is right to say about light negation?

As has been observed by Schwarz (2004) and Schwarz & Bhatt (2008), inclusion of a negative marker like German *nicht* in front of indefinite or definite DPs, as in (1), renders a sentence ill-formed:

(1) a. Fritz kann (*nicht) eine Fremdsprache.
Fritz knows not a foreign language
b. Fritz hat (*nicht) Frage 3 beantwortet.
Fritz has not question 3 answered

Remarkably, such negative constructions are, however, fine, once they are embedded in NPI licensing contexts; e.g. the interrogative version of (1a) is fine:

(1) c. Kann Fritz nicht eine Fremdsprache?
Fritz knows not a foreign language

The question is whether the facts in (1) are due to the fact that *nicht* here is a special NPI, dubbed *light negation*, homophonous to the negative marker (as has been proposed by Ladusaw 1979, Schwarz 2004 and Schwarz & Bhatt 2008), or whether the negative marker is a regular negation in (1) and (2) and some other mechanism is responsible for the ungrammaticality of the sentences in (1). In this paper I explore the latter approach, hypothesizing that all cases currently analyzed as light negation involve in fact regular negation and that the ungrammaticality of the examples in (1) results from particular pragmatic inferences. Let's first focus on (1a) and assume that the underlying structure of (1a) is as in (2a), where *nicht* c-commands *eine Fremdsprache*; negation thus scopes over the indefinite DP:

(2) [Frits kann [nicht [eine Fremdsprache]]] [¬ > [∃ NP]]

For most scholars, the syntactic structure in (2) is different from the structure of sentence containing a regular negative indefinite (such as (3)).

(3) Frits kann keine Fremdsprache
Fritz knows no foreign language

For some a negative indefinite is a negative quantifier of some sort (Geurts 1999, De Swart 2000, Abels & Marti 2010); others take it to be lexically decomposed into a negation and a non-negative indefinite (Jacobs 1980, Rullman 1995, Zeijlstra 2011). Finally, Penka (2010) takes it to be a non-negative indefinite that needs to stand in an agreement relation with an abstract negative operator. Under the view that negative indefinites are negative quantifiers, as well as for Zeijlstra (2011), the syntactic structure of the sentence containing *keine* is as in (2b), where a negative indefinite takes the NP as its complement. For Jacobs (1980), Rullman (1995) and Penka (2010) (3) is ambiguous between [¬ > [∃ NP]] and [[¬ > ∃] > NP].

(4) Frits kann [keine [Fremdsprache]] [[¬ > ∃] > NP]

Adopting the former approach, it now follows that (1a) and (3) exhibit different scopal relations between the negation, the indefinite and the NP. Moreover, replacing *nicht* + *eine* by *keine* in (1a) results in a good sentence (3). Since *keine* is a single morphological word and *nicht eine* is not, it also makes good sense to assume that *nicht eine* is marked w.r.t. *keine*. Following Horn's (1984, 1989) division of pragmatic labour, unmarked expressions are generally used to convey unmarked messages and marked expressions are generally used to convey marked messages. Applying this to (1a) and (3), this means that it can be inferred that a speaker uttering (1a) does not want to convey the meaning of (3). However, this yields a contradiction: the speaker wants to convey that Fritz does not know a foreign language, but at the same times the speaker does not want to convey that Fritz knows no foreign language. This is what explains that ill-formdeness of (1a): uttering a construction that contains light negation gives rise to a conversational implicature that contradicts it.

This analysis makes a number of predictions. First, since sentences like (1a) have syntactic structure [¬ > [∃ NP]], (1a) should be fine with a reading which is not yielded by (3). This is indeed correct. (1a), if properly modified, is fine with a reading where the

indefinite scopes over negation (by LF-raising [∃ NP] over the negation). Also (1a) can be uttered with focus on *eine*. Crucially, these readings can never be yielded by (3).

(5) a. Fritz kann nicht eine Fremdsprache die man in Frankreich spricht
b. Fritz kann nicht EINE Fremdsprache.

Second, since the effect that by uttering (1a) the speaker does not want to convey the meaning of (3) is a conversational implicature (cf. Horn 1984, 1989), this implicature should be cancellable. This is indeed correct as well, as shown in the following question-answer pair:

(6) Q. Kann Fritz nicht eine Fremdsprache?
A. Nein, Fritz kann nicht eine Fremdsprache. Er kann keine Fremdsprache

Third, implicatures of this type disappear in downward entailing contexts (cf. Levinson 2000 amongst many others for discussion). Therefore, it is predicted that light negation constructions are fine when they are embedded under a downward entailing operator, deriving their NPI-like distributional behaviour. Again, this is indeed correct, as shown in (1c) and in (7), taken from Schwarz & Bhatt 2008.

(7) Wir haben keinen angenommen, der nicht eine Fremdsprache kennt
We have no one hired, who not a foreign language knows

Fourth, the implicature can only arise when *nicht eine* and *keine* stand in competition. Consequently, once lexical material intervenes *nicht* and *eine*, *nicht + X + eine* can no longer be replaced by *keine* and the construction is fine again, as shown in (8). Note that this also prevents the analysis from overgeneralizing to languages like English that lack light negation.

(8) Fritz denkt nicht an eine Fremdsprache
Fritz thinks not of a foreign language

Fifth, the analysis naturally extends to other cases of light negation. For instance, (1b), contains a definite expression under the scope of negation. Given that definite expressions presuppose the existence of their referent and that such presuppositions survive under negation, the sentence is truth-conditionally equivalent to a sentence where the definite expression outscopes negation, as in (9). Once it is assumed that (8) and (9) stand in a markedness relation as well, albeit a markedness relation of a syntactic/semantic kind ((9) is an instance of plain sentential negation; (8) is a special type of constituent negation), the ill-formedness of (8) immediately follows.

(9) Fritz hat Frage 3 nicht beantwortet.

To conclude: there is nothing special about light negation. Light negation involves regular negation and its limited distribution follows from independently established pragmatic mechanisms.

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