Information, Program, and Abstracts

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May 30-June 1, 2014
Department of Linguistics
New York University

Contents

The conference is preceded by *New Frontiers: Formal Semantics Beyond Spoken Language*, a series of tutorials organized jointly by the ERC Advanced Grant Project 'New Frontiers of Formal Semantics' and New York University.
https://sites.google.com/site/semanticsbeyondspokenlanguage/ .

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Conference Schedule

Friday, May 30 • NYU LAW SCHOOL, Greenberg Lounge, 40 Washington Square South

8:00--9:20 Registration / Breakfast /
Opening Remarks by Professor Michael Laver, Dean of Social Science

9:20--14:00 Session chair: Maria Piñango
Roger Levy, Leon Bergen, and Noah Goodman, *'Roses and flowers': An informativeness implicature in probabilistic semantics*
Marie-Christine Meyer, *Grammatical uncertainty implicatures and Hurford's constraint*

10:40--11:00 Coffee break

11:00--12:00 Session chair: Lucas Champollion
Lauri Karttunen (invited talk), *Three ways of not being lucky*

12:00--1:30 Lunch break

13:30--2:50 Session chair: Graeme Forbes
Gillian Ramchand, *Stativity and 'present tense' epistemics*
Daniel Lassiter, *The weakness of 'must': In defense of a mantra*

2:50--3:10 Coffee break

3:10--6:00 Poster Session (DEPARTMENT OF LINGUISTICS, 10 Washington Place)
Talk alternates present posters, if not called upon.
5:00--7:00 Wine and Cheese Reception, overlapping with the Poster Session
(DEPARTMENT OF LINGUISTICS, 10 Washington Place)

Saturday, May 31 • NYU LAW SCHOOL, Greenberg Lounge, 40 Washington Square South

8:30--9:00 Breakfast / Registration

9:00--10:00 Session chair: Chris Barker
Sarah Moss (invited talk), *On the semantics of epistemic vocabulary*

10:00--10:20 Coffee break

10:20--12:20 Session chair: Barry Schein
Yulia Zinova and Hana Filip, *Meaning components in the constitution of Russian verbs: Presuppositions or implicatures?*
Dag Haug, *The anaphoric semantics of partial control*
Elizabeth Bogal-Allbritten, *Interpreting DP-modifying modal adverbs*

12:20--1:50 Lunch break

2:00--3:20 Session chair: Anamaria Fălăuş
Wataru Uegaki, *Japanese-type alternative questions in a cross-linguistic perspective*
Margit Bowler, *Coordination and disjunction in a language without 'and'*

3:20--3:40 Coffee break

3:40--5:00 Session chair: Kristen Syrett
Robert Grimm, Choonkyu Lee, Eva Poortman, and Yoad Winter, *Evidence for non-existential readings of locative indefinites*
Florian Schwarz, *Presuppositions are fast, whether hard or soft - Evidence from the visual world paradigm*

5:00--5:10 Short Break

5:10--6:10 Session chair: Roger Schwarzschild
Emmanuel Chemla (invited talk), *Logic in Grammar: An experimental investigation*

6:10--6:30 Business Meeting

7:00--11:00 Dinner at Jing Fong Restaurant, 20 Elizabeth Street

Sunday, June 1 • NYU LAW SCHOOL, Greenberg Lounge, 40 Washington Square South

9:00-9:30 Breakfast

9:30--10:30 Session chair: Philippe Schlenker
Valentine Hacquard (invited talk), Bootstrapping into attitudes

10:30--10:50 Coffee break

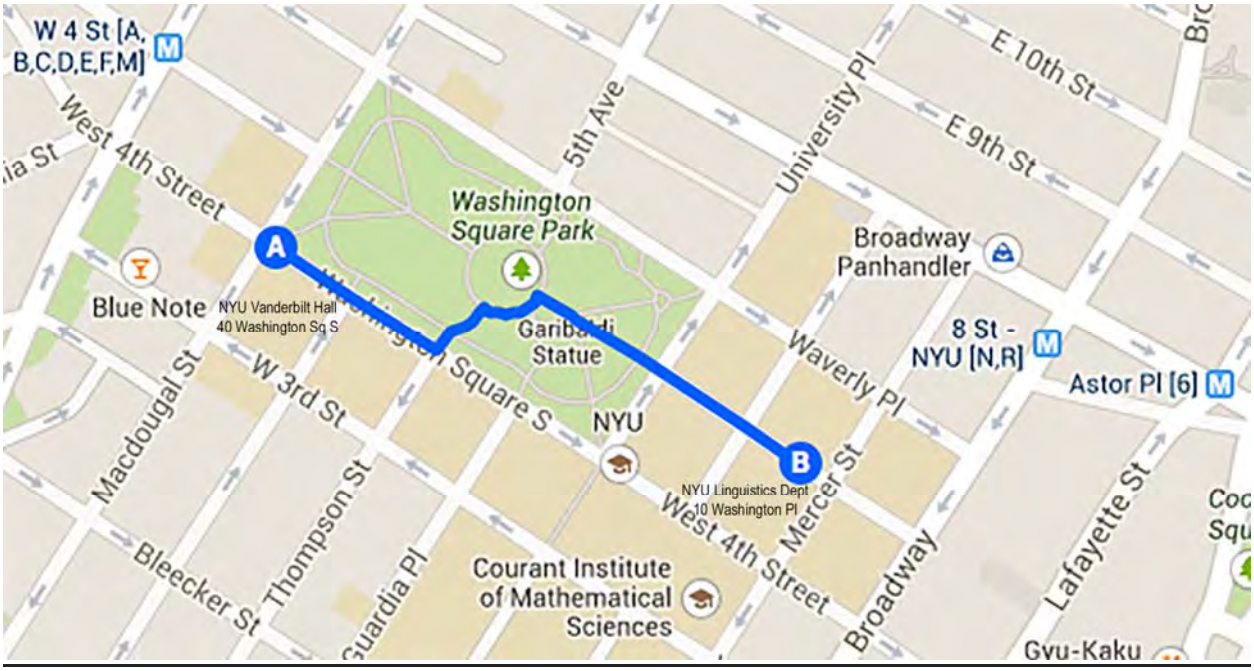
10:50--12:10 Session chair: Chungmin Lee
Suzi Lima, *All notional mass nouns are count nouns in Yudja*
Scott AnderBois, *On the exceptional status of reportative evidentials*

12:10--12:20 Short Break

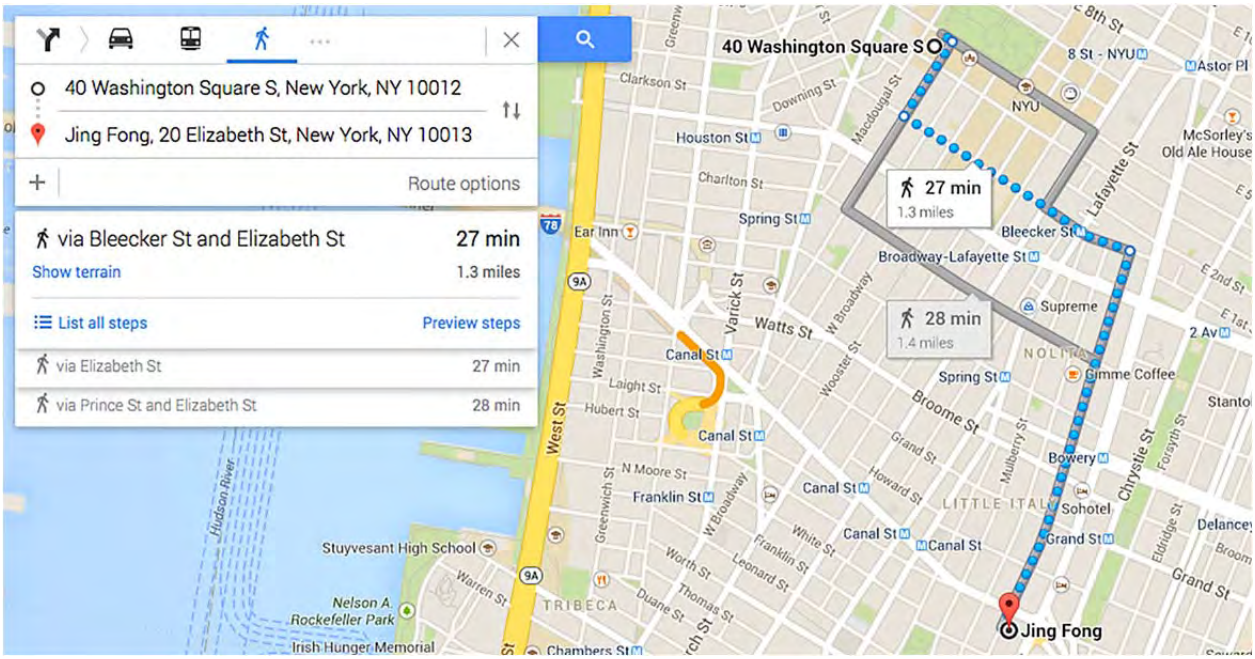
12:20--13:00 Session chair: James Pryor
Chris Kennedy, *Predicates and formulas: Evidence from ellipsis*

End of conference

Walk from the conference site (40 Washington Square South), eastward, to the poster session & reception (Department of Linguistics, 10 Washington Place)



Walk from the conference site (40 Washington Square South), southward, to Jing Fong Restaurant (20 Elizabeth Street).
You may also take the subway (No. 6) from Bleecker St. to Canal St., or hail a yellow cab.



Practical information

Conference website: www.nyu.edu/salt2014.

Contact phone number (Lucas Champollion): 1-917-834-7003,
where 1 is for the US and 917 is the area code.

Please carry a passport, driver's license, or similar government-issued picture identification card to show to security guards at the entrances of NYU buildings.

If you arrive to John F. Kennedy Airport (JFK), you may want to take the AirTrain and the A or the E subway lines to Manhattan. From Newark-Liberty International Airport (EWR), take their AirTrain and New Jersey Transit to New York Penn Station (not Newark Penn Station). From La Guardia Airport (LGA), you might take the #60 city bus. All airports are served by shuttles and yellow cabs. Yellow cabs charge a flat rate for a trip to and from the city.

The subway stops closest to New York University are West 4th Street (lines A, B, C, D, E, F, M), Astor Place (line 6), and 8th Street (lines N, R). See http://web.mta.info/maps/submap.html .

For more local information, see
http://www.nyu.edu/projects/salt2014/SALT_2014/Local_Info.html .

The conference breakfasts will include coffee, tea, orange juice, bagels, and marble and yogurt loaves. The conference dinner at Jing Fong Restaurant will be served in the so-called family-style (not a buffet dinner, and not dim sum). It will include vegetarian, fish, shrimp, and chicken dishes, and beer. The restaurant will offer a cash bar. Cantonese cuisine is not spicy.

Please be sure to carry your dinner ticket that is part of your registration package.

The conference folder will also include instructions for gaining internet access during the conference, and a registration fee receipt.

Suggested lunch spots nearby

Stars correspond to take-out places under $10, if you wish to sit and eat in Washington Square Park. Pins indicate sit-down restaurants in the $11-30 range, most of them easily under $15. You will find many other restaurants in the area.

List of Abstracts

Invited talks

Abstracts of talks, in order of presentation

Abstracts of talk alternates, posters, and poster alternates, alphabetically

Three ways of not being lucky

Lauri Karttunen
Stanford University

Being lucky has two facets: *likelihood* and *benefit*. Apart from presupposing or entailing that Linda got into Stanford, a sentence like

(1) Linda was lucky to get to Stanford.

implies that

(i) the odds of being admitted were not in her favor and that
(ii) Linda will or did benefit from being at Stanford

The **first** way of *NP not being lucky to VP* involves challenges to (i) and (ii), the unlikelihood or beneficiality of the event. (2a) contradicts (i), (2b) disclaims (ii).

(2) (a) Linda was not 'lucky' to get to Stanford. She was one of the best candidates.
(b) Linda was not lucky to get to Stanford. It was not the right place for her.

What is not denied in (2) is that Linda did in fact get to Stanford. Examples like (3) show that there are states that are too beneficial to be characterized merely as *lucky*:

(3) I was not lucky to be alive. I was blessed.

Here, the negative version, *NP was not lucky to VP*, is metalinguistic, it says that the word *lucky* is not correct as an evaluation of what is presumed to be the case for the protagonist. Most linguistic articles that mention the *NP was lucky to VP* construction assume that it is **factive**, presupposing the truth of the clause *NP VPed*.

The **second** way of *NP not being lucky to VP* is illustrated in (4).

(4) (a) I was not lucky to find any data on this topic.
(b) We were not lucky to book a sea view room, but still we absolutely enjoyed our 3-night stay there .
(c) I still have not been lucky to manage to get my orchids to flower again.

These examples come from the web with a context that clearly indicates that the author intends to communicate that the embedded clause is false. This *NP was not lucky to VP* construction is **implicative**, it entails *NP did not VP*.

For many speakers of American English the examples in (4) sound ungrammatical. For them these examples would be acceptable in the intended sense only if *not lucky* was replaced by *not lucky enough*. But the robust presence of such examples on the web suggests that the existence of a dialect where the *NP is lucky to VP* construction is implicative rather than factive.

Moreover, the split between a factive and implicative interpretation in this construction is not unique to *lucky*. It holds for a whole class of so-called **evaluative** adjectives such as *clever*, *brave*, *fortunate*, *lucky*, *stupid*, etc. (Karttunen et al. 2014)

The **third** way of not being lucky is illustrated in (5).

(5) You will be lucky to break even.

Among the evaluative adjectives *lucky* and *fortunate* are unique in that they can be used to make negative, pessimistic predictions. Most likely the speaker of (5) intends to convey that probably you are not going to break even. This is an **idiomatic** sense of *lucky*. (Karttunen 2013).

In an experimental study (Karttunen et al. 2014) demonstrate that in the simple present or

past tense the construction *NP is not lucky to VP* is predominantly factive for most people but implicative for some. We also demonstrate that the interpretations are sensitive to preconceptions about how suitable the adjective is as a characterization of the event described by the infinitival clause. This **consonant/dissonant** effect can be seen in the in (6) and (7), all picked from the US, UK, and Canadian web sites.

(6) (a) Obviously she is not lucky to go through a divorce.
(b) Women with mixed or black skin are not lucky to have to cheat with foundation to look good.
(c) You are right he is lucky to get the property but he is not lucky to have to pay for it when he hasn't got a tenancy agreement, keys, or even seen the property.

The examples in (6) are clearly meant to have a factive interpretation, e.g. the protagonist of (6a) is going through the divorce. The examples in (7) have an implicative interpretation. The infinitival clause is presented as false. The girl in (7a) did not get away alive.

(7) (a) Only a week before Urbina was due in court to face the charges for his alleged rape of a waitress, police believe that he claimed another victim. This time, the girl was not lucky to get away alive.
(b) I was so fucking excited to go there, eat pizza, play games and get tickets to win awesome prizes, but I was not lucky to experience any of that.
(c) But all are not lucky to get a well shaped and chiseled body because of inactive lifestyle.

The factive *NP is not lucky to VP* examples in (6) are **dissonant**, it is not lucky for the protagonist that the infinitival clause is true. The implicative examples in (7) are **consonant**. If the protagonist of (7a) had got away, she would have been lucky.

The idiomatic 'probably not' sense of *lucky* illustrated in (5) is subject to structural constraints, e.g. future orientation, affirmative only. There are also non-structural factors even subtler than the consonance/dissonance effect. For example, the majority of our Amazon Mechanical Turk subjects interpret (8a) in the idiomatic way as saying that probably you will not avoid a jail sentence.

(8) (a) You will be lucky to avoid a jail sentence.
(b) At least you will be lucky to avoid a jail sentence.

But (8b) is interpreted by most of our informants in the literal way, as a positive prediction, because of the effect of *at least* that signals a silver lining on an approaching dark cloud.

Looking back at my own early work and the work of many others in the late 1960s and 1970s, one now sees that the field was too quick to assign semantic labels such as 'factive', 'semi-factive', 'implicative', etc. as if they were unequivocal like part-of-speech categories, 'verb', 'noun', 'adjective', etc. There are adjectives that are truly factive by all the relevant criteria, namely the emotive ones: *surprised/outraged/annoyed*, but the evaluative adjectives like *lucky*, *stupid*, *brave* etc. are different. To get a handle these matters one needs more data than one can dream up by oneself, more data than one can find on the web, experimental data to calibrate the effects of factors that might have an effect.

References

Lauri Karttunen 2013: http://www.stanford.edu/~laurik/publications/Lucky.pdf
Lauri Karttunen, Stanley Peters, Cleo Condoravdi and Annie Zaenen 2014: (submission to EISS-10) "The Chameleon-like Nature of Evaluative Adjectives."

On the Semantics of Epistemic Vocabulary

Sarah Moss
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This talk motivates and develops a novel semantics for several epistemic expressions, including possibility modals and indicative conditionals. The semantics I defend constitutes an alternative to standard truth conditional theories, as it assigns sets of probability spaces as sentential semantic values. I argue that what my theory lacks in conservatism is made up for by its strength. In particular, my semantics accounts for the distinctive behavior of nested epistemic modals, indicative conditionals embedded under probability operators, and instances of constructive dilemma containing epistemic vocabulary.

For further details, the handout is available in advance:
http://www-personal.umich.edu/~ssmoss/SALTHO.pdf.

Logic in Grammar: An experimental investigation

Emmanuel Chemla (Ecole Normale Supérieure)

This talk is based on joint work with Vincent Homer and Daniel Rothschild. We will look at linguistic generalizations of the form:

"Sentence S is acceptable only if S satisfies property P",

in which an acceptability judgment is related with a logical property P. We will present three sets of results pertaining to how such generalizations are cognitively deployed.

R1: We will show that the acceptability of an NPI *for a given speaker* best correlates with the ability of this particular speaker to recognize that the environment in which the NPI occurs is downward-entailing and not upward-entailing (Chemla, Homer, Rothschild, 2011).

R2: We will show that the presence of a polarity item (positive or negative polarity item) influences inferences comprehenders are willing to draw. Roughly, polarity items may create illusions of some monotonicity for environments of the opposite monotonicity or for non-monotonic environments (for simple environments, however, we replicate the absence of effect found in Szabolcsi, Bott, McElree, 2008).

R3: We will show how the project that consists in looking at individual data and correlations between "linguistic" and "logical" judgments may be extended to another generalization. There exist several characterizations of the set of determiners Q that are felicitous in there-constructions: "There are Q students in the park". Following the format for a generalization given at the outset, that amounts to say that several properties P1, P2, etc. have been proposed to characterize the set of determiners Q that yield a felicitous sentence of this form. For instance, Higginbotham (1987) proposed that the appropriate set of determiners are the symmetrical determiners, while others have proposed that acceptability is to be linked to presuppositional aspects of the quantifiers. We will show that one can look at individual data and correlate speakers' felicity judgments with their corresponding logical judgments about P1=symmetry, P2=presuppositional aspect, etc., to evaluate the corresponding proposals from a new empirical perspective.

Each result will come with its own set of theoretical consequences, either for polarity items (R1 and R2) or for the definiteness effect (R3). We will conclude with a discussion about the possible role of such results more generally to assess linguistic generalizations per se or to inform us about the links between linguistic and other abilities.

Bootstrapping into Attitudes*

Valentine Hacquard
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This talk explores two classic problems at the semantics-pragmatics interface from a learner's perspective. First, the meaning that speakers convey often goes beyond the literal meaning of the sentences they utter. Second, not all content encoded in utterances has equal standing: some is foregrounded, some backgrounded. Yet a sentence does not formally distinguish what a speaker asserts from what she presupposes or merely implicates. For this reason, the child acquiring a language has a daunting task. She must both extract the literal meaning from the overall message, and separate the background assumptions that are linguistically required from those that are incidental. I will discuss, through a few case studies on children's acquisition of attitudes, the ways in which the syntax might guide the child with this daunting task.

(*This talk presents joint work with Jeff Lidz, Shevaun Lewis, Aaron White, Kate Harrigan, Naho Orita and Rachel Dudley.)

Abstracts of

talks, in the order of presentation,

followed by

talk alternates, posters, and poster alternates, alphabetically

Roses and flowers: an informativeness implicature in probabilistic pragmatics

Roger Levy (rlevy@ucsd.edu), Leon Bergen (bergen@mit.edu), Noah Goodman (ngoodman@stanford.edu)

In the half-century since the introduction of Grice's maxims (1957; 1975), considerable effort has gone into refining them into a smaller set of generalizations rooted in deeper principles of cooperative communication (Horn, 1984; Sperber and Wilson, 1986; Levinson, 2000, inter alia). One particularly fruitful result has been identification of the tension between "quantity" (Q-)implicature, in which utterance meanings are upper-bounded by the literal content of alternatives, as in (1), and "informativeness" (I-)implicature, in which utterances are interpreted as strengthened to a prototypical case, as in (2) (Atlas and Levinson, 1981; Horn, 1984; Levinson, 2000):

(1) a. Pat has three children→Pat has exactly three children
b. I injured a child yesterday→The child was not mine

(2) I injured a finger yesterday→The finger was mine

A Bayesian account to pragmatic inference offers the promise of this tension falling out of more general principles: complex interactions are predicted from recursive reasoning involving alternative utterances, shared beliefs about common communicative goals, prior information about world state, and utterance costs. Here we discuss the challenges posed to such an account by a previously unobserved pattern of informativeness implicature: when the conjunction of a superordinate category X with a subordinate member x of that category, *x and X*, receives a strengthened interpretation equivalent to *x and other X*, as in (3) below:

(3) We sell roses and flowers for Mother's Day.[1]

Corpus analysis shows that English has many such common alternations: *tulips and (other) flowers*, *beef and (other) meat*, *horse and (other) animal*, *physicists and (other) scientists*, and more. Longitudinal data show that this is an historically stable pattern. An experimental investigation of naive native speaker intuitions about how many flower types are being talked about shows that omitting *other* has no discernible effect on interpretation.

The challenge for a formal analysis is thus to show how *roses and flowers* can come to be interpreted as meaning the same thing as *roses and other flowers*. The immediate challenge for a strongly neo-Gricean account is that if literal semantics have a chance to be computed globally, we are stuck with a truth-conditional meaning for utterances involving *roses and flowers* that is the same as for utterances involving *roses* alone: for example, the literal meaning of (4) is the same as that of (3):

(4) We sell roses for Mother's Day.

The strengthening of (3) would need to be a "division of pragmatic labor", with the more formally marked of a pair of literally meaning-equivalent expressions associated with more unusual meanings than the less marked (Horn, 1984; Levinson's M-implicature). Problematically, however, this would predict that *roses and flowers* could be strengthened to mean *roses and no other flowers* in cases when such a state of affairs is more unusual (has lower prior probability) than *roses and other flowers*. As a second challenge, if *roses and other flowers* is considered an alternative utterance (seemingly necessary to yield the more familiar Q-implicature of *John bought roses* that John bought no other types of flowers), it is not clear why *roses and flowers* fails to trigger a Q-implicature of *roses and no other flowers*.

[1] `http://e-clubhouse.org/sites/townofsheboyganwi/`

Here we present a rational speech-act theory (Frank and Goodman, 2012; Goodman and Stuhlmüller, 2013; see also Jäger, 2012; Franke, 2013) account of this pragmatic strengthening that is robust to precise details of prior probabilities and specification of alternative utterances. We model the listener-speaker relationship as a pair of recursive probabilistic functions, with listeners as rational Bayesian interpreters and speakers as soft-max rational actors. The set of possible world states is given in Figure 1, with the literal semantic content of each simple NP expression outlined (f_1 being roses).

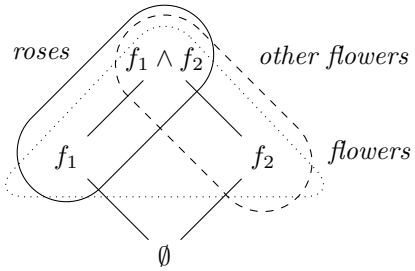

Figure 1: The domain of possible flower types

We employ the technique of LEXICAL UNCERTAINTY first introduced by Bergen et al. (2012) to account for M-implicature by introducing explicit reasoning over different possible mappings between forms and pragmatically refined meanings, allowing the efficient pairing of low-cost forms with high-probability meanings to be identified and subsequently strengthened through recursive inference. Speakers' and interpreters' reasoning follows these recursive probabilistic functions:

$$P^{(0)}_{Listener}(m|u,\mathcal{L}) \propto \mathcal{L}_u(m)P(m)$$

$$P^{(1)}_{Speaker}(u|m,\mathcal{L}) \propto \left[P^{(0)}_{Listener}(m|u,\mathcal{L})e^{-c(u)}\right]^{\lambda} \quad P^{(1)}_{Listener}(m|u) \propto P(m)\sum_{\mathcal{L}} P(\mathcal{L})P^{(1)}_{Speaker}(u|m,\mathcal{L})$$

$$P^{(n)}_{Speaker}(m|u) \propto \left[P^{(n-1)}_{Listener}(m|u)e^{-c(u)}\right]^{\lambda} \qquad P^{(n)}_{Listener}(m|u) \propto P(m)P^{(n)}_{Speaker}(u|m) \qquad (n>1)$$

for meanings m, cost function c, utterances u, greedy optimality parameter λ, and ranging over lexica $\mathcal{L}$—refinements of the "literal" form-meaning mappings of Figure 1. Accounting for *roses and flowers* requires lexical uncertainty to be COMPOSITIONAL: the form-meaning mappings for simple NP expressions (*roses*, *flowers*, *other flowers*) can be refined arbitrarily but complex expressions (*roses and flowers*, *roses and other flowers*) must mean the composition of the refined meanings of their constituent parts.

This model robustly recovers the empirically observed strengthening for *roses and flowers*. In addition, it makes a distinctive prediction regarding how speakers' preferences regarding *other*-drop should vary as a function of the prototypicality of the distinguished subtype f_1—modeled here as $P(f_1|\textit{flowers})$ for Figure 1. As $P(f_1|\textit{flowers})$ increases, an increasingly strong M-implicature bias is added to the compositional model's fundamental bias toward the empirically observed strengthening. The model thus predicts that *other*-drop will be more frequent the more prototypical f_1 is in the supertype. Using unigram word frequency as a proxy for in-category prototypicality, we find support for this prediction in corpus counts (Google Web n-grams) of expressions of the type *x and flowers*, *flowers and x*, and *x and other flowers*. As seen in Figure 2, across a variety of flower types x, higher unigram frequency of x is associated with higher rates of *other* drop.

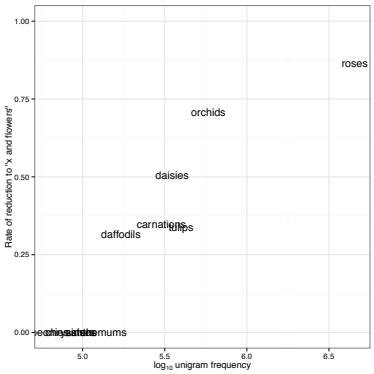

Figure 2: Rate of *other*-reduction as a function of corpus frequency

In sum, this work is the first report of a new class of informativity implicature and shows how simple principles of rational communication can explain its major patterns of both interpretation and speaker choice.

Grammatical Uncertainty Implicatures and Hurford's Constraint

Marie-Christine Meyer
The Hebrew University of Jerusalem

Summary In this talk, I show that the infelicity of disjunctions in which one disjunct entails the other ("Hurford disjunctions"), as well as the felicity of a subclass of Hurford disjunctions (e.g., *some or all*), can be derived from a general principle of Brevity under the independently motivated assumption that uncertainty implicatures are generated in the grammar.

Background Hurford (1974) observed that disjunctions in which one disjunct (contextually) entails the other are infelicitous:

(1) # *Jeff got a job in France or in Paris*

Disjunctions like (1) have been ruled out by the constraint in (2) (cf. Gazdar 1979, Singh 2008, Chierchia, Fox & Spector (CFS) 2009):

(2) Hurford's Constraint
A disjunctive phrase [L or R] is infelicitous if L ⇒ R or R ⇒ L

However, Hurford's Constraint is not explanatory, but simply generalizes the observation from (1) above. Furthermore, felicitous Hurford disjunctions like (3) seem problematic for (2):

(3) ✓ Jeff drank some or all of the beers short: SOME or ALL

It has been argued by CFS (2009) that (3) does in fact obey Hurford's constraint because the first disjunct contains an embedded scalar implicature *not all*, derived by a covert exhaustivity operator *exh*. The propositional operator *exh* takes a set of formal alternatives $\mathcal{ALT}$ and a sentence S and adds to the meaning of S the negation of those $\mathcal{ALT}(S)$ which can be "innocently excluded" in the sense of Fox (2007). Given the availability of *exh*, Hurford's constraint requires the following structure for (3):

(4) $[_A\ [_{B'}\ exh\ [_B$ SOME]] or $[_C$ ALL]] $[\![A]\!] \equiv [\![B]\!]$

But the stipulative nature of (2) remains. Intuitively, it seems like (2) should be derived from Grice's maxim of Brevity – avoid structural complexity without semantic effects:

(5) Let S be a syntactic tree and let S' be a sub-constituent of S
#S if S is equivalent to S'

Unfortunately, (5) runs into problems with felicitous Hurford disjunctions like (3):[1] As shown in (4), the whole disjunction A is equivalent to its subtree B and therefore ruled out, as is any other structure for (3). Thus, felicitous Hurford disjunctions seem to obviate a more explanatory account of Hurford's constraint in terms of Brevity.

Proposal

I show that Hurford's constraint and its apparent exceptions can be derived from Brevity. My proposal has two essential ingredients. First, I will introduce and argue in favor of a grammatical theory of uncertainty implicatures. Under this theory, both epistemically weak implicatures (*the speaker is not sure that* ϕ) and epistemically strong

1 I show furthermore that (5) also has problems with sentences like *Jeff drank some but not all of the beers*, while the principle I suggest below does not rule out these disambiguation strategies.

implicatures (*the speaker is sure that* $\neg\phi$) are derived in the same way, though scopal interactions between the exhaustivity operator *exh* and a covert epistemic operator *K* which is attached at the matrix level (cf. Alonso-Ovalle & Menéndez-Benito 2010):

(6) $[\![\mathrm{K}_x\phi]\!] = \lambda w.\ \forall w' \in \mathcal{D}ox(x)(w) :\ \phi(w')$
$w' \in \mathcal{D}ox(x)(w)$ *iff* given the beliefs of x in w, w' could be the actual world

The operator *exh* can attach above or below K. I propose that its distribution is guided by a principle of transparency:

(7) An LF of the form [... $\mathrm{K}_x\phi$] is licensed iff it entails $K_x(\psi)$ or $\neg K_x(\psi)$ about every $\psi \in \mathcal{ALT}(\phi)$

(7) is a corollary of Grice's Quantity; as we will see, both [K *exh* S] and [*exh* K S] are semantically stronger than their counterparts without *exh*. Given the operators K and *exh* and the principle in (7) (3) can be mapped unto several LFs:[2]

(8) (LF1) *exh* K [[*exh* SOME] or ALL] (LF2) *exh* K [SOME or ALL]
(LF3) *exh* K [*exh* [SOME or ALL]] (LF4) K *exh* [SOME or ALL]

Secondly, I propose a formalization of Brevity which rules out all but the first LF – the empirically correct result. In doing so I make crucial use of Katzir's definition of structural complexity $\lesssim$ (cf. Katzir 2007):

(9) Brevity – Final Version
An LF ϕ is ruled out if there is a competitor ψ such that $\psi \lesssim \phi$ and $[\![\psi]\!] \equiv [\![\phi]\!]$

Roughly, $\psi \lesssim \phi$ means that ψ can be derived from ϕ by substitution and deletion as defined by Katzir (2007). My analysis predicts that LF1 is the only possible LF for (3):

(10) $[\![$*exh* [K [*exh* SOME] or [ALL]]$]\!]$=
K(SOME) & ¬ K(ALL) & ¬K(SOME & ¬ ALL)
= K(SOME) & ¬K(ALL) & ¬K¬(ALL)

The analysis also predicts that this reading cannot be expressed by any simpler structure (e.g., *exh* K [SOME]). I will present empirical arguments that this prediction is correct. Having derived LF1 as the only available parse for (3) without stipulating Hurford's constraint, I go on to show that (1) can be derived without Hurford's constraint too: Building on a proposal by Singh (2008), I show that all LFs licensed by (7) give rise to grammatical uncertainty implicatures which contradict common beliefs. The proposed theory thus also suggests a new perspective on under-informative sentences like # *Some Italians come from a warm country* (cf. Magri 2009), which can be accounted for without having to assume obligatory *scalar* implicatures.

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2 As we will see, the additional LFs K [(*exh*) SOME or ALL] are ruled out by the principle in (7).

Stativity and 'Present Tense' Epistemics

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The Observation: There are a number of well known linguistic environments where English shows a strong state vs. event distinction, lumping together dynamic eventualities of different telicity specifications against states (cf. Bohnemeyer and Swift 2004 for a classification of English in these terms, as opposed to 'telicity' sensitive languages). Summarizing: only states allow for a Universal reading of the perfect, where the eventuality is interpreted as continuing from a past time up to and possibly including the speech time (see Portner 2003); only states allow an 'ongoing at speech time' interpretation for the present tense, while events require the progressive for the ongoing reading and get habitual readings in the present tense (Dowty 1979); in discourse sequencing, dynamic eventualities in English are non-overlapping (tending to advance the topic time), while states produce overlapping predications with the previously mentioned eventuality (cf. Kamp and Rohrer 1983 for Romance). It is relevant to note that with respect to these tests, both progressive and perfects pattern as 'states' in English (see also Hallmann 2010), while passives pattern as 'events'. In this paper, I add the following novel empirical generalization to this set of stativity sensitive phenomena in English:

Epistemic Stative Sensitive (ESS) Modals: ESS Modals are those that are technically ambiguous between an epistemic and circumstantial interpretation, but can only get that epistemic interpretation when combined with a stative prejacent

An example of an ESS Modal, *must*, is shown in (1) below.

1. a. Eeyore must be sad/in the field. (epistemic or obligational (future-oriented))
b. Eeyore must go to Christopher Robin's party. (only obligational)

An example of a non-ESS Modal, *might* is shown in (2).

2. a. Eeyore might be sad/in the field. (epistemic (present) or epistemic (future))
b. Eeyore might go to Christopher Robin's party. (epistemic future)

In the case of ESS Modals, the possibility of an epistemic reading correlates with the 'present' orientation of the modal anchor (in the sense of Condoravdi 2002), while in the non-ESS modal it does not. I show that this is not just an isolated quirk, but that there is a whole class of ESS Modals in English, and that the generalization applies to derived states (including by hypothesis the progressive and the perfect) as well as to lexical ones.

This paper proposes an answer to the following two questions. How can a constrained theory of modal compositional interpretation be combined with an analysis of stativity so as to derive the distribution of epistemic interpretations here? What is the role of the specific modal's lexical contribution in delivering this result, given that not all modals are ESS Modals?

Background: Hacquard (2007) has already made an important and influential proposal concerning systematic modal ambiguity and its relation to structure. Her idea is to relate the semantic differences to differences in event anchoring, which is sensitive to the height of the modal in question. Specifically, she claims that when the modal is speaker-oriented, it is keyed to the speech time and receives an epistemic interpretation; when the modal is attitude holder- oriented, it is keyed to the attitude time and receives an epistemic interpretation and when the modal is subject-oriented, it is keyed to the time provided by Tense and receives a root interpretation. However, as it stands, Hacquard's account does not allow us either to understand the state sensitivity of the epistemic reading, or to distinguish between ESS and non-ESS modals in a principled way. One further ingredient is necessary, as well as a formal grammatical distinction between two different types of modals.

The Analysis: The intuition I will pursue here is that there is something about epistemic modals like *must* that is stubbornly indexical, just like the present tense in English. Further, the analysis will follow Kratzer (2008) in claiming that propositions are not sets of possible worlds, but are rather characteristic functions (sets of) of *situations*. Under this view, situations have time, world and location parameters and can be modified by both temporal and modal operators. Situations are smaller and more specific than worlds, and have no transworld reality except via the 'counterpart' relation of Lewis (1986). Using situations, the schematic representation for the semantics of a modal would thus be as in (3) below, where 'Acc' is the Kratzerian accessibility relation.

(3) *MODAL*: $\lambda p \lambda s_c QUANT s'$[Acc($s_c$)(s′)][p(s′)]]

The analysis employs two main modifications: (i) in addition to standard pragmatic considerations, the Accessibility relation is further constrained by the syntax to only allow 'alternatives' to the situation denoted by the prejacent, where the alternatives are constructed by varying only the values of the situational parameters that still left open at that syntactic height. The intuition is thus similar to the construction of classical Roothian alternatives (Rooth 1996), but where the 'alternatives' are built from varying values of the parameters of the situational description, and whose availability for manipulation is sensitive to syntactic height. (ii) modals will vary with respect to whether their 'topic' situation (s_c in the above representation) is necessarily identified with the utterance situation s* (indexical modals, or ESS Modals) or not (anaphoric modals, or Non-ESS Modals).

Accessibility Relations: Epistemic vs. Circumstantial. Epistemic modality will be defined as quantifying over modal alternatives based on the properties/facts left open by incomplete knowledge, and not over alternatives based on world or time. In other words, in epistemic interpretations, the topic situation is one which contains only the information known to the speaker/epistemic centre and is not an exhaustive description of the relevant facts in the real world. Situational alternatives are not constructible by varying worlds and times anymore once we are above the T node, but alternatives *are* constructible by varying the facts and properties that are 'still in play' epistemically, as Werner (2006) puts it. One might call these alternative situations 'ignorance-alternatives' for convenience. Epistemic readings will thus be related to structural height because of the fact that the modal in question will combine with the situational complement *after* the time and world variables have been specified. (The proposal is thus similar, though not identical to Hacquard 2007, and exploits much of the same intuition).

Anchoring Relations: Indexical vs. Anaphoric. The T head (abstractly construed) establishes a relationship between the topic situation s_c and the situational anchor of the clause s^*. The natural assumption then is that modals are also endowed with information that establishes such a relationship. Compare also Iatridou (2000) (and Isard 1974) on past tense morphology as a manifestation of the more general semantic category REMOTE. However, unlike Iatridou (2000), I propose that the basic relational distinction is not between IDENTITY and REMOTE, but between INDEXICAL and ANAPHORIC.

INDEXICAL:Topic situation is identified directly with the deictic anchor, the utterance situation.

ANAPHORIC:Topic situation must have its reference resolved *anaphorically*, either by binding from something in the linguistic context, or to some purely discourse contextual topic situation.

Anaphoric reference thus covers many different modes of reference resolution. It reflects the basic cut in the pronoun system between indexical forms like *I* on the one hand, and non-indexical ones like *he/she/it* on the other, regardless of the means of reference assignment of the latter.

States. Finally, we need to assume that in English, the present tense relates topic situations via an identity relation to an utterance situation with a single'now' moment. If the meaning postulates distinguishing states from events are as claimed in Taylor (1977), this means that the simple present tense in English will only combine with states (basic or derived). ("If α is a *stative* predicate, then α(x) is true at an interval I just in case α(x) is true at all moments within I; (ii) If α is an *eventive* predicate, then α(x) is only true at an interval larger than a moment. (after Taylor 1977)"). ESS Modals, being indexical, or 'present tense-y', will only allow their epistemic readings for situations whose time parameter can be identified with 'now', i.e. states.

The main proposal of this paper is that we must acknowledge a new dimension of meaning for modals alongside the traditional Kratzerian parameters of quantificational force, modal base and ordering source. This is the parameter that relates to the ways in which the modal perspective situation is anchored to the utterance situation (indexical vs. anaphoric). Time permitting, I will show how this distinction has further consequences for explaining the differing behaviour of modals in embedded contexts, where the epistemic centre can be relativized to the higher attitude holder.

The weakness of *must*: In defense of a Mantra

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There is a Mantra, for decades repeated mindlessly by researchers in modal semantics: "*Must* is weak". So claim von Fintel & Gillies (2010; "vFG") in reference to an influential line of thought going back to [K72]. Karttunen claims that an utterance of (1) indicates a weaker commitment than (2), in that (1) implies that "it is not yet an established fact that John has left".

(1) John must have left. (2) John has left.

[K91] formalizes this by making *must* a quantifier over a maximally normal subset of the epistemically possible worlds ($\mathcal{E}$); thus *must p* is compatible with there being $\neg p$-worlds in $\mathcal{E}$.

vFG marshal an impressive variety of arguments against the Mantra, and in favor of an account according to which *must* indicates indirectness, but *must p* entails *p*. But there are problems. vFG's negative arguments work against only some Weak theories. Their positive proposal fails to account for their flagship example, and also fails for new examples drawn from the ancestry.com discussion boards and presented in §4. Users of this website frequently use *must* to mark inferences about the lives of unknown, long-dead persons made on the basis of fragmentary information. vFG unambiguously predict that cooperative speakers should not use *must* under these circumstances. To explain these uses, §5 proposes a new account on which *must* is both weak **and** inferential.

vFG's argument 1: *must* is not always weak. vFG emphasize the distinction between indirectness and weakness: conclusions derived from indirect evidence can be maximally strong. For instance, *must* is natural in proofs: "*x* is prime. *x* is even. *x* must equal 2." There is no hint of uncertainty.

If *must p* did not entail that $\mathcal{E} \subseteq p$, we might expect it to generate an uncertainty implicature. However, the reasoning only goes through if there is an uncertainty-free expression entailing *must p*. This may be a problem for [K91], if (e.g.) *certainly* is a quantifier over $\mathcal{E}$; but the theory developed below treats *must* as semantically weak **and** indirect. A speaker could thus use *must* in order to mark inference explicitly; there is no entailment from purely epistemic items.

vFG's argument 2: *must* is never weak. Consider *#It must be raining, but it might not.* vFG claim that a Strong theory is needed to explain the unacceptability of this example. But we can easily deal with this issue by defining *might* as the dual of *must*, rather than an existential quantifier over $\mathcal{E}$.

Consider *If P, must Q. P. Therefore, Q*. This seems to be valid reasoning. vFG treat it as evidence for the Strong theory; but this holds only on the assumption that our intuitions about argument strength track deductive validity. On Weak theories, the argument is **probabilistically** valid in the sense of [E95]: if the premises are true or highly probable, the conclusion is highly probable. In fact there is much psychological evidence that argument strength intuitions track probabilistic rather than strictly logical validity [OC07].

vFG's argument 3: Strong semantics makes available an attractive account of evidential meaning. Like [P86], vFG treat *must* as an evidential. Their account goes as follows: there is a set of propositions $\mathcal{K}$ (the **kernel**) known from direct experience. The epistemically possible worlds $\mathcal{E}$ are equal to $\bigcap\mathcal{K}$, and the propositions known indirectly (by deductive inference) are those true throughout $\mathcal{E}$ but not in $\mathcal{K}$: $\mathcal{I} = \{p|\mathcal{E} \subseteq p\} - \mathcal{K}$. *Must p* presupposes $p \notin \mathcal{K} \wedge \neg p \notin \mathcal{K}$, and asserts $\mathcal{E} \subseteq p$.

vFG's example is this: Billy sees people coming into the office with wet raincoats, and utters *u*: "It must be raining." The semantics predicts the appropriateness of *u* if $\mathcal{K}$ = {**people with wet raincoats**, **people only come in with wet raincoats when it's raining**}: the closure of this $\mathcal{K}$ entails **rain**.

But this characterization does not fit well with vFG's central hypothesis. How could Billy come to know by direct experience the second item in $\mathcal{K}$ — a proposition equivalent to "People never come in with wet raincoats when it's not raining"? No amount of experience could grant Billy **direct** knowledge of the non-existence of a situation type: either she is confused, or vFG are wrong.

4. Corpus evidence. In natural discourse, speakers frequently use *must p* despite clearly being aware that they do not know anything (direct or indirect) which entails p. For instance:

(3) [T]he 1880 census shows her living with mom, two brothers, and her daughter ... So David [the father] must have died before 1880. (source: ancestry.com)

$\mathcal{K}$ would have to include **The only way the father of a family living in York County, PA in 1880 can fail to appear in the census is that he was dead**. No one could seriously self-ascribe knowledge of this; rather, (3) presents David's death as the *best explanation* of the census record [S94].

(4) **A1**: [Y]our man Lazarus must have sustained injuries at [Buena Vista] by his death date. ...
B: I check the killed and wounded list ... Lazarus wasn't listed under killed and wounded.
A2: Curious. I was only assuming that since Lazarus is listed as dying [a week after Buena Vista], it was from wounds suffered the week prior ... [A]s we all know, disease took a heavier toll on the troops than actual enemy fire. [But] when I see a death date that close to the battle date, I tend to think that wounds played a part. (source: ancestry.com)

A's choice to use **A1** is not plausibly accounted for by supposing that he thought he knew **wounded**. **A2** explains "I was only assuming ...", and continues by giving **statistical** considerations pushing in each direction: most soldiers died of disease [low $P(\textit{wounded}|\textit{died})$], but most who died within a week of a battle were wounded [high $P(\textit{wounded}|\textit{battle},\textit{died})$]. Lacking specific evidence when **A1** was formulated, A chose *must* to mark "wounded" as the best explanation of the available data.

5. Abductive and threshold semantics. Our account combines ideas from [K72,S94,Y11] with a perspective from AI and psychology in which epistemic states are represented using structured probabilistic models [P88,T11]. Let $\mathcal{V}$ be the set of questions (= random variables) that an agent represents. $\mathcal{V}$ is partitioned into $\mathcal{V}_\mathcal{D}$, whose values have been observed directly, and $\mathcal{V}_\mathcal{I}$, for which a distribution is inferred by conditionalizing on $\mathcal{V}_\mathcal{D}$. An epistemic state thus determines a posterior $P(\mathcal{Q}|\mathcal{V}_\mathcal{D})$ on answers to each $\mathcal{Q} \in \mathcal{V}$. We can formalize the "best explanation" intuition as:

(5) If $q \in \mathcal{Q}$, then *must* q $\{$is felicitous only if $\mathcal{Q} \notin \mathcal{V}_\mathcal{D}\}$; $\{= 1$ iff $\forall q' \neq q \in \mathcal{Q} : P(q|\mathcal{V}_\mathcal{D}) > P(q'|\mathcal{V}_\mathcal{D})]\}$.

(5) presents q as the answer to $\mathcal{Q}$ which best explains the observations $\mathcal{V}_\mathcal{D}$. If $\mathcal{Q}$ = *Was David alive in 1880?* and $\mathcal{V}_\mathcal{D}$ includes the census record, (3) indicates $\mathcal{Q} \notin \mathcal{V}_\mathcal{D}$ and $P(\textit{dead}|\mathcal{V}_\mathcal{D}) > P(\textit{alive}|\mathcal{V}_\mathcal{D})$.

Problem: this semantics is too weak. If $\mathcal{Q}$ has many possible answers, the most likely may still be very improbable. Since *must q* is clearly false when $P(q)$ is low, we strengthen (5) to (6):

(6) If $q \in \mathcal{Q}$, then *must* q $\{$is felicitous only if $\mathcal{Q} \notin \mathcal{V}_\mathcal{D}\}$; $\{= 1$ iff $P(q|\mathcal{V}_\mathcal{D}) > \theta\}$.

(6) entails (5), as long as θ is at least .5. Our examples suggest that (6) is right to leave the meaning of *must* vague (and itself subject to inference, cf. [LG13]). Both definitions are neutral about what, if anything, determines the epistemic state relevant to evaluating a given utterance of *must q* (and so the difficult question of whether **A1** was true, false, or neither when uttered: see [Y11]).

The free parameter θ in (6) suggests the possibility of binding. Many examples confirm this prediction: e.g., (7) indicates indirectness, but with reduced commitment associated with *figured*.

(7) If the handgun was engraved or had some sort of fancier finish then I figured he must be a "pistolero." I might have been wrong but those were my initial impressions.
(source: http://americanhandgunner.com/handgun-esthetics/)

6. Conclusion. *Must* is weak! *Must* is weak! *Must* is weak! *Must* is weak! *Must* is weak! ...

Refs: [E95] **Edgington**, On conditionals [vFG] **von Fintel & Gillies**, Must...stay...strong! [K72] **Karttunen**, Possible & *must* [K91] **Kratzer**, Modality [LG13] **Lassiter & Goodman**, Context, scale structure, and statistics in the interpretation of positive-form adjectives [OC07] **Oaksford & Chater**, *Bayesian Rationality* [P86] **Palmer**, *Mood & Modality* [P88] **Pearl**, *Prob. Reasoning in Intelligent Systems* [S94] **Stone**, The reference argument of epistemic *must* [T11] **Tenenbaum et al.**, How to grow a mind: Structure, statistics, and abstraction [Y11] **Yalcin**, Nonfactualism about epistemic modality

Meaning components in the constitution of Russian verbs: Presuppositions or implicatures?

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The meaning of Russian imperfective and perfective verbs is often analyzed in terms of presuppositions triggered by the aspect of a whole verb and/or one of its constituting affixes. The goal of this talk is to shed doubts on the validity of such analyses by showing that at least some cases of the putative triggers of presupposition are better analyzed as triggers of scalar implicature. The focus is on the inferences triggered by the perfective aspect of whole verbs and on those associated with the completive prefix *do-* and iterative prefix *pere-*. One common way of characterizing the difference between imperfective and perfective sentences like (1) and (2) involves the claim that it is of presuppositional nature: namely, perfective verbs, but not imperfective ones, trigger an existential presupposition on (the beginning of) events in their denotation, also dubbed as the 'activity' or 'process' component, and assert the culmination component Padučeva (1996); Romanova (2004); Docekal and Kucerová (2009); Kagan (2013).

(1) Ja ne čital^{IPF} ètu knigu.
I not read this book
'I wasn't reading/didn't read this book.'

(2) Ja ne pročital^{PF} ètu knigu.
I not pro.read this book
'I didn't read this book.' ⇝ 'I started reading this book'

In this respect, perfective morphology has presuppositional properties that are comparable to those of English phasal verbs like *begin*, *start* and *continue* (Geurts, 1999). In addition to the contribution of the perfectivity, which is a property of verbs as lexical items, certain derivational prefixes used to form perfectives are also claimed to trigger presuppositions. What is at stake becomes evident when we compare a simplex imperfective verb, as in (1), with a secondary imperfective verb containing a prefix in question, here the iterative *pere-* and completive *do-*, as in (3):

(3) a. Ja ne perečityval^{IPF} ètu knigu.
I not pere.read this book
'I wasn't reading/didn't read the book again.' ⇝ I was reading/read the book (before).

b. Ja ne dočityval^{IPF} te knigi, kotoryje byli mne neinteresny.
I not do.read those books, that were I-dat not.interesting
'I wasn't finishing the books that I didn't find interesting.' ⇝ I was reading books that I didn't find interesting

The iterative meaning of *pere-* being similar to *again* and the completive meaning of *do-* to *finish* also invites parallels in their presupposition triggering properties. The presuppositional nature of all the three mentioned elements (perfective morphology of lexical verbs and the two prefixes) is taken to be established based on the standard negation and question tests (Docekal and Kucerová, 2009; Kagan, 2013; Padučeva, 1996; Romanova, 2004).

Although it is tempting to consider the observed inferences in (2) and (3) as being presuppositional in nature, the following objections can be raised: the inferences triggered by the perfective aspect vanish very easily; the inferences are very vague and context-dependent; scalar implicatures exhibit the same behaviour under negation and question tests, as presuppositions do.

In fact, similar objections to the analysis of the contribution of the perfective aspect as a presupposition trigger were raised by Grønn (2004). He suggested that the inference like one in (2) is a matter of a pragmatic implicature. However, there are no tests and the cases like (3) are not discussed. To derive the observed inference in the case of (3-a) via scalar implicature (henceforth, SI, Horn, 1972), the following reasoning has to be applied: a prefixed verb is more informative than an unprefixed one, so it is a stronger alternative; under negation, the scale is reversed, so the stronger alternative to (3-a) is the sentence in (2) – the negation of the whole reading event; as the speaker used the weaker alternative, by the Gricean maxim of quantity (Grice, 1975) the hearer infers that the stronger alternative does not hold; by the negation of the stronger alternative (1), the hearer implicates that some attempt of reading the book was made, which is the inference native speakers get.

According to the presupposition projection theories (Heim, 1983; Schlenker, 2008), if a sentence S with the presupposition $P(x)$ is embedded under quantifiers *every* or *no*, the presupposition of the

resulting sentence is universal: $\forall x : P(x)$ (see discussion and experiment results in Chemla, 2009). This property does not hold for SIs: if a sentence S entails that $I(x)$, then S, embedded under *no*, implicates that $\exists x : I(x)$ (existential inference), and embedded under *every* – entails that $\forall x : I(x)$. If these predictions are correct, embedding sentences that contain inferences of unknown nature under universal quantifiers can be seen as a test for distinguishing between presuppositions and SIs: if the initial sentence contained a presupposition, the resulting inference should be universal. If it is weaker (existential inference), than the initial inference was an implicature.

In order to better understand the nature of the inferences in ex. (2) and (3), a simple questionnaire was put together, in which 97 native speakers rated different possible inferences of sentences like (2) and (3) embedded under *nikto* 'none' (resulting sentences being like those in (4), (5), and (6)).

(4) Nikto iz nas ne pročital^{PF} učebnik.
Nobody from us not pro.read manual
'None of us read the manual.'

(5) Nikto iz nas ne dočital^{PF} učebnik.
Nobody from us not do.read manual
'None of us finished reading the manual.'

The results of the questionnaire show that universal inferences (i.e., 'all of us started reading the manual') are strongly dispreferred at least for sentences like (4) and (5), while an existential inference is accepted: 'some of us started reading the manual'. This behaviour, according to the explanation above, corresponds to that of SIs. For the iterative prefix *pere-* (ex. (6), imperfective aspect used to separate contribution of the prefix from those of the aspect) the picture is much less clear. Some native speakers accept the universal inference ('all of us were reading the manual'), which points towards the presuppositional nature of the inference. On the other hand, most of the respondents rejected even existential inferences in case when the speaker of the sentence is not an actor (as in (7)). This can be explained if the inference is an SI, but not if it is a presupposition.

(6) Nikto iz nas ne perečityval^{IPF} učebnik.
Nobody from us not pere.read manual
'None of us were reading/read the manual again.'

(7) Nikto iz studentov ne perečityval^{IPF} učebnik.
Nobody from students not pere.read manual
'No student wasn't reading/didn't read the manual again.'

Conclusion. Contrary to most works that attempt to analyse the meaning of Russian imperfective and perfective verbs in terms of presuppositions triggered by the aspect of a whole verb and/or one of its constituting affixes, we found that there is no ground to claim that these inferences are presuppositions at least in the case of perfective verbs and the completive prefix *do-*. Such inferences were shown to be a matter of scalar implicature. The iterative prefix *pere-* exhibits a more complex behaviour and in order to establish the nature of the inferences it triggers, full experiments like those by Chemla (2009) would need to be done.

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The anaphoric semantics of partial control

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Partial control (PC) is the phenomenon that instead of identity there is a subset relation between the controller and the controllee in a control construction, as in (1), where the embedded predicate *gather* requires a plural subject, but the controller is singular.[1]

(1) a. The chair$_i$ wanted PRO$_{i+}$ to gather at six.
b. The chair$_i$ preferred PRO$_{i+}$ to gather at six.
c. The chair$_i$ agreed PRO$_{i+}$ to gather at six.

PC has received considerable interest, at first from a syntactic perspective (cf. in particular the work of Landau), more recently also in semantics [2, 7, 9]. PC touches on important theoretical questions such as how the controller-controllee relation is established and what the denotation of a control complement is. Morever it raises new questions such as why there is no 'superset control' (controller $\supset$ PRO) or why there is no partial raising [7].

The semantic analyses in [2, 7, 9] all make PC unexceptional and directly allowed by the semantics e.g. by having the control verb introduce an embedded subject which is existentially quantified and relates to the controller via a subset relation rather than equality [7]. Such approaches are at odds with the oft-made observation that PC is a marked, sometimes marginal option that requires contextual support. This paper offers a new analysis that accounts for this observation by assimilating PC to bridging in anaphoric resolution. The approach is formalized in an extended version of partial, compositional DRT (PCDRT) [3].

Context-dependency of PC PC requires a contextually salient plurality, such as the one primed by *chair* in (1), to be felicitous. For example, the second sentence of (2) can only mean 'He wants to have lunch with me', as the context does not provide other suitable ways of constructing the plural antecedent for PRO that the complement requires.

(2) John is lonely. He wants PRO to have lunch together.

Here, PRO scopes over the attitude: the plurality denoted by PRO cannot exist only in John's desire worlds ('John wants that there is a plurality y such that John is part of y and y have lunch together'). On the other hand, this *can* happen whenever the context provides such an intensional plurality, as in modal subordination (3).

(3) John is looking for a group of elves. He wants PRO to have lunch together.

On the most natural reading of (3), the elves only exist in John's belief worlds and so PRO scopes under the attitude. On the specific reading of the first sentence (entailing the existence of elves), the second sentence must also get a specific reading. This shows that the resolution of PRO is context-dependent, contradicting theories such as [7] that introduce the embedded subject via existential quantification – such theories will have to fix the scope of the existential quantification relative to the attitude in the lexical entry of the control verb (or assume an otherwise unmotivated ambiguity).

The antecedent of PRO. Control theory states that PRO has a grammatically imposed antecedent. Which is this antecedent? There are two main candidates: the matrix controller itself, and the 'center' of the embedded attitude (in 'centred world' approaches). The latter option directly yields the obligatory *de se* reading of PRO and is adopted by many (e.g. PRO denotes the attitude center [8, 9]; PRO is anaphorically resolved to the attitude center [4]). However, this does not sit well with the fact that PRO's ϕ-features reflect the semantics of its matrix antecedent, not that of the attitude center, cf. (4) from [8].

[1] Some predicates allow PC and others like *begin, manage, try* do not. I follow [1, 2] in assuming that verbs that disallow PC are restructuring predicates. Hence, all and only PC verbs instantiate true control structures.

(4) John hopes PRO to be a woman and he hopes to buy {himself/*myself/*herself} a new car.

PRO's ϕ-features in fact reflect the matrix antecedent even when they contradict PRO's own plural semantics in PC.[2] Therefore PC PRO cannot license a plural anaphor (5).

(5) The chair preferred to meet (*each other) at six.

Finally, (6) is problematic for theories that take PRO to be anaphorically dependent on (or directly refer to) the attitude center, as pointed out in [5].

(6) Molly wants PRO to accept a paper by herself.

PRO binds a reflexive that is interpreted (on the relevant, 'mistaken identity' scenario) *de re* and hence must scope out of the attitude, showing that its binder PRO also scopes out of the attitude. This means the antecedent is the matrix controller, not the embedded attitude center.

The referential relationship between PRO and its antecedent How can we reconcile PRO's fixed, grammatically imposed antecedent with its variable, context-dependent reference? We suggest that control theory fixes the antecedent but not the anaphoric relation: under certain conditions, PRO, like other pronouns, can relate to its antecedent through relations other than identity. For overt pronouns, these conditions are identified by [6] as 1. inferability 2. uniqueness 3. use of semantically available information only 4. support of discourse coherence by anaphoric link. These strong contextual conditions constrain PC too and directly predict that 'superset control' is impossible: controller $\supset$ PRO would fail uniqueness.

Formalization in PCDRT Simplifying somewhat, PCDRT models anaphora via a function $\mathcal{A}$ taking anaphoric drefs to antecedent drefs. For bridging we also need a function $\mathcal{C}$ taking drefs and their antecedents to a coreference relation (by default, identity). These functions are inferred by non-monotonic reasoning over semantic representations with unresolved anaphora, but can also be specified grammatically e.g. in binding and control, yielding (7) for *want*.

(7) $\lambda P.\lambda x.[\ |want_x([x_1|\mathcal{A}(x_1) = x]\ ; P(x_1))]$

x_1 is PRO's dref and $want_x$ is the usual relation between an individual x and a proposition. The equation $\mathcal{A}(x_1) = x$ achieves three things:1. it fixes the antecedent of PRO; 2. by doing this inside the scope of the attitude, it forces *de se* in a similar way to the identity acquaintance relation used in [5]; 3. it disallows strict readings of PRO in ellipsis (details in the full paper). Since $\mathcal{C}$ is left unspecified, we get exactly the context-dependent but constrained leeway in interpreting PRO that PC calls for. In sum, this analysis of PRO as a pronoun with a grammatically imposed antecedent correctly predicts the anaphoric semantics of partial control. Moreover, since raising does not involve a pronoun we predict there is no partial raising. Finally, the analysis vindicates Landau's claim that PC shows that control complements are propositions.

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[2] 'Agreement trumps semantics' has an analogue in overt bound pronouns, cf. *We all sometimes think we are the only person in the world* (Sauerland apud [8]).

Interpreting DP-modifying modal adverbs

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I. Introduction: I explore the semantics of DP-modifying epistemic modal adverbs (1), comparing them with sentences in which the modal adverb occurs along the clausal spine (2).

(1) a. Mary is drinking [$_{DP}$ *probably* / *perhaps* [$_{DP}$ the American wine]].
b. Mary hiked toward [$_{DP}$ *possibly* / *maybe* [$_{DP}$ the tallest mountain in Spain]].

(2) a. *Probably* / *perhaps* [$_{TP}$ Mary is drinking the American wine].
b. *Possibly* / *maybe* [$_{TP}$ Mary hiked toward the tallest mountain Spain].

I first present a semantic analysis of sentences like (1) which permits modal adverbs of familiar <st,st> type to modify DPs. Second, I compare the behavior of DP-modifying modals with the behavior of modals on the clausal spine, focusing on their interpretations in intensional contexts.

II. Composition of modal adverbs with DP: I argue that the DP-adjacent modal adverbs in (1) are interpreted where they appear in surface structure: they take semantic scope only over DP. They cannot be analyzed as parenthetically displaced adverbs for two reasons. First, they lack the comma intonation characteristic of parenthetical adverbs (Ernst 2002). Second, the linear position of the adverb affects the sentence's truth conditions. Sentences with DP-adjacent modals carry actuality entailments. Sentence (3a) is only true if Mary climbed some object; uncertainty introduced by *possibly* is restricted to the object climbed. (3b) is true if Mary climbed Spain's tallest mountain in at least one of the speaker's epistemic alternatives. By contrast, parenthetical displacement of adverbs has no truth conditional effect (4a,b).

(3) Mary planned to climb Pico de Teide yesterday, which is Spain's tallest mountain. The a weather was bad, however, so it's possible she didn't climb after all. You say,
a. # Yesterday, Mary climbed possibly [$_{DP}$ the tallest mountain in Spain].
b. Yesterday, Mary possibly climbed the tallest mountain in Spain.

(4) a. Happily, Mary missed my phone call. **b.** Mary missed, happily, my phone call.

Although non-parenthetical adverbs are generally prohibited in object position (**Mary missed happily my phone call*; Ernst 2002), epistemic modal adverbs can appear there. The ability of modal adverbs to be interpreted when they only scope over DP is initially surprising if we wish to retain familiar type <st,st> entries (5a). I propose that composition between type <st,st> modal adverbs and type <se> DP intensions (5c) is made possible by typeshifting the DP into a property with IDENTIFY, an intensional form of Partee's IDENT (5b). IDENTIFY is utilized in work on Concealed Questions (*Mary knows the tallest mountain in Spain*) which, like modal-modified DPs, involve composition of DPs with typically <st,st> expressions (*know*) (Frana 2006, Schwager 2008). The resulting property (5d) composes with the modal adverb via Function Composition (6).

(5) a. $[[\textit{possibly}]] = \lambda p_{st}\lambda s[\exists s'' \in \text{EPI-MB}(s)[p(s'')]]$ **b.** $[[\text{IDENTIFY}]] = \lambda\chi_{se}\lambda z_{e}\lambda s'[z = \chi(s')]$
c. $[[\textit{the tallest mountain in Spain}]] = \lambda s.\iota x[\text{TMIS}(x,s)]$ (TMIS=*tallest mountain in Spain*)
d. $[[\text{IDENTIFY } \textit{TMIS}]] = \lambda z_{e}\lambda s'[z = \iota x[\text{TMIS}(x,s')]]$

(6) $[[\textit{possibly the tallest mountain in Spain}]] = \textit{possibly} \circ \textit{TMIS} = \lambda y(\textit{possibly}(\textit{TMIS}(y)))$
$= \lambda y\lambda s[\exists s'' \in \text{EPI-MB}(s)[y = \iota x[\text{TMIS}(x,s'')]]]$

The property denoted by the modal-modified DP composes with the subject and verb via Predicate Modification followed by Existential Closure (*viz.* RESTRICT, Chung & Ladusaw 2001). The actuality entailment attested for sentence (3a) follows from the truth conditions in (7b).

(7) a. [[*possibly the tallest mountain in Spain*] λy Mary climbed y] **PM**
$= \lambda z\lambda s'$[Mary climbed z in s'] & [$\exists s'' \in \text{EPI-MB}(s')[z = \iota x[\text{TMIS}(x,s'')]]$]
b. $\lambda s'\exists z$[Mary climbed z in s'] & [$\exists s'' \in \text{EPI-MB}(s')[z = \iota x[\text{TMIS}(x,s'')]]$] **EC**
= Situations s' in which Mary climbed z in s' & z is possibly Spain's tallest mountain in s'

With a proposal in place for the composition of modal adverbs and DPs, I now compare the behavior in intensional contexts of DP-modifying modals and modals along the clausal spine.

III. Transparent interpretations of DP-modifying modals: Modals and quantificational adverbs on the clausal spine necessarily receive opaque interpretations when embedded by an intensional operator (Percus 2000, Hacquard 2007). In (8) –adapt. Hacquard 2007– *possibly* must be evaluated relative to *thought* (s_1); it cannot be evaluated relative to the utterance situation (s_0):

(8) λs_0 Every contestant$_i$ thought λs_1 he$_i$ was possibly$_{s1/*s0}$ the winner.
a. *Opaque:* Each contestant$_i$ thinks that he$_i$'s in a world s_1 in which it's possible he won.
b. **Transparent:* Every contestant$_i$ thinks that he$_i$ is in a world s_1 in which the speaker believes it to be possible (given **the speaker's** beliefs in $\boldsymbol{s_0}$) that he$_i$ won.

Unlike clausal adverbs, DPs permit transparent and opaque interpretations, suggesting that DPs –unlike adverbs (cf. Percus 2000)– have syntactically-represented situation pronouns which permit them to have different indexings (Fodor 1970, Keshet 2008, Schwarz 2012):

(9) λs_0 Mary wants λs_1 her infant son to marry [the tallest woman in the state]$_{s1/s0}$.

When a modal adverb modifies a DP (6), the resulting expression has a single situation argument. Example (10) shows that under doxastic attitudes (*thinks*), the situation argument of a modal-modified DP –and, thus, of the modal itself– permits the transparent indexing that is available to DPs (9) but which was unavailable to modals along the clausal spine (8):

(10) λs_0 Mary thinks λs_1 she ate [possibly the best pizza in New Haven]$_{s1/s0}$.
a. *Opaque:* Mary thinks she is in a world s_1 in which what she ate is 'possibly the best pizza in NH' given **her** beliefs in $\boldsymbol{s_1}$. The speaker might not share these beliefs.
b. *Transparent:* Mary thinks she is in a world s_1 in which what she ate is 'possibly the best pizza in NH' given the **speaker's** beliefs in $\boldsymbol{s_0}$. Mary might not share these beliefs.

IV. Missing opaque interpretations of DP-modifying modals: There are, however, still parallels in behavior between epistemic modals in both syntactic positions. I give two examples where missing opaque interpretations for epistemic modal-modified DPs follow from more general restrictions on the interpretation of epistemic modals along the clausal spine.

First, although non-modal-modified DPs can receive either opaque or transparent interpretations beneath *want* (9), the opaque reading disappears when the DP is modified by the epistemic adverb *possibly* (11). The same pattern can be observed for *look for*, *need*, and *wish*.

(11) λs_0 Mary wants λs_1 her infant son to marry [possibly the tallest woman in the state]$_{*s1/s0}$.
a. **Opaque:* Mary believes that very tall women make good partners. She wants whoever her son ends up marrying to be **at that time** possibly the tallest woman in the state.
b. *Transparent:* There is a woman (Sally) who the **speaker** (but maybe not Mary) thinks is **currently** possibly the tallest woman in the state. Mary wants her son to marry Sally.

Second, modal adverbs block the Concealed Question (CQ) reading of *know*. The CQ reading for *know* arises when the object DP is interpreted opaquely (i.e. when *know* binds the object DP's situation argument; Romero 2005, Frana 2006, Schwager 2008):

(12) **a.**Jan knows possibly the tallest NBA player. ≠ Jan knows who is possibly the tallest NBA player.
b.Jan knows_{CQ} the tallest NBA player. = Jan knows who is the tallest NBA player.

I propose that the missing opaque readings are due to restrictions also relevant to epistemic modals along the clausal spine. Anand & Hacquard (2013) show that *have to* allows an epistemic interpretation beneath 'representational attitudes' (*think*; 13a) but not beneath desideratives (13b). They argue that only the former provide situations interpretable by epistemic modals. I likewise posit that (11) lacks an opaque reading because *want* cannot bind the modal-modified DP's situation.

(13) a. John thinks that Paul has to be innocent. **b.** *John wants Paul to have to be the murderer.

Anand & Hacquard treat both *know* and *think* as representational attitudes and thus don't predict the missing reading of (12a). I argue, however, that the missing reading is expected given subjective epistemic modals' inability to appear in the complements of factive attitude verbs (Papafragou 2006). A question under investigation is whether Anand & Hacquard's theory of attitude types can capture these finer differences between *think* and *know*.

Japanese-type alternative questions in a cross-linguistic perspective

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Introduction: One of the ongoing debates pertaining to the syntax and semantics of alternative questions (AltQs) is whether they involve deletion/movement, and if they do, what the elided/moved materials are. For example, there are (at least) three analytic possibilities existing in the literature for the compositional semantic derivation of an English AltQ. One possibility is to analyze the disjunction as undergoing some form of covert scoping operation (Quantifying-in in Karttunen 1977, Larson 1985; focus semantics in Beck & Kim 2006), making it to take scope over the question-forming operator. The other two possibilities involve deletion in the second disjunct whose underlying structure is larger than its surface appearance. In one analysis, the underlying structure of the AltQ is a coordination of two questions, and no covert scoping operation is needed to derive the AltQ meaning (Pruitt & Roelofsen 2011). The other way is to assume both deletion and a covert scoping operation (Han & Romero 2004). This paper contributes to this debate by focusing on AltQs in Japanese, arguing that they are underlyingly disjunctions of polar questions along the lines of the second analysis above. After presenting an argument for the analysis, I will situate the Japanese-type AltQs in the new cross-linguistic typology of AltQs, which is structured in terms of the [±WH] feature on the Disj head.

Data: Korean and Japanese AltQs are known to be syntactically more constrained than their English counterparts (Han & Romero 2004). E.g., disjunction of object DPs with the Disj marker *ka* in Japanese only allows an Yes/No-question (YNQ) reading, and does not license an AltQ reading:

(1) boku-wa [Taro-ga koohii-ka ocha-o non-da-ka] shitteiru
I-Top Taro-Nom coffee-Disj tea-Acc drink-Past-Q know
'I know whether it is the case that Taro drank coffee or tea.' [*AltQ; ✓YNQ]

On the other hand, what looks like a VP (or possibly clausal) disjunction licenses an AltQ reading:

(2) boku-wa [Taro-ga koohii-o non-da ka (~~T.-ga~~) ocha-o non-da-ka] shitteiru.
I-Top Taro-Nom coffee-Acc drink-Past KA tea-Acc drink-Past-Q know
'I know whether Taro drank coffee or Tea.' [✓AltQ; ?✓YNQ]

Another piece of data that needs attention is that materials above TP cannot scope over the entire (VP/clausal) disjunction in an AltQ where the item appears once preceding the Q-particle:

(3) Taro-wa koohii-o nomu ka (~~T.-ga~~) ocha-o nomu-**beki**-ka?
Taro-Top coffee-Acc drink KA tea-Acc drink-should-Q
*'Which is true: Taro should drink coffee or he should drink tea?' [AltQ]
✓'Is it true that Taro should drink coffee or tea?' [YNQ]
✓'Which is true: Taro drinks coffee or he should drink tea?' [AltQ]

In (3), the modal *beki* cannot scope over the disjunction in the AltQ reading. Thus, the only available readings are (i) the YNQ reading and (ii) the AltQ reading in which the modal takes scope only over the second disjunct. The parallel fact holds when we replace *beki* with a politeness-marker *desu*.

Syntactic analysis: This paper proposes that the structure of Japanese AltQs is always disjunction of polar questions. The disjunction marker in such a structure is either covert or realized as the designated marker *soretomo*. Thus, the structure of a Japanese AltQ looks as follows:

(4) boku-wa [[T.-ga koohii-o non-da-ka] (soretomo) [~~T.-ga~~ ocha-o non-da-ka]] shitteiru
I-Top Taro-Nom coffee-Acc drink-Past-Q Disj tea-Acc drink-Past-Q know

One important claim behind this analysis is that the first *ka* in (2) under the AltQ reading is a Q-marker rather than the disjunction marker *ka*. A piece of support for this comes from the fact that the clause-final particle in the first disjunct has to match the particle of the second disjunct in an AltQ. (Here, *no* is a particle that can be used in place of the Q-particle *ka* in an informal speech.)

(5) a. Taro-wa koohii-o nonda-**no** ~~T.-wa~~ ocha-o non-da-**no**?
Taro-Top coffee-Acc drink-Q tea-Acc drink-Past-Q [only AltQ]

b. Taro-wa koohii-o nonda-**ka** ~~T.-wa~~ ocha-o non-da-**no**?
Taro-Top coffee-Acc drink-Disj tea-Acc drink-Past-Q [only YNQ]

This fact is mysterious if the first *ka* in an AltQ is a Disj-marker while the second one is a Q-particle. However, this can be accounted for in the current analysis if we assume that there is a parallelism condition that requires the Q-particles to be the same in the two polar questions composing an AltQ.

Accounting for the data: In this view, there is a natural account for why (1) does not have the AltQ reading: the deletion operation that would be needed to derive (1) from structure in (4) involves a deletion of the verb *non-da*, stranding the Q-particle *ka*, as in the following structure.

(6) *boku-wa [Taro-ga koohii-~~o~~ ~~non-da~~-ka] [~~Taro-ga~~ ocha-o non-da-ka] shitteiru
I-Top Taro-Nom coffee-Acc drink-Past-Q tea-Acc drink-Past-Q know

Whatever the status of the deletion may be, the deletion fails to satisfy the general constraint on ellipsis that it is allowed only if there is a suitable linguistic antecedent. Thus, we predict the deletion in (6) to be illicit. The modal fact in (3) also falls out straightforwardly from the current analysis. Since each disjunct in an AltQ is underlyingly as big as a CP, it has to include the modal projection. This means that, in order for the modal to be interpreted in both disjuncts, it has to be underlyingly present within each of the disjuncts. (3) does not have the relevant AltQ interpretation since the modal would have to undergo a deletion in the first disjunct (violating the condition on ellipsis) in order for it to be derived from the disjunction of two CPs each involving the modal.

Compositional Semantics: As the semantic proposal, I analyze the denotation of a polar question as the singleton set of the proposition denoted by the embedded TP: $[\![\text{Q TP}]\!] = \lambda p.[p = [\![\text{TP}]\!]]$. The designated disjunction marker *soretomo* is syntactically restricted to coordinate CPs, and it semantically takes the union of the proposition-sets denoted by each CP disjunct. As a result, the denotation of an AltQ comes out as the set of two propositions, each expressed by a clausal disjunct: $[\![\text{TP}_1\ \text{Q soretomo TP}_2\ \text{Q}]\!] = \lambda p.[p = [\![\text{TP}_1]\!] \vee p = [\![\text{TP}_2]\!]]$. This question denotation corresponds to that in Hamblin (1973), i.e., the set of possible answers to the question. The Hamblin denotations can be converted into the strongly exhaustive answer by the Answer2 operator from Heim (1984), which can be further modified to encode the uniqueness presupposition of AltQs.

Cross-linguistic typology: We have seen that Japanese AltQs are always underlyingly disjunctions of polar questions. This means that a disjunction underlyingly c-commanded by a Q-operator can never receive an AltQ reading in Japanese. This is in contrast with a language like English, where a disjunction can covertly move above the Q-operator to derive an AltQ reading (See Nicolae 2013 for a recent argument for this view). This means that languages differ in whether they allow DisjPs to out-scope the Q-operator at LF. In fact, this variation in the scopal property can be found *within* a language: *who* and *someone* in English are both existentials in Karttunen's semantics, but the former always scopes out a Q-operator while the latter never does. Taking the presence of the WH-feature as the necessary and sufficient condition for an item to scope-out the Q-operator at LF, we can capture the cross-linguistic difference in terms of the [WH]-feature on the Disj-head. Japanese is a language where the Disj does not bear the feature while English is a language where it optionally does. To push the view further, this typology predicts that there are languages with two disjunction markers, one with and one without [+WH], i.e., a Disj-head that only occurs in an AltQ and a Japanese *ka*-type Disj-head that never licenses an AltQ. This is what we observe in languages like Basque and Arabic (Haspelmath 2007, George 2011). The typology can be summarized as follows:

(7)

	[+WH]	[–WH]	examples
English, German	α	α	$\alpha = or$
Basque, Arabic	β	α	$\alpha = edo, \beta = ala$
Finnish, Mandarin	α, β	α	$\alpha = tai, \beta = vai$
Japanese, Korean	—	α	$\alpha = ka$

The contribution of the current paper with respect to this typology is to show that Japanese AltQs exhibit a typological feature that has not been explicitly described before. Namely, there is no Disj-head in the language that bears the [+WH] feature, and thus the AltQ-interpretation can be derived only by way of disjoining PolQs.

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Coordination and disjunction in a language without 'and'

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1. Overview of the Warlpiri data

Warlpiri (Pama-Nyungan, Australia) possesses only a single coordinator, *manu*. Linguists generally gloss *manu* as 'and' (Nash 1980:177). However, some linguists have also glossed *manu* as 'or' (Legate 2003:92). Warlpiri speakers produce *P manu Q* in response to the English prompt 'P and Q,' and also translate *P manu Q* into English as 'P and Q.' *Manu* can coordinate all lexical categories in constructions of the form *P manu Q*:

(1) Cecilia **manu** Gloria=pala yanu tawunu-kurra. (Jirrama=juku yanu.)
Cecilia manu Gloria=3DU.SUBJ go.PST town-to two=exactly go.PST
Cecilia and Gloria went to town. (Both went.)

To express disjunction, Warlpiri speakers combine the epistemic possibility modal *marda* 'maybe' with alternatives in constructions of the form *P marda, Q marda* (3). A single instance of *marda* can also combine with a single proposition to express epistemic possibility (2):

(2) Gloria **marda** yanu tawunu-kurra.
Gloria maybe go.PST town-to
Maybe Gloria went to town.

(3) Gloria **marda**, Cecilia **marda** yanu tawunu-kurra=ju. (Jinta-mipa yanu.)
Gloria maybe Cecilia maybe go.PST town-to=TOP one-only go.PST
Gloria or Cecilia went to town. (Only one went.)

There are a number of English disjunctive contexts in which Warlpiri speakers use *P manu Q* rather than *P marda, Q marda*. These include downward-entailing contexts such as under the scope of negation:

(4) Kula=rna=ngku yinyi rampaku **manu** loli. (Lawa.)
NEG=1SG.SUBJ=2SG.NSUBJ give.NPST biscuit manu lolly nothing
I will give you neither biscuits nor lollies. (Nothing.)

The Warlpiri data in (1)–(4) parallels data on childrens' interpretation of disjunction in English presented by Singh, et al (2013). Singh, et al show that English speaking children strengthen *P or Q* (P ∨ Q) to conjunction (P ∧ Q). I use the data in (1)–(4) to argue that Warlpiri lacks a conjunctive coordinator analogous to English 'and' and that *manu* in fact has a denotation of inclusive 'or.' Warlpiri speakers use the strengthening strategies described by Singh, et al for disjunction in childrens' English to express 'and' and 'or' with the tools available to them.

2. Analysis of the Warlpiri data

Warlpiri has the following toolkit to express conjunction and disjunction:

(5) $[\![\text{manu}]\!]^w = [\![\text{or}_{English}]\!]^w = \lambda t_1 \in D_t . \lambda t_2 \in D_t . t_1 = 1 \vee t_2 = 1$

(6) $[\![\text{marda}]\!]^w = [\![\text{maybe}_{English}]\!]^w = \lambda q \in D_{<s,t>} . \exists w' \in \text{Epistemic}_w : q(w') = 1$

(7) Warlpiri has no coordinator equivalent to $[\![\text{and}_{English}]\!]^w$ ($\lambda t_1 . \lambda t_2 . t_1 = 1 \wedge t_2 = 1$).

It is generally assumed that the English *P or Q*, which has a non-strengthened meaning of P ∨ Q, is strengthened by pragmatic reasoning to ((P ∨ Q) ∧ ¬(P ∧ Q)) through competition with *P and Q*. Given the above toolkit, *P manu Q* (P ∨ Q) cannot be pragmatically strengthened in this way since it does not compete with another coordinator meaning P ∧ Q like $and_{English}$. Sauerland (2004) suggests that the set of alternatives to English *P or*

Q is effectively {(P ∧ Q), P, Q, (P ∨ Q)}. Since Warlpiri does not have $and_{English}$, I will assume instead that the set of competing stronger alternatives to *P manu Q* is {P, Q, (P ∨ Q)}. This assumption is also made by Singh, et al for the set of alternatives available to English-speaking children for *P or Q* (P ∨ Q). Singh, et al assert that this is due to the inability of English-speaking children to access the lexicon and include P ∧ Q when generating alternatives, whereas I crucially claim that the set of alternatives available to Warlpiri speakers simply falls out from the lexical items that are available to them.

Singh, et al follow the recursive strengthening approach given in Fox (2006). Assuming that English-speaking children have a non-strengthened denotation of (P ∨ Q) for *or*, recursive application of Fox's strengthening function introduced by a covert syntactic operator yields (P ∨ Q) ∧ ¬(P ∧ ¬Q) ∧ ¬(¬P ∧ Q), namely P ∧ Q. This is how Warlpiri speakers use *manu* in conversation, showing that this strengthening strategy is also applicable to *manu*. I will also discuss the compatibility of this proposal with Katzir (2013).

P marda, Q marda constructions are underlyingly the disjunction of epistemic possibilities ('maybe P or maybe Q'). The covert disjunctive coordinator can be optionally overtly realized as *manu* in *P marda manu Q marda* constructions, which then can undergo strengthening to ◇P ∧ ◇Q. However, *P marda, Q marda* cannot be interpreted identically to English *P or Q* disjunctions. In particular, Warlpiri speakers do not interpret these constructions as exhaustive (Zimmermann 2001).

P manu Q and *P marda, Q marda* are both compatible with P ∧ Q, necessitating an explanation as to why speakers choose *P manu Q* over *P marda, Q marda* for expressing P ∧ Q. I propose an optional covert universal epistemic modal, MOD, attached at the root node in *P manu Q* constructions. I will show that this universal modal strengthens *P manu Q* constructions such that speakers always choose *P manu Q* over *P marda, Q marda*.

In summary, the strengthened usage of *P manu Q* expresses a conjunction (sometimes of epistemic necessities), whereas *P marda, Q marda* expresses a conjunction of epistemic possibilities. The (P ∨ Q) denotation of *manu* also accounts for its occurrence in downward-entailing contexts like (4), where it follows de Morgan's law in its distribution and results in a straightforward 'neither P nor Q' reading.

3. Comparison of Warlpiri with Hungarian

The distribution of *manu* in downward-entailing contexts resembles the behavior of conjunctive *és* 'and' in Hungarian (Szabolsci & Haddican 2004). Hungarian speakers use *és* under the scope of negation:

(8) Mari nem járt hokira **és** algebrára.
Mari not went hockey-to and algebra-to
Mary didn't take hockey and didn't take algebra. (Szabolsci & Haddican 2004:1)

Szabolsci & Haddican argue that *vagy* 'or' is a PPI; since *vagy* cannot occur under the scope of clausemate negation, Hungarian speakers use *és* 'and' instead. Like *vagy* 'or,' *marda* 'maybe' also does not occur within the scope of clausemate negation. This suggests there is a syntactic similarity between Warlpiri and Hungarian with respect to the distribution of disjunctive constructions. This also accounts for the distribution of *manu* in downward-entailing contexts due to the fact that it does not compete with *P marda, Q marda*.

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Evidence for non-existential readings of locative indefinites

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Iatridou [2] points out contrasts between indefinites in locatives, as in the following examples.

(1) We are close to a gas station. (2) We are far from a gas station.

While (1) only requires that there exists a gas station nearby, the prominent interpretation of (2) is that **all** gas stations are far away. We examine two accounts of this kind of contrast. Under one possible explanation, *far from* decomposes into its negated antonym (henceforth *Implicit Negation*, or IN, cf. in another context Heim [1]). Under an alternative account, indefinites denote properties which are associated with *eigenspaces* – the spatial regions inhabited by the entities in the extension of the property (*Property Eigenspace Hypothesis*, or PEH, see [3,4]). We present new evidence, with experimental support, for the PEH and against IN: sentences containing indefinites with *projective* locatives like *left of, south of* have a salient *false* interpretation also in situations where the existential reading is true. IN cannot explain these interpretations, whereas they are directly predicted by the PEH. Our results imply that indefinites uniformly denote properties, and only indirectly, through derivational ambiguity, existential quantifiers.

Contrasts as in (1)-(2) show that locative indefinites may give rise to a salient non-existential and a less salient existential interpretation. However, this is so only for *far from* in (2) but not for *close to* in (1). Another example [3,4] is the contrast between (3) and (4), where (3) only requires that Fido be inside of some doghouse, but (4)'s prominent interpretation is that Fido is outside of all doghouses:

(3) Fido is inside a doghouse. (4) Fido is outside a doghouse.

IN explains this without introducing mechanisms different from existential quantification: *far from* decomposes into *not close to* and *outside of* into *not inside of*; scope ambiguity then provides both the existential and the non-existential reading. In contrast, under the PEH indefinites denote properties, and eigenspaces of properties consist of the *union of eigenspaces* of entities in the extension of the property. Given the PEH, (1) and (2) require that we be close to/far from the *union region* of the gas stations. This makes (1) true if we are close to the the nearest gas station, and (2) true if we are far from the nearest gas station. And if we are far from the nearest gas station, we are far from every gas station. A possible (though contextually hard) existential interpretation of (2) is assumed to be derived as well, via derivational ambiguity between the PEH and existential quantification (every property may be mapped to an existential quantifier, depending on context, cf. [5, 6]). Similar reasoning holds for (3) and (4).

Initial problems with IN: One problematic point with IN is the lack of a principle governing which prepositions (or parts of PPs) should be decomposed and which ones should not, i.e. why decompose *far from* but not *close to*, and why *outside of* but not *inside of*? Another problem has to do with measure phrases. For example, *five meters outside a doghouse* should decompose into *five meters not inside a doghouse*. But you are either inside a doghouse or not – you cannot be five meters *not* inside of it. These are general concerns, but perhaps not enough reason for abandoning IN.

Projective Prepositions: A more serious problem is that IN cannot account for certain judgments involving projective locative relations like *left of, south of*, etc. Take sentences (5) and (6),

which illustrate this problem with indefinites in parallel to referential definites that more directly refer to regions:

(5) The dot is left of the line. (6) We are south of a forest.

(5) involves a definite and is true just in case the dot is left of the *nearest point* in the eigenspace ϕ of the line. This is regardless of whether there is some other point in ϕ such that the dot is right of it, as is the case in Figure 1. A similar phenomenon occurs with locative indefinites, as in (6). If we are north of the nearest forest, it possible to interpret (6) as false even if there is some forest such that we are south of it. This is the case in Figure 2, where the two gray shapes are forests and our position is marked by the cross. IN cannot explain this non-existential effect, but the PEH can: we are north and not south of a forest because we are north of the nearest point in the eigenspace of *a forest*. Crucially, this explanation of (6) is simply obtained by extending, via the PEH, the standard treatment of locative definites as in (5). No additional principle is needed on top of the PEH. The situation with IN is quite different. There is no reason we know of to think that *south of* in (6) can be decomposed, and even if it is decomposed into *not north of*, the symmetric effect with *north of* would not be accounted for. We conclude that IN has to postulate another explanation for the non-existential interpretation of (6), with unknown consequences. It is therefore of great importance that our intuitions for sentences like (6) are secure.

Figure 1

Experiment: To test these intuitions more thoroughly, we ran an experiment with 21 native speakers of Dutch (mean age $\approx$ 22.5). Acceptability judgments were elicited on sentences containing locative indefinites. In block one of two, subjects had to provide judgments on sentence-picture pairs. For example, one stimulus consisted of a picture similar to Figure 2 together with a textual context meant to make accessible the non-existential reading. Subjects then gave an acceptable-unacceptable judgment on sentence (6). In block two, trials were similar to those from block one, but subjects now had to provide judgments on pairs consisting of pictures and judgments, made by a fictitious referee, about the content of the picture. Referee judgments were introduced to more directly elicit subject judgments on the possible *falsity* of (non-)existential interpretations in more vivid scenarios.

Figure 2

Results and Conclusion: About two thirds of answers given for *left of, north of* and *south of*, and about half of answers given for *east of* are consistent with a non-existential reading. The acceptance of the non-existential interpretation with these projective PPs cannot be explained by IN, which does not have any non-existential strategy for such cases. By contrast, the PEH expects the non-existential interpretation, as well as insecure judgements that follow from the (additionally derived) standard existential reading (cf. [5, 6]). More generally, the PEH offers theoretical continuity from the treatment of locative definites to locative indefinites. This theoretical elegance gives further new support to an old idea: some indefinites (bare or with *a*, but not necessarily *some* indefinites) denote properties first and, due to derivational ambiguity, existential quantifiers second.

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Presuppositions are Fast, whether Hard or Soft - Evidence from the Visual World Paradigm

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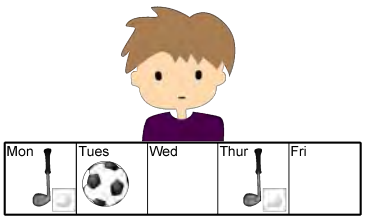
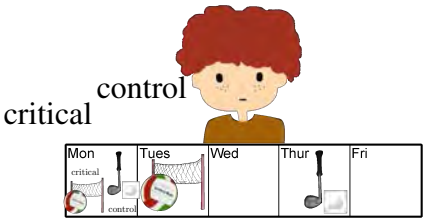
Introduction Much work on the processing of linguistic meaning has been concerned with the relative processing speed of different aspects of meaning, in particular with regards to implicatures in comparison to literal asserted content (e.g., Bott & Noveck 2004, Huang & Snedeker 2009, among many others). More recently, researchers have begun to investigate presuppositions experimentally as well, but mostly using offline measures. Initial reading time results for *again* based on the timing of infelicity effects suggest relatively fast availability of presupposed content (e.g., Schwarz & Tiemann 2012), as do a couple of visual world studies on *also* (e.g., Romoli et al. 2012), which track the interpretive effect of felicitous presupposition interpretation online. The present studies extend these efforts by investigating *again* and *stop* with the visual world paradigm, and provide further evidence for rapid processing of presupposed content when compared to control conditions. The equivalence of the two in processing is of theoretical relevance given proposals for distinguishing classes of hard vs. soft triggers (e.g., Abusch 2010). For a more direct comparison with asserted content, we also included *twice* as a minimal comparison to *again*, which expresses essentially the same meaning without a presupposition. Shifts in eye movements for these two cases appear to be entirely on par, further supporting the notion that presupposed and asserted content are available in parallel early on in online processing.

Experiment 1 Subjects carried out an indirect reference identification task by determining which of four figures - depicted on the screen with a schedule of activities - a linguistic description like (1) was about. Two were distractors of opposite gender, the target always matched the description throughout, and the competitor was varied as to whether or not it met the condition introduced by *again/twice* (control vs. critical). In the critical condition, the target could already be identified during the otherwise ambiguous time window (indicated by underlining), based on the implication that it would involve two occurrences of golf, which was either presupposed or asserted. The last-mentioned activity provided independent disambiguation in both critical and control conditions.

(1) a. **Context**: *Some of these children went to play golf on Monday, and some to play volleyball.*
b. **Target**: *John went to play golf* {***again*** *later on* / ***twice*** *this week*} *and also played soccer on Tuesday.*



Target



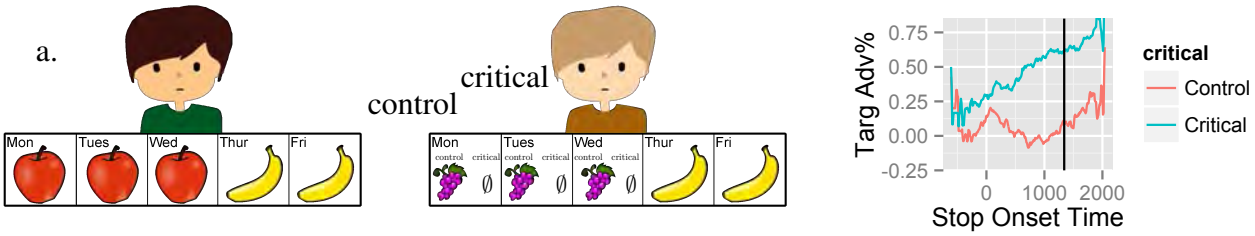
Competitor

Results: 27 participants saw 24 such sentence-picture pairs in a fully counter-balanced design, after being instructed to choose the picture that matched the sentence. For purposes of analysis, Target Advantage scores (TAs) were calculated by subtracting proportion of fixations on Competitor from proportion of fixations on Target. The graph illustrates TAs as a function of time relative to the onset of *again/twice* (represented by 0; vertical black line indicates mean independent disambuguation). Eye movement patterns for *twice* and *again* in the critical conditions were indistinguishable, revealing an immediate shift to target from the earliest point on (200ms after *again/twice* onset, allowing for time for planning and executing saccades). LMEM-analyses (with

maximal random effect structures) were carried out on Elogit-transformed TAs, both on the entire ambiguous window and on 200ms increments within, starting 200ms after the onset of the critical word. There was a significant main effect of critical vs. control condition but no interaction or main effect for *again* vs. *twice*. Planned comparisons revealed simple effects of the critical vs. control manipulation for both *again* and *twice*. All effects were already significant in the 200-400ms time-window, suggesting that the relevant implication was immediately available, and indistinguishably so in the presupposed and asserted conditions.

Experiment 2 The same paradigm was used to investigate the time course of interpreting the presupposition of *stop* (that the relevant activity had been going on previously). Disambiguation during the underlined part of the sentence was again possible in the critical condition based on this presupposition (as the competitor had empty initial calendar slots), though final disambiguation occurred independently later on in both critical and control conditions (at *apples*):

(2) a. **Context**: *These children got nice treats for their snacks this week.*
b. **Target**: *Henry* ***stopped*** *eating the delicious apples on Thursday.*



Results: Eye movement data from 27 participants, treated in a way parallel to Experiment 1, exhibit a significant shift in TAs right upon encountering *stop* (see graph). LMEM analyses revealed a significant effect of critical vs. control, both for the overall ambiguous region and for 200ms time windows, starting from 200ms after the onset of *stop*, indicating that the presupposition is available right away in online processing.

Discussion The experimental results substantially broaden the evidence for the online processing of presuppositions. They are inconsistent with accounts that predict a delayed availability for (at least certain) presuppositions due to their assumed pragmatic derivation, as both types of triggers investigated here are available immediately. In the case of *again*, the comparison with *twice* furthermore shows that the time-course is parallel to asserted content (and even in the case of *stop*, the immediate nature of the effect would not allow for any detectable delays relative to asserted content.) The results also contribute to recent debates about potential differences between classes of presupposition triggers, e.g., hard (here *again*) vs. soft (here *stop*) ones, (Abusch 2010; for experimental work, see, e.g., Cummins & Amaral 2013). While these may need to be distinguished for other reasons, their online processing time-course does not provide independent motivation for doing so. Finally, the present approach opens up new methodological avenues for investigating a broad range of important theoretical questions that require evidence beyond the level of intuitions.

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All notional mass nouns are count nouns in Yudja.

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Overview. In Yudja (Tupi, Brazil; 348 people), all nouns can be directly combined with numerals and count quantifiers. We show that this is not due to coercion, i.e. that all nouns have a default count interpretations. This result is significant, since it means that some languages do not fit in the three classes recognized in the typology of countability: number marking, number neutral and classifier languages (Chierchia 2010).

Countability and coercion. In Yudja notional mass nouns can be directly combined with numerals without intervening classifiers or container phrases, as illustrated by the acceptability of sentences (1) and (3):

(1) Txabïu asa he wï he
Three flour in port in
'There are three (bags of) flour in the port.'

(2) Itxïbï iidja a'i
Many woman here
'There are many women here.'

(3) Itxïbï y'a a'i
Many water here
'There are many (portions of) water here.'

Note that (1) and (3) do not show that *asa* ('flour') and *y'a* ('water') have a default count interpretation: the acceptability of (1) might be due to mass-to-count coercion. This form of coercion (aka 'universal packager') is illustrated in 'three beers' (for 'three bottles of beers'). Its availability in English is dependent on the existence of standardized or otherwise naturally occurring bounded amounts of the relevant substance (cf. Gleason 1965, Pelletier 1975, Frisson and Frazier 2005, Wiese and Maling 2005). If coercion played a role in Yudja, speakers would consistently refuse scenarios where a notional mass noun is combined with a numeral and a standardized container is not involved in the individuation of the portions of substance. The following observations show that this is not the case.

Production task. This is a scenario-based elicitation session carried out with 2 adult Yudja speakers. Methods: (i) oral/visual presentation of a scenario; (ii) the consultants had to provide a sentence to describe the scenarios provided. Materials: 20 notional mass nouns were used in two different scenarios: one that included individualized portions and a standardized container (4a) and another that included individualized portions, but not a standardized container (4b). Results: the two speakers combined numerals directly with notional mass nouns in both scenarios, even when containers are not available at all.

(4a) A woman brought three bowls of water to the school and put them on a bench.
Txabïu y'a pïkaha txade anu.
Three water bench above ASP
'There are three (bowls of) water on a bench.'

(4b) A woman was carrying a pan of water. Three drops fell on the ground.
Txabïu y'a anu.
Three water ASP
'There are three (drops of) water.'

Quantity judgments task (QJ) This task was carried out with 18 adult Yudja speakers. It follows a paradigm proposed in Barner and Snedeker (2005). Materials and methods While presenting two different drawings, one with a big portion of *x* (Volume drawing) and another with three different portions of *x* (Number drawing), we asked: *Ma de bitu x dju au?* ('Who has more *x* ?'). Subjects answered 3 questions with a notional mass noun (e.g., *asa* 'flour'), 3 questions with a notional count noun (e.g., *xãã* 'bowl') and

2 questions with an aggregate noun (e.g., *abeata* 'clothes'). Participants had to point to one of the drawings to answer the question. Results Yudja speakers consistently chose the 'Number' drawing for all noun categories (notional mass nouns: 85% of 'Number' responses; notional count nouns: 83% of 'Number responses'; aggregate nouns: 79% of 'Number' responses). Mixed effects modeling using Helmert contrasts confirmed that there was no effect of noun type. Conclusion The default reading for notional mass nouns like *water* in Yudja is not a mass reading, but a count reading (the number of concrete portions of *x*).

Lack of mass quantifiers. To the best of our knowledge, there is no mass quantifier in the language. In picture elicitation tasks aimed at eliciting mass quantifiers such as 'a lot', speakers used volume adjectives, as illustrated in (5) and (6).

(5) Urahu aka Tuba Tuba he.
Big house Tuba Tuba in
'There is a big house in Tuba Tuba.'

(6) Urahu y'a yuhaha he.
Big water lake in
'There is a big portion of water in the lake'

Container phrases One way to individuate portions in the extension of mass nouns in number marking languages is to use a container phrase (e.g. 'a bottle of whiskey'). In Yudja, container phrases have the syntax of locatives, as illustrated in (7).

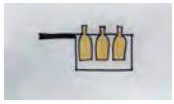
(7) Maria yauda awatxi'i xãã he dju wï
Maria two rice bowl in bring
'Maria brought two portions of rice in bowls'

The following study show that container phrases are actually interpreted as locatives and not as partitive measure phrases. Method: picture/sentence matching; Materials: 12 critical items counterbalanced in two lists (10 fillers unrelated to the manipulation). The critical items consisted of a target sentence and a drawing. Two types of scenarios were manipulated: one where the individuation criterion for the notionally mass noun matches the container phrase (8a), and one where does not (8b).

(8) Txabïu awïla wã'ẽ he.
(There are) three honey pan in.

Scenario 1 (8a)

Scenario 2 (8b)



Results For all participants the target sentence could describe both scenarios. Conclusion Container phrases are not interpreted as partitive measure phrases (e.g. Schwarzschild 2006) but as locatives. Since there are no dimensional measure nouns (e.g. 'meter') in Yudja, this means that there is no partitive measure phrases at all in the language. This observation brings indirect support to our conclusion: if all nouns are count, there is no functional motivation for the inclusion of partitive measure phrases in the grammar of Yudja.

Analysis. We propose that any noun in Yudja denote a set of maximally strongly connected entities (Casati and Varzi 1999, Grimm 2012), closed under sum formation (since Yudja is number neutral, see Lima 2007). For notionally count nouns such as *iidja* ('woman'), these will be natural units of the associated kind. On the other hand, the extension of nouns that describe substances such as *y'a* ('water') is relative to a topic situation: it is defined as the closure under sum formation of the set of maximally strongly connected portions of the substance *in that situation*.

Conclusion The main contribution of this paper is typological. The facts described in this paper offer robust descriptive and experimental evidence for the inclusion of a fourth class of languages in the typology of countability, aside from number marking, number neutral and classifier languages.

On the exceptional status of reportative evidentials

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I. Introduction: Aikhenvald (2004) defines evidentiality as "a linguistic category whose primary meaning is source of information", such as DIRECT: visual, auditory, etc.; REPORTATIVE: what others have said; RESULTS: abductive inference based on a result state; and REASONING: inference based on general knowledge. While this basic description makes evidentials seem uniform as a class, Faller (2002) and many subsequent studies of their semantics/pragmatics have shown a large amount of heterogeneity both across languages and across evidentials within a given language.

In this paper, we examine one such case of variation first analyzed in detail by Faller (2002) for Cuzco Quechua: the potential to *deny* REPORTATIVE claims, a pattern we dub Reportative Exceptionality (RE). Whereas Faller and others give *semantic* accounts of RE, we propose an alternative: RE is due to pragmatic perspective shift of the sort discussed by Harris & Potts (2009) for non-speaker-oriented appositives and expressives in English. REPORTATIVES better facilitate this shift by making a non-speaker perspective salient in the shared discourse context: the reporter.

II. Reportative exceptionality: Utterances of the form EVID(p) are commonly taken to do two things: **(i)** assert p (or some modalized version thereof), and **(ii)** convey in some way that the speaker has EVID-type evidence for p. Given (i), we expect it to be infelicitous/contradictory for a single speaker to go on to deny p. Indeed, such infelicity is found consistently for DIRECT evidentials as well as 'weaker' evidentials such as RESULTS and REASONING. For REPORTATIVES, however, we show – drawing primarily on published data from more than fifteen unrelated languages – that the possibility for such denials like (1) in Cuzco Quechua is quite consistent cross-linguistically.

(1) a. Pay-kuna-[S] ñoqa-ma-qa qulqi-ta muntu-ntin-pi saqiy-wa-n
(s)he-PL-[REP] I-ILLA-TOP money-ACC lot-INCL-LOC leave-1O-3
p = 'They leave me a lot of money...' EVID = Speaker was told that p

b. mana-má riki riku-sqa-yki ni un sol-ta centavo-ta-pis saqi-sha-wa-n-chu
not-IMPR right see-PP-2 not one Sol-ACC cent-ACC-ADD leave-PROG-1O-3-NEG
q = '(but) that's not true, as you have seen, they don't leave me one sol, not one cent.'
EVID = Speaker has direct evidence that q. (Faller, 2002, p. 191)

Previous authors (e.g. Faller (2002), Faller (2007), Murray (2010)) give accounts where RE is part of the semantics of the REPORTATIVE. For example, Faller (2002) claims that the conventional contribution of the REPORTATIVE *-si* (unlike other evidentials) is to modify the speech act performed by (1a) from an assertion to a 'presentation'. Such an approach, however, fails to *explain* why REPORTATIVES consistently allow for such denials whereas other evidentials do not. Furthermore, since RE is robust within languages whose evidentials differ in many other ways (e.g. syntactic and scopal properties), it seems likely that no single semantic solution would be possible.

III. Reportative exceptionality as perspective shift: Whereas most content embedded under attitude verbs like *think* and *believe* is attributed to the verb's subject, Potts (2005) argues that appositive relative clauses and expressives are invariably speaker-oriented. More recent work has shown, though, that non-speaker-orientation is possible in a sufficiently rich context like (2). Harris & Potts (2009) argue, however, that such non-speaker-orientation is not due to compositional semantics, but rather is a pragmatically induced perspective-shift made possible by a 'perspectivally-rich' environment. Being the subject of an attitude verb is one factor which helps establish the disconnect between Joan's perspective and the speaker's, but it is neither necessary nor sufficient.

(2) Joan is crazy. She's hallucinating that some geniuses in Silicon Valley have invented a new brain chip that's been installed in her left temporal lobe ... Joan believes that her chip, **which she had installed last month**, has a twelve year guarantee.

Claim: RE like (1) is an instance of perspective shift of the same sort as (2). This sort of perspective shift is readily possible with REPORTATIVE evidentials because the semantics of reportatives makes salient another perspectival agent – the reporter – whereas DIRECT, INFERENTIAL, and REASONING evidentials are explicitly *indexical*, invoking the speaker's own perception or inference. Beyond explaining why REPORTATIVES are exceptional in this way, this account helps explain further features of the denials. First, as in (1b), attested denials invariably use a DIRECT evidential rather than another REPORTATIVE or weaker evidential. Second, (1b) is typical of such denials in that it possesses a variety of other 'evaluative' elements which serve to further clarify the speaker's distinct perspective: words glossed as 'true' or 'really', first person attitude verbs, and negative polarity items. In at least some languages, prosody plays a similar role (e.g. Shipibo-Konibo *ronki* Valenzuela (2003), Tagalog *daw* Schwager (2010)). In sum, the REPORTATIVE introduces a second perspective which together with context and evaluatively charged denial sentences serves to establish a 'perspectivally-rich environment', facilitating felicitous sequences like (1)[1].

IV. Evidence from indirect evidentials: Further support for the pragmatic hypothesis comes from Bulgarian and Turkish, where a single evidential has both reportative and non-reportative uses. As predicted, denials like (1) are possible only when context provides a reportative evidential source (Smirnova (2013) for Bulgarian, Şener (2011) for Turkish), as the glosses of Turkish (3) suggest:

(3) Sinan bisiklet-ten düş-müş ama gerçekte öyle birşey yok
Sinan bike-ABL fall-INDIR but actually like nothing exists
'Sinan fell off the bike, {reportedly/#I infer}, but in fact nothing like that happened.'

V. Conclusions: Much research on evidentials has focused on characterizing variation between different evidentials within and across languages. Since we give a pragmatic account of reportative exceptionality, our account therefore allows for a *semantics* where reportatives are indeed parallel to DIRECT and RESULTS) evidentials, differing only in the evidence type. Building on Gunlogson (2001), Farkas & Bruce (2010), and other recent work, we assume discourse contexts with a Stalnakerian Common Ground (CG) and a set of public Discourse Commitments (DC) for each discourse participant (NB. as stressed by Stalnaker (2002), the CG may diverge from speaker beliefs, even public ones). An evidential-marked declarative, then, makes two discourse contributions:

(4) **Discourse components:** $\langle X, \mathrm{CG}_X, \{\mathrm{DC}_x \mid x \in X\}\rangle$

(5) An **evidential assertion** by a with content p and evidential source EVID:
   a. Adds EVID(p) to DC_a.
   b. Proposes to add p to $\mathrm{CG}_{\{a,b\}}$ on the basis of (5a), subject to acceptance or denial by b.

Selected References: **Faller, M. (2002)** *Semantics and pragmatics of evidentials in Cuzco Quechua*, Ph.D. Stanford; **Harris, J. and Potts, C. (2009)** Perspective-shifting with appositives and expressives, *Linguistics & Philosophy* 32(6): 523-552; **Matthewson, L. and Davis, H. and Rullman, H. (2007)** Evidentials as epistemic modals: evidence from St'át'imcets, *Linguistic Variation Yearbook* 7: 202-254; **Murray, S. (2010)** *Evidentiality and the structure of speech acts*, Ph.D. Rutgers; **Şener, N. (2011)** *Semantics and pragmatics of evidentials in Turkish*, Ph.D. UConn; **Smirnova, A. (2013)** Evidentiality in Bulgarian: Temporality, Epistemic Modality, and Information Source, *Journal of Semantics* 30(4): 479-532.

[1]Previous literature has regarded RE as a point of cross-linguistic variation with St'át'imcets (Matthewson et al. (2007)) and Gitksan (Peterson (2010)) not patterning with the languages discussed here. However, while we do not present an in depth analysis of the St'át'imcets data, perspective shift of a different sort – verbal irony – has been claimed to be impossible in the language (Lyon (2009)), so this exception can plausibly be explained in our account. For Gitksan, the relevant denial example in fact involves a lexical verb glossed as 'hear' with no reportative evidential *=kat*, and therefore does not bear on the generalization here. Finally, for both languages, utterances of the form REP(p) are claimed to be infelicitous in contexts where the speaker has *private* knowledge that p false. Such data are consistent with the account we propose here, since neither the context nor the sentence itself make the speaker's differing perspective on p clear to the addressee.

Predicates and Formulas: Evidence from Ellipsis

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It is nowadays standardly thought that the compositional interpretation of filler-gap dependencies (binding) involves the creation and saturation of a function-denoting expression (the scope term) by an expression that takes that function as its argument (the binder). This idea is implemented in a number of different ways (e.g., Heim and Kratzer's (1998) rule of Predicate Abstraction, function composition, etc.), but the standard view is that the scope constituent denotes a function from individuals to the type that the constituent would have if there were no gap. My goal in this talk is to revisit an argument from ellipsis, first made by Heim (1997), that the standard view is incorrect, and that instead the scope term denotes an open expression in which the gap introduces a free variable. Heim's own proposal was shown to be empirically inadequate by Jacobson (1998); in this talk, I provide a new semantics for binding based on Sternefeld 1998 and Kobele 2010 that provides a full account of the facts.

The crucial data involve a pattern of acceptability in antecedent-contained VP deletion (ACD) first discussed in Kennedy 1994. Descriptively, ACD is unacceptable when the argument position bound inside the elided VP (which is part of a relative clause) is associated with a quantificational DP that is distinct from the one that binds the corresponding argument position in the antecedent (matrix) VP. This pattern is illustrated by the pair in (1), and holds across a range of examples involving different internal argument positions.

(1) a. Polly read every book Erik did ~~[VP read]~~.
b. * Polly read every book recommended by someone who wrote a book Erik did ~~[VP read]~~.

Using the theory of ellipsis in Rooth 1992, Heim (1997) shows that the standard view of binding fails to explain this pattern. Ellipsis is licensed when two VPs are contained in non-overlapping, contrasting structures, such that the denotation of the constituent containing the antecedent VP is a member of the focus value of the constituent containinig the elided VP. In the standard view, the parallel constituents in (1a) are the relative clause restriction of the quantifier and the quantifier's scope, marked R and S in (2). (I will speak in LF-terms in this abstract, but the same reasoning carries over to direct interpretation.)

(2) [every book [$_R$ *wh* 1 Erik did ~~[VP read t_1]~~]] [$_S$ 2 Polly PAST [VP read t_2]]

Here the focus semantic value of R is the set of $\langle e, t\rangle$ functions true of x iff y read x, where y is an alternative to Erik. S denotes a function in this set, and so ellipsis is licensed. The problem is that (1b) also contains instances of R and S with exactly the same denotations as in (1a), and so ellipsis is incorrectly licensed. Crucially, the fact that the variables introduced by the VP-internal traces are distinct is irrelevant, because on the standard view these positions correspond to the argument slots of the restriction and scope functions, and so do not introduce variability in meaning across assignment functions.

Heim accounts for the contrast in (1) by revising the semantics of binding in a way that makes R and S vary across assignments. Specifically, she proposes that the restriction and scope terms of a quantifier denote open propositions, and that variable-denoting expressions may be coindexed only when co-bound. This gives the following LFs for (1a-b):

(3) a. [every book [$_R$ Erik did ~~[VP read t_1]~~]] [$_S$ Polly PAST [VP read t_1]]
b. [every book ... a book [$_R$ Erik did ~~[VP read t_1]~~]] [$_S$ Polly PAST [VP read t_2]]

Ellipsis is licensed in (3a), because even though R and S have assignment-dependent meanings, coindexation of the VP-internal traces ensures identity across assignments. In contrast, obligatory non-coindexation in (3b) entails lack of identity across assignments, and ellipsis is ruled out. Unfortunately, Heim's analysis also requires non-coindexation in examples like (4), and so incorrectly predicts that ellipsis should be impossible here (Jacobson 1998).

(4) [every book [$_{R1}$ Erik [VP read t_1]]] was longer than [every book [$_{R2}$ Polly did ~~[VP read t_2]~~]]

Intuitively, what we need is an analysis that treats restriction terms in the standard way (if *R1* and *R2* in (4) denote expressions of type $\langle e,t\rangle$, then ellipsis is licensed for the reasons outlined above) but treats scope terms as open propositions, as in Heim's analysis. This sounds *ad hoc*, but I show that in fact it follows from a semantics for binding in which assignment functions are part of the model (Sternefeld 1998; Kobele 2010). The crucial elements of the analysis are listed in (5), where a is the type of assignment functions.

(5) a. β^i [$_\alpha$ ... t_i ...]
b. If $[\![\beta]\!]^g$ is type $\langle\langle e,t\rangle,\tau\rangle$, then $[\![\beta^i]\!]^g = \lambda p_{\langle a,t\rangle}.[\![\beta]\!]^g(\lambda x.p(g[i/x]))$
c. If $[\![\beta]\!]^g$ is type $\langle\langle a,t\rangle,t\rangle$ and $[\![\alpha]\!]^g$ is type t, then $[\![\beta\ \alpha]\!]^g = [\![\beta]\!]^g(\lambda g.[\![\alpha]\!]^g)$
d. $[\![wh]\!]^g = \lambda f_{\langle e,t\rangle}.f$

(5a) gives the syntax of filler-gap dependencies for the case of movement of β to α. The subscript index on the trace is interpreted as usual, but the superscript index on the binder triggers the type-shifting rule in (5b), which maps a second-order property of individuals to a second-order property of assignment functions. (5c) is the composition rule for binding, which can be thought of as a specific version of a more general rule that facilitates function application by abstraction over a parameter of evaluation (cf. von Fintel and Heim's (2007) rule of Intensional Functional Application). Finally, (5d) analyzes the relative operator as an identity function of type $\langle\langle e,t\rangle,\langle e,t\rangle\rangle$. (6) shows the derivation of the denotation of a relative clause; (7) compares the case of binding by a generalized quantifer.

(6) $[\![wh^i]\!]^g(\lambda g.[\![Erik\ read\ t_i]\!]^g)$
$[\lambda p_{\langle a,t\rangle}.\lambda f.f(\lambda x.p(g[i/x])]](\lambda g.\mathbf{read}(g(i))(\mathbf{e}))$
$\lambda f.f(\lambda x.[\lambda g.\mathbf{read}(g(i))(\mathbf{e})](g[i/x]))$
$\lambda f.f(\lambda x.\mathbf{read}(g[i/x](i))(\mathbf{e}))$
$\lambda f.f(\lambda x.\mathbf{read}(x)(\mathbf{e}))$
$\lambda x.\mathbf{read}(x)(\mathbf{e})$

(7) $[\![every\ book^i]\!]^g(\lambda g.[\![Polly\ read\ t_i]\!]^g)$
$[\lambda p_{\langle a,t\rangle}.\forall x[\mathbf{book}(x)\rightarrow p(g[i/x])]](\lambda g.\mathbf{read}(g(i))(\mathbf{p}))$
$\forall x[\mathbf{book}(x)\rightarrow[\lambda g.\mathbf{read}(g(i))(\mathbf{p})](g[i/x])]$
$\forall x[\mathbf{book}(x)\rightarrow\mathbf{read}(g[i/x](i))(\mathbf{p})]$
$\forall x[\mathbf{book}(x)\rightarrow\mathbf{read}(x)(\mathbf{p})]$

In both cases, the scope of the binder is an open proposition, but in (6) we derive a standard type $\langle e,t\rangle$ meaning for the relative clause (and potentially for *wh*-structures in general), which gives us what we need to license ellipsis in (4) and other non-overlapping binder-variable constructions. At the same time, because the scope of a binder is assignment-dependent relative to its base position, we also maintain Heim's analysis of the contrast in (1a-b), which are parsed as in (8a-b), given the additional assumption that all binders bear unique indices, except for relative pronouns, whose indices agree with the DP they modify (cf. agreement of ϕ-features).

(8) a. [every book [$_R$ wh^1 Erik did ~~[$_{\text{VP}}$ read t_1]~~]]^1 [$_S$ Polly PAST [$_{\text{VP}}$ read t_1]]
b. [every book ... a book [$_R$ wh^1 Erik did ~~[$_{\text{VP}}$ read t_1]~~]]^2 [$_S$ Polly PAST [$_{\text{VP}}$ read t_2]]

I conclude by showing that the analysis can also handle the interaction of ACD and pied-piping discussed in Jacobson 1998, as well as the "head identity" effects discussed in Sauerland 2004. The general framework that emerges is one in which binding in filler-gap dependencies can be characterized strictly in terms of function application, without the need for syncategorematic rules like Heim and Kratzer's rule of Predicate Abstraction.

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A new kind of definite: Uniqueness, salience, and the Bulu determiner *-tè*

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Overview: Definite NPs are generally assumed to encode uniqueness implications, although there is disagreement about how to characterize the relevant domain of uniqueness (Russell 1905, Kadmon 1990, Roberts 2003, Elbourne 2013). In Bulu (Bantu, Cameroon), definite NPs with the determiner *-tè* display a different pattern of acceptability across contexts than any type of English definite NP. In this paper based on original fieldwork, I argue that differences in acceptability exist because NPs with *-tè* encode uniqueness in a novel domain: *the set of discourse referents (DRs) that are salient to the addressee*. I develop a presuppositional account of the uniqueness implication of *-tè* and propose including sets of salient DRs, relativized to each interlocutor, in current models of a discourse context.

NPs with *-tè* vs. English definites: The use of an NP with *-tè* requires a weakly familiar, unique antecedent (Author et. al. to appear), like an English definite (Heim 1982, Roberts 2003). However, NPs with *-tè* have different felicity conditions than any kind of English definite NP, as shown in (1)-(6). (1)-(2) differentiate NPs with *-tè* from English definite descriptions. Depending on one's theory of definiteness, the uniqueness domain of a definite description is assumed to be individuals in the world (Russell), individuals familiar to the speaker (Kadmon), weakly familiar DRs (Roberts), or individuals in a minimal situation (Elbourne). The sun is unique in all of these domains, and *the sun* is generally acceptable out of the blue. However, uniqueness in these domains is not sufficient to license the use of *vǐan tè* 'the sun.' (The agreement prefix on *-tè* is often null.)

(1) *Context: Abondo is sitting on a bus when a stranger sits down beside him. The man says*

a.#**vǐan tè** wáfà̀j dən
sun TE shines today
Intended: 'The sun is bright today.'

b. {The sun/?that sun/#it} is bright today.
(where *it* is interpreted as the sun)

A context in which *vǐan tè* 'the sun' is acceptable out of the blue is given in (2).

(2) *Context: minimally different from (1), in that the stranger opens a curtain to let in sunlight*

a. **vǐan tè** wáfà̀j dən = (1a)

b. {The sun/?that sun/#it} is bright today.

(2) shows that *vǐan tè* 'the sun' is acceptable when the speaker knows that the sun is perceptually prominent for the addressee. Following Roberts (2003), perceptual prominence is just one factor that increases the salience of a DR. Others include topicality, relevance to an individual's goals, recency of mention, and grammatical function in previous utterances. (1)-(2) show that an NP with *-tè* differs from an English definite description by requiring an antecedent that is salient, not merely unique.

(3)-(4) differentiate NPs with *-tè* from English pronouns, which presuppose the existence of a unique maximally salient antecedent (Roberts 2003, 2005).

(3) *Context: I say to you:* Yesterday I saw two men and a woman at the farm. One of the men had black hair. The other man had white hair. The man that had black hair was white. The man that had white hair was black.

a.#**fàm tè** èmbɔ́ ékɔ̀bɔ̀ fùlàsí
man TE AUX speaking French.
'The man [just mentioned] was speaking French.'

b. {?The man/that man/he} was speaking French.

In (3), two DRs satisfying the descriptive content of *fàm tè* 'the man,' are introduced. Both are being discussed in the discourse and therefore are salient, and *fàm tè* 'the man' is unacceptable. In contrast, *he* is acceptable, taking as its antecedent the maximally salient DR corresponding to the subject of the preceding sentence. (3) shows that uniqueness among maximally salient DRs (i.e. via maximal salience) is not sufficient to license the use of an NP with *tè*.

As in (3), in (4) two DRs satisfying the descriptive content of *fàm tè* 'the man' are entailed to exist by the context. However, only one is under discussion. Both *fàm tè* 'the man' and *he* are acceptable.

(4) *Context: I say to you:* Yesterday I saw two men and a woman at the farm. One of the men had black hair.

a. **fàm tè** èmbɔ́ ékɔ̀bɔ̀ fùlàsí = (3a)

b. {?The man/that man/he} was speaking French.

Although the context entails the existence of two DRs satisfying the descriptive content of *fàm tè* 'the man,' only one is the topic of the discourse and thereby salient. That DR is the maximally salient DR compatible with the descriptive content of *he*, and it is also unique among all salient DRs in satisfying the descriptive content of *fàm tè* 'the man.'

(5)-(6) illustrate the importance of an individual's goals for the salience of a DR relative to that individual. In both examples, the kind 'stump' is mentioned in the context. The acceptability of *ékùt é-tè* 'the stump' varies with the relevance of stumps to the addressee's goals. Contrasting (5a) and (6a) is the point here; the (b) examples are additional evidence of divergence from English definites.

(5) *Context: Maliki is telling me about what he does at his house. He cuts down trees, he digs up stumps, he mows the grass, he plants bushes, he rakes leaves, he digs up rocks, etc. I say:* Yesterday I cut down a tree.

a.#**ékùt é-tè** émbà ànɔ́n
stump AGR-TE was big
'The stump was big.'

b. {The stump/?that stump/#it} was big.
(where *it* is interpreted as the stump)

(6) *Context: Sara is a photographer and she is making a book of pictures of tree stumps. Fred tells her:* Yesterday I cut down a tree.

a. **ékùt é-tè** énà ànɔ́n
stump AGR-TE is big
'The stump is big.'

b. {The stump/?that stump/#it} is big.
(where *it* is interpreted as the stump)

(1)-(6) show that an NP with *-tè* requires a unique antecedent among the DRs salient to the addressee.

Analysis: Following the conceptualizations of context in Stalnaker (1978), Lewis (1979), Kamp (1981), and Heim (1982), a context c is modeled as a tuple consisting, minimally, of four elements: $\langle \mathsf{I}, \mathsf{C}, \mathsf{D}, t \rangle$, where I is the set of interlocutors, including at least a speaker, s, and an addressee, a; C is the common ground, a set of propositions; D is the set of weakly familiar DRs; and t is a time. Following Stalnaker, C contains information about the (purported) belief states of the interlocutors. To that is added information about what is salient to each interlocutor, i.e. the DRs she is paying attention to. *Sal* defines a relation between an interlocutor and a DR entailed to be salient to that interlocutor. Salience/attention depends on at least the factors discussed above.

(7) Given a context c, $Sal(i \in \mathsf{D}_c, \alpha \in \mathsf{I}_c) \leftrightarrow \mathsf{C}_c$ entails that i is salient to α at t_c

The meaning of *-tè* in (8a) is a function from a context, c, and a property, P, denoted by the common noun argument of *-tè*, to the unique DR in c that is entailed to have property P and to be salient to the addressee. The felicity condition associated with *-tè*, that its antecedent is unique among DRs salient to the addressee, is given in (8b) and represented in (8a) by the ι operator.

(8) a. *-tè* $=_{def} \lambda c.\lambda P.\iota i \in \mathsf{D}_c[P(i) \wedge Sal(i, \mathsf{a}_c)]$

b. The use of an NP with *-tè* is felicitous in c iff
$\exists i \in \mathsf{D}_c[P(i) \wedge Sal(i, \mathsf{a}_c) \wedge \forall j \in \mathsf{D}_c[(P(j) \wedge Sal(j, \mathsf{a}_c)) \rightarrow j = i]]$

Analyzing the meaning of Bulu *-tè* requires incorporating sets of salient, weakly familiar DRs into current models of context. No extant theory of definiteness can provide an empirically adequate analysis without this addition (or an analogous one in terms of situations). The analysis also supports the claim that the unifying feature of definites is a uniqueness implication, and argues that crosslinguistic differences between definites are due to differences in uniqueness domains. Most importantly, it shows that languages partition the referential space differently–that felicity conditions for definites, pronouns, etc. are language specific rather than crosslinguistically uniform.

The grammar of discourse: The case of *then*

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This paper investigates *then* within conditional structures and across discourse. It provides a unified analysis and argues that the notion of *explanatory claim* is the key insight in both cases. I build on [4] and [2] to provide an analysis in which *discourse reference* is at the heart of the interpretation.

***Then* in conditionals:** It has already been claimed that *then* carries a meaning that explains its infelicity in some conditionals, (1). [4] proposes that *then* in the conditional *if p, then q* triggers the presupposition that there are $\neg p$ alternatives in which q is not true; [2] builds on [4] and proposes that *then* triggers a conventional implicature that *only* the p worlds are q worlds.

(1) a. Well, if you finished your homework, then you can go play outside.
b. Even if Smith is dead, (#then) the Sheriff wants him.
c. Whether Smith is dead or alive, (#then) the Sheriff wants him. (*unconditional*)
d. If you are hungry, (#then) there is pizza in the fridge. (*biscuit conditional*)

[4] and [2] do not consider examples like (2) and (3), making wrong predictions in these cases:

(2) I'm certainly taking a job, but so far all the opportunities require me to start working at 7:00 a.m. Yes, as incredible as it sounds, if I take the Taco Bell job, then I also start at 7:00 a.m.

(3) If Jim had asked Jack for help, then there would (have to) have been no quarrel yesterday.

The speaker in (2) does not presuppose an alternative to taking the job at Taco Bell in which he does not start at 7:00 am (contra [4]). The backtracker in (3) does not convey that only the situations in which Jim asked Jack for help are situations in which there was no quarrel (contra [2]).

***Then* across discourse:** Intuitively, *then* needs an "antecedent". It can be provided by an *if*-clause, but it can also be found in the preceding discourse in various forms:

(4) A: I'm cold.
B: Then put on a sweater!

(5) A: What does "lambda" mean?
B: Then you didn't understand the lecture.

(6) A: He must confess! Cut off his fingers!
B: Then you really are a sadist.

(7) A: He was cranky this morning.
B: Then you told him?

The presence of *then* does not change the truth-conditions of the embedded clause (the meanings of declaratives, questions or imperatives remain the same). **Explanatory intuition**: the presence of *then* signals that (discursively) what follows *then* is explained by what precedes it (the antecedent). E.g. I suggest that you put on a sweater because you don't want to be cold; I know that you didn't understand the lecture because you ask a question you should know the answer to by now; I know you are a sadist because only sadist order torture. The antecedent of *then* is sometimes provided by the content proposition of the previous discourse move, (4) and (7), but sometimes by the fact that the previous discourse move itself took place, (5) and (6). **"In conditionals" vs. "across discourse":** Differences between the two cases are independent of *then*, which can receive a unified analysis. Suppose a child says she finished her homework. The reply in (8) is not identical to (1a):

(8) Well, then you can go play outside.

Faced with (1a), the child could complain *Don't you believe me?*, but not in the case of (8). This shows that *then*-clauses (e.g. (8)) are not elided *if*-conditionals. Contrary to *then*-clauses, conditionals like (1a) assume that the context set includes both antecedent- and non-antecedent worlds.

Proposal. The contribution of *then* is not backgrounded (i.e. presupposed), and it lacks speaker oriented meaning (i.e. not a conventional implicature). Following the paraphrases provided above, I characterize *then* as a discourse marker: *then* signals that the utterance of the embedded clause is motivated by information gained from the previous discourse move (where a discourse move M_i is defined as the utterance of a sentence structure syntactically headed by a force operator, i.e. $[_A[S]], [_Q[S]]$ or $[_{Imp}[S]]$). The utterance of a *then*-clause leads the hearer to reconstruct (i) what the speaker learned from the previous discourse move and (ii) what (modal) relation it bears to the information gained from the clause embedded under *then*. I use [3]'s *committment slates* to model a participant B's public commitments and define the information gained from a discourse move M_i:

(9) **Information gain:** $I_{B,M_i} = \{p : p \in cos_{B,\,M_i}\ \&\ p \notin cos_{B,\,M_{i-1}}\}$, where M_{i-1} is the move immediately preceding M_i and cos_{B,M_i} is B's commitment slate after M_i.

Then establishes a modal relation between the information gained from the discourse move that precedes it and the discourse move corresponding to the embedded clause. It is reminiscent of a conditional, but operating at the level of discourse, where the antecedent "explains" the consequent:

(10) Let g be an assignment function, P and MB Kratzer-style conversational backgrounds, $s_@$ the utterance situation, and $\textsc{Max}_{P(s_@)}(X)$ the P-best situations in a set of propositions X,
$[\![[_{\text{CP}}\ \text{Then}\ [\ M_{i+1}]]]\!]^g(s_@) = [\![M_{i+1}]\!](s_@)$, defined only if
i. $\forall s \in \textsc{Max}_{P(s_@)}([\cap \textsc{Mb}(s_@)] \cap g(i)),\ g(i+1)(s) = 1$
Where for any discourse move M_j, $g(j) \in I_{A,M_j}$ and A utters the *then*-clause.

According to (10), *then* does not change the truth-conditions of the embedded clause. It refers to discourse moves and imposes felicity-conditions on the relation between two propositions identified by the assignment g (roughly: a Kratzer-style conditional relation). *Then* requires a (discourse) *antecedent* and *consequent*: the antecedent proposition is information gained by the speaker from the preceding discourse move (not necessarily the semantic content), and the consequent is extracted from the discourse move embedded under *then* (again, not necessarily the semantic content). With a contextually-determined modal flavor, *then* requires that in the best situations in which the antecedent is true, the consequent also be true. The utterance of a *then*-clause is only felicitous if we can recover the salient propositions standing in a modal relation that comply with the constraints imposed by *then*. **Consequences of the proposal**: **(I) Two case studies: a. *Then*-Imperative**.

(11) A: I'm cold. $[M_1]$ cs_{B,M_2} {A is cold; A wants to be warmer; A putting on a sweater makes him warmer}
B: Then put on a sweater. $[M_2]$

(12) $I_{B,\,M_1}$={A is cold; A wants to be warmer}; $I_{B,\,M_2}$ = {A putting on a sweater makes him warmer}

By uttering the *then*-clause, B *implicitly committed* to the fact that A wanted to be warmer (not just to that A is cold), and stated that the best situation in which A is warmer are situations in which A puts on a sweater (bouletic modality). **b. *Then* in conditionals:**

(13) If there is light in John's room, then he is home.

Under a restrictor analysis, the epistemic conditional in (13), minus *then*, states that given what the speaker knows, the consequent is true in the best situations in which the antecedent is true (i.e. information about a knowledge state). The presence of *then* adds that it is *because* the antecedent is true (or assumed to be true), that the consequent is true: *then* signals that the utterance of the consequent is motivated by the speaker learning the antecedent (it conveys (counterfactual) *discourse causation* between discourse moves) and that antecedent and consequent stand in a modal relation (epistemic-modality in (13)). In most scenarios, upon the utterance of (13), g identifies the content proposition of the *if*-clause as the antecedent for *then* (discursively, the antecedent restricts the domain of quantification), and the content proposition of the assertion embedded under *then* as the consequent. As is the case "across discourse", the presence of *then* in a conditional *if p*, *then q* signals an *explanatory claim*: that *q because* of *p*. *Explanatory claims* can be causal (depending on the discourse context), but even in that case, they do not require that antecedent and consequent stand as cause to effect ([1] a.o.). **(II) The impossibility of *then*:** This analysis explains why *then* is not possible in (1b-1d): the antecedent of (1b-1c) exhaustifies the domain of quantification and the conditional conveys that the antecedent and the consequent are orthogonal: the consequent is true no-matter what. Hence, the antecedent does not provide any explanation for why the consequent is true, and *then* is infelicitous. In the case of (1d) (a *biscuit-conditional*), there is no possible modal dependency between antecedent and consequent, and so *then* is also banned. In addition, the present proposal correctly predicts that *then*-clauses are not good out of the blue, and that imperatives and questions are not good antecedents unless the antecedent is the information gained from the act of suggesting/ordering or questioning itself. **Conclusion.** Understanding *then* requires a grammar that operates at the level of discourse.

[1] Beebee. 2004. Causing and nothingness. [2] von Fintel. 1994. Restrictions on quantifier domains. [3] Gunlogson. 2008. A question of commitment. [4] Iatridou. 1994. On the contribution of conditional *then*. [5] Lewis. 1973. Causation.

A new metalinguistic degree morpheme

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In this talk, we discuss the use of *. . . ish* in English as in (1), which is especially prevalent among younger speakers of English. It appears at the end of a sentence, following a pause, which we represent orthographically with ellipses. We argue that it is part of the paradigm of metalinguistic degree morphemes. With it the speaker signals that she is not wholly committed to the truth of the proposition. This morpheme also comes in an ordinary variety as the suffix *-ish*, where it occurs with gradable adjectives as in (2), and also as an adjectivizing morpheme on nouns, as in (3).

(1) I liked the movie . . .ish. / Lee drew a circle . . .ish. PROPOSITIONS

(2) John is tallish. / The dishes are dry-ish. GRADABLE ADJECTIVES

(3) Kim's childish behavior was annoying. / The cake has a coffee-ish flavor. NOUNS

That there is such a metalinguistic degree morpheme should not come as a surprise given the existence of metalinguistic comparatives, which have received recent attention (e.g. Giannakidou & Stavrou 2009; Morzycki 2011). This literature highlights both the similarities and the differences between metalinguistic and 'ordinary' comparatives (*Your problems are more financial than legal* vs. *Kim is taller than Lee*), which operate over propositions and gradable predicates, respectively, while sharing a common semantic core of comparison. We propose that *. . . ish*/*-ish* likewise has a common semantic core in its metalinguistic and 'ordinary' uses.

Distribution and use. Propositional *. . . ish* displays properties of both attenuating modifiers like *sorta*, which have been given a degree analysis (Anderson, 2013), and modal particles in languages like German (e.g., unstressed *schon*), which typically do not receive a degree analysis (Zimmermann, 2012). On the one hand, *. . .ish* acts as a hedge on speaker's commitment to the truth of a proposition. In this respect, *. . .ish* has a truth conditional effect similar to *sorta* in (4). Also like *sorta* (and unlike modal particles, cf. Zimmermann 2012), it has a truth-conditional effect.

(4) I sorta liked the movie. / I liked the movie . . .ish.

On the other hand, whereas *sorta* combines with a predicate within the sentence (Anderson, 2013), *. . .ish* does not attach to a particular predicate, but rather embeds an entire proposition. This behavior makes *. . .ish* similar to modal particles in that it operates at the level of the proposition. Another similarity to modal particles is the inability of *. . .ish* to appear in embedded positions like (5), unless the embedding predicate is a reportative or attitude predicate, see (6)-(7).

(5) ??If Lee draws a circle . . .ish, he will get a gold star.

(6) John told me that Kim liked the movie . . .ish.

(7) John believes that Kim liked the movie . . .ish.

Note that the attenuation in (7) can be relative to Kim's liking the movie (Kim sort of liked the movie) or John's attitude towards the embedded proposition (John sort of believes that Kim liked the movie). Similar to the German modal particle *schon* (Zimmermann, 2011), *. . .ish* makes implicit reference to some attitude holder. In unembedded contexts, the speaker is the attitude holder, while it is the subject of the attitude verb in embedded contexts.

Core analysis. We propose that because of its contribution to the truth conditions of the proposition it attaches to, *. . . ish* is not a modal particle, but a metalinguistic degree morpheme. To make clear the connection between *. . .ish* and metalinguistic comparatives, we borrow some of the terminology and formal apparatus of Giannakidou & Stavrou (2009) (though we do not believe this

choice is crucial – an alternative account involving degrees of precision a la Morzycki (2011) could just as well be implemented). First, we make use of an individual anchor or epistemic agent α, as providing the basis for the metalinguistic judgment. The value of α is by default the speaker of the utterance, although in cases like (6)-(7), the subject of an attitude predicate makes available another epistemic agent. Second, we make use of a gradable propositional attitude predicate R: roughly, α's degree of commitment to a proposition. Third, we use a vague degree predicate $\textbf{small}_c$, which holds of a degree if it is sufficiently small according to a contextual standard. The semantics of *. . .ish* can then be modeled as in (8), where d_s is the standard degree of commitment to a proposition.

(8) $[\![\textit{. . .ish}]\!](p) = 1$ iff $\max\{d|R(\alpha)(p)(d) = 1\} < d_s \wedge \textbf{small}_c(d_s - \max\{d|R(\alpha)(p)(d) = 1\})$

In prose, *. . .ish*(p) is true iff the maximal degree to which α is committed to p is less than the standard degree of commitment to a proposition, and the difference between those degrees is sufficiently small according to a contextual standard. We assume that d_s will typically be quite high, in fact maximal or nearly so, given Grice's (1975) maxim of Quality, by which speakers only say what they believe to be true and have good evidence for. The use of *. . .ish* thus hedges on that commitment to the proposition it embeds.

The broader picture. Just as metalinguistic and ordinary comparatives share a common semantic core, the proposed meaning for metalinguistic *. . . ish* can be easily translated to adjectival *-ish*. Compare our semantics in (8) to that of Sugawara (2012) for adjectival *-ish* in (9), where $s(P)$ is the standard for a gradable predicate P, and d_c is the contextually expected deviance from the standard.

(9) $[\![\textit{-ish}]\!] = \lambda P_{\langle d,et\rangle}\lambda x.\max\{d|P(d)(x) = 1\} < s(P) \wedge (s(P) - \max\{d|P(d)(x) = 1\}) < d_c$

Under this analysis, *ADJ-ish* is a property that holds of an individual to a degree that is close to, but somewhat less than, the standard degree for *ADJ*. Note that this correctly predicts that *-ish* is generally unacceptable with minimum-standard adjectives (e.g., *#bent-ish*), whereby an individual could not possibly hold the property to a degree lower than the standard, which corresponds to the minimum value on the scale. Such an analysis can also be extended to cases like (3): *-ish* picks out a particular property associated with the noun and marks that the degree to which that property holds of an individual is (slightly) less than a standard degree. For example, someone who is *childish* may have a degree of immaturity which is slightly less than that of an actual child. Other properties of being a child (e.g. being young) are ignored.

In sum, we believe it possible to provide a unified(-ish) analysis for all the uses of English *. . . ish*/*-ish*, based on the semantics in (8), thus providing further evidence for metalinguistic degree morphemes in natural language. To the extent that speakers' metalinguistic judgments are gradable, language provides a means for talking about this gradability.

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Ignorance in context: The interaction of modified numerals and QUDs

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I. The phenomena. Geurts & Nouwen (2007) report a contrast between superlative modifiers (henceforth SUPs) like *at most*, and comparative modifiers (henceforth COMPs) like *less than*: only SUPs license an **ignorance inference**. For instance, (1a) but not (1b) conveys that the speaker doesn't know the exact number of diamonds:

1. a. SUP: I found at most ten of the diamonds under the bed. $\rightsquigarrow$ *not sure how many*
b. COMP: I found less than ten of the diamonds under the bed. $\not\rightsquigarrow$ *not sure how many*

This contrast was experimentally confirmed by Geurts et al. (2010), but disconfirmed by Coppock & Brochhagen (2013), who use a different experimental setup. This paper builds on their work in search of an explanation for this discrepancy. We report the results of 2 experiments, each consisting of an acceptability-judgment-like task paired with a self-paced reading task, investigating the dependence of such ignorance inferences on **questions under discussion (QUDs)**.

Experiment 1 considered (1a,b) as responses to the 3 kinds of questions in (2) below ($2 \times 3 = 6$ conditions total):

2. a. POLAR: Did you find {at most / less than} ten of the diamonds under the bed?
b. WHAT: What did you find under the bed?
c. HOWMANY: How many of the diamonds did you find under the bed?

We found an overall weaker ignorance inference in response to a POLAR (2a) than in response to a WHAT question (2b), but with no difference between SUPs and COMPs. The contrast in ignorance between SUPs and COMPs is detectable only in responses to HOWMANY questions (2c), with SUPs exhibiting stronger ignorance inferences than COMPs. *Stronger* ignorance inferences are also systematically correlated with *increased* reading times (RTs): the WHAT and HOWMANY & SUP conditions are associated with significantly higher RTs.

The follow-up Experiment 2 considered three additional question types:

3. a. APPROX: Approximately how many of the diamonds did you find under the bed?
b. EXACT: Exactly how many of the diamonds did you find under the bed?
c. DISJUNCT: Did you find eight, nine, ten, or eleven of the diamonds under the bed?

We found weaker ignorance inferences for APPROX (3a) relative to EXACT (3b) and DISJUNCT (3c), with no difference between SUPs and COMPs for any QUD type and no significant effects on RTs (except for the DISJUNCT condition in one region; more details in the paper). Below, we first present our account, and then discuss the experiment in more detail.

II. The account. We take our findings to argue for a *pragmatic* account, but *with a twist*, to account for the contrast between SUP and COMP in response to the HOWMANY QUD. We assume: **(i)** ignorance is derived via the Maxim of Quantity, in line with Grice (1975), Büring (2008): if the context is understood as demanding precision, then giving merely an upper bound implicates ignorance; **(ii)** HOWMANY is *underspecified* with regard to the desired level of precision, unlike POLAR/APPROX (imprecise) and WHAT/EXACT/DISJUNCT (precise); **(iii)** SUPs are used in contexts demanding precision more than COMPs are (Cummins et al 2012). Now, if the QUD *fixes* the desired level of precision (as do all QUDs except for HOWMANY), then the assumed difference between SUP and COMP cannot affect the ignorance inference. However, if the QUD *doesn't* completely fix the desired level of precision (as is the case for the HOWMANY QUD), participants use the modified numeral as a cue to disambiguate the context: if the answer contains a SUP, the context was likely precise, yielding a stronger ignorance inference; but if the answer contains a COMP, the context was likely less precise, yielding a weaker ignorance inference.

Our account suggests an important way in which a lexical entry's *typical context of use* affects pragmatics, by affecting how an underspecified context is disambiguated. QUD underspecification, we argue, is the reason for the discrepancies between previous experiments.

III. Experimental method and statistical modeling. Both experiments had a 2×3 design, with 36 items each (6 per condition), presented as conversations between a judge and a witness. The instructions mentioned the witness had nothing to hide. Each item consisted of a **question** by the judge, the witness's **answer**, and an **inference** drawn by the judge:

4. The judge asks: "What did you find under the bed?" (Example from Exp. 1)
The witness answers: I found at most ten of the diamonds under the bed.
Based on this, the judge concludes: "The witness doesn't know exactly how many of the diamonds she found under the bed." How justified is the judge in drawing that conclusion?

Question, answer and inference were presented on three distinct screens, with the answer presented as a **self-paced reading** task: participants read it word-by-word, with the SPACE bar revealing the next word and hiding the preceding one. Participants were asked to indicate on a 5-point Likert scale how justified they thought the judge's inference was (1: not justified at all, 5: strongly justified). We used a Latin square design for each experiment (6 lists of items, participants were rotated through lists, every item appeared once in each list with items balanced across conditions, the lists rotated the items through the conditions). There were 108 stimuli total (36 items + 72 fillers) in each experiment, the order of which was randomized for every participant (35 participants in Exp. 1, 51 participants in Exp. 2).

For reasons of space, we discuss only the statistical modeling of the acceptability (justifiability) data. Since the response data for both experiments was ordinal (ordered categorical), we used mixed-effects ordinal probit regression models to analyze the data. All models included intercept random effects for participants and items.

In Experiment 1, there were two factors: ModNum with two levels Comp (the reference level) and Sup, and QudType with three levels Polar (reference level), What and HowMany. The interaction model with all two-way interactions did not significantly reduce deviance compared to the main-effects-only model (LR statistic 2.72, $p = .26$), but when we examined subsets of the data by QudType, there was a significant effect of Sup for the HowMany subset ($\beta = .27, SE = .11, p = .016$), but not for the Polar or What subsets. In the main-effects-only model estimated for the entire data set, the main effects for both What ($\beta = .23, SE = .08, p = .003$) and HowMany ($\beta = .28, SE = .08, p = .0004$) were highly significant, but not the main effect for Sup ($\beta = .11, SE = .06, p = .08$).

The analysis of the Experiment 2 data proceeded in a very similar way (with Approx as the reference level for QudType). Once again, the interaction model with all two-way interactions did not significantly reduce deviance compared to the main-effects-only model (LR statistic 2.57, $p = .28$). Furthermore, Sup was not significant in any of the three QudType subsets. In the main-effects-only model estimated for the entire data set, the main effects for both Exact ($\beta = .23, SE = .06, p = .0003$) and Disjunct ($\beta = .17, SE = .06, p = .007$) were highly significant, but not the main effect for Sup ($\beta = .07, SE = .05, p = .21$).

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Deontic Modals and Probabilities: One Theory to Rule Them All? (Abstract)

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1. Synopsis. I defend and develop a probabilistic premise semantics for deontic modals. The probabilistic component is motivated by considering embeddings of deontic modals in conditionals with probabilistic antecedents. To make room for probabilities, premises are treated as properties of alternatives (and not of individual worlds). The theory can be shown to be importantly different from the scalar semantic theories that have gathered attention in recent literature.

2. An Argument for a Probabilistic Semantics. There are embeddings of deontic modals in conditionals with probabilistic antecedents (Yalcin 2012).

(1) If it is likely that your opponents will attack your team on the right flank, you should concentrate your defense on the right side.

(2) If it is not likely that your opponents will attack your team on the right flank, you should not concentrate your defense on the right side.

In treating these cases, I make two assumptions: (i) expressions like 'it's likely' constrain probabilistic information states (Swanson 2011, Yalcin 2010, 2012, Lassiter 2011) and (ii) conditionals with probabilistic antecedents shift the relevant information state (as opposed to restricting the modal base for the *should*). Under these assumptions, explaining the meaning of these complex embeddings requires us to explain how the compositional semantic value of the deontic consequents is sensitive to the shift introduced by the probabilistic antecedents.

Furthermore, these kinds of embeddings give rise to distinctive entailments, such as:

(3) If rain is likely, you should wear a coat. Strong winds are likely. Rain is at least as likely as strong winds. *Therefore:* You should wear a coat.

Inferences like (3) must be validated by a joint account of probabilistic and deontic language.

3. Scalar Theories. According to scalar theories (e.g., Lassiter 2011), unembedded deontic claims express comparisons of expected values between the prejacent and the alternatives. Deontic claims in consequents of conditionals express comparisons of expected value between the prejacent and the alternatives in the local context created by evaluating the antecedents.

Applying these ideas to (1)-(2) easily explains how probabilistic shifts affect deontic claims and also accounts for (3) and other interactions between probability operators and deontic modals.

Scalar theories run into trouble with ascriptions of propositional attitudes to non-Bayesian agents. Suppose that John thinks that everyone should follow an unorthodox decision rule such as *Maximin* (the rule that requires agents to choose based on the outcome of each choice in the worst case scenario). Consider (4) as uttered in a context in which (i) I flip a coin that is heavily (but not perfectly) biased towards heads and (ii) you can choose between betting on the outcome at even odds or refrain from betting.

(4) John thinks that you should not bet on heads.

For the scalar theorist, (4) is acceptable iff for every pair $\langle Pr, v\rangle$ of probability and value function compatible with John's state, the expected value (calculated according to Pr and v) of betting on heads is higher than that of the alternatives. This does not seem to be correct representation of the content of (4): John might think the deontic claim is true, even though the expected value of betting on heads is greater than that of the alternatives (note that alternative scalar theories that

are built on non-Bayesian rules face similar problems with the attitudes of Bayesian agents). I argue that attempts to address this problem by pushing John's risk-aversion in the value function produce unsatisfactory results in more complicated examples and undermine the motivation for scalar theories.

4. Probabilistic Premise Semantics. The central idea of my approach is to build deontic semantics on an ordering of alternatives (i.e. propositions), rather than an ordering of worlds. Probabilities enter the picture because this ordering is determined by premises that may be probabilistic in character (e.g., "given alternative A in state S, it is likely that you will win the game"). Conditional antecedents (including probabilistic antecedents) update the state S, and hence may affect which ordering source members apply to which alternatives.

The technical implementation of this idea requires three parameters: (i) a *fine-grained state*, i.e. a pair $\langle I, Pr\rangle$ with I a set of worlds, and Pr a probability function (ii) an *alternative set* Alt and (iii) an *elevated ordering source* O—that is, a set of sets of propositions (these parameters can be made to depend on the world of evaluation, but I ignore this complication here). As in Kratzer's (1981) semantics, I define a preorder by inclusion. Where α and β are propositions:

(5) $\quad \alpha \succeq_{I,Pr,O} \beta$ iff $\{\pi \in O \mid (\alpha \cap I) \in \pi\} \supseteq \{\pi \in O \mid (\beta \cap I) \in \pi\}$

Informally, α is at least as good as β (relative to I) if and only if every premise that applies to $\beta \cap I$ applies to $\alpha \cap I$. Since the ranking of α is only affected by $\alpha \cap I$, this preorder is sensitive to updates to the fine-grained state. Given an analogue of the limit assumption, the ordering in (5) can be used to define a quantificational domain:

(6) $\quad \textit{Domain}(I, Pr, O, Alt) = \{v \in I \mid \exists \beta \in Alt[\sim \exists \alpha \in Alt(\alpha \succ_{I,Pr,O} \beta \,\&\, v \in \beta)\}$

(7) $\quad [\![\textsf{SHOULD}(\phi)]\!]^{I,Pr,O,Alt,w} = T$ iff $\forall w' \in \textit{Domain}(I, Pr, O, Alt), [\![\phi]\!]^{I,Pr,O,Alt,w'} = T$

This approach is easily extended to other modal auxiliaries and deontic comparatives. As mentioned, I assume that antecedents of the form ⌜if it's likely that ϕ⌝ operate on these points of evaluation partly by shifting Pr.

5. Accounts of the Data. Despite the superficial similarities, this theory is fundamentally different from Kratzer's classical premise semantics. On the present theory, 'SHOULD' is *information sensitive* (in the sense characterized by Kolodny and MacFarlane, 2010 to solve the *miners paradox*; see also Charlow 2013). Crucially for current purposes, the interpretation of deontics is sensitive to probabilistic updates. Suppose, for instance, that the elevated ordering source for (1)-(2) includes the premise {α| given α, it is likely that you will win} and suppose it's common ground that it's likely you will win if and only if you match defense to your opponent's offense. Then, in the local context created by the antecedent of (1), concentrating the defense on the right satisfies the premise. In the context created by the antecedent of (2), it does not. Hence, the semantics can capture the interaction between probability claims and deontics. Furthermore, given any standard definition of validity, this semantics validates the inference in (3) and others like it.

Like the scalar semantics, the probabilistic premise semantics can handle the interaction between probabilities and deontic modalities. However, the present theory also easily handles ascriptions of attitudes to non-Bayesian agents: (4) is acceptable iff for every I, Pr, O, w compatible with John's state, $[\![\text{you should bet on heads}]\!]^{I,Pr,O,Alt,w} = F$. This delivers the expected verdicts if we suppose, among other things, that a premise set compatible with John's state will feature premises that represent John's risk-aversion, like {α| given α, you are guaranteed to win}.

References. Charlow (2013) *What We Know and What to Do* ■ Kolodny and MacFarlane (2010) *Ifs and Oughts* ■ Kratzer (1981) *The Notional Category of Modality* ■ Lassiter (2011) *Measurement and Modality* ■ Swanson (2011) *How Not to Theorize about the Language of Subjective Uncertainty* ■ Yalcin (2010), *Probability Operators* ■ Yalcin (2012) *Bayesian Expressivism*.

A Superlative Argument for a Minimal Theory of Definiteness

Elizabeth Coppock and David Beaver

Coppock & Beaver (2012) argue in favor of decoupling existence and uniqueness in the analysis of definiteness. This paper argues that the 'relative' reading of superlatives as in (1a), on which Gloria climbed a higher mountain than anyone else in the context, provides further evidence in favor of this approach.

(1) a. Gloria climbed the highest mountain.

b. ??Gloria climbed a highest mountain.

On such readings, the definite article is sometimes analyzed as underlyingly indefinite. According to 'DP-external' analyses of relative readings (Szabolcsi, 1986; Heim, 1999; Hackl, 2009), the superlative takes scope outside the object DP and *the* must be interpreted as *a* because its uniqueness presupposition is not satisfied by its complement. While such DPs do display indefinite-like behaviors, we argue that the definite article is not meaningless in such constructions, and reconcile this tension in terms of *weak uniqueness*.

Interpreting *the* as *a* falsely predicts that (1b) should be acceptable and synonymous with (1a). (1b) cannot be ruled out on the basis of a syntactic requirement for a definite article before a superlative because there is no such requirement (Herdan & Sharvit 2006; e.g. *Is there a best student in your class?*). This view also fails to distinguish between (2a) and (2b), as Krasikova (2012) points out.

(2) a. Gloria climbed the most mountains.

b. Gloria climbed most mountains.

(2a) has only a relative reading, while (2b) has only a proportional reading ('Gloria climbed most of the mountains'), so the determiner affects the meaning.

'DP-internal analyses', on which the superlative is interpreted inside the DP (Farkas & É. Kiss, 2000; Sharvit & Stateva, 2002; Teodorescu, 2009) do not require interpreting *the* as *a* and can thereby avoid these problems (although Sharvit & Stateva (2002) also make this assumption for purposes that can be met otherwise).

However, DP-external analyses seem to be the only ones that can account for sentences like (3), which should be nonsense on a DP-internal analysis with Fregean *the* (Heim, 1999).

(3) If nobody unambiguously climbs the highest mountain, the prize is not awarded.

Furthermore, there is hard evidence that the definites in such cases are in some sense semantically indefinite, as Szabolcsi has shown. We add that relative superlatives contrast with ordinary definites with respect to anaphora, denial of existence, non-restrictive modification, and strict VP-anaphora:

(4) Perhaps Sue climbed the {#most, snow-capped} mountains. I took a picture of them.

(5) Sue wanted to eat the {most, #large} apples, but there were no apples.

(6) Sue wanted to see the {#most, old} marble statues, which I had showed her a picture of.

(7) Sue wanted to see the {#most, old} marble statues, and so did John. Therefore Sue and John wanted to see the same statues.

We note that minimizing NPI superlatives (not accounted for in prior work) pattern similarly:

(8) Jane didn't drink the {#tiniest, tiny} drop of whiskey. John didn't drink it either.

These facts indicate that definites with superlatives may lack the existence presupposition that is normally associated with definite descriptions. This is not predicted by existing DP-internal analyses of superlatives. (Heim also argues for a DP-external analysis based on 'upstairs *de dicto*' readings but Sharvit & Stateva (2002) and Teodorescu (2009) argue that these are consistent with a DP-internal analysis.)

Krasikova (2012) proposes that *the* can operate within DegP and signal uniqueness of a degree property. This analysis maintains the integrity of the definite article while predicting that

the DP is indefinite. However, it runs into problems with the at-issue entailment of uniqueness at the individual/DP-level that superlatives give rise to. Imagine that everyone in a choir is given two tickets to sell, and most people manage to sell both tickets, including Sally. Then it would be felicitous to say *Sally sold the maximum number of tickets,* but not (9).

(9) Sally sold the most tickets.

In order to avoid the prediction that (9) is true in this context, Krasikova intensionalizes the degree property, but then (9) ends up meaning that the highest number of tickets that Sally could possibly sell is higher than the highest number anyone else could sell.

We use Coppock & Beaver's (2012) independently-motivated analysis of definiteness to overcome all of these problems. We maintain that *the* always means *the*, but what it denotes is an identity function on predicates which encodes only *weak uniqueness*, i.e., that there is a maximum of one satisfier of the description, possibly zero (so *the* does not presuppose or entail existence). For use in argument position, (in)definite descriptions are interpreted via the same coercions that bare nominals in article-less languages undergo, including an ι-shift (yielding an individual) and an existential shift (yielding an existential quantifier). The latter makes it possible to account for the indefinite-like behavior of the object DP and the possibility of (3).

We analyze *the* as follows, where ∂ is Beaver & Krahmer's (2001) partiality operator.

(10) *the* $\rightsquigarrow \lambda P \lambda x[\partial(|P| \leq 1) \wedge P(x)]$

With a DP-internal analysis of superlatives, Heim's (1999) lexical entry for *-est* (or a more decompositional analysis as argued for by Szabolcsi (2012)), we have the following interpretation for *tallest mountain* (ignoring *-est*'s presuppositions):

(11) $\lambda x \exists d[\textsc{tall}(x, d) \wedge \textsc{mtn}(x) \wedge \forall y[y \neq x \wedge C(y) \rightarrow \neg[\textsc{tall}(y, d) \wedge \textsc{mtn}(y)]]]$

Regardless of how C is saturated, this property can hold of at most one individual – none in the case of a tie for highest mountain. Hence *the*'s presuppositions are satisfied, and it is licensed, while *Maximize Presupposition* predicts the unacceptability of (1b).

Now, if (weak) uniqueness *and* existence are not both in the common ground, then the ι-shift will not be applicable and the existential shift will apply. This will lead to the following interpretation for (1a), abbreviating (11) as $\textsc{tallest-mtn}_C$:

(12) $\exists x[\textsc{climbed}(\textsc{g}, x) \wedge \partial(|\textsc{tallest-mtn}_C| \leq 1) \wedge \textsc{tallest-mtn}_C(x)]$

Since this does not presuppose existence of a tallest mountain, (3) and (5) are predicted to be felicitous. And these definite descriptions have the same anaphoric potential as indefinites, hence the behavior displayed in (4), (6), and (7). It is entailed that there is only one mountain satisfying the property, so we correctly capture the uniqueness entailment illustrated with (9).

We conclude that by taking the definite article to encode weak uniqueness and allowing it to undergo an existential shift, we can maintain its integrity and thereby avoid overgeneration, while accounting for both the indefinite-like behavior and the uniqueness entailment exhibited by definites in relative superlatives. Superlatives thus provide a new argument for decoupling uniqueness and existence.

References: Beaver & Krahmer 2001: A partial account of presupposition projection; *JoLLI* ◆ Coppock & Beaver 2012: Weak uniqueness: The only difference between definites and indefinites; *SALT 22* ◆ Farkas & Kiss 2000: On the comparative and absolute readings of superlatives; *NLLT* ◆ Hackl 2009: On the grammar and processing of proportional quantifiers; *NLS* ◆ Heim 1999: Notes on superlatives ◆ Herdan & Sharvit 2006: Definite and nondefinite superlatives and NPI licensing; *Syntax* ◆ Krasikova 2012: Definiteness in superlatives; in *Logic, language and meaning*. ◆ Sharvit & Stateva 2002: Superlative expressions, context, and focus; *L&P* ◆ Szabolcsi 1986: Comparative superlatives; in *Papers in theoretical linguistics* ◆ Szabolcsi 2012: Compositionality without word boundaries: *(the) more* and *(the) most*; *SALT 22* ◆ Teodorescu 2009: *Modification in the noun phrase: The syntax, semantics, and pragmatics of adjectives and superlatives*; UT Austin dissertation.

Scope Fixing, Scope Economy and Focus Movement

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Synopsis. We present a new argument for focus movement by looking at the scope-shifting behavior of pre-VP *only*. We show (i) that in contrast to standard assumptions pre-VP *only* can undergo covert movement and (ii) that in many cases where it is not able to this is due to independently motivated grammatical constraints.

1. Scope fixing effects. It is commonly assumed that pre-VP *only* has rigid scope (Taglicht 1984, Rooth 1985, Bayer 1996, i.a.). An exemplification of this is provided in (1)-(2). While the sentence in (1a) can be true even if you are allowed to learn, say, German, the sentence in (1b) cannot. This contrast is usually explained by *only Spanish* being able to scope above *be required* in (1a), yielding the proposition that only Spanish is such that you are required to learn it, and by a parallel construal not being available for (1b) (e.g., Rooth 1985).

(1) a. You are required to learn only SPANISH (require > only, only > require)
b. You are required to only learn SPANISH (require > only, #only > require)

This state of affairs is unexpected on the movement approach to focus association, according to which the focused phrase moves to the complement of *only* to form a quantifier (Chomsky 1976, Drubig 1994, Wagner 2006, i.a.). Namely, there is no obvious reason why this quantifier should not be able to undergo further covert scope-shifting operations (CSSOs), as illustrated in (2).

(2) $[\ \ldots\ [_{((et)t)}\ \text{only}_C\ \text{Spanish}_F]\ [_{(et)}\ \lambda x\ [\text{you learn } x]]$

Accordingly, scope fixing with pre-VP *only* can be construed as an argument against a version of focus movement (see esp. Rooth 1985, Ch. 3). In contrast, if the interpretation of pre-VP *only* is assumed not to involve focus movement but rather indirect association with alternatives induced by focus (*in situ* approach of Rooth 1985, 1992), its scope rigid behavior is to some extent expected: if movement of such *only* were assumed, it would for reasons of interpretability have to leave no trace, ruling it out as an instance of A'-movement (see Rooth 1985 for further discussion).

2. Scope interactions with nominal quantifiers. The scope rigid nature of pre-VP *only* appears to be corroborated by the behavior of pre-VP *only* with respect to nominal quantifiers like *some*. For example, the sentence in (3B) only allows for a contextually vacuous surface scope reading.

(3) A: We need to pay bonuses to our married workers. Who must get a bonus?
B: ?Someone is only married to JOHN (some > only, #only > some)

However, if the sentence is embedded in a downward-entailing environment, its contribution appears to be felicitous, that is, it can have an inverse scope reading that only John is married.

(4) A: We need to pay bonuses to our married workers. Does that mean only John?
B: I doubt that someone is only married to JOHN

The contrast between (3) and (4) can be shown to follow from the following condition:

(5) **Generalized Scope Economy Condition (GSEC)** A CSSO is licensed in a sentence S only if there exists a constituent C of S such that the CSSO does not make the semantic value of C entail what it would be without the CSSO (Mayr & Spector 2013)

The inverse scope reading in (3) entails the surface scope reading, represented in (6). Accordingly, a CSSO that would yield the inverse scope reading is ruled out by GSEC.

(6) [only J.] λx [someone is married to x] ⇒ [someone [λx [only J.] λy [x is married to y]]

However, embedded in a downward-entailing environment, (4B), the entailment pattern of the readings is reversed at the level of the matrix sentence. Accordingly, a CSSO that yields the inverse scope of *only-XP* and the existential quantifier satisfies GSEC and is licensed.

3. Scope interactions with modal quantifiers. Pre-VP *only* may scope above universal modals *have to, need to,* the negative polarity *need*, and *must* (this holds for deontics but not epistemics, which prefer widest scope, cf. von Fintel & Iatridou 2003). This is shown in (11): the sentence is felicitous on the inverse scope reading – to pass the exam only one book is such that you must read it; surface scope reading is pragmatically odd – you must read exactly one book to pass the exam – namely, it contradicts the shared assumption that the more you read the better you do in exams.

(7) To pass the exam, you {have to/need to/need/must} only read ONE book

Note that although *must* is a positive polarity item, it can scope below *only* but not negation (Iatridou & Zeijlstra 2013), suggesting that it is indeed *only* taking scope above *must* in (7) rather than, say, an abstract negation associated with *only* (cf. von Fintel & Iatridou 2007).

4. Issue for Generalized Scope Economy. Pre-VP *only* may also scope above existential modal verbs like *allow to.* For example, the sentence in (8) has the inverse scope reading: you are allowed to eat one cookie but not allowed to eat two. This is unexpected on the formulation of GSEC in (8): a CSSO that takes *only-XP* above *allow* leads to a stronger meaning.

(8) Since we are having dinner early, you are allowed to only eat ONE cookie

More generally, modals appear to systematically obviate GSEC (but see Mayr & Spector 2013, Sec. 7). For example, on the preferred reading of the sentence in (9), the QP takes scope above the existential modal, yielding the meaning that fewer than three women are eligible brides for Waldo.

(9) Prince Waldo is allowed to marry fewer than three women, namely Princesses Zoe and Sara

Since the inverse scope reading is stronger than the surface scope reading in (9), it is falsely ruled out by GSEC. In short, GSEC must modified so as to pertain to non-modal operators (cf. Takahashi 2006), which could be fleshed out for the purposes of the abstract as a constraint on Quantifier Lowering (Johnson & Tomioka 1997): to obtain inverse scope, a quantifier undergoes QL (QPs never move QR above other QPs due to tucking-in property of A'-movement, Richards 2001).

5. Some apparent counterexamples. Not all occurrences of pre-VP *only* appear to be able to undergo CSSOs. For example, the sentence in (1b) appears to only allow the surface scope reading. We illustrate in (10) that inverse scope readings can be found even with such configurations: for ACD resolution, *only* together with the DP containing focused *one* takes scope above *require*.

(10) To pass the exam, you are required to only solve ONE exercise that the students who want to get a perfect score are <~~required to solve/*solve~~> (#require > only, only > require)

Furthermore, we propose that the inverse scope reading with pre-DP *only* in (1a) is more accessible than that of pre-VP *only* due to information structure considerations that are independently known to facilitate disambiguation (Büring 1997): if rising intonation is on *required* and falling intonation is on *only Spanish*, the inverse scope may be facilitated, (1a); this is not possible with the pre-VP *only* in (1b) (unless the entire VP is focused). This gives rise to the expectation that if the whole VP is focused, wide scope of pre-VP *only* may be facilitated. This is borne out, as shown in (12).

(11) You are /required to learn [only $\text{SPANISH}_F]_F$\
(Uncertainty inference: 'You are allowed to learn X.' Facilitation of inverse scope.)

(12) Some classes require you to only SHOW UP but this one requires you to put in some effort

6. Conclusion and outlook. We have shown that pre-VP *only* can undergo CSSOs – this can be naturally captured on focus movement approach but not obviously so on the alternative semantics approach. The appearance of scope fixing can be attributed to independent grammatical principles, say, GSEC. Future work: A study of scopal interactions of *only* with a greater variety of operators is mandated as well as a more careful investigation of other focus particles (*even, also* etc.).

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Plural Quantification and The Homogeneity Constraint

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1. Introduction. (1a-b) illustrates Winter's 2002 generalized version of Dowty's 1986 puzzle regarding *all*:

(1) a. All the/most of the students are meeting in the hall. b. *All the/most of the students are a good team.

(1a-b) shows that only a sub-class of the predicates that select pluralities ('collective predicates' henceforth) allow quantificational DPs, in particular *most of DPs*, on which I will concentrate. The core empirical claim of the paper will be that the contrast (1a) vs (1b) is parallel to (2a) vs (2b), which illustrates the Homogeneity Constraint (HC) on Mass Quantification stated in (3):

(2) a. All the/most of the water is liquid/dirty. b. *All the/most of the water is heavy/weighs one ton.

(3) The predicate in the nuclear scope of a mass quantifier must be homogeneous. **(HC)**
(Bunt 1979, 1985, Lønning 1987, Higginbotham 1994)

The main theoretical claim will be that the Roeper-Lønning-Higginbotham analysis of mass quantifiers extends to *plurality* quantifiers: such quantifiers do not denote relations between sets but rather relations between *plural entities*.

2. The non-integrativity constraint (NIC). The canonical definition of Homogeneity (*A predicate is homogeneous iff it is both cumulative and distributive*) is reputedly problematic, being confronted with the 'minimal-elements' problem. [Note: A granularity-based weakening of the HC (Champollion 2010) would not help here since the HC is concerned with distinguishing between homogeneous and non-homogeneous predicates which – if real – cannot be defined in terms of granularity]. I will therefore restate the HC as the Non-Integrativity Constraint (NIC):

(3') The predicate in the nuclear scope of a mass quantifier cannot be integrative. **(NIC)**

NIC depends on the distinction between integrative and non-integrative predicates (for a somewhat similar distinction see Löbner (2000) on integrative and summative predication):

(4) a. Integrative predicates describe entities that qualify as 'integral wholes'. (Simons 1987).
Ex: *heavy, tall, cover a large space, mad*
b. Non-integrative predicates describe parts of integral wholes. Ex: *liquid, dirty, yellow*

The difference in descriptive content correlates with a difference in denotation:

c. Integrative predicates denote sets (no inherent ordering relation among the elements).
d. Non-integrative predicates denote join semi-lattices (inherent part-whole order).

My next proposal will be that the distinction between integrative and non-integrative predicates is relevant for collective predicates:

(5) a. Integrative collective predicates denote sets of pluralities (no inherent ordering relation).
Ex: *mafia, team, committee, numerous*
b. Non-integrative collective predicates denote join semi-lattices (sets of pluralities ordered by the part of relation).
Ex: *meet*, *love each other, be friends, be neighbours, be similar*

The contrast in (1a-b) can now be viewed as illustrating a generalized version of the HC restated as the NIC:

(6) A collective predicate in the nuclear scope of a plural quantifier must be non-integrative.

The rest of the presentation will provide the details of the proposal and some answers to potential worries.

3. Entity Quantifiers

3.1 Mass Quantifiers as relations between entities. According to Roeper 1983, Lønning 1987 and Higginbotham 1994, mass quantifiers are not set-quantificational, but instead should be defined as in (7):

(7) Mass quantifiers denote relations between *entities* (type e).

According to this analysis, (2a) is true iff (2'a) is satisfied; μ notates a measure function and ∩ is the general lattice-theoretic operation *meet* (*intersection* is *meet* applied to sets), which in this case applies to two entities (type e); capital X notates a variable that ranges over non-atomic entities:

(2') a. $\mu([[\text{the water}]] \cap \sum X.\ \text{dirty}(X)) > \mu([[\text{the water}]] - [[\text{the water}]] \cap \sum X.\ \text{dirty}(X))$

In words, the measure of the meet of [[the water]] and (the maximal sum of the dirty parts in the domain) is bigger than the measure of the relative complement of the outcome wrt [[the water]]. According to Higginbotham 1994 this analysis explains why mass quantifiers are subject to the HC: computing truth conditions of the type in (2') depends on applying the Σ operator (Σ is the fusion operator, which applies to a set and picks up the supremum; Σ is not

defined for sets that do not have a supremum) to the nuclear scope; non-homogeneous (or rather integrative) predicates are disallowed, because they denote unordered sets, to which Σ cannot apply (because unordered sets do not have a supremum). In what follows I will assume the basic idea of this explanation, but revise the details: in addition to (i) relying on integrativity (instead of non-homogeneity) I will assume that (ii) the relevant nominalizing operator is not the fusion operator but rather the intensional iota operator (Chierchia's 1998 Down) and (iii) no nominalizing operator applies to the restrictor; rather an entity restrictor must be provided by the syntax itself.

3.2 Plurality Quantifiers. Let us now assume that the plural quantifiers in (1) resemble mass quantifiers in so far as they are not set quantificational, but instead denote relations between entities:

(8) Plurality quantifiers denote relations between *pluralities* (plural entities).

Given (8), the *most*-example in (1a) is true iff (1'a) holds:

(1') a. μ ([[the students]] ∩ ιX. met(X)) > μ ([[the students]]- [[the students]] ∩ ιX. met(X))

Because we are in a count domain, the measure function is the cardinality function; I nevertheless use the μ notation in order to bring out the similarity between the formulae in (1') and (2'). Examples (1b) are unacceptable, because their truth conditions cannot be computed: *good-team* denotes a set of elements that are not ordered by the part-of relation and by definition, the intensional ι cannot apply to unordered sets (because unordered sets lack a maximal element).

3.3 Plurality Quantifiers and pluralized predicates. The main predicates in examples of the type in (9) are integrative, which seems to go against the NIC:

(9) a. Most of my students are hard-working. b. Most of my classes are good teams.

These examples are not problematic, since the ι operator applies to the join semi-lattice denoted by the pluralized predicates **hard-working* and **good team* (*notates Link's pluralization operator). Correspondingly, these examples necessarily take distributive readings (compare the collective readings of plurality quantifiers built with collective predicates in the nuclear scope, e.g., (1a)). Selectional restrictions explain the unacceptability of **Most of my students are good teams.*

4. The set-relational *most*. The examples in (10) differ from those examined so far in that the restrictor is not filled with a DP (type e) but rather with a NP (<e,t> type):

(10) a. Most students of mine are hard-working. b. Most mafias will meet tomorrow.
c. *Most students of mine will meet in the hall.

Assuming that type-shifting in the restrictor is prohibited (independent evidence will be provided in favor of this constraint, which distinguishes my analysis from Higginbotham's (see (iii) at the end of § 3.1)), examples of this type will be analyzed as relying on the set-quantificational *most*, for which the standard GQT will be assumed:

(10') a. μ({x: student(x)} ∩ {hard-working(x)}) > μ({x: student(x)} ∩ {not- hard-working(x)})
b. μ({x: mafia(x)} ∩ {meet tomorrow(x)}) > μ({x: mafia(x)} ∩ {not-meet-tomorrow(x)})

(10'a) requires the cardinality of hard-working students of mine be larger than the cardinality of the non-hard-working ones; (10'b) requires that the cardinality of mafias-that-meet-tomorrow (this is the set obtained by intersecting the set of mafias with the set of pluralities who meet tomorrow) is larger than the cardinality of mafias-that-do-not-meet-tomorrow; (10c) is unacceptable because it violates selectional restrictions. Note that the acceptability of (10b) forces us to assume that - in this type of example at least - *meet* is an integrative predicate that denotes an unordered set of pluralities of meeting people (rather than a join semi-lattice of pluralities of meeting people). This systematic shift - due to pluralization - from non-integrative to integrative status, which can also be observed with atomic predicates (e.g., *yellow*, which is non-integrative in *Most of this gold is yellow* but integrative in *Most daffodils are yellow* or *This daffodil is yellow*) can be viewed as being due to coercion, which is triggered by the impossibility of applying pluralization to non-integrative predicates (the mass to count coercion pertains to this general phenomenon).

5. Brief discussion of Winter's (2002) Account. The proposal made in this abstract will be briefly compared with Winter's account, which establishes no correlation between plural and mass quantification.

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VP Ellipsis without Parallel Binding: Towards a QUD approach

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Summary: VP-Ellipsis (VPE) is a phenomenon involving a missing VP, which stands in an identity relation with some antecedent VP in the discourse. Over the past 40 years, scores of linguists have investigated the nature of this identity relation. Some claim that it is syntactic (Sag 1976, Williams 1977, Fiengo and May 1994, etc.), others that it is semantic (Dalrymple et al. 1991, Hardt 1999, etc.), and still others claim that certain pragmatic factors are also relevant (Rooth 1992, Hardt and Romero 2004, Kehler 2000, 2002, Kehler and Büring 2007, etc.). Central to the debate are the readings available with VPE when the antecedent contains pronouns, especially the so-called *strict* and *sloppy* readings. In this talk, we contribute to the debate by examining a third type of reading, which we dub the *sticky* reading. This reading has largely been ignored in the literature, despite its theoretical relevance. We claim that the sticky reading is indeed problematic for major theories of VPE. In order to account for the sticky reading, we propose that the identity condition should be formulated in terms of the question under discussion (QUD) in the sense of Roberts (1996/2012) (cf. Kehler and Büring 2007, Reich 2007, AnderBois 2010, Weir 2013).

Observation: We observe that (1) has three readings:

(1) None of the boys revised his paper. So instead, the professor did Δ.
   a. **Strict reading:** There's a particular man x. None of the boys revised x's paper, so the professor revised x's paper.
   b. **Sloppy reading:** None of the boys revised his own paper, so the professor revised his own paper.
   c. **Sticky reading:** None of the boys revised his own paper, so the professor revised the boys' papers.

While the strict and sloppy readings have garnered much attention in the literature, the sticky reading (1c) has scarcely been discussed. One exception is Dalrymple et al. (1991), who analyze it as resulting from a wide scope reading of the quantifier over the two sentences, which binds the overt pronoun *his*, as well as a corresponding variable in the denotation of the elided VP. There are several reasons to reject this analysis. Firstly, it is dubious that the scope of the quantifier can extend across a sentential boundary. Secondly, this analysis predicts demonstrably incorrect truth-conditions, paraphrasable as: "None of the boys x is such that x revised x's paper, so the professor revised x's paper instead". This does not entail that none of the boys revised his own paper.

We propose instead that the elided VP under the sticky reading contains a plural definite, as illustrated in (2). We represent binding relations with superscripts and subscripts (the deletion analysis of VPE is adopted for expository purposes).

(2) [None of the boys]^x revised his$_x$ paper. So instead, the professor did ~~revise their papers~~.

The question that immediately arises is in what sense the elided VP counts as *identical* to the antecedent VP. Most accounts in fact predict that it doesn't count as identical. It is important to notice that *his* in the first sentence is a bound pronoun, while *their* in the second sentence is free. Previous accounts are generally tailored to rule out such readings, due to the absence of 'mixed readings' like the following, where one of the pronouns is bound while the other is free.

(3) a. [None of the boys]^x revised his$_x$ paper. So the professor did ~~revise his$_y$ paper~~.
   b. [None of the boys]^x revised his$_y$ paper. So [the professor]^z did ~~revise his$_z$ paper~~.

Syntactic identity rules out (3a) & (3b) by requiring the two VPs to be identical wrt binding relations. Similarly, under semantic identity, the two pronouns must either both be bound or both be free. The sticky reading in (1c) shows that such identity conditions are too strong.

The same problem arises under Rooth's (1992) dual-account (and related accounts in Heim 1997, Fox 1999, 2000, and Sauerland 2004). He postulates two identity conditions on VPE: (i) the two VPs must be syntactically isomorphic, (ii) the elided VP must be reflexively dominated by some constituent XP whose focus semantic value contains the ordinary semantic value of a parallel constituent that reflexively dominates the antecedent VP (the so-called *parallelism* condition). This parallelism condition rules out VPE in (2), even if syntactic identity is satisfied. That is, assuming that *the professor* is in focus, the focus semantic

value of the second sentence is $\{ x$ revised the boys' papers $\mid x \in D \}$, of which the ordinary semantic value of the first sentence is not a member.

Analysis: We propose that the parallelism condition should be formulated in terms of Roberts' (1996/2012) Question under Discussion (QUD) model, where each discourse move is either an assertion or a question (Kehler and Büring 2007 pursue a similar idea to account for Dahl's puzzle). It is assumed that each assertion must be a partial answer to a congruent question, and each question must be related to some other question in the discourse (see below). Assuming this, we state our condition as follows.

(4) Call the question that the clause containing the elided VP is congruent to, Q_E, and the question that the clause containing the antecedent VP is congruent to, Q_A. In order for the VPE to be licensed, both of the following must be true: (i) Q_E is part of Strat(Q_A); (ii) Q_E entails Q_A.

We borrow from Roberts (1996/2012) the notion of the strategy of inquiry, Strat(), which is defined for all accepted questions as follows.

(5) Strat(q) := $\langle q, S \rangle$ such that (i) if there is no q' such that the last member of QUD(q') is q, $S = \emptyset$, (ii) otherwise S is the smallest set such that for each question q' such that the last member of QUD(q') is q, Strat(q') $\in S$.

QUD(m) here is the *QUD stack* for discourse move m. We extend Roberts' definition of QUD stacks using the notion of *follow-up questions* in order to cover various discourse relations besides subquestions, which Roberts exclusively focuses on.

(6) QUD(m) for any discourse move m is the smallest set of questions totally ordered by the temporal precedence $<$ such that for each $q \in$ QUD(m), (i) $q < m$; and (ii) for each $q' \in$ QUD(m) such that $q' < q$, q is a follow-up question of q'.

(7) q is a follow-up question of q' if either of the following is the case.
   a. q has not been completely answered and q' contextually entails q (q is a subquestion of q').
   b. q' has been partially answered by p, and a true partial answer to q is explains p.
   c. q' has been partially answered by p, and a true partial answer to q is a consequence of p.

We assume that particles such as *too, because, so, although*, etc. signal what kind of follow-up question is intended (often implicitly). Also, (7) is arguably a non-exhaustive list of discourse relations, but one can easily add other relations, if necessary (see Kehler 2000, 2002, Hardt and Romero 2004).

Consider example (1) in light of (4). The strict and sloppy readings can be captured as cases where the two sentences answer the same question. More specifically, under the strict reading, the second sentence looks like *the professor ~~revised his$_y$ paper~~*, which is congruent to the question *Who revised his$_y$ paper?*. The first sentence is also congruent to the same question and is a partial answer to it. By definition, the strategy of inquiry for this question contains itself, and also the question trivially entails itself. Similarly for the sloppy reading.

Now let us turn to the sticky reading, represented as (2) where *their* refers to the boys. The second sentence is congruent to *Who revised the boys' papers?*. The first sentence is congruent to *Which of the boys revised his paper?*, and the particle *so* signals that these two questions stand in a consequence relation (7c). Thus, the strategy of inquiry for the latter includes the former. Furthermore, the former entails the latter. Therefore, we predict VPE to be possible, as desired.

Our analysis also correctly rules out the readings in (3). In these cases the relevant questions do not stand in an entailment relation.

Lastly, our analysis of VPE is similar in spirit to recent Question-based theories of clausal ellipses (such as *sluicing* and *fragment answers*) developed by AnderBois, Weir, a.o. We will consider possible ways to account for known differences between VPE and clausal ellipses within the QUD-based approach to ellipsis.

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Unlikely imperfectives

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This paper offers a novel observation of the event-in-progress reading of the imperfective aspect, as represented by the English progressive in (1).

(1) Diana Nyad is swimming from Cuba to Florida.

The observation is that "unlikely" progressives like (1)–progressives in which the fully culminated event is unlikely–display vagueness effects. Such effects include borderline cases and participation in the sorites paradox (see Kennedy 2007). For example, the truth of (1) depends on how far Nyad has swum (Dowty 1979, Landman 1992). If she has swum half the distance, speakers are disposed to treat (1) as true; if she has swum only a few meters, speakers are disposed to treat (1) as false (or perhaps infelicitous, see Portner 2011). This setup gives rise to the possibility of a sorites paradox for the progressive, as in (2).

(2) Premise 1. (At the reference time in the world of evaluation, Nyad has swum 85km (half the distance) on a path from Cuba to Florida.) Nyad is swimming from Cuba to Florida.
Premise 2. Any event of "swimming from Cuba to Florida" in which 1m less is swum is still an event of swimming from Cuba to Florida.
Conclusion. (At the reference time in the world of evaluation, Nyad has swum 3 meters.) ?? Nyad is swimming from Cuba to Florida.

Similarly, speakers may be unsure of whether an event of swimming $\frac{1}{4}$ (or $\frac{1}{8}$, or $\frac{1}{16}$, etc.) of the distance licenses (1). This is a borderline case. However, run-of-the-mill progressives like (3a) don't display these effects. For instance, (3a)'s correlate to Premise 2 is false (3b) (falsified by the sharp boundary between having something on the page and having nothing on the page, setting aside mental preparatory acts).

(3) a. Mark was drawing a circle.
b. Premise 2. # Any event of "drawing a circle" in which 1 degree less (of an arc) is drawn is an event of drawing a circle.

These vagueness effects are similar to those displayed by gradable adjectives, as is the split between the vague and non-vague predicates. A modal theory of the progressive (Landman 1992, Portner 1998) combined with a theory of gradable modality (Lassiter 2010, Klecha 2011) will derive both facts. First, this account follows Lassiter (2010) in adopting a probability measure over the set of possible worlds (4a) and a denotation of *likely* as in (4b).

(4) a. A Probability Space is a pair $\langle W, prob \rangle$, where W is a set of possible worlds and $prob : \mathcal{P}(W) \rightarrow [0, 1]$ is a function from subsets of W to real numbers between 0 and 1 such that $prob(W) = 1$ (and satisfying other conditions omitted here).
b. $[\![\text{likely}(\phi)]\!] = 1$ iff $prob(\phi) > s$
"ϕ *is likely* is true if ϕ's probability is greater than a contextually determined standard on the scale of possibility"

The second task is to combine this notion of modality with any modal theory of the progressive. The account adopts Portner's (1998) modal theory, which expresses the sensible intuition that the progressive ϕ is true if, in the normal course of events, ϕ would have reached completion. Combining Portner's insights with Lassiter's theory (and relativizing to an event time) yields (5).

(5) Prog(ϕ) is true at a pair of an interval and world $< i, w >$ iff there is an event e in w such that i is e's event time, ϕ *is likely* is true, and there is an interval i' such that $< i', w' \in \phi >$ and i' includes i as a non-final subinterval.

The semantics in (5) derive the vagueness facts straightforwardly. For instance, (5) is equivalent in relevant respects to (6a) (ι is the type of intervals, see Deo 2010), whose resemblance to (6b) is clear in the underlined portions. Tellingly, (6b) is the denotation of the *positive* morpheme, responsible for vagueness effects in the positive form of relative gradable adjectives. The explanation for vagueness effects in the aspectual and adjectival domains is therefore the same, residing in the contextual standard function s (see Kennedy 2007 for discussion).

(6) a. $[\![\text{Prog}(\phi)]\!] = \lambda\phi_{\langle\iota,t\rangle}\lambda i.\exists i'[i \subset_{nf} i' \wedge \underline{prob(\phi)(i') > s}]$
b. $[\![pos]\!] = \lambda g_{\langle d,t\rangle}\lambda x.\underline{g(x) > s}$

However, (6a) predicts that all progressives should display vagueness effects, when data from run-of-the-mill progressives do not support this prediction (3a, 3b). A choice-functional analysis of the progressive resolves this inconsistency. In particular, let the standard function s be a choice function over the probability space $C(W, \geq)$ (7) (Sen 1970).[1]

(7) If $C(W, \geq)$ is defined, there is a best element in every nonempty subset S of W, where an element w in S is a "best element" of S with respect to $\geq$ iff $\forall y[y \in S \rightarrow w \geq y]$

This account makes the further assumption that there may be many different orderings $\geq_i$ of possibility figuring into the semantics of the progressive. These orderings are all aggregated into the final ordering $\geq$. This assumption is supported by sentences like (8).

(8) In one respect, Nyad is swimming from Cuba to Florida, but in another respect, she is not (swimming from Cuba to Florida).

As Sen (1970) shows, where the different orderings agree on what is likely, the choice function is well-behaved. But where the orderings may disagree significantly (i.e. where one ordering places world w_1 near the top of the possibility scale but another ordering places it near the bottom), the choice function gives rise to intransitivities. This account demonstrates how intransitive orderings lead to vagueness effects (more broadly, vagueness effects do not result from the existence of a contextual standard but from how the choice function s sets that standard). The upshot for vagueness effects in the progressive is this: unlikely imperfectives are just those in which judgments of likelihood may vary wildly; run-of-the-mill progressives are those in which judgements of likelihood are apt to agree. Therefore, this account predicts vagueness effects in unlikely imperfectives but not in their run-of-the-mill cousins. Such an approach unifies vagueness phenomena in aspectual and adjectival semantics. Finally, this account captures the progressive's "description sensitivity," and it predicts the felicity of some seemingly impossible imperfectives, like *Elena was writing a book (right before she died)*, by relativizing their interpretation to possibility orderings $\geq_i$ that bracket the interrupting event (e.g. Elena's death).

Refs. Deo 2010, Unifying the imperfective, *L&P*. Dowty 1979, *Word meaning*. Kennedy 2007, Vagueness & grammar, *L&P*. Landman 1992, The progressive, *NLS*. Lassiter 2010, Gradable epistemic modals, *SALT 20*. Portner 1998, The progressive in modal semantics, *Lang.* – 2011, Perfect and progressive, *Int'l Handbook of NLM*. Sen 1970, *Social Choice & Collective Welfare*.

[1] (7) ignores the potential incommensurability of worlds in W, though a refinement taking this into account would not alter the point made here.

Is 'more possible' more possible in German?

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1. The debate. The gradability of modals has received considerable attention in recent literature. While some modals are undisputably gradable (e.g. *more likely*), there is disagreement about 'possible'. Kratzer (2012) and Lassiter (2011) claim it is gradable; Klecha (2012) disagrees.

2. A puzzle. The central argument for gradable possibility comes from the widely attested occurrence of possibility modals in *eher* comparatives in German (Kratzer 1981, 2012):

(1) Der Gauzner-Michl **kann eher** der Mörder sein als der Kastenjakl.
The Gauzner-Michl **can** **EHER** the murderer be than the Kastenjakl
'Gauzner-Michl is more likely to be the murderer than Kastenjakl.' (Kratzer 1981)

(2) Dies ist auf regional/lokaler Ebene **eher** **möglich**, als auf der staatlichen Ebene.
This is on regional/local level **EHER** **possible** than on the national level
'This is more likely possible on a regional than on a national level.' (Web)

Does German reveal that possibility is a gradable notion and that the limited availability of English *more possible* (highlighted by Klecha) is merely an uninteresting gap (as argued by Kratzer)? We argue instead that *eher* is not a simple comparative but semantically complex, and that its internal complexity explains why it can combine with non-gradable modals like *möglich/kann*.

3. A contrast: *eher* vs. *-er*. Evidence that *eher* is not an ordinary comparative comes from the contrast between (2) and the minimally different and ungrammatical comparative: **Dies ist auf regionaler Ebene möglich-er als auf staatlicher Ebene* 'This is on regional level possible-COMP than on national level'. This contrast parallels one we find with prototypical non-gradable adjectives like 'pregnant', where only the combination with *eher* is grammatical:

(3) Maria ist **eher** **schwanger/*schwanger-er** als Eva.
Maria is **EHER** **pregnant/pregnant-COMP** than Eva
(With *eher*: 'I am more inclined to say that Maria is pregnant than that Eva is.')

Though gradable adjectives appear with both *eher* and *-er*, the resulting interpretations differ:

(4) Eva ist **eher** **groß/größ-er** als Maria.
Eva is **EHER** **tall/tall-COMP** than Maria
'I am more inclined to say that Eva is tall than I am inclined to say that Maria is tall.'

The *-er* variant does not require Eva's or Maria's height to exceed the contextual standard for tallness. *Eher*, in contrast, conveys that the speaker is making a conjecture, and to the extent that the conjecture is true, Eva's height exceeds this standard (the effect of POS; Kennedy & McNally 2005). Thus, *größ-er* in (4) but not *eher groß* is felicitous with a continuation 'but neither is tall.'

4. Analysis. We hypothesize that *eher* grades epistemic commitment. This explains why it can combine with non-gradable predicates, such as 'pregnant' in (3), and it also explains the particular meaning it gives rise to when it combines with gradable predicates. Exploiting the morphological fact that *eher* is the comparative member of a paradigm consisting of a root *eh* and a superlative *(am) ehestens*, we propose a compositional analysis of *eher* sentences based on the meanings of *eh* and a comparative morpheme *-er*:

I. *Eh* is an epistemic predicate relating a proposition p to the degree to which p is epistemically clear to a contextually salient individual z. In a declarative, the contextually salient individual is typically the speaker; in a question, it is the addressee (cf. Zimmermann 2004, McCready 2007).

(5) $[\![eh]\!]^z = \lambda p.\lambda d.p$ is d-clear to z

II. German *-er*, in turn, is a clausal comparative (Lechner 2001, 2004): the gradable predicate that is overt in the matrix clause also occurs covertly in a 'than'-clause, and, as in (6), the comparative combines with two predicates of degrees (type $< d,t >$) requiring the second to have a greater maximal element than the first (von Stechow 1984).

(6) $[\![\text{-}er]\!] = \lambda P_{<d,t>}.\lambda Q_{<d,t>}.max(Q) > max(P)$

Putting the semantics of *eh* and *-er* together, the *eher* variant of (4) has the structure in (7) and composes semantically as in (8) (glossing over the contribution of a standard of tallness by POS).

(7) [[*er* [than ~~*eh* tall~~ Maria ~~is~~]] [*eh* Eva is tall]]

(8) a. $[\![eh\ Maria\ is\ tall]\!] = \lambda d.[\![Maria\ is\ tall]\!]$ is d-clear to z
b. $[\![eh\ Eva\ is\ tall]\!] = \lambda d.[\![Eva\ is\ tall]\!]$ is d-clear to z
c. $[\![(7)]\!] = max(\lambda d.[\![E.\ is\ tall]\!]$ is d-clear to $z) > max(\lambda d.[\![M.\ is\ tall]\!]$ is d-clear to $z)$

5. More possible? We take the ungrammaticality of comparative **möglich-er* to show that *möglich* 'possible' is not gradable. When 'possible' appears with *eher*, the comparison is between degrees of epistemic commitment to the possibility of the embedded proposition (so (2) conveys that the speaker's commitment to the relevant event being possible on a regional level is greater than her commitment to it being possible on a national level). Theoretically, analyses that attribute gradable properties to 'possible' generate an expectation that this modal appears in regular comparative constructions. The fact that this expectation is not met (setting coercion aside) supports a more traditional view of the modal as an existential quantifier over possible worlds (Klecha 2012; cf. Lassiter 2011).

6. Further discussion. *Eher* is in several respects similar to "metalinguistic comparatives" (MLCs, e.g. *He is more dumb than crazy*): non-gradable predicates are fine in MLCs (cf. (3)) and they imply that the adjective holds absolutely (cf. (4); Morzycki 2011, Giannakidou and Yoon 2011). *Eher* also differs from MLCs, however, since the MLC comparative seems to combine with two properties rather than two propositions and it does not contain an overt epistemic component. Our analysis assimilates *eher* comparatives and MLCs at an abstract level, by exploiting the epistemic meaning of *eh* within a clausal comparative structure.

Decomposing *eh-er* into semantically contentful morphemes, we are able to consider a relationship between the modal use of *eh* and two seemingly unrelated uses of the word: a discourse particle *eh* meaning 'obviously, anyway' (typical of Austrian and Bavarian dialects; Hentschel 1983), and a temporal adverb meaning *eh/eher/ehestens* 'soon/er/est', which, though archaic, is still partly accessible to speakers.

7. Conclusion. The ability of the comparative *eher* to combine with 'possible' in German does not constitute evidence for a gradable notion of possibility. If, as we propose, *eher* includes an epistemic component, then on closer look German in fact provides evidence for a basically non-gradable meaning for 'possible'. Our analysis of *eher möglich* contributes a new perspective on the crosslinguistic expression of non-standard, "metalinguistic" comparatives.

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On Line Processing of ACD Gives No Evidence for QR

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Antecedent Contained Deletion (ACD) as in (1) has been used as evidence for a level of LF at which the object is raised out of the matrix since at least as early as Sag (1976):

(1) Sarah read the/every newspaper that Katie did (while visiting Spain).

Conventional wisdom is that the relative clause in (1) requires *read t* to be present or supplied at the ellipsis site, and an antecedent supplying this is available only if the object undergoes QR. But there are alternatives. Cormack, (1984), Jacobson (1992, 2003) and others show that under assumptions in Categorial Grammar (and related theories), all that needs to be supplied in (1) is a 2-place relation which is available as the meaning of *read* in the matrix.

Recently, Hackl, Koster-Hale and Varvoutis (HKV) (2012) revisit ACD, and attempt to provide new evidence for the QR analysis based on on-line processing results. Assuming that the processor applies the minimal steps necessary to compute a meaning, then – in the version of (1) with *the* as determiner – QR will not apply until the ellipsis site is encountered. There should thus be a cost at that site, which would be absent for the *every* case, since QR would have already applied. HKV did find a slowdown in reading times after the ellipsis site in the *the* condition compared to the *every* condition, and also the *the* condition has lower acceptability in off-line judgments. They further considered cases like (2) (a portion of their Exp. 2):

(2) Sarah was reluctant to read the/every newspaper that Katie was.

Here they claim that *every* should have no advantage, reasoning as follows: As known since Sag (1976), these require a *de re* reading in which the object has widest scope. The "do as little as possible" processor will indeed have already applied QR to *every* but only to the edge of the *read* clause. But this does not resolve the antecedent containment paradox. In both conditions, then, the processor needs to perform QR at the ellipsis site. Their prediction was borne out: in Big Ellipsis as in (2), *every* had no advantage over *the* (actually, the reverse held).

We present experimental evidence that the HKV effect has nothing to do with QR. We show that the effect is due to reduced acceptability of stimuli like (1) with *the* because of heavy pressure to insert *also* or to use *the same*. (Similar cases requiring *also* or *too* are discussed in, e.g., Kaplan 1984, Amsili 2012). The pressure is absent or greatly reduced with *every*, and we hypothesize that when the events are "the same" there is pressure in this configuration to call attention to that fact unless some other connection can be established (e.g., a causal connection or a connection given by context). We show that *every* naturally allows speakers to establish a causal connection, much more so than does *the*. Finally we show that HKV's result that *every* loses its advantage over *the* in the "big ellipsis" Exp. 2 is predicted by our account, but is actually not predicted by theirs, and we speculate on why *the* has a greater advantage here.

By way of elaboration: First there are weaknesses in the reading time data. Some of this is addressed separately in Gibson, Mahowald, Piantadosi, and Levy (subnmitted). Moreover, an attempted replication of HKV's Experiments 1 and 2, using 80 participants in each (more than HKV's experiments: 50 and 48) demonstrated no reliable effect.

We did, however, replicate the judgment contrast in cases like (1), using a judgment task run on Amazon's Mechanical Turk with 80 speakers, and using the exact stimuli used in HKV. We conclude that the acceptability contrast is real, but is independent of QR. Note that while HKV compared (1) to a case with a full verb, they used a different verb (with a different meaning) than the one understood at the ellipsis site. They did not compare sentences like (1) to corresponding ones with the full verb *read* (rather

than ellipsis) in the relative clause. They (very briefly) defend the lack of running this control by positing that use of the same verb may cause the processor to supply deaccented prosody, which itself - under a certain set of assumptions - would trigger QR (to satisfy the conditions on deaccenting). But this logic is invalid. First it is not at all clear that deaccenting in the corresponding spoken materials (with a full identical verb) would require identity of LF (and hence force QR). Actually, it is well known (see, e.g., Lakoff 1971, Rooth 1992) that deaccenting in general does *not* require identical LFs or any kind of linguistic identity; material can be deaccented in virtue of information which is inferred. But suppose that deaccenting of the full verb in the case at hand does require identity of LF (and hence QR). It is still true that there is no reason to think that the *processor* would supply deaccented prosody - for the processor cannot "know" to deaccent unless it has already inferred the meaning, which is of course what it is trying to do. (Note that not every instance of a repeated verb allows deaccenting; deaccenting is allowed only when the overall semantics is right.) In fact, if identity of LF is required here then there is no reason to conclude that full repeated verb (*read* in (1)) *must* be deaccented, and so again no reason to speculate that the processor would supply deaccented prosody. After all, if deaccenting is licensed only when QR occurs, then - since nothing (in the grammar) forces QR in the *the* case - deaccenting would simply be optional; its conditions need not be met.. We therefore conclude that the same verb condition is an essential control. We ran this, and there remains an advantage for *every* over *the* (albeit weaker). Since the same verb condition does not force QR, we conclude that the HKV effect is not driven by QR. Our hypothesis predicts that the advantage remains, and we will show that it is also consistent with the advantage being weaker.

Since we posit that the effect is due to a pressure to insert *also* (or some similar form such as *the same*) in the *the* condition, we also tested cases like (1) where the object has the form *the/every newspaper that Katie also did*. Indeed the advantage for *every* disappears. While the presence of *also* would (under a certain set of assumptions) itself trigger QR in the *the* condition, this is no different than the situation with ellipsis. The *also*-driven QR does not happen until later (when *also* is encountered), so the same penalty should be present. But it isn't.

But why is there no (or less) pressure to insert *also* with *every?* We hypothesize that this pressure disappears if an independent connection can be established between the events, and use of *every* allows for a natural causal connection (which we label the "copycat" reading). We tested this on Mechanical Turk (40 subjects and 20 items for each condition) using a judgment task asking subjects the likelihood of (for example) the following sentence being true following the *every* and the *the* condition (with full verb in the frame sentence): *Sarah read The Globe because Katie read the Globe*. Subjects rated the *because* sentences as significantly more likely to be true in the *every* condition, confirming that *every* more easily supports a causal connection. That the establishment of an independent connection (such as a causal connection) is sufficient to remove the pressure for *also* is shown by additional experimental evidence: the penalty for *the* (without *also)* disappears entirely if prior context establishes a connection.

The full paper will address in greater detail HKV's Experiment 2. Here we address just one aspect: the lack of advantage for *every* over *the* in the "Big Ellipsis" condition in 2. First, contrary to HKV's claims, their model predicts that *every* should still have an advantage. Although QR is needed in either case, the "minimal processor" hypothesis predicts that in the *the* condition 2 QRs are necessary, because the processor cannot "know" in advance that the low QR will not result in a good antecedent, and so it would perform that first. Hence the *every* condition requires 1 instance of QR while the *the* condition requires 2. In our account, though, the availability of the "copycat" reading is absent in Big Ellipsis for *every*. This is because Big Ellipsis requires a *de re* interpretation. In any example where the matrix verb/adjective expresses an attitude on the part of the subject, the possibility of "copycat" reading is absent if the object DP is out of the scoped of that attitude. Indeed at least 65% of the HKV stimuli have this property (and others are also such that the *de re* interpretation removes the copycat reading). In sum, then, the HKV effect seems to be independent of QR; the consequences of this is that grammatical architectures making no use of LF are perfectly consistent with the HKV effect.

***Plural indefinite articles: the case of* des *and* unos**

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The paradigm of plural indefinite articles is different from the singular one in that singularity is a single-flavored concept whereas plurality comes in two flavors, an inclusive and an exclusive one. We argue that this leads to two different kinds of articles – exemplified by French *des* and Spanish *unos* – each with their own properties with respect to blocking, aspect and pragmatics.

Background | The Spanish determiner *unos* (Laca & Tasmowski 1993; Villalta 1994; Gutiérrez-Rexach 2001, 2010; Lopez-Palma 2007; Martí 2008; Alonso-Ovalle & Menéndez-Benito 2012) shares a number of characteristics with prototypical indefinite articles like English *a*: (i) it doesn't allow for partitive readings (#*A* child is dumb. #*Unos* niños son mudos.), (ii) it cannot be used as an answer to a *how many* question (How many children came? **A* child came/ **Unos* niños vinieron), (iii) and it can occur in the scope of a generic operator without giving rise to taxonomic readings (*A* millionaire doesn't travel coach. / Unos millonarios no viajan en segunda clase.) These three characteristics set *a* apart from the numeral paradigm as well as from other indefinite determiners and have consequently been taken to define the class of indefinite articles (Farkas 2002, Krifka 2004, Le Bruyn 2010). For *unos*, however, an article analysis in which it would be the simple spell-out of existential quantification in the plural is rarely explicitly defended. Wisdom has it that plural indefinite articles block bare plurals from appearing as arguments, and semantically behave like French *des*. We challenge these predictions by exploring recent advances in plurality, improving on the semantics of *for*-adverbials, and challenging the alleged incompatibility of *unos* with distributive predicates.

Plurality | Plurality is crucially different from singularity in that it comes in two flavors: an inclusive (atoms + plural individuals/groups) and an exclusive one (plural individuals/groups). We follow Krifka (1989), Sauerland et al. (2005), Spector (2007), Zweig (2008) and Farkas & de Swart (2010) in assuming that the morphological plural on nouns can express an inclusive interpretation.

Given that we have two flavors of plurality, we expect there to be variation in the plural indefinite article paradigm. *Des* and *unos* illustrate this: the former resembles standard plural morphology in that it can express an inclusive interpretation, the latter only expresses an exclusive one:

(1) Tu as vu des enfants ('Have you seen DES children')? Yes, I have seen one.

(2) Has visto unos niños ('Have you seen UNOS children')? *Yes, I have seen one.

Even though the choice of plurality flavor seems to be a minor issue, it has important consequences for blocking. Following Chierchia (1998), we assume articles block covert type-shifts as soon as their contribution is truth-conditionally equivalent to the type-shifts in question. Under the assumption that *des* expresses the same plural as plural morphology, we expect it to block bare plural nouns from appearing in argument position. *Unos* is different and consequently doesn't play a blocking role.

Aspect | *Unos* objects are not compatible with *for*-adverbials whereas *des* objects are:

(3) Il a cueilli des fraises pendant une heure. ('He picked DES strawberries for an hour')

(4) *Preparé unas galletas durante una hora. ('He prepared UNOS cookies for an hour')

We argue that this difference can be reduced to the difference in plural flavor treated above and that it should consequently not be taken as an argument against the article status of *unos*.

Krifka (1989) proposes that *for*-adverbials turn atelic predicates into telic ones and that atelicity should be seen as a combination of cumulativity of the verb and cumulativity of the object. Zucchi & White (2001) point out that Krifka has a problem with *some N* as well as *a sequence* (see also Alonso-Ovalle & Menéndez-Benito 2012 on *unos*) given that these can be argued to be cumulative but are nevertheless incompatible

with *for*-adverbials:

(5) #John wrote some letters for half an hour.

(6) #John wrote a sequence for half an hour.

They propose a DRT analysis instead in which all run-of-the-mill objects are in some sense non-cumulative. The reason *letters* ends up being compatible with *for*-adverbials has to do with the fact that *letters* doesn't directly refer to actual letters but to kinds instead.

A straightforward problem for Zucchi & White's analysis is that bare plurals in Romance as well as *des* N behave the same but crucially don't refer to kinds (Dobrovie-Sorin & Laca 2003). A non-referential analysis wouldn't help either given that Romance bare plurals and *des* N – unlike Romance bare singulars (Espinal & McNally 2011) – are compatible with non-restrictive relative clauses (see (7)), suggesting that they come with their own referential force.

(7) Emily sometió los resultados a sencillas estadísticas que – por lo demás – no eran necesarias.
Emily submitted the results to simple statistics that – for the rest – were not necessary.

Our proposal goes back to Krifka's but instead of tying the compatibility of predicates with *for*-adverbials to cumulativity, we tie it to (partial) divisiveness. Building on insights in the literature on pluractionality (Van Geenhoven 2005 and de Swart 2006), we propose that a sentence like *John ate apples for an hour* is not about a succession of events closed off by *for an hour* but rather about a single event of eating apples that took an hour and for which it necessarily holds that there is a plurality of subevents to which the same predicate applies. We add this last condition as a felicity condition in (8).

(8) $[\![\text{for an hour}]\!] = \lambda P(P(e)\&h(e)=1/\forall e'(P(e')\rightarrow\exists e''\exists e'''(e''<e'\&e'''<e'\&e''\neq e'''\&P(e'')\&P(e''')))$

Independent support for (8) comes from coercion: (4), (5) and (6) become grammatical as soon as we give them an iterative interpretation. The contrasts for the default readings follow if we make one extra assumption for bare plurals and *des* N, *viz.* that – despite the fact that they are semantically compatible with a singular interpretation – they can never be used if plurality is not at issue (Farkas & de Swart 2010). This means that at least the event e' in (8) has to involve a plurality. With this assumption in place, all the facts follow: we predict (i) bare plurals and *des N* to be compatible with *for*-adverbials, (ii) *unos* N – given its exclusive plural interpretation – to be incompatible with *for*-adverbials: there is no guarantee that a predicate containing *unos* N will be true of e', e'' and e''', (iii) the noun *sequence* as well as the DP *some N* to be incompatible with *for*-adverbials: like *unos*, they come with no guarantee that a predicate that is true of e' is also true of e'' and e'''.

Distributivity | *Des* N is known to allow for collective and distributive readings whereas *unos* – since Villalta (1994) – has been claimed to only be compatible with collective readings. Extensive corpus research as well as native speaker judgments however show that *unos* has a strong preference for collective readings but does not impose them. If it did, it should turn out to be incompatible with overt distributive operators like *cada uno* and *sendos*, contrary to fact (data from CREA and CORDE, *contra* Gutiérrez-Rexach 2001):

(9) Unos espectadores que habían apoquinado sus buenas pesetas **cada uno** para...
('UNOS viewers that had **each** spent their precious pesetas to...')

(10) unos medallones antiguos con **sendos** relieves de pasta de marfíl
('UNOS antique medals **each** with its marble paste relief')

We conclude that the collective nature of *unos* comes from pragmatics rather than from semantics. The inclusive/exclusive plural distinction gives us the beginning of a handle on this: if *unos* competes with the bare plural in expressing exclusive rather than inclusive plurality, we expect distributive readings – which undo part of the effect of exclusive pluralization – to be dispreferred. No such preference comes with *des* as it has no bare plural competitor.

Generalized focus intervention

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1 Introduction This study develops Li and Law's (2013) approach to focus intervention effects (FIEs), arguing that it makes desirable predictions regarding FIEs in alternative questions, sentences with indefinites, and contrastive topic constructions. Differing from previous analyses of FIEs, which unselectively ban *wh*-phrases in the scope of a focus operator (Beck 2006, Cable 2010, Mayr 2013), Li and Law (2013) take into consideration the grammaticality contrast between FIEs (1a) and focus association with *wh*-phrases (FWHA) (1b) in *wh*-in-situ languages (Mandarin examples are used for illustration).

(1) a. ?*Ta zhi rang $[\text{Lee}]_F$ jian shei?
he only allow Lee meet who
'Who is the person x such that he allows *only Lee* to meet x?'

b. Ta zhi rang shei jian Lee?
he only allow who meet Lee
'Who is the person x such that he allows *only x* to meet Lee?'

Based on the contrast between FIEs and FWHA, they proposed that FIEs arise iff a focus operator scopes over a constituent that provides a set of sets as the quantificational domain for the focus operator.

2 Deriving FIEs The LF structure of (1a) is (2) (the English gloss is used throughout for simplicity). Following the flexible functional application (FFA) (Hagstrom 1998), *who* is composed in a pointwise manner. As a result, the ordinary value of VP1 is a set of properties (3a). The secondary value of VP1 is (3b), in which the assignment function *h* is activated to interpret $[\text{Lee}]_{F1}$ as a distinguished variable (Kratzer 1991). Therefore, the focus value of VP1 is (3c), which is a set of sets of properties.

(2) $[_{CP}\,[_{IP}$ he $[_{VP2}$ only $[_{VP1}$ allow $[\text{Lee}]_{F1}$ meet who]]]]

(3) a. $[\![\text{VP1}]\!]^g = \{\lambda y.\ y \text{ allows Lee to meet } x \mid x \in \{\text{John, Peter, …}\}\ \}$

b. $[\![\text{VP1}]\!]^{g,h} = \{\lambda y.\ y \text{ allows } h(1) \text{ to meet } x \mid x \in \{\text{John, Peter, …}\}\}$

c. $[\![\text{VP1}]\!]^f = \{\{\lambda y.\ y \text{ allows } h(1) \text{ to meet } x \mid x \in \{\text{John, Peter, …}\}\} \mid h \in \text{H}\}$

According to Kratzer (1991), the focus value of a given constituent provides the quantificational domain for a focus operator. In (2), *only* takes $[\![\text{VP1}]\!]^f$ as its quantificational domain. At the level of the ordinary value, the composition of *only* with VP1 is facilitated by the FFA, which results in a new set (4).

(4) $[\![\text{VP2}]\!]^g = [\![\textit{only}\ \text{VP1}]\!]^g$
$= \{\lambda y.\ \forall P \in [\![\text{VP1}]\!]^f [P(y) \rightarrow P(y) = y \text{ allows } x \text{ to meet Lee}] \mid x \in \{\text{John, Peter, …}\}\}$
$= \left\{ \begin{array}{l} \lambda y.\forall P \lambda [\![\text{VP1}]\!]^f\ [P(y) \rightarrow P(y) = y \text{ allows John to meet Lee}], \\ \lambda y.\forall P \lambda [\![\text{VP1}]\!]^f\ [P(y) \rightarrow P(y) = y \text{ allows Peter to meet Lee}], \ldots \end{array} \right\}$

Note that the quantificational domain of *only* is inappropriate. In (4), *only* should quantify over properties, but *its quantificational domain is a set of sets of properties*. The composition is illicit, giving rise to FIEs.

3 Deriving FWHA The LF structure of (1b) is (5). Since no focused phrase is contained in the scope of *only*, the secondary value of VP1 is equivalent to its ordinary value, i.e., a set of properties (6).

(5) $[_{CP}\,[_{IP}$ he $[_{VP2}$ only $[_{VP1}$ allow who meet Lee]]]]

(6) $[\![\text{VP1}]\!]^g = [\![\text{VP1}]\!]^{g,h} = \{\lambda y.\ y \text{ allows } x \text{ to meet Lee} \mid x \in \{\text{John, Peter, …}\}\}$

Although *h* is not used to compute VP1, $[\![\text{VP1}]\!]^{g,h}$ still denotes a set of alternatives by virtue of containing *who*. *Only* can directly take $[\![\text{VP1}]\!]^{g,h}$ as its quantificational domain. At the level of the ordinary value, *only* is applied to each member of the set in (6), resulting in a new set (7).

(7) $[\![\text{VP2}]\!]^g = [\![\textit{only}\ \text{VP1}]\!]^g$
$= \{\lambda y.\forall P \in [\![\text{VP1}]\!]^{g,h} [P(y) \rightarrow P(y) = y \text{ allows } x \text{ to meet Lee}] \mid x \in \{\text{John, Peter, …}\}\}$

$$= \left\{ \begin{array}{l} \lambda y.\forall P \in [\![\text{VP1}]\!]^{g,h}[P(y) \rightarrow P(y) = y \text{ allows John to meet Lee}], \\ \lambda y.\forall P \in [\![\text{VP1}]\!]^{g,h}[P(y) \rightarrow P(y) = y \text{ allows Peter to meet Lee}], \ldots \end{array} \right\}$$

The quantificational domain of *only* is a set of properties; hence, the composition is licit.

4 Alternative questions The contrast between FIEs and FWHA can also be observed in alternative questions in English. (8a) shows that FIEs arise when both a focus and a disjunctive phrase fall in the scope of *only*; (8b) shows that FIEs does not arise when only the disjunctive phrase is in the scope of *only*.

(8) a. *Did only $[\text{John}]_F$ drink $[_{\text{DisjP}}$ TEA or COFFEE]? (Alt-Q)
b. Did John only drink $[_{\text{DisjP}}$ TEA or COFFEE]? (Alt-Q)

If we take a disjunctive phrase to denote what a *wh*-phrase denotes, i.e., a Hamblin set, as suggested by von Stechow (1991) and Biezma and Rawlins (2012) (see also Beck and Kim 2006), the contrast between (8a) and (8b) follows straightforwardly from the analysis of FIEs and FWHA in the previous sections.

5 Indefinites We have observed that an indefinite in an intensional context fails to have a *de re* reading when it is in the scope of a focus-sensitive operator being associated with a focused phrase. As a consequence, the indefinite in (9a) fails to license the cross-sentential anaphora. (9b) shows that the *de re* reading of the indefinite is possible when *only* is not present.

(9) a. Only $[\text{John}]_F$ wanted to watch *a movie*. #It's Titanic.
b. John wanted to watch *a movie*. It's Titanic.

We propose that the lack of the *de re* reading is due to FIEs. Inspired by Kratzer and Shimoyama (2002), we adopt Hamblin semantics to analyze indefinites. Specifically, *a movie* has the denotation in (10). The LF of (9a) is (11).

(10) $[\![\text{a movie}]\!]^g = \{x \text{ is a movie } \& \ x \in D_{<e>}\}$

(11) $[_{\text{IP3}}$ ∃ Only $[_{\text{IP2}}$ $[$ John $]_{F1}$ wanted $[_{\text{IP1}}$ to watch a movie]]

In order to get a *de re* reading, the expansion of the set denoted by the indefinite must be closed by an existential closure in IP3. Therefore, the ordinary value of IP2 denotes a set of propositions via set expansion (12a). Correspondingly, the secondary and focus values of IP2 are (12b) and (12c) respectively. Following the composition shown in section 2, FIEs arise when *only* takes $[\![\text{IP2}]\!]^f$ as its quantificational domain.

(12) a. $[\![\text{IP2}]\!]^g = \{[\text{John}]_{F1} \text{ wanted to watch } x \mid x \text{ is a movie } \& \ x \in D_{<e>}\}$
b. $[\![\text{IP2}]\!]^{g,h} = \{h(1) \text{ wanted to watch } x \mid x \text{ is a movie } \& \ x \in D_{<e>}\}$
c. $[\![\text{IP2}]\!]^f = \{\{h(1) \text{ wanted to watch } x \mid x \text{ is a movie } \& \ x \in D_{<e>}\} \mid h \in \text{H}\}$

6 Contrastive topic (CT) The current analysis also predicts that FIEs could appear in a CT constructions in Mandarin. Constant (2010, 2011) argues that the focus value of a CT construction denotes a set of sets. In (13a), for example, the second clause denotes a set of sets of propositions as its focus value, as in (13b).

(13) a. Mama meitian hen wan cai hui jia, $[_S$ $[\text{Baba}]_{CT}$ ne, gancui jiu $[\text{bu hui jia}]_F]$.
mother everyday very late just return home father NE simply just not return home
'Every day, mom comes home very late, and Dad does not even come home at all.'

b. $[\![S]\!]^f = \left\{ \begin{array}{l} \{\text{Mom comes home late, Mom does not come home, } \ldots\} \\ \{\text{Dad comes home late, Dad does not come home, } \ldots\} \end{array} \right\}$

Suppose that a focus operator scopes over the CT construction, it should take the set of sets in (13b) as its domain and trigger FIEs. (14) shows that this is indeed an illicit composition.

(14) *Zhiyou $[_S$ [baba] ne, gancui jiu [bu hui jia]$_F$]
only father NE simply just not return home
'Only Dad NE, does not even come back at all.'

5 Conclusion This paper has shed new light on the empirical domain of FIEs. Given that *wh*-questions, alternative questions and sentences with indefinites have all been argued to involve Hamblin sets, the fact that they are all sensitive to FIEs is unsurprising. This in turn provides strong motivation for adopting Hamblin's semantics as a general framework for analyzing FIEs.

Taste Predicates and the Acquaintance Inference

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Taste predicates (*tasty*, *delicious*, etc.) along with aesthetic predicates (*beautiful*, *elegant*, etc.) typically carry with them a requirement of *first-hand knowledge*. If we restrict our discussion to *tasty* (for simplicity), we have:

- **Observation 1**: Utterances of the form *o's are tasty* (e.g. *The lobster rolls are tasty*) typically convey the information that the speaker has actually tasted an *o* (Pearson, 2013).

Call the sort of inference associated with *tasty* an *acquaintance inference*. An utterance of the form *o's are tasty* would normally be odd if its associated acquaintance inference were false (if the speaker had, for example, only been told by a friend that the item in question was tasty). This is puzzling, for note the contrast here with most other predicates: I can, for example, say *The lobster rolls contain paprika* even if I haven't tasted them. I might assert this on the basis of testimony from a reliable informant. Here first-hand knowledge (i.e. tasting) is not required for assertion.

What is the nature of the acquaintance inference associated with *tasty*? The phenomenon has been discussed in philosophical aesthetics, where it has been analyzed as a conversational implicature (Mothersill, 1984). But the implicature hypothesis faces two problems:

- **Observation 2**: While conversational implicatures do not typically project over negation, acquaintance inferences do.
  1. *Scenario: a passerby is speaking to a motorist who is out of gas.*
     (a) There is a gas station around the corner. (*implicates p, where p = there is a gas station around the corner that is open*)
     (b) There isn't a gas station around the corner. (*doesn't implicate p*)
  2. (a) The lobster rolls at *Neptune Oyster* are tasty. (*suggests q, where q = the speaker has tasted the lobster rolls at Neptune Oyster*)
     (b) The lobster rolls at *Neptune Oyster* are not tasty. (*also suggests q*)
- **Observation 3**: While conversational implicatures can usually be cancelled quite easily, acquaintance inferences resist cancellation (cf. Klecha, 2013).
  3. There is a gas station around the corner, but it isn't open.
  4. ?? The lobster rolls at *Neptune Oyster* are tasty, but I haven't tried them.

Note that **Observation 2** also suggests that acquaintance inferences are not entailments, since entailments typically do not project over negation.

Observations 2 and **3** might seem to suggest that acquaintance inferences arise from a lexical presupposition of taste predicates (cf. Pearson, 2013), since presuppositions also project over negation and resist cancellation:

5. (a) John stopped smoking. (*presupposes that John used to smoke*)
   (b) John didn't stop smoking. (*also presupposes that John used to smoke*)
6. ?? John stopped smoking, but he never used to smoke. (*presupposition can't be cancelled*)

But the presupposition hypothesis also faces two problems:

- **Observation 4**: Presupposition-canceling negations cannot target acquaintance inferences.
  7. John didn't *stop* smoking – he's never smoked a cigarette in his life!
  8. ?? The lobster rolls at *Neptune Oyster* aren't *tasty* – I haven't even tasted them!
- **Observation 5**: Acquaintance inferences project over negation, but fail to project over many other presupposition 'holes'.
  9. *The following usually presuppose that John used to smoke*:
     (a) If John stopped smoking, his doctor will be happy.
     (b) John probably stopped smoking.
     (c) Did John stop smoking?
  10. *The following do not suggest that the speaker has tasted the lobster rolls*:

(a) If the lobster rolls are tasty, I will invest in the restaurant.
(b) The lobster rolls are probably tasty.
(c) Are the lobster rolls tasty?

(This last observation presumably also rules out an analysis in terms of *conventional* implicature.)

The unusual behavior of taste predicates can be explained by adopting the *Acquaintance Principle* (AP) (cf. Wollheim, 1980) and the *knowledge account of assertion* (Williamson 2000, a.o). The knowledge account of assertion says: One must assert p only if one knows p. AP says: Generally speaking, one can only know whether o's are tasty if one has tasted an o. AP is roughly equivalent to the conjunction of two claims: AP+ which says that, generally speaking, one can only know that o's are tasty if one has tasted an o; AP− which says that, generally speaking, one can only know that o's are *not* tasty if one has tasted an o.

If (competent speakers generally know that) one can know p only if q is true, then given the knowledge account of assertion, an assertion of p will typically convey q; in such cases, we say that an assertion of p *epistemically implicates* q. For example, since one can know p only if one knows p (here q = *one knows* p), an assertion of p epistemically implicates that the speaker knows p.

If (competent speakers generally know that) AP+ holds, then *I have tasted o* is a an epistemic implication of *o is tasty*; if (competent speakers generally know that) AP− holds, *I have tasted o* is also an epistemic implication of *o is not tasty*. So AP+ explains why acquaintance inferences arises in the first place (**Observation 1**), and AP− explains why they project over negation (**Observation 2**). **Observations 3** and **4** are likewise explained by this approach, since:

- Unlike conversational implicatures, epistemic implications resist cancellation:

  11. ?? It's raining, but I don't know that it's raining.

- Unlike presuppositions, epistemic implications cannot be targeted by presupposition-cancelling negations:

  12. ?? It's not *raining* because I don't *know* that it's raining.

What about **Observation 5**, the unusual projection pattern of acquaintance inferences? On this account, acquaintance inferences project over negation because of AP−, which more or less follows from AP. But note that AP doesn't entail analogous principles concerning conditionals or epistemic modals, such as 'AP-*probably*', which would say that, generally speaking, one can know that o's are probably delicious only if one has tasted an o. Thus, the present account doesn't lead us to expect acquaintance inferences to project over presupposition holes generally.

Two final points. First, this is only the beginning of an explanation of the acquaintance inference, since I have said nothing about *why* AP is true. Why is taste/aesthetic knowledge so different from other kinds of knowledge in this regard, which can normally be based on indirect evidence (such as testimony)? Second, **Observation 1** says that utterances of the form *o's are tasty* typically convey that the speaker has tasted an o. Typically, but perhaps not always. So suppose there are contexts in which one can appropriately utter something of the form *o's are tasty* without having tasted an o. Is this a problem for the present account? Not necessarily. For note that AP only says that *generally speaking*, one can only know whether o's are tasty if one has tasted an o. So AP allows that *sometimes* one can know whether o's are tasty even if one *hasn't* tasted an o. Thus, my conjecture is that contexts (if such there be) in which a speaker can utter a sentence of the form *o's are tasty* without having tasted an o are contexts in which the speaker can know whether o's are tasty even if she has not tasted an o. A complete account of the acquaintance inference, then, would include an account of why knowledge of taste claims requires acquaintance in most situations, but not in all. This is left as a topic for future inquiry.

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Indexicals and the long-distance reflexive *caki* in Korean

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Introduction It has been found that indexicals in the complements to attitude verbs can be interpreted with respect to the reported context instead of the actual speech context in many languages, such as Amharic (Schlenker 1999), Zazaki (Anand and Nevins 2004), Uyghur (Sudo 2012), Nez Perce (Deal To appear), etc., a phenomenon known as 'indexical shift'. The main goal of this paper is, first, to show that Korean is also a language that indexicals can optionally shift under certain attitude predicates, and to propose that there are two different *monsters*, i.e. context-shift operators, for person and adverbial indexicals, given the different properties of the two types of indexicals. This paper also presents novel data on the interactions between the indexicals and the long-distance reflexive/logophor *caki*: context-shift operators cannot intervene between *caki* and an antecedent of *caki*, which I dub the 'IS (indexical shift)-Blocking Effect.'

Indexicals in Korean I first show that both the 1st/2nd person pronouns and the temporal/locative adverbials, e.g. *yeki* 'here', *onul* 'today', *ece* 'yesterday', etc., are indeed indexicals in Korean, since they cannot co-vary with a quantifier unlike the expressions 'the speaker', 'same day', etc. (Kaplan 1989). Then, I present evidence that indexicals can shift in an indirect speech. For example, the shifted interpretation in (1) cannot be due to direct quotation, given the fact that the wide scope interpretation of the *in-situ* wh-phrase in the embedded clause is available. I also show that these facts are not due to partial quotation (Maier 2007) using arguments against to this approach developed by Sudo (2012).

(1) a. Mary-ka **nay**-ka **nwukwu**-lul cohahanta-ko malhayss-ni?
Mary-Nom I-Nom who-Acc like-C said-Q
'Who did Mary say {I like, Mary likes}?'
b. New York-eyse Mary-ka **nwuka** **yeki**-eyse thayenassta-ko malhayss-ni?
New York-in Mary-Nom who-Nom here-at be.born-C said-Q
'In New York, who did Mary say was born {here, in New York}?'

Person vs. Adverbial indexicals I next show that there are several key contrasts between person and adverbial indexicals in Korean. First, while the person indexicals can be shifted only under the predicates of communication, e.g. 'say', 'tell', etc., the adverbial indexicals are shiftable under other attitude verbs as well, such as 'think', 'believe', etc. Second, the person and adverbial indexicals do not have to shift together, while indexicals of the same type do. For example, unlike the two person indexicals in (2), the person and adverbial indexicals in (3) can shift independently, so that there is a four-way ambiguity.

(2) *Context*: John and Mary are having a conversation.
John: Tom-i Sue-eykey [**nay**-ka **ne**-lul cohahanta-ko] malhayssta.
Tom-Nom Sue-to I-Nom you-Acc like-C said
Lit. 'Tom said to Sue that I like you.'
a. 'I' = John, 'you' = Mary (Neither Shift) b. 'I' = Tom, 'you' = Sue (Both Shift)
c. *'I' = Tom, 'you' = Mary (*Speaker* Shift) d. *'I' = John, 'you' = Sue (*Addressee* Shift)

(3) *Context*: John and Mary are having a conversation in Seoul.
John: New York-eyse Tom-i [**nay**-ka **yeki**-eyse thayenassta-ko] malhayssta.
New York-at Tom-Nom I-Nom here-at be.born-C said
Lit.'Tom said in New York that I was born here.'
a. 'I' = John, 'here' = Seoul (*Neither* Shift) b. 'I' = John, 'here' = New York (*Adverbial* Shift)
c. 'I' = Tom, 'here' = Seoul (*Person* Shift) d. 'I' = Tom, 'here' = New York (*Both* Shift)

Third, when occurring in the same clause as the long-distance reflexive/logophor *caki*, person indexicals do not receive the shifted interpretation (4), but adverbial indexicals can (5).

(4) *Context*: John and Mary are having a conversation.
John: Tom-i Sue-eykey [**caki**-ka **ne**-lul cohahanta-ko] malhayssta.
Tom-Nom Sue-to caki-Nom you-Acc like-C said
'Tom$_i$ said to Sue that he$_i$ likes {Mary, *Sue}.'

(5) *Context*: John and Mary are having a conversation in Seoul.
John: New York-eyse Tom-i [**caki**-ka **yeki**-eyse thayenassta-ko] malhayssta.
New York-at Tom-Nom caki-Nom here-at be.born-C said
'In New York, Tom$_i$ said that he$_i$ was born {in Seoul, in New York}.'

Two Monsters Following Anand & Nevins (2004) and Anand (2006), I assume that indexical shift is the result of a context-shift operator that overwrites the context parameter on the interpretation function (6). However, given the different properties of the two types of indexicals, especially the fact that they do not have to shift together, I argue that there are two separate operators, OP$_{PER}$ and OP$_{ADV}$, for person and adverbial indexicals in Korean (Deal To appear for Nez Perce). OP$_{PER}$ only overwrites the author and hearer coordinates of the context parameter with those of the index parameter, while OP$_{ADV}$ overwrites the location and time coordinates (6).

(6) **Semantics of the two context-shift operators**
a. OP$_{PER}$: $[[\mathbf{OP_{PER}\ [\alpha]}\ ]]^{<Ac, Hc, \ldots>,i,g} = [[\mathbf{\alpha}]]^{<Ai, Hi, \ldots>,i,g}$
b. OP$_{ADV}$: $[[\mathbf{OP_{ADV}\ [\alpha]}\ ]]^{<\ldots, Tc, Lc>,i,g} = [[\mathbf{\alpha}]]^{<\ldots, Ti, Li>,i,g}$

Also, I argue that the incompatibility between *caki* and shifted person indexicals (4) is due to a presupposition born by *caki*. Unlike long-distance reflexives in other languages, in Korean, it is not possible for *caki* to have 1st or 2nd person antecedents. Consequently, I propose that *caki* bears the 3rd person phi-features, [-1st, -2nd] (Schlenker 2003). Thus, if the context-shift operator in (6a) appears by the subordinate clause in (4), *caki* will be unable to refer to *John*, the speaker of the reported context. Finally, since the operator in (6b) only shifts the time and location coordinates, *caki* can refer to *John* in (5).

Interactions between shifted indexicals and *caki* Finally, I discuss a second key interaction between shifted indexicals and *caki*: the context-shift operators in (6) cannot intervene between *caki* and its antecedent, if they are separated by more than one clause boundary. To illustrate, in (7a), we find that if the antecedent of *caki* is *Bill*, then the operator in (6a) can sit above the clause containing *Bill*, causing embedded 'I' to be shifted to *John*. In (7b), however, we see that if the antecedent of *caki* is *John*, then the operator in (6a) cannot sit above the clause containing *Bill*, nor can it sit above the clause minimally containing *caki* (thus no shifted reading of embedded 'I' is possible). This leads us to the generalization in (8), the 'IS-BLOCKING EFFECT'.

(7) [John-i [Bill-i [**cak**i-uy emma-ka **na**-lul silhehanta-ko] malhayssta-ko] malhayssta.
John-Nom Bill-Nom caki-Gen mom-Nom I-Acc hate-C said-C said
a. 'John$_i$ said that Bill$_j$ said that his$_j$ mother hates me (=John, *Bill, Speaker).'
b. 'John$_i$ said that Bill$_j$ said that his$_i$ mother hates me (=*John, *Bill, Speaker).'

(8) **IS-BLOCKING EFFECT**: If *caki* and its antecedent are separated by more than one clause, a context-shift operator cannot intervene between them.
*[$_{CP1}$ **NP$_1$** ... [$_{CP2}$ NP$_2$... ***OP$_{PER/ADV}$*** [$_{CP3}$ ***caki$_1$***... *ind$_2$*…]]]

I relate (8) to the obligatorily *de se* interpretation of *caki*. Unlike *caki* that is always interpreted *de se*, the 3rd person pronoun can be interpreted either *de re* or *de se* in Korean, as in many other languages. When *caki* is replaced by 'he' in (7), the 1st person pronoun can be shifted to 'Bill', while 'he' refers to the matrix subject, 'John', unlike *caki* in (7b). However, 'his' can only get a *de re* reading but not a *de se* reading in this case. Given this, I also suggest that this effect might be extended to more general cases regarding *de se*.

Copular asymmetries in belief reports

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In one way or another, copular sentences relating referential expressions are often thought of as symmetric in their semantics: on this view, *A is B* expresses that a symmetrical relation holds between the semantic value of *A* and the semantic value of *B*. The coherence of claims like (1) – emphasized by Cumming 2008 -- persuades us that this view is wrong. In this paper, we propose an essentially asymmetric analysis of these kinds of copular sentences, with the goal of accounting for their contribution to belief reports. We motivate the analysis with a treatment of known facts involving copular questions, and then show how it accounts for others.

(1) Mary thinks that Jessica is Sam, but she doesn't think that Sam is Jessica.

The proposal. *The main ingredients*: (i) Copular sentences may involve a relation PRED that relates an individual and an individual concept ((2)). (ii) An individual can be coerced to a concept, and thus an inherently individual-denoting expression can appear in the concept-argument position of PRED ((3)). While the precise nature of the coercion – the precise identity of *f* in (3) – depends on the context, there is a constraint. Our choice of *f* on a given occasion will make it the case that, for any individual *x* in its domain, the value of *f(x)* at an index i has properties at i that we presuppose *x* to have uniquely. *Examples*: Two examples appear in (4) (assuming that $[\![\text{ Jessica }]\!]^{c,i}$ is a certain individual *j* and $[\![\text{ Sam }]\!]^{c,i}$ a certain individual *s*). We imagine "PREDPs" like those in (4) as small clauses generated below *be*.

(2) $[\![\text{ PRED }]\!]^{c,i} = \lambda k_{<s,e>}. \lambda x_e. x = k(i)$

(3) $[\![\text{ PRED Z }]\!]^{c,i} = \lambda x_e. x = f([\![Z]\!]^{c,i})(i)$

(4) a. $[\![$ Jessica [PRED [^the violinist] $]\!]^{c,i} = 1$ iff *j* is the violinist in i

b. $[\![$ Jessica [PRED Sam] $]\!]^{c,i} = 1$ iff $j = f(s)(i)$ (where $f(s)(i)$ is the individual in i who has certain properties that we presuppose *s* to have uniquely)

Old facts involving questions. As observed by Percus 2003, in a context like (C1) it would make sense for me to whisper (5a) to you but not (5b). We see this as follows, assuming that the name *Jessica* denotes individual *j* who is standing in front of us. In the case of (5), extraction occurs from the argument position of PRED that is reserved for a concept (cf. (6a)). The question thus poses a choice among elements of (6b), and, given the context, it makes sense to pose a choice among three such elements – these propositions involve concepts that for a given index yield the trio's violinist at that index, or the trio's cellist, or the pianist. By contrast, in the case of (5b), extraction occurs from the position that is reserved for an individual ((7a)). To the extent that the sentence is interpretable at all, it is because *Jessica* is coerced to a concept, and in that case the question poses a choice drawn from (7b). It is clear that the propositions here do not correspond to propositions that we would use (5a) to pose a choice between. Moreover, if we consider the propositions in this set that make reference to salient individuals, arguably the constraints on *f* make the truth of each settled in the context; it therefore makes no sense to pose the question.

(C1) *The role dilemma scenario*. Having just been introduced to the members of a piano trio, we know their names but are not sure who plays which instrument. They are still standing in front of us.

(5) a. Who do you think Jessica is _ (-- the violinist) ?
b. Who do you think _ is Jessica (-- the violinist) ?

(6) a. … [Jessica [PRED t_1]]
b. $\{ \lambda i_s.$ For all i'$\in \text{Dox}_{\text{you(c)},i,s}$, $j = k(i') \mid k \in D_{<s,e>} \}$

(7) a. … [t_1 [PRED Jessica]]
b. $\{ \lambda i_s.$ For all i'$\in \text{Dox}_{\text{you(c)},i,s}$, $x = f(j)(i') \mid x \in D_e \}$

New facts involving questions. In context (C2) – a context in which we can take (1) to be true – it would make sense for me to whisper (8a) to you but not (8b). The view above extends naturally to these facts. It makes sense to ask (8a), because, given the context, it makes sense to pose a choice among propositions in (6'b) -- this time, however, the relevant propositions are arguably like what we would get by embedding (4b) under *Mary thinks*, and the concepts at play would be what we get by applying *f* to some individual. Asking (8b) is inappropriate because it does not seem to be an issue to which individual Mary attributes properties that Jessica has uniquely.

(C2) *The mistaken identity scenario*. Bill is throwing a party in honor of his cousin Sam who has just been awarded his PhD. All the guests know that, but they don't all know Sam (and some of them, like Mary, don't even know his name). When Jessica arrives, Mary, who is already completely toasted, walks up to her with a big smile. "You must be proud to be a doctor now," she says, "Is your wife coming too?" I am in the room (next to Sam) and can see that Mary is very confused, but haven't caught on yet as to the precise nature of her confusion.

(8) a. Who does Mary think Jessica is _ ?
b. Who does Mary think _ is Jessica ?

(6') a. … [Jessica [PRED t_1]] b. $\{ \lambda i_s.$ For all i' $\in Dox_{m,i,}$ $j = k(i') \mid k \in D_{<s,e>} \}$

(7') a. … [t_1 [PRED Jessica]] b. $\{ \lambda i_s.$ For all i' $\in Dox_{m,i,}$ $x = f(j)(i') \mid x \in D_e \}$

Cumming-style sentences. That we take (1) to be true in Context (C2) follows given that the precopular DPs correspond to external arguments of PRED and the postcopular DPs to internal arguments. (C2) makes salient the fact that Mary thinks that *j* -- the individual she is talking to -- has certain properties that *s* has uniquely in actual fact (the property of being the cousin of Bill's who has just been awarded his PhD, the property of being the guest of honor at Bill's party). Nothing about (C2) indicates that Mary thinks that *s* – the individual next to me – has certain properties that *j* has uniquely in actual fact.

Complications. We imagined above that the precopular DP always corresponds to the external argument of PRED and the postcopular DP to the internal argument. In that case, statements of the form *Mary thinks that A is B* should systematically express that Mary thinks that A has certain properties that B has uniquely in actual fact. In fact, however, statements of this form are ambiguous. This can be seen from the fact that, even though we can take (1) to be true in (C2), Bill, watching the scene with amusement, could also say (9) truly. A consideration of facts of this sort leads us to the following conclusions, akin to those of other "inversion" approaches to specificational sentences: (i) Copular sentences may contain an additional projection above PRED's projection, to which non-focused material may move; (ii) this additional projection constitutes a focus domain. This means that *Sam is Jessica* can be constructed starting from the ingredients in (10a) (Foc^0 in (10) is the head of the additional projection and is itself uninterpreted). At the same time, the use of this structure requires there to be a salient question that poses a choice among the propositions in (10b), which express that one individual or another has properties that Sam happens to have in actual fact; we suggest that Bill's utterance evokes a question like "Which one is the guest of honor?" a relevant question in light of Mary's mental state even if it is settled for the discourse participants. Crucially, we maintain that wh-words cannot extract from the higher position, and thus our analysis of (5b) and (8b) above remains unchanged. We argue that ultimately this condition follows from pragmatic principles – the basic idea is that questioning from the higher position conflicts with the givenness condition on the material in that position.

(9) Look! Mary thinks that SAM is JESsica!

(10) a. [$_{FocP}$ Foc^0 [$_{PREDP}$ $Jessica_F$ [PRED Sam]]]~C b. $\{ \lambda i_s.\ x = f(s)(i) \mid x \in D_e \}$

Notes. We made several simplifications in this abstract, most notably: (i) On our view, a sentence like *Mary thinks that Jessica is Sam* (if generated without inversion) describes a de re belief of Mary's about Jessica and is more properly paraphrased as *Mary ascribes to Jessica certain properties that Sam has uniquely in actual fact*. We have abstracted away here from the mechanism that yields de re readings. (ii) We actually assume, contrary to the way we presented things here, that predicates have index (world) arguments that are realized syntactically by variables; this opens up further questions. (iii) The use of indexicals like *you* and *I* rather than names adds some interesting additional wrinkles to the data, which we will discuss. Also, beyond what we summarized here : (iv) We will show that facts discussed by Romero 2005 are consistent with our approach and do not force us to posit an additional relational element in copular sentences as Romero does. (v) We will consider question-answer matching and show that an initially puzzling pattern can be described naturally.

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Extreme Modality

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Introduction. In the current literature, there is ongoing debate on how modal semantics and scale-based semantics combine in the interpretation of *more likely than, completely certain* and other gradable modal expressions. Importing the basic tools of scalar semantics into the modal domain has led Lassiter [2011], Klecha [to appear] and others to conflicting conclusions about the scales underlying the meaning of pairs like *likely/certain*. In this paper, we advocate a new perspective on the debate based on the observation that such pairs exhibit properties of NON-EXTREME/EXTREME adjectives [Paradis, 2001, Rett, 2008, Morzycki, 2012]. Focusing specifically on modal necessity operators, we address both the **compositional modeling** of modal gradability in a Kratzer-style quantificational framework, and the significance of the lexical distinction between **two strength levels** of necessity.

The modals. (1) exemplifies the gradability of *should*, *important*, and *likely*, on a par with a concrete gradable adjective such as *big*.

(1) (a) You should call Barbara more than you should call Alice. (cf. *bigger*)
(b) It is very important to talk to Barbara. (cf. *very big*)
(c) It is just as likely that Barbara will win as it is that Alice will. (cf. *as big*)

(2) shows that each of the modals in (1), which we call weak necessity modals, has a strong counterpart which entails it.

(2) (a) You must call Barbara. (entails *you should*)
(b) It is crucial to talk to Barbara. (entails *it is important*)
(c) It is certain that Barbara will win. (entails *it is likely*)

Our key observation is that strong necessity modals (*must, crucial, certain*) have the properties of extreme adjectives such as *huge*, *excellent* and *gorgeous*.

Extreme and non-extreme modals. Strong necessity modals, but not weak ones, have a host of properties associated with extreme adjectives. For example, (3)-(4) (we present additional tests from Morzycki 2012 in the paper):

- Extreme expressions readily take extreme modifiers (*downright huge* vs. **downright big*):

(3) (a) Susan positively/downright must/*should call her mother.
(b) It is positively/downright crucial/*important for Mary to call her mother.
(c) It is positively/flat-out/downright certain/*likely that Mary will call her mother.

- Extreme expressions are less natural with *very* (**very excellent* vs. *very good*):

(4) (a) Susan very much *must/should call her mother.
(b) It is very *crucial/important for Mary to call her mother.
(c) It is very *certain/likely that Mary will call her mother.

Lassiter [2011] points out the similarity between certain strong necessity modals (in particular, deontics) and what he calls "high degree adjectives". He treats them within a probability/utility framework as requiring degree standards much higher than the standards of their weak necessity counterparts. He does not, however, observe that strong necessity modals have the unique grammatical properties of extreme adjectives or make a connection to existing work on this class. We develop a scale-based analysis which integrates Morzycki's ideas about extreme adjectives with treatments of necessity modals in premise semantics. Our analysis can explain their grammatical properties and it formalizes a pragmatic account of what it is to be "extreme".

Analysis. Extreme adjectives are typically the upper-scale versions of relative open-scale adjectives (*big/huge, good/excellent*). Intuitively, they range over degrees that go beyond the normal or salient range of their scales. For a given scale S, a context C makes salient a subscale $S_C = \langle D_C, \leq \rangle$. The

extreme degrees, "off the salient scale", belong to the extended set D_C^+ in the scale S_C^+ [Morzycki, 2012]. We propose that the scale of necessity N has the same structure.

Our formalization has two major components. First, we build on von Fintel and Iatridou's [2008] proposal that weak and strong necessity modals differ in terms of two levels of ordering sources. Strong necessity modals make use of only the primary ordering source, while weak necessity modals make use of both the primary and secondary ordering sources. (We elaborate on the pragmatics of this choice below.) Second, we define degrees by considering alternative versions of an ordering source (given by $h(o(w))$, a set of non-empty subsets of $o(w)$), where a proposition is **more necessary** than another when it is still necessary after **less important premises are dropped**. Putting these ideas together, we construct $N_{C,w}$, the non-extreme part of the scale, by considering subsets of the secondary ordering source, and $N_{C,w}^+$, the extended scale including the extreme part, by considering also an empty secondary ordering source and subsets of the primary:

(5) $N_{C,w}$ is only defined if $h(o_2(w))$ is defined for every world w. When defined,
$$D_C = \{\{p : Best_{m(w),o_1(w),o'} \subseteq p\} : o' \in h(o_2(w))\}$$
$$\leq_C = \{\langle d_1, d_2\rangle : d_1, d_2 \in D_C \wedge d_1 \supseteq d_2\}$$

(6) $N_{C,w}^+$ is only defined if $h(o_1(w))$ is defined, for every world w. When defined,
$$D_C^+ = D \cup \{\{p : Best_{m(w),o',\emptyset} \subseteq p\} : o' \in h(o_1(w))\}$$
$$\leq_C^+ = \{\langle d_1, d_2\rangle : d_1, d_2 \in D_C^+ \wedge d_1 \supseteq d_2\}$$

($N_{C,w}$ and $N_{C,w}^+$ are scales of necessity provided that $\leq$ is a linear order; in the full paper, we also refine the definition of degrees to allow incompatible propositions to have the same degree.)

From this point, we build on a standard scale-based semantics [Kennedy, 2007]. The measure function of necessity $\mu_N(p, w)$ returns, for any proposition p, the set of degrees which contain p. The lexical entries in (7) capture the two levels of strength: weak necessity modals are measures of propositions of non-extreme degree, whereas strong ones are restricted to extreme values [Morzycki, 2012]. The positive form results from combining (7) with the null morpheme pos.

(7) (a) $[\![\Box_{weak}]\!]^c = [\lambda p \lambda w \lambda d : d \in D_C.\ d \in \mu_N(p, w)]$
(b) $[\![\Box_{strong}]\!]^c = [\lambda p \lambda w \lambda d : d \in (D_C^+ - D_C).\ d \in \mu_N(p, w)]$

Results. Since degrees are sets of propositions ordered by $\supseteq$, our analysis derives the entailment relations between strong and weak necessity modals (2). By classifying necessity modals as extreme vs. non-extreme, we are able to capture a range of facts at issue in the empirical disputes between Lassiter and Klecha. For example, Klecha pointed out that only high probability phrases (*90%* but not *30%*) cooccur with *certain*; this makes sense if *30%* is never an extreme degree.

Assuming a standard scale-based analysis of comparative morphemes, our analysis accounts compositionally for the gradability properties exemplified in (1). We can also take over Morzycki's (2012) explanations of the properties of extreme adjectives and modifiers. For example, *very* requires a degree in the non-extreme range, while *positively* requires one in the extreme range.

Our account allows us to explain the sense in which extreme degrees of necessity are "off the scale", in Morzycki's sense. We associate the difference between the extreme and non-extreme degrees with the pragmatic functions of primary and secondary ordering sources. Following Rubinstein [2012], the primary ordering source consists in premises which are contextually agreed-upon, while the secondary ordering source contains propositions which are potentially up for debate. Thus, by (5)-(6), the strong necessities would not normally need to be talked about, since they are judged to be necessary by all participants, and in this sense are not salient. In contrast, it is not settled in the context whether the weak necessities, i.e. the propositions which are only of non-extreme degree, are truly necessary, and this is what makes them salient. It is not easy to see how previous scale-based theories of modality would motivate a similar distinction.

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Gradable Adjectives, Vagueness and Optimal Language Use: A Speaker-Oriented Model

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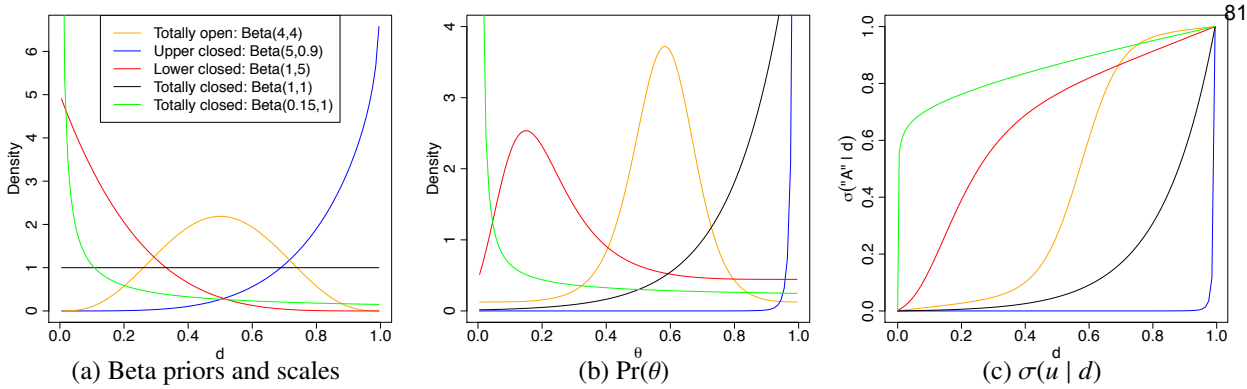
Degree-based approaches to the semantics of gradable adjectives [e.g. 1] hold that the meaning of the *positive form*, such as "tall" in the sentence "John is tall," is obtained by composition with a silent morpheme *pos*: $[\![pos\ \text{tall}]\!] = \lambda x.\mathbf{height}(x) \geq \theta$, where **height** is a function that maps individuals to *degrees* on an underlying *degree scale*, and θ is the *standard of comparison*. [1] proposed that abstract properties of degree scales influence the contextual resolution of θ. *Relative adjectives* like "tall" have totally open scales without minimal or maximal elements and allow θ to be resolved quite freely in context. *Absolute adjectives* like "wet" have closed degree scales including either their upper or lower bound (or both) and force θ to have a relatively rigid, context-independent interpretation corresponding to one of the scale's end points. Absolute adjectives with totally closed scales can have a maximal and minimal standard reading depending on context.

Kennedy tried to explain this interaction by appeal to *interpretive economy* (IE): resolution of θ should make maximal use of semantic resources, including, if available, salient endpoints of degree scales. Subsequent contributions have tried to give a functional grounding of the resolution of θ in terms of evolutionary pressure for optimal language use [e.g. 2, 3]. A related approach is taken by the rational speech-act model (RSA) of [4], where the interpretation of gradable adjectives is given by probabilistic reasoning about hypothetical (sub-)optimal speaker behavior.

We present a model that combines basic tenets of these previous approaches, but overcomes some of their major shortcomings. In particular, the new model (1) adds a fully predictive speaker component (RSA really only covers interpretation, not production), (2) incorporates a cost parameter as a general contextual factor and makes plausible predictions for various values, and (3) predicts the context-independence of absolute adjectives' interpretation, which few previous models have attempted. The key idea is motivated by evolutionary considerations, i.e. speakers employ a standard of comparison θ with a probability proportional to the *communicative efficiency* that results from using θ as a general convention. The relevant contextual variance is the *contextual degree distribution*, i.e., the general probability with which objects (of the given general reference class) have the property in question to a certain degree. Concretely, following [3, 4], we adopt the metaphysically austere view that degree scale types are relevantly different mainly because they are associated with different classes of probability distributions over degrees. Whether a scale is open or closed reduces to whether the probability of lower and upper bounds is negligible or not. Examples for the ensuing relation between scale types and degree distributions are given in Fig. (a) (degree ranges rescaled to fit the unit interval).

Like the RSA model, we assume a descriptive use of gradable adjective A to answer the question under discussion "what degree of A-ness does x have?" The efficiency of using θ as a conventional standard, given a contextual distribution over degrees ϕ, can then be measured in terms of the *expected success* of a speaker trying to raise the listener's level of credence in the actual degree d_x to which x has property A under a literal interpretation given threshold θ. Expected success is defined in the usual way as "probability-weighted sum" over all potentially actual degrees d, times the utility for the case that d is actual, which in this case is the listener's level of credence in d given that the speaker follows the convention: $ES(\theta) = \int_{-\infty}^{\infty} \phi(d) \cdot \phi(d|u,\theta)\,\mathrm{d}d = \int_{-\infty}^{\theta} \phi(d)^2\,\mathrm{d}d + \int_{\theta}^{\infty} \phi(d) \frac{\phi(d)}{\int_{\theta}^{\infty} \phi(d)\,\mathrm{d}d}\,\mathrm{d}d$. The left summand applies when A is not true of x given θ, in which case the speaker cannot use utterance u "x is A" truthfully, and only listener's prior beliefs apply. (The speaker could say different things, but we are only measuring the quality of a level of applicability for the phrase "x is A.") The right summand applies when A is true of x given θ, in which case the speaker can utter "x is A" truthfully and the listener can update his prior beliefs with the information that $d_x \geq \theta$.

Using a standard soft-max function [5], we capture actual threshold choices in production as



(a) Beta priors and scales (b) $\Pr(\theta)$ (c) $\sigma(u \mid d)$

the probability $\Pr(\theta) \propto \exp(\lambda \cdot U(\theta))$, where $U(\theta)$ is the general utility after taking cost into account. This captures the probability with which speakers would adhere to standard θ if they tend to use language optimally, but might make mistakes of various sorts, as captured by rationality parameter λ in the usual way. Probabilities over conventional thresholds under this rule are shown in Fig. (b) for the different priors in Fig. (a) (corresponding cases are colored equally, and for space reasons we only show the basic case in which cost is negligible). The corresponding production probabilities are shown in Fig. (c), based on the rule $\sigma(u \mid d) = \int_{-\infty}^{d} \Pr(\theta)\, \mathrm{d}d$, i.e., the sum probability of all threholds no greater than d [6]. We can further derive the listener's interpretation rule by applying Bayes' rule: $\rho(d \mid u) \propto \phi(d) \cdot \sigma(u \mid d)$ (plots are as expected and skipped for space reasons).

The plots suggest that availability of endpoints on a scale (in the sense of sufficient probability mass) makes endpoint-conventions optimal. We can show this suggestive trend even analytically. Our formal arguments target distributions in the beta-family, but are easily seen to generalize. Concretely, we can show that (modulo cost): (i) if there is a sufficient amount of probability mass on the upper end point, we receive a maximal standard reading; (ii) otherwise if the probability mass at the lower endpoint is sufficiently larger than elsewhere, we receive a minimal standard reading; (iii) otherwise we receive a relative standard that is free to vary with the prior distribution ϕ. This has a direct bearing on Kennedy's original observation. For relative adjectives on open scales, case (iii) is relevant, and we predict the expected relatively free contextual variation with ϕ (and cost). For upper closed scales we predict a maximum standard reading, as desired. For totally closed scales either (i) or (ii) applies, so we predict either maximal or minimal standards, depending on properties of ϕ. Finally, for lower closed scales that violate (ii), the model captures the same exception predicted by [4]. In addition, our model predicts that (non-radical) contextual variance in ϕ or cost will not affect the maximum and minimum standards of absolute adjectives.

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Conditional Independence and Biscuit Conditional Questions in Dynamic Semantics

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Biscuit conditionals such as (1) are felt different from canonical conditionals (2) in that the consequent seems to be entailed regardless of the truth/falsity of the antecedent.

(1) If you are thirsty, there's beer in the fridge. (2) If it's raining, the fireworks will be cancelled.

BC AND INDEPENDENCE IN STATIC SEMANTICS: Franke (2009) argues that the "feeling of the consequent entailment" in biscuit conditionals is due to the conditional independence between the antecedent and consequent; thus a uniform semantics (i.e., a strict implication, $\sigma \cap A \subseteq C$, where a set σ is the speaker's epistemic state) for canonical and biscuit conditionals can be maintained. Let us define the speaker knows A ($\Box A$, in short) σ if $\sigma \subseteq A$, and A is consistent with ($\Diamond A$, in short) σ if $\sigma \cap A \neq \emptyset$. Briefly, if the antecedent of a conditional is presupposed to be possible ($\Diamond A$ in σ) and the speaker has a prior knowledge that the antecedent A and the consequent C are conditionally independent (3), it follows from $\sigma \cap A \subseteq C$ that the speaker knows C, hence the entailment of the consequent obtains.

(3) A and C are conditionally independent in σ
if $\forall X \in \{A, \overline{A}\}.\forall Y \in \{C, \overline{C}\}$: if $\Diamond X$ and $\Diamond Y$ in σ, then $\Diamond(X \cap Y)$ in σ. (Franke, 2009)

To see this, suppose for contradiction that the speaker does not know C in σ, i.e., $\Diamond\overline{C}$ hold in σ. Then, by assumption, (3) gives us $\Diamond(A \cap \overline{C})$ in σ. This contradicts with the speaker's assertion $\sigma \cap A \subseteq C$; $(\sigma \cap A) \cap \overline{C} \subseteq C \cap \overline{C}$; $(A \cap \overline{C}) \cap \sigma \subseteq \emptyset$. Therefore, $\sigma \subseteq C$, as desired.

Now, the next question pertains to whether it is possible to derive the same consequent entailment in the framework of dynamic semantics. Furthermore, there are some instances of biscuit conditional questions, as in (4). Intuitively, a BC question does give rise to a consequent entailment. In (4), answering 'yes' entails that there is something in the fridge and answering 'no' entails the opposite regardless of the state of the speaker's thirst. Put another way, if the speaker asks the unconditionalized counterpart right after the conditionalized one, it would be a superfluous question. In contrast, canonical conditional questions do not. I.e., answering 'yes' to (5) does not enlighten the questioner on whether the fireworks will be cancelled or not when it is not raining.

(4) If I'm thirsty, is there anything in the fridge? (5) If it's raining, will the fireworks be cancelled?

This paper provides a dynamic and nonsymmetric version of the independence condition, a *d-independence* condition which correctly derives the consequent entailment in both declaratives and interrogatives.

INDEPENDENCE AND BCQ IN DYNAMIC SEMANTICS: Within the dynamic view, conditionals are characterized as a two-step update procedure (Stalnaker 1986; Karttunen 1974; Heim 1982): 1. A temporary state is created by updating the information state with the antecedent of the conditional. 2. The derived state is updated with the consequent. In the current paper, we follow Kaufmann's (2000) formulation of dynamic semantics. First, we regard a *possible world* as a mapping from the set P of proposition letters to $\{0, 1\}$ and define an *information state* σ as a set of possible worlds and define $W := \{0, 1\}^{\mathsf{P}}$. We assume that our syntax $\mathcal{ML}$ consists of the negation $\neg$, the conjunction $\wedge$, the implication $\rightarrow$, and the diamond operator $\Diamond$, as well as P. Then, we define the result of updating σ with the sentence $\varphi \in \mathcal{ML}$ as follows:

$$\sigma[p] = \{ w \in \sigma \mid w(p) = 1 \}, \qquad \sigma[\varphi \wedge \psi] = \sigma[\varphi][\psi], \quad \sigma[\neg\varphi] = \sigma \setminus \sigma[\varphi],$$
$$\sigma[\varphi \rightarrow \psi] = \{ w \in \sigma \mid w \in \sigma[\varphi] \text{ implies } w \in \sigma[\varphi][\psi] \}, \quad \sigma[\Diamond\varphi] = \{ w \in \sigma \mid \sigma \cap \sigma[\varphi] \neq \emptyset \}.$$

In characterizing the intuition of "entailment", we use the notion of *support* (*acceptance* in Veltman (1996)): φ is *supported* in σ (notation: $\sigma \models \varphi$) if $\sigma[\varphi] = \sigma$. We also say that φ is *consistent* in σ if $\sigma[\varphi] \neq \emptyset$. In Kaufmann (2000), remark that we obtain the monotonicity of the updates, i.e., $\sigma[\varphi] \subseteq \sigma$ for all σ and φ. We define the nonsymmetric *d-independent* condition as in Definition 1. Intuitively speaking, ψ is independent of φ if updating σ with φ or $\neg\varphi$ does not affect the consistency of ψ.

Definition 1. We say that ψ is *d-independent* of φ in σ if, for all $X \in \{\varphi, \neg\varphi\}$ and all $Y \in \{\psi, \neg\psi\}$, $\sigma[X] \neq \emptyset$ implies that $\sigma[Y] \neq \emptyset$ is equivalent with $\sigma[X][Y] \neq \emptyset$.

Note that our condition is nonsymmetric, i.e., only defines the consequent's independence from the antecedent, since in the current analysis, a conditional is treated as a two-step update. This non-symmetry is particularly suitable for

biscuit conditional questions discussed below, as the antecedent assertion sets up a context on which the consequent question operate. Van Rooij (2007) also offers a notion of independence in context in a dynamic setting to account for the strengthening of conditional presuppositions, but it is symmetrically defined. Now, by $\sigma[\neg\varphi] = \emptyset$ iff $\sigma[\varphi] = \sigma$, we can rewrite the d-independence in terms of the notion of support.

Proposition 2. ψ is d-independent of φ in σ iff, $\sigma[X] \neq \emptyset$ implies that $\sigma \models Y$ is equivalent with $\sigma[X] \models Y$, for all $X \in \{ \varphi, \neg\varphi \}$ and all $Y \in \{ \psi, \neg\psi \}$.

Theorem 1. Let ψ be d-independent of φ in σ. If $\sigma[\varphi] \neq \emptyset$ and $\sigma \models \varphi \rightarrow \psi$, then $\sigma \models \psi$.

Proof. Assume $\sigma[\varphi] \neq \emptyset$ and $\sigma \models \varphi \rightarrow \psi$. By Proposition 2, it suffices to show $\sigma[\varphi][\psi] = \sigma[\varphi]$, i.e., $\sigma[\varphi] \subseteq \sigma[\varphi][\psi]$ by monotonicity. Fix any $w \in \sigma[\varphi]$. Since $\sigma[\varphi \rightarrow \psi] = \sigma$, $w \in \sigma[\varphi \rightarrow \psi]$. By $w \in \sigma[\varphi]$, $w \in \sigma[\varphi][\psi]$, as desired. □

Let us take (1) as an example. Assume a normal (i.e., non-magical) situation where acquiring the knowledge that the addressee is thirsty does not determine whether there is beer in the fridge or not. Thus, the proposition 'there's beer in the fridge' is independent of 'you are thirsty'. Now, the speaker uttered the sentence (1). Given the d-independence condition and Theorem 1, the consequent proposition 'there's beer in the fridge' is supported. Thus, our condition derives the consequent entailment in the dynamic framework.

BCQ: EXTENSION TO STRUCTURED CONTEXTS We extend our dynamic independence to structured contexts to handle biscuit conditional questions. As before, we stipulate $W := \{ 0, 1 \}^{\mathsf{P}}$, where P is the set of proposition letters. In dealing with statements and questions, we now introduce a *structured context* C as an equivalence relation on some set of possible worlds (Groenendijk 1999, Isaacs and Rawlins 2008). We define the set $\mathsf{Bool}(\mathsf{P})$ as all the propositional combinations generated from P. Note that we can calculate the truth value of $w(\varphi)$ for a $w \in W$ and $\varphi \in \mathsf{Bool}(\mathsf{P})$. Now, we define the set $\mathcal{QL}$ of query-formulas by the following rule: if φ, $\psi \in \mathsf{Bool}(\mathsf{P})$ then $\varphi!$, $\varphi?$, $\varphi! \rightarrow \psi!$, $\varphi! \rightarrow \psi?$ are in $\mathcal{QL}$. We denote query-formulas of $\mathcal{QL}$ by α, β, γ, etc. Then, we define the result of updating C with a query-formula of $\mathcal{QL}$ as follows (Isaacs and Rawlins 2008):

$$C[\varphi!] = \{ \langle w, v \rangle \in C \mid w(\varphi) = v(\varphi) = 1 \}, \quad C[\varphi?] = \{ \langle w, v \rangle \in C \mid w(\varphi) = v(\varphi) \},$$
$$C[\varphi! \rightarrow \gamma] = \{ \langle w, v \rangle \in C \mid \exists z \in W.(\langle w, z \rangle \in C[\varphi!] \text{ or } \langle z, v \rangle \in C[\varphi!]) \text{ implies } \langle w, v \rangle \in C[\varphi!][\gamma] \},$$

where $\gamma \in \{ \psi!, \psi? \}$. Note that $C[\varphi! \rightarrow \psi!]$ and $C[\varphi! \rightarrow \psi?]$ are also structured contexts. Let us say that C *supports* α (written: $C \models \alpha$) if $C = C[\alpha]$. We also say that α is *consistent* in C if $C[\alpha] \neq \emptyset$. As in Kaufmann (2000), we also obtain that $C[\alpha] \subseteq C$ for all C and $\alpha \in \mathcal{QL}$. What is the *d-independent* condition in this setting? Just replacing σ in Definition 1 with C is insufficient, because, for instance, $C[\neg\varphi!] = \emptyset$ is no longer equivalent to $C[\varphi!] = C$. That is, now that we have structured contexts, the condition can*not* be rewritten in terms of the notion of support. However, we can still preserve our previous intuition of independence in dynamic semantics: a query-formula $\psi!$ (or $\psi?$) is independent of $\varphi!$ in C if updating C with $\varphi!$ or $\neg\varphi!$ does not affect the supportedness and the consistency of $\psi!$ (or $\psi?$). Thus, we provide Definition 3 as the notion of independence for structured contexts. From the condition 2) of Definition 3, we can obtain the desired consequent entailment, as is the case with Theorem 1.

Definition 3. $\gamma \in \{ \psi!, \psi? \}$ is *d-independent* of $\varphi!$ in C if, for all $\alpha \in \{ \varphi!, \neg\varphi! \}$ and all $\beta \in \{ \psi!, \neg\psi! \}$ (or $\beta = \psi?$ if γ is $\psi?$), $C[\alpha] \neq \emptyset$ implies the following: 1) $C[\beta] \neq \emptyset$ iff $C[\alpha][\beta] \neq \emptyset$ and 2) $C \models \beta$ iff $C[\alpha] \models \beta$.

Theorem 2. Let $\gamma \in \{ \psi!, \psi? \}$ be d-independent of $\varphi!$ in C. If $C[\varphi!] \neq \emptyset$, then $C \models \varphi! \rightarrow \gamma$ implies $C \models \gamma$.

Let us take (1) and (4) as examples. Assume a similar non-magical situation where the speaker being thirsty does not determine the presence/absence of drinks in the fridge. Given the d-independence condition and Theorem 2, both the consequent declarative 'there's beer in the fridge' and the consequent interrogative 'Is there anything in the fridge?' are supported. Thus, our condition derives the consequent entailment for both biscuit conditional statements and questions in the dynamic framework.

CONCLUSION: We develop a dynamic and nonsymmetric version of independence tailored for both information states and structured contexts. Franke's proposal is further supported in that there is no need for stipulating special semantics for biscuit conditionals, since the "feeling of entailment" of biscuit conditional questions as well as statements can be derived from the existing dynamic semantics of conditionals and our dynamic independence.

SELECTED REFERENCES: **Franke** (2009) *Signal to Act*. **Groenendijk** (1999) 'The logic of interrogation.' **Heim** (1982) *The Semantics of Definite and Indefinite Noun Phrases.* **Isaacs and Rawlins** (2008) 'Conditional questions.' **Kaufmann** (2000) 'Dynamic context management.' **van Rooij** (2007) 'Strengthening Conditional Presuppositions' **Veltman** (1996) 'Defaults in update semantics.'

Filtering Semantics for Counterfactuals

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Synopsis. I argue that ordering/premise semantics for counterfactuals in the style of Lewis, Kratzer, and others validates inference patterns that are disconfirmed in natural language. The objection extends to all semantics employing a fixed ordering of worlds or equivalent algebras. The solution is to let the ordering shift (in a systematic way) on the basis of the antecedent. The proposed implementation starts from standard premise semantics and adds a new 'filtering' operation on the premise set. The resulting semantics is interestingly related to the semantics for counterfactuals emerging from Judea Pearl's causal models framework in computer science: filtering is a possible worlds counterpart of Pearl's interventions; my data reveals a gap in predictions between classical Lewis/Kratzer semantics and Pearl's account.

The puzzle. Consider the following scenario.

> *Love triangle.* Andy, Billy, and Charlie are in a love triangle. Billy is pursuing Andy; Charlie is pursuing Billy; and Andy is pursuing Charlie. Each of them is very annoyed by their suitor and wants to avoid them.
>
> Suppose that there is a party going on at the moment. All of them were invited. None of them went, but each of them kept appraised of the others' decisions. An occasion to spend time with the person they liked, and without their suitor being there, would have been sufficient for them to go.

The scenario gives rise to the following judgments:

(1) If Andy was at the party, Billy would be at the party. ✓
(2) If Andy was at the party, Charlie would be at the party. ✗

Generalizing ('A', 'B' and 'C' stand for the propositions that Andy, Billy, and Charlie are at the party):

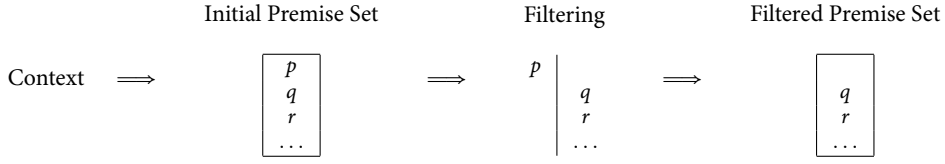
$$\begin{array}{llll} A \boxdot\!\!\rightarrow B & \checkmark & A \boxdot\!\!\rightarrow C & \times \\ B \boxdot\!\!\rightarrow C & \checkmark & B \boxdot\!\!\rightarrow A & \times \\ C \boxdot\!\!\rightarrow A & \checkmark & C \boxdot\!\!\rightarrow B & \times \end{array}$$

But this pattern cannot be vindicated by any version of ordering/premise semantics. All versions of the latter validate the following rule (which is mentioned and studied by Kraus et al. (1990)):

Loop $\quad A \boxdot\!\!\rightarrow B, B \boxdot\!\!\rightarrow C, C \boxdot\!\!\rightarrow A \vdash A \boxdot\!\!\rightarrow C$

Loop is essentially a byproduct of the fact that the comparative closeness relation $\leq_w$ is transitive. (Transitivity is essential to $\leq_w$ qualifying as an ordering.)

Account: filtering semantics. My solution starts from a Kratzer-style (1981a, 1981b) premise semantics and introduces a new operation that 'filters out' elements from the premise set:



Different antecedents filter out different premises. Hence, within the same context, counterfactuals with different antecedents are evaluated with respect to different premise sets. This is equivalent to antecedent-induced shifts in the ordering.

For illustration, consider *Love triangle*. I assume that the key premises state how one person's going to the party depends on other people going. For example (simplifying in several ways; more below):

(i) {*w*: A is at the party iff (C is at the party and B isn't at the party) in *w*} A ↔(C∧¬B)
(ii) {*w*: B is at the party iff (A is at the party and C isn't at the party) in *w*} B ↔(A∧¬C)
(iii) {*w*: C is at the party iff (B is at the party and A isn't at the party) in *w*} C ↔(B∧¬A)

Given how filtering works, different antecedents filter out different premises among (i)–(iii). E.g., (1) and (2) filter out (i). Counterfactuals with antecedents B and C filter out, respectively, (ii) and (iii). Hence counterfactuals in the Loop-invalidating sextet filter out different premises and are evaluated with respect to different premise sets. As a result, the six judgments are all vindicated.

Implementation. The semantics exploits two innovations. (1) The elements of premise sets are not propositions. They are rather pairs of a partition (construed as sets of mutually incompatible and jointly exhaustive propositions; for short, *answers*) and a proposition. E.g., the full form of (i) is:

(i) $\langle\{A, \neg A\}, A \leftrightarrow(C\wedge\neg B)\rangle$

(2) Filtering consists in removing premises from the (premise set generated by the) ordering source. (Informally: we take the smallest set(s) of answers, among all those appearing in premises in the ordering source, that entails the antecedent; we remove the corresponding premises from the ordering source.) This is encoded directly in the semantics for counterfactuals. Using '$[g|A]$' to mean that the ordering source g is filtered for antecedent A, here is a first pass:

$$[\![\Box\ [\text{if } p]\ [q]]\!]^{f,g} = [\![\Box\ q]\!]^{f\cup\{p\},[g|p]}$$

A second pass: there may be more than one way to perform filtering. (I.e. there may be more than one minimal set of answers that entails the antecedent.) For example, consider the disjunctive antecedent 'A ∨ B' in *Love triangle*. To accommodate this, we quantify over filterings:

$$[\![\Box\ [\text{if } p]\ [q]]\!]^{f,g} = \forall [g|p] \text{ s.t. } [g|p] \text{ is a filtering of } g \text{ for } p,\ [\![\Box\ q]\!]^{f\cup\{p\},[g|p]}$$

The analogy with causal models. A number of researchers in computer science (above all, Pearl (2000)) have developed a formal framework for modeling causation and causal reasoning. Pearl's framework involves a semantics for counterfactuals (in artificial languages) that is claimed to yield a logic equivalent to Lewis's (e.g. by Galles & Pearl (1998)). There are two connections between the current project and causal models literature. (1) Scenarios like *Love triangle* are counterexamples to the equivalence claim: Pearl's framework does indeed predict the failure of Loop (this claim is backed by a very recent result in Halpern (2013)). (2) *Contra* Pearl's own early claims and later literature (e.g. Kaufmann (2013)), I claim that just filtering semantics is the right way to implement Pearl's system into a compositional possible worlds semantics. In particular, filtering works as the counterpart of Pearl's intervention operation in a premise/ordering semantics.

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Amount Semantics

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This paper develops a new semantics for degrees under which they are nominalized quantity-uniform properties of individuals: degrees are the same sort of entity as kinds. We use English *amount* as a case study to first motivate a kind semantics for degrees, and then apply the semantics in a novel analysis of amount relatives (Grosu and Landman, 1998). Amounts: *Amount* admits two readings: under the first, *amount* behaves like *quantity*, partitioning a predicate's denotation; (1) thus references specific apples. Under the second reading, (1) references an abstract amount of apples. We focus on the second reading. This EXISTENTIAL reading also surfaces with the noun *kind* (Carlson, 1977b; Wilkinson, 1995).

(1) John wants that amount of apples.
   a. DEFINITE: John wants those specific apples there
   b. EXISTENTIAL: John wants some apples that measure the relevant amount

(2) John wants that kind of apple.

Amount requires a substance noun (e.g., *apples*) to designate what we are referencing amounts *of*. It then relates the substance noun with a set of nominalized quantity-uniform properties, formed on the basis of a contextually specified measure μ_f (e.g., μ_{kg}, μ_{li}, etc.).

(3) $[\![\text{amount}]\!] = \lambda k \lambda d.\ \exists n[d = {}^{\cap}\lambda x.\ {}^{\cup}k(x) \wedge \mu_f(x) = n]$
where k is the kind denoted by a substance noun,
μ_f is a contextually-specified measure, and
n is some number in the range of the measure μ_f

The set of entities to which *amount* refers is a set of degrees, the individual correlates of quantity-uniform properties (cf. kind semantics, under which, e.g., the DOG kind is the individual correlate of the property of being a dog; Chierchia, 1998).

(4) $\text{DEGREE} := {}^{\cap}\lambda x.\ \mu(x) = n \quad$ (for some μ, n)

Rethinking degrees: Conceiving of degrees as nominalized properties necessitates rethinking how they interact with the compositional semantics. In (1), we access the abstract amount of apples by first identifying the relevant apple individual (i.e., by establishing a pointer to it with *that*) and then picking out the degree that applies to this individual.

(5) $[\![\text{that}]\!] = \lambda P.\ \iota y[P(y) \wedge {}^{\cup}y(\text{THAT})] \quad$ where $[\![\text{THAT}]\!]$ = the salient (plural) individual

In the basic case where *that* takes a set of individuals, it returns the individual that is relevant (via Partee's Id); when *that* takes a set of degrees (i.e., nominalized properties) it returns the degree that applies to the relevant individual. Assuming three apples (a, b, c) and the relevance of μ_{kg} in the context of (1), we get the following (where $\mu_{kg}(a+b+c)=n_{a+b+c}$):

(6) $[\![\text{that}]\!]([\![\text{amount of apples}]\!])$
$= [\![\text{that}]\!](\lambda d.\ \exists n[d = {}^{\cap}\lambda x.\ {}^{\cup}\text{apple}(x) \wedge \mu_{kg}(x) = n])$
$= [\lambda P.\ \iota y[P(y) \wedge {}^{\cup}y(\text{THAT})]](\lambda d.\ \exists n[d = {}^{\cap}\lambda x.\ {}^{\cup}\text{apple}(x) \wedge \mu_{kg}(x) = n])$
$= \iota y \in \{y = {}^{\cap}\lambda x.\ {}^{\cup}\text{apple}(x) \wedge \mu_{kg}(x) = n : n \in \mathbb{N}\}[{}^{\cup}y(\text{THAT})]$
$= \iota y \in \{y = {}^{\cap}\lambda x.\ {}^{\cup}\text{apple}(x) \wedge \mu_{kg}(x) = n : n \in \mathbb{N}\}[{}^{\cup}y(a+b+c)]$ assuming 3 apples
$= {}^{\cap}\lambda x.\ {}^{\cup}\text{apple}(x) \wedge \mu_{kg}(x) = n_{a+b+c}$

The result references a degree: a nominalized quantity-uniform set of apples. For this degree to compose with the rest of the sentence, we generalize the operation of DKP (Chierchia, 1998) to type-shift nominalized properties (kinds or degrees) for object-level argument slots.

(7) *Generalized Derived Kind Predication* (*DKP*):
If P applies to objects and y denotes a kind or degree, then $P(y) = \exists x[^{\cup}y(x) \wedge P(x)]$

(8) $[\![$I ate that amount of apples$]\!]$
$=$ ate($[\![$that amount of apples$]\!]$)(I)
$=$ ate($^{\cap}\lambda x.\ ^{\cup}$apple(x) $\wedge\ \mu_f(x) = n_i$)(I)
via generalized DKP
$=$ $\exists y[^{\cup}(^{\cap}\lambda x.\ ^{\cup}\text{apple}(x) \wedge \mu_f(x) = n_i)(y) \wedge \text{ate}(y)(I)]$

Amount relatives: In relative clauses formed with *amount*, (9), we abstract over degrees at the CP level. (We use a head-external syntax for illustrative purposes only; raising or matching analyses work equally well.) Intersective modification restricts the set of degrees *amount* references to just those that apply to objects picked out by the CP. Definite *the* takes this restricted set of degrees. The set is ordered (on the basis of the measure internal to the degrees); when *the* takes an ordered set it selects the maximal element, yielding the largest apple-degree that applies to the apples that you ate. In other words, *the* returns the amount of apples that you ate in (9); generalized DKP applied at the matrix level takes this degree, asserting that I ate an apple-quantity equal in amount to the apple-quantity you ate.

(9) I ate the amount of apples λd that you ate d
$=$ I ate the $(\lambda d.\ \exists n[d = {}^{\cap}\lambda x.\ {}^{\cup}\text{apple}(x) \wedge \mu_f(x) = n]) \cap (\lambda d.\ \exists y[\text{ate}({}^{\cup}d(y))(\text{you})])$

This sort of degree abstraction also applies in so-called "amount relatives." These relative clauses ostensibly violate the Definiteness Restriction, which precludes individuals or individual variables from occurring in the pivot of an existential construction (Heim, 1987).

(10) John ate the apples that there were on the table.
(cf. **there were the apples on the table*)

Our account of amount relatives assumes degree abstraction (e.g., Heim, 1987): the pivot of the existential contains a degree variable, not an individual. (Like degrees, kinds freely serve as pivots to existentials: *there were those kinds of apples at the store*; Wilkinson 1995). Here the RC denotes an individual: *the apples that there were on the table* references apples, not an abstract amount thereof. This object-level interpretation arises from modification of the RC head (*apples*) by a set of degrees, which yields a restricted set of individuals:

(11) $[\![P_{\langle e,t\rangle} \cap_E A_{\langle d,t\rangle}]\!] = \lambda x.\ P(x) \wedge \exists d[A(d) \wedge {}^{\cup}d(x)]$

(12) the apples λd that there were d on the table
$=$ the $\lambda z.\ \text{apples}(z) \wedge \exists d[(\lambda d'.\ \exists n[d' = {}^{\cap}\lambda x.\ \mu_f(x) = n \wedge \text{on-table}(x)])(d) \wedge {}^{\cup}d(z)]$

(12) references the maximal apple individual that instantiates on-table degrees; in other words, it references the apples on the table. The RC is structured on the basis of the degree-internal measure; we get maximality from the semantics of *the* applied to an ordered set (cf. MAX from Grosu and Landman). We get the object-level interpretation by modifying a set of individuals by a set of degrees; Grosu and Landman stipulate an optional SUBSTANCE operator for this obligatory reading. The peculiar behavior of amount relatives (Carlson, 1977a) follow from two factors: (i) ordered/overlapping sets resist quantification, limiting the determiners that may appear; and (ii) *wh*-forms *which* and *who* preclude degree abstraction.

An Alternative Account of Imprecision

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Introduction: Round numbers are known to allow imprecise or approximate interpretations: for example, (1a) might be used felicitously if a couple more or fewer than 100 people attended, (1b) to describe a rope whose true length diverged slightly from 50 meters, and (1c) for an arrival time of 3:00 plus/minus a few minutes. (Im)precision can also be regulated overtly with approximators such as *roughly, about* and *exactly* (2).

(1) a. There were 100 people at the rally.
b. The rope is 50 meters long
c. Mary arrived at 3:00.

(2) a. There were about 100 people at the rally.
c. The rope is roughly 50 meters long.
b. Mary arrived at exactly 3:00.

Based in part on facts relating to the comparative, we defend a novel analysis of imprecision based on the notion of granularity, construed here in terms of sets of alternatives.

Two Theories: There are two leading approaches to imprecision. Lasersohn '99 considers it to be loose talk, and models it via **pragmatic halos (PH)**, sets of entities which differ from an expression's denotation in only pragmatically ignorable ways. The halo of *3:00*, for instance, would consist of times 'close enough' to 3:00. Approximators like *about/exactly* operate on halos. In the **scale granularity (SG)** approach (Krifka '07, Sauerland & Stateva '07), measurement results can be reported w.r.t. scales that differ in their granularity level, conceptualized as density of scale points. The approximate interpretation of *3:00* might involve a scale measuring time in 15-minute increments. Imprecision involves interpretation relative to a coarse-grained scale; approximators work by determining scale choice.

Data: Some initial facts support SG over PH. In particular, not all values pattern the same w.r.t. approximation: While the round numbers in (1) can be interpreted approximately, non-round numbers (e.g. *97, 3:01, 49 meters*) must be interpreted (more) precisely. This is problematic for PH. If the difference between 3:00 and 3:01 is pragmatically ignorable, such that 3:01 is in the halo of 3:00, then we would expect 3:00 also to be in the halo of 3:01 (i.e. 'different only in ignorable ways' should be symmetric). But 3:01 cannot be felicitously used for a time closer to 3:00. Under SG, this is accounted for in that 3:00 occurs on a coarser-grained scale than 3:01.

However, other data are not explained by either PH or current theories of SG.

i) Comparatives are precise. While the values in (1) can be read approximately, the same values in comparatives cannot. (3) does not have a reading on which it is true if 99 attended (though 99 is greater than 98, a value that could count as roughly 100), nor one where it is false if 101 attended (though 101 also falls within the approximate interpretation of 100).

(3) There were more than 100 people at the rally.

To account for this via PH, we would need to stipulate that the comparative has the function of reducing the halo of a measure expression to the trivial one. SG would require a similar stipulation that the comparative necessarily selects for fine scale granularity.

ii) Approximators are NPIs. A previously unnoticed pattern is that in positive sentences, overt approximators are disallowed in comparatives (4a) (with the exception of echo contexts). But oddly, they are grammatical in the corresponding negative sentences (4b) and other NPI-licensing contexts, e.g. (4c):

(4) a. *There were more than about/roughly/approximately 100 people at the rally.
b. There weren't more than about/roughly/approximately 100 people at the rally.
c. If there were more than about/roughly/approximately 100 people at the rally…

For PH there is first of all an interpretive challenge: in examples like (2), approximators might be analyzed in terms of existential quantification over halo elements, such that (2a) would be true iff $\exists n \in$ *Halo(100)* s.t. *n* attended. But (4b) does not mean that there does not exist an *n* close to 100 s.t. more than *n* attended; this would entail that no more than the minimum number describable as *about 100* attended, when intuitively (4b) means that no more than the maximum in that range attended. To solve this, it would be necessary to replace existential with universal quantification, or stipulate that the existential quantifier always scopes over negation and other operators. Here SG has an advantage, in that *about 100* denotes an interval of the scale as a single unit, with (4b) asserting that this interval is not exceeded. But current SG approaches, in common with PH, do not explain the contrast between (4a) and (4b,c).

Proposal: We propose a novel granularity-based analysis of imprecision in which distinct granularity levels are modeled as sets of alternatives to the mentioned expression. For example, two possible sets of alternatives to *50 meters* (5 meter and 1 meter levels) are:

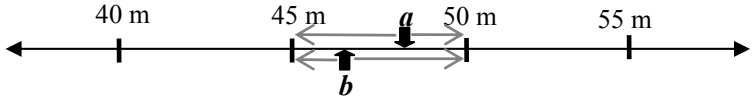
(5) a. $ALT_{5\ meters}$*(50 meters)* = {…40 m, 45 m, 50 m, 55 m, …}
b. $ALT_{1\ meter}$*(50 meters)* = {…48 m, 49 m, 50 m, 51 m, …}

The choice of granularity level *gran* is contextually determined via an assignment function *g*. Truth relative to a granularity level assignment is then defined as follows:

(6) For a measure expression *n*, $[[\varphi(n)]]^g = 1$ iff for all $m \neq n \in ALT_{gran}(n)$,
$[[\varphi(n)]]^{g[gran=0]}$ is 'closer to true' than $[[\varphi(m)]]^{g[gran=0]}$;
$[[\varphi(n)]]^g = 0$ otherwise

'Closeness to truth' in turn is defined in terms of the scalar distance that the actual measure would need to be displaced to reach a value that would yield truth under a maximally precise (*gran=0*) interpretation. For example, if the actual length of the rope were *a*, (1b) would be true at *gran=5 meters*, because *a* is closer to 50 meters than to the next value, 45 meters. However, if the true length were *b*, (1b) would be false, as 45 meters is closer than 50 meters:

(7)



Values that occur in coarser-grained alternative sets (typically powers of 10 and the results of halving/doubling these) thus allow more imprecise interpretations.

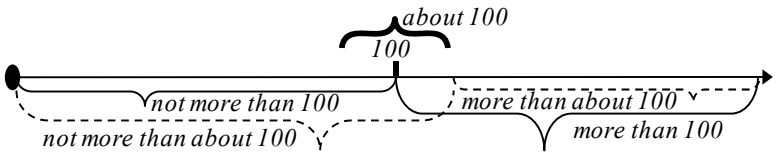
Comparatives: The picture is different for comparatives such as *more than 100* or *more than 50 meters*. No matter how *gran* is set, the definition in (6) ensures that (3) is true if 101 attended, since it is true at *gran=0* with no displacement of the actual value. Likewise, (3) is false if 99 attended, since in that case there is some alternative within $ALT_{gran}(100)$ for which it is true at *gran=0*; for example, if *gran=10*, *more than 90* is such an alternative. Thus (6) derives the necessarily precise interpretation of measure expressions in comparatives without stipulation. The choice of ALT_{gran} turns out not to have a truth-conditional effect; but we show it nonetheless plays a role, specifically in implicature calculation (Cummins et al. '12).

Approximators: The truth definition in (6) has the effect of associating each measure expression with a range of values for which it is true (relative to the assigned granularity level). We propose that this is lexicalized by approximators, which map values to intervals based on some possible granularity level:

(8) $[[APPROXIMATOR\ n]]^g = [n - gran'/2,\ n + gran'/2]$, for some granularity level *gran'*

In the case of expressions such as *roughly* and *about*, *gran'* is set to the coarsest granularity level that is a possible candidate for *gran*; *exactly*, by contrast, selects for the finest possible level. An immediate advantage of (8) relative to previous approaches is that it explains the infelicity of approximators with 0 and other scalar endpoints *(??about/exactly 0 people;* though cf. *about/exactly 0°C)*: if *n* equals 0, $n - gran'/2$ is undefined. Like other versions of SG, (8) derives the correct interpretation for negated approximators in comparatives (4b), in that the modified expression denotes an interval as a single unit. The restriction of such expressions to NPI contexts can then be accounted for in terms of competition with structurally defined alternatives in the sense of Katzir '07. Specifically, the range encompassed by *more than about 100* is contained within that covered by *more than 100*; a speaker in a position to utter the former is thus also in the position to utter the latter, which is favored in that it is briefer and (we will argue) not less informative. But in negative contexts the inclusion relation is reversed: a speaker may be in a position to utter *not more than about 100* without being knowledgeable as to whether *not more than 100* obtains.

(9)



Summary: The present analysis provides further support for a granularity-based approach to imprecision, while also accounting for facts not explained by existing theories of granularity.

Disentangling *own*: evidence from association with focus

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The possessive marker *own* exhibits a complicated behavior that gives rise to a wide range of subtle meaning differences. Accordingly, the theoretical literature has proposed a number of different (and, for the most part, informal) characterizations of this element. In, e.g., (1), *own* has been argued to turn *her* into a reflexive possessive pronoun (Higginbotham 1985), whereas in (2) *own* is usually described as some sort of 'emphatic possessive' (Baker 1995). This paper uses (primarily) data from association with focus to disentangle the various effects that *own* gives rise to and argue that there are at least two distinct items; own_R, a marker of strong reflexivization, and own_{IP}, a marker of strong/ inalienable possession.

(1) Zelda painted her own room. (2) Zelda's own room is bigger than Lucie's.

***Own*$_R$.** Focused Local Reflexivizers (LR) in the scope of Focus Association Operators (FAOs) like negation in (3), license two types of alternatives; Subject Alternatives (SA, {x praised John}) and Object Alternatives (OA, {John praised x}). Spathas (2010) generates these alternatives by treating LR as a reflexivizing function (4) that contrasts with other arity reducing operations, like Passivization and Anti-Passivization (5). Similarly, focused *own* gives rise to SA ({x painted John's room}) and Possessor Alternatives (PA, {John painted x's room}) (6). We capture the alternatives in (6) by treating *own* as a reflexivizer that operates on the complex derived predicate *λxλy. y painted x's room*, which is created after QR of own_R above the head introducing the external argument (7) (cf. the QR treatment of LR in Lechner 2012). Safir (1996) a.o. expresses the intuition that SA support the idea that *own* is an 'intensifier', as, e.g., (1) can be paraphrased by the use of the anti-assistive intensifier *herself* in (8). Spathas (2012, 2013) shows that anti-assistive intensifiers, but not reflexivizers, license SA under Conventionally Associating Operators like *only* (Beaver&Clark 2008). Crucially, own_R does not license SA under *only* (9). Notice also that SA cannot be attributed to *her own* being a possessive reflexive interpreted as a designated bound variable, since focused pronouns, which do license bound variable readings, do not license SA (10).

(3) a. Zelda didn't praise herSELF. Oscar praised her. *SA*
b. Zelda didn't praise herSELF. She praised Oscar. *OA*

(4) $[\![\text{herself}]\!]=\lambda R_{eet}\lambda x.R(x)(x)$ (5) a.$[\![\text{PASS}]\!]=\lambda R\lambda x\exists y.R(x)(y)$b.$[\![\text{Anti-P}]\!]=\lambda R\lambda x\exists y.R(y)(x)$

(6) a. Zelda didn't paint her OWN room. Oscar painted her room. *SA*
b. Zelda didn't paint her OWN room. She painted Oscar's room. *PA*

(7) $[_{vP}\ own_1\ [_{vP}\ v\ [_{VP}\ V\ [_{DP}\ her\ [_{D'}\ [_{D}\ `s\ t_1]\ [NP\ room]]]]]]$

(8) Zelda painted her room herself (i.e. without help).

(9) a. Zelda only painted her OWN room. #No one else painted her room. **SA*
b. Zelda only painted her room herSELF. No one else painted her room. *SA*

(10) Zelda didn't paint HER room. #Oscar painted her room. **SA*

Unlike LR, however, which can license strict readings in similar environments, own_R never licenses strict readings in (11). We claim that own_R not only reflexivizes the derived predicate but in addition turns it into a Strong Reflexive relation, i.e. a *necessarily* reflexive relation (12) (based on the definition of Strong Reflexivity in Moulton 2005). Given (12), own_R is predicted to be redundant with complex predicates that are inherently strongly reflexive (13) and to force a self-as-other reading of ambiguous predicates (14).

(11) a. Only ZELDA painted her own room. #No one else painted Zelda's room.
b.*Zelda painted her own room, because Lucie did <paint Zelda's room>.

(12) $[\![own_R]\!]= \lambda R\lambda x\lambda e\lambda w.R(x)(x)(e)(w)$ **& ∀y∀z∀e'∀w'. R(y)(z)(e')(w')=1 → y=z**

(13) *Zelda lost her own mind. (14) Zelda opened her own eyes (with her hands).

Our account predicts own_R to be subject oriented. As predicted, no SA arises when the antecedent of the pronoun is not the subject (15). Also, assuming that own_R will land to the first landing site available for compositional interpretation, we predict own_R to be strictly

local. As predicted, the choice of local vs non-local antecedent leads to distinct interpretations. In particular, only the local antecedent gives rise to SA, (16) vs. (17).

(15) Zelda$_1$'s brother didn't paint her$_1$ OWN room.
#Lucie's brother/Lucie painted Zelda's room.

(16) Zelda$_1$ didn't ask Lucie$_2$ to paint her$_1$ OWN house.
#Oscar asked Lucie to paint Zelda's house.

(17) Zelda$_1$ didn't ask Lucie$_2$ to paint her$_2$ OWN house.
She asked Oscar to paint Lucie's house.

Own$_{IP}$. The entry in (12) does not cover cases where reflexivization of a derived predicate is not possible, e.g. (2), (16). As in (7), we assume that *own* merges with the Possessive head *'s* (Safir 1996), a definite article which introduces a Possession Relation (Barker 1995, 2011) represented in (18) as a free, contextually resolved variable R. For DPs with relational nouns (*Zelda's brother*), which are inherently/ lexically inalienable, we assume the entry in (19). The contribution of *own$_{IP}$* is to compositionally turn a relation R of 'alienable possession' into a relation of 'inalienable possession'; it strengthens R into a *necessary* relation by adding the bold-faced condition in (20)(which we assume is part of the meaning of relational nouns in cases of lexical inalienable possession). The strengthening can apply regardless of the content of R; *own$_{IP}$* does not specify R as literal 'possession' (contra Nishiguchi 2008). In, e.g., (21) R can be any salient relation. The exclusion of alternative possessors in the case of *own$_{IP}$* is part of its truth-conditional meaning, unlike in the case of *own$_R$* where PA is an effect of focus and requires stress on *own$_R$*. *own$_{IP}$*, then, cannot be taken to signal focus on the possessor (contra Nishiguchi 2008); the existence of salient alternative possessors is neither a necessary nor a sufficient condition to license *own$_{IP}$*. Since DPs with and without *own$_{IP}$* are extensionally equivalent in context, use of *own$_{IP}$* requires that the (in)alienability of R is at issue. E.g., the context in (22) (Zribi-Hertz 1996, (77)), which licenses *own$_{IP}$*, does not make salient alternative possessors of John's dog, but alternative animals (dogs among them) with which John can be in some fleeting relation. In (23), where *own* appears in the scope of an intensional transitive verb, the speaker does not express a wish to be in some possessive relation R with a room, but to be in an inalienable possession relation with a room. As in the case of *own$_R$*, we predict that use of *own$_{IP}$* will be degraded if R is lexically inalienable, e.g if the NP is a body-part. This prediction appears to be borne out, as long as care is taken to exclude a parse with *own$_R$*. Consider (24). In a context in which the speaker looks at the hand of the hearer and notices that it is smaller than his, (24) is degraded. In a context where the speaker and the hearer have been given pictures of hands, however, (24) is felicitous. We assume that in this latter case the relational noun has been detransitivized (Barker 1995), before combining with the determiner in (19). Notice that the account does not predict that the hand in (24) cannot be the speaker's actual hand; it only predicts that the relation R between the speaker and the hand is not the body-part relation, but some alienable relation.

(18) $[\![$'s $]\!] = \lambda P_{et}\lambda y\iota x.P(x)$ & $R(x)(y)$ (19) $[\![$'s $]\!] = \lambda R_{e,et}\lambda y\iota x.\ R(x)(y)$

(20) $[\![$'s own$]\!] = \lambda P\lambda y\lambda e\lambda w\iota x.P(x)(w)\&R(x)(y)(e)(w)$ **& $\forall z\forall e'\forall w'.\ R(x)(z)(e')(w')=1 \rightarrow z=y$**

(21) My own cloud is nicer than yours.

(22) My friend John$_1$ already knew that Mary$_2$ disliked animals, but he has been taking tranquillizers since he heard the awful news: John's sister$_2$ hates his$_1$ own dog as well.

(23) I am tired of sharing. I want my own room. (24) My own hand is bigger than yours.

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Plurality inferences are scalar implicatures: Evidence from acquisition

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Summary: This study offers novel experimental evidence for a scalar implicature (SI) approach to plurality inferences (PIs) in English. We investigated comprehension of plural morphology in both children and adults. The main findings were that both groups computed PIs significantly more often in upward-entailing (UE) than in downward-entailing (DE) environments, but children computed PIs significantly less often than adults did in UE environments. The findings are consistent with previous research demonstrating children's relative insensitivity to SIs.

Plurality inferences as scalar implicatures: The plural-singular distinction is the source of a long-standing puzzle (Sauerland 2003, Spector 2007, a.o.): (1-a) appears equivalent to (1-b) and different from (1-c), suggesting that English plural morphology is associated with a meaning like 'more than one' (Lasersohn, 1995, a.o.). Under negation, however, the expected "not more than one" meaning is absent; the negated plural in (2-a) is better paraphrased as the negation of a singularity, as in (2-c).

(1) a. Emily fed giraffes.
b. Emily fed more than one giraffe.
c. Emily fed a giraffe.

(2) a. Emily didn't feed giraffes.
b. Emily didn't feed more than one.
c. Emily didn't feed a (single) giraffe.

In response to this puzzle, an SI approach to plurals has been proposed. Spector (2007), in particular, argues that the plural and singular are equivalent and are both associated with a weak semantics, with PIs arising as a higher-order type of SI (see also Magri, to appear). On the SI approach, both the singular and the plural have the meaning in (3-a) (in a model with three giraffes, Jill, Mary, and Fran). The singular is typically compared to (3-b), yielding the SI in (4-a). By contrast, the plural is directly compared to the singular enriched with its SI (4-a). Once the enriched singular is negated, the PI is generated (4-b).

(3) a. $[\![\textbf{giraffes}]\!] = [\![\textbf{giraffe}]\!] = \{j, m, f, j \oplus m, j \oplus f, f \oplus m, j \oplus m \oplus f\}$
b. $[\![\textbf{more than one giraffe}]\!] = \{j \oplus m, j \oplus f, f \oplus m, j \oplus m \oplus f\}$

(4) a. $[\![\textbf{giraffe}]\!] \wedge \neg [\![\textbf{more than one giraffe}]\!] = \{j, m, f\}$
b. $[\![\textbf{giraffes}]\!] \wedge \neg([\![\textbf{giraffe}]\!] \wedge \neg [\![\textbf{more than one giraffe}]\!]) = \{j \oplus m, j \oplus f, f \oplus m, j \oplus m \oplus f\}$

Given that SIs are typically not derived when scalar terms appear in DE contexts, the SI approach predicts the pattern of interpretation observed in (1) and (2). Moreover, the SI approach can account for an additional reading of (2-a) that excludes singularity, namely that in (5) (typically read with emphasis on the plural *-s*); this involves postulating a local SI under the scope of negation.

(5) Emily didn't feed giraffes, because she fed only one!

The acquisition of plurality inferences: If PIs are derived as a kind of SI, the pattern of children's PIs is expected to mirror their performance with other SIs. Despite considerable variation in the reported rates of children's success with SIs (Chierchia et al., 2001; Gualmini et al., 2001, 2004; Papafragou & Musolino, 2003, a.o.), one consistent finding is that children compute SIs less than adults do. Against this background, Sauerland et al. (2005) tested 3-5-year-olds' computation of PIs in polar questions such as *Does a dog have tails?*, and found that children accepted these more often than adults did. As the authors (and Pearson et al. 2011) point out however, the study had some potential limitations: first, PIs typically disappear in polar questions, and, second, the stimuli involved generic interpretations, which could have been misinterpreted by children as containing dependent plurals, e.g., *Do dogs have tails*?

The experiment: To overcome these potential limitations, and to provide a clearer picture of the viability of the SI account, we used a Truth Value Judgment Task to assess subjects' interpretations of singular and plural sentences in both UE and DE environments.

Materials & Procedure: Subjects watched short stories on a laptop computer. Following each story, a puppet was asked a question about the story, and the subject's task was to judge the puppet's answers. We adopted a 2x2x2 design with three factors: group (adults vs. children), number (singular vs. plural - between subjects), and monotonicity (UE vs. DE - within subjects). 28 English-speaking children (4;01-5;09, Mean

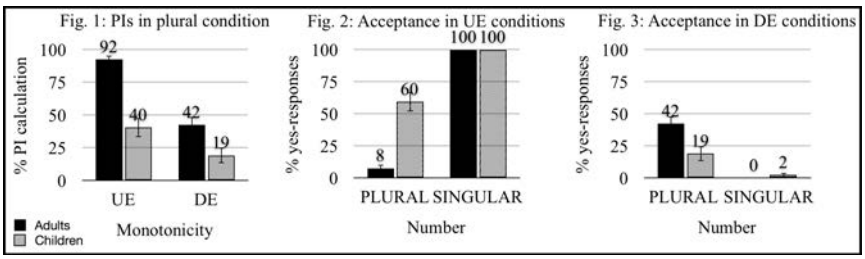
= 4;11) and 43 adults participated. There were six test stories and eight controls. Three of the test stories were associated with a positive (plural or singular) sentence, and three with a negative (plural or singular) sentence. In a typical story, a main character executed an action on only one of a set of objects (see (i)-(ii)). For example, at a farm with a large group of pigs, Emily ultimately feeds only one (salient) pig. If participants in the plural condition computed the PI in the UE condition, they were expected to reject the sentence *Emily fed pigs*; in the DE condition, participants were expected to reject the sentence *Emily didn't feed pigs* (although they might accept it if they accessed a meaning like (5)). Both plural and singular test conditions also included two positive and two negative control items designed to elicit opposite target responses, e.g., positive plural sentences in contexts that satisfied the PI, and negative plural sentences in contexts that did not satisfy the PI. All participants also received four negation controls (e.g., *Sally didn't eat the apple*). Only participants who passed at least 6 of 8 controls were included in the analysis.

Results & Discussion: There were three main findings. First, in the plural condition children and adults computed PIs significantly more often in the UE than in the DE condition (Fig. 1). A two-way ANOVA on responses in the plural condition revealed a main effect of monotonicity ($F(1,68)=21.36$, $p<.001$) and of group ($F(1,68)=19.04$, $p<.001$), but no interaction. Second, a two-way ANOVA on the UE condition revealed a main effect of number ($F(1,67) = 197.79$, $p<.001$) and of group ($F(1,67)=24.89$, $p<.001$), as well as a significant interaction ($F(1,67)=24.44$, $p<.001$); both children and adults were significantly more accepting in the singular than in the plural condition (Fig. 2). Third, a two-way ANOVA on the DE condition revealed a main effect of number ($F(1,67) = 22.12$, $p<.001$), no effect of group, and no interactions (Fig. 3). The results indicate that children were adult-like in the singular condition, as well as the plural DE condition. In the plural UE condition, however (where PIs are expected), children differed significantly from adults. While adults computed PIs 92% of the time, children only did so 40% of the time. This finding is consistent with previous findings that children typically compute SIs less than adults do. Follow-up justifications were elicited from the adult-like children who rejected the positive plural statements. These justifications were consistent with the PI being computed. Finally, note that some proportion of adults (42%) and children (19%) in the plural DE condition appeared to access the interpretation in (5), made available by locally computing the PI in the scope of negation.

(i) 

(ii) 

Conclusion: All in all, these findings strongly support an SI-approach to PIs. The observed differences in behavior between children and adults are typical of previous SI findings. Moreover, the present study overcame some possible limitations of the previous study by Sauerland et al. 2005. Because we examined both UE and DE contexts, there is no clear way in which our stimuli could have been misinterpreted as involving dependent plurals.



Selected References • **Sauerland et al 2005**. The plural is semantically unmarked. • **Spector 2007**. Aspects of the pragmatics of plural morphology. • **Pearson et al 2011**. Even more evidence for the emptiness of plurality.

Building Alternatives

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Inferences that result from exhaustification of a sentence S depend on the set A of alternatives to S. We will give a characterization of A which accounts for inference patterns that pose a challenge for other proposals. This is an example of such patterns:

(1) Bill went for a run and didn't smoke. John (only) went for a run.
Inference: ¬[John went for a run and didn't smoke]

(2) Bill passed some of the tests and failed some. John (only) passed some of the tests.
*Inference: ¬[John passed some of the tests and failed some]

While (1) can imply that it is not the case that John went for a run and didn't smoke (i.e. that John smoked), (2) cannot imply that it is not the case that John passed some of the tests and failed some (i.e. that John passed all of the tests). (The sequence in (2) is odd. We believe the reason for its oddness is that it cannot have the inference.) To derive the inference of (1), the exhaustification of S_1 = **John went for a run** must be relative to a set A that includes the sentence S_1' = **John went for a run and didn't smoke** (to license the inference) and excludes S_1'' = **John went for a run and smoked** (so that the inference is not canceled out). To explain the lack of an inference in the case of (2), exhaustification of S_2 = **John passed some of the tests** must be relative to a set A that includes both S_2' = **John passed all of the tests** and S_2'' = **John passed some of the tests and failed some** (so that S_2' and S_2'' cancel each other out). In both cases, S_i' and S_i'' are symmetric alternatives to S_i: $S_i' \wedge S_i''$ is a contradiction and $S_i' \vee S_i''$ is equivalent to S_i (Fintel and Heim 1997). Our theory must "break symmetry" in the case of (1) (i.e. define A in such a way that it can contain S_1' but not S_1'') without breaking symmetry in the case of (2). Assuming that $A = F(S) \cap C$, where F(S) is the set of formally defined alternatives of S and C a contextual restriction (Rooth 1992), symmetry can be broken by imposing conditions on F(S) and/or C.

Fox and Katzir (2011), henceforth F&K, advance a theory in which symmetry is broken in F(S) alone. They propose that F(S) be regarded the set in (3), where $F_R(S)$ is the set of sentences derived from S by replacement of F-marked constituents with expressions of the same semantic type.

(3) *Formal alternatives (F&K)*: $F(S) = F_R(S) \cap \{S' \mid S' \preceq_c S\}$

The relation 'x $\preceq_c$ y' is to be understood as 'x is no more complex than y in discourse context c.' Here is the definition.

(4) a. $E' \preceq_c E$ if $E' = T_n(...T_1(E)...)$, where each $T_i(x)$ is the result of replacing a constituent of x with an element of SS(E,c), the substitution source of E in c

b. $SS(E,c) = \{x \mid x \text{ is a lexical item}\} \cup \{x \mid x \text{ is a constituent uttered in c}\}$

(3)&(4) yield, correctly, that the sequence in (2) does not license $\neg S_2'$ as an inference since the formal alternatives of S_2 in (2) include both S_2' (generated by replacing **some** in S_2 with **all**, taken from the lexicon) and S_2'' (generated by replacing **passed some of the tests** in S_2 with **passed some of the tests and failed some**, taken from the disourse context). (3)&(4) can also break symmetry: S_2 outside a context licenses $\neg S_2'$ as an inference. This is predicted: the formal alternatives of S_2 in this case include S_2' (same as above), but not S_2'' (since **passed some of the tests and failed some** is neither in the lexicon nor in the context). Problematically, however, (3)&(4) fails to predict that the sequence in (1) does license $\neg S_1'$ as an inference: the formal alternatives of S_1 in (1) include both S_1' (generated by replacing **went for a run** in S_1 with **went for a run and didn't smoke**, taken from the context) and S_1'' (generated by replacing **didn't smoke** in S_1' with **smoked**, also taken from the context; note that (4a) allows for successive replacements). Even worse, given what has been said the inference in (1) is licensed only if symmetry can be broken in C.

At first glance, a strategy to explain the contrast between (1) and (2) by breaking symmetry in C is to appeal to the notion of a "pragmatic scale" (cf. Klinedinst 2004). It seems much easier to

construct an evaluative scale on which S_1'' is ranked lower than S_1' (e.g. a healthiness scale), than it is to construct a scale on which S_2'' ranks lower than S_2'. However, a draft dodging context makes available, and salient, a scale on which S_2'' ranks lower than S_2' (i.e. a scale measuring the degree of luck of a draft dodger). But even this context cannot support the relevant inference for (2):

(5) In the draft for the Korean war, Bill has been dealt a better hand than John. He passed some of the military fitness tests and failed some, while John (only) passed some of the tests.
*Inference: ¬[John passed some of the tests and failed some]

We conclude that a solution to the problem at hand in terms of pragmatic scales is not tenable and that a refinement of F&K's approach is called for instead. As it turns out, we only need to make a minimal adjustement. We propose to impose the constraint in (6) on F&K's concept of F(S):

(6) *Atomicity*: Expressions in the substitution source are syntactically atomic

Atomicity breaks symmetry in (1). The derivation of S_1'' proceeds as follows (where AT marks the atomic expressions): **John went for a run** → **John [$_{AT}$ went for a run and didn't smoke]** → **John [$_{AT}$ went for a run and [$_{AT}$ smoked]]**. The second step violates Atomicity so that S_1'' cannot be derived. It is still possible to derive from S_1 the alternative **John smoked**, which is contradictory to S_1', too. However, this is not a problem for our analysis since **John smoked** can be excluded from A: A=$\{S_1, S_1'\}$ satisfies the three conditions in (7) (equivalent to F&K's hypothesis that A is restricted to the set of relevant sentences which is closed under negation and conjunction).

(7) *Conditions on A (F&K)*: (i) $A \subseteq F(S)$, (ii) $S \in A$, and (iii) there is no S' in $F(S) \backslash A$ such that S' is in the Boolean closure of A

Atomicity does not break symmetry in (2): $F(S_2)$ = {**pass some**, **pass all**, **fail some**, **fail all**, **pass some** ∧ **fail some**}. To get the non-attested inference, A must be the set N = {**pass some**, **fail some**, **fail all**, **pass some** ∧ **fail some**}. However, N does not qualify, as $F(S_2) \backslash N$ contains **pass all** which, being equivalent to **pass some** ∧ ¬**fail some**, is in the Boolean closure of $F(S_2)$.

F&K's theory has another problem: given (3)&(4) and the assumption that exhaustification also involves logically independent alternatives (Spector 2006), (8) cannot be explained (Romoli 2012a).

(8) They did [$_{NegP}$ not [$_{VP}$ pass all of my students]]
Inference: ¬[They didn't pass some of my students]

(3)&(4) predict both S_3' = **they didn't pass some of my students** and S_3'' = **they passed some of my students** to be formal alternatives of (8). Atomicity solves this problem, too: it rules out S_3'', as its derivation involves replacing NegP with VP and **all** in the then atomic VP with **some**.

The Atomicity constraint makes the substitution source a sort of numeration. If we further impose the condition that the derivation of F(S) must proceed from bottom up, we can account for the "switching problem" (Romoli 2012b): **Some of my students did all of the readings** cannot imply ¬[all of my students did some of the readings], while **None of my students did all of the readings** can imply that all of my students did some of the readings. Atomicity and the bottom-up constraint make the syntactic derivation of formal alternatives strikingly similar to the syntactic derivation of sentences, suggesting that the former might be a "cooptation" of the latter.

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How and Why Conventional Implicatures Project

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It is well-known that a single utterance may convey different types of information, for example *new* and *old* information. It is not always clear, however, how these types of content relate to each other. One way to pursue a unified semantic analysis would be to see how different types of content that exhibit the same semantic property relate to each other. Of particular interest in this context is the property of *projection*; the indifference of linguistic content to semantic operators such as negation. The three most prominent classes of projection phenomena are anaphora, presuppositions, and conventional implicatures (CIs; as defined by Potts [7]) [10]. The correspondence between the former two forms the basis for one of the major accounts of presuppositions [11, 2]. In contrast, formal analyses of CIs have mainly focused on differentiating between the semantic contribution of presuppositional and CI content by introducing different meaning dimensions [7, 5], or different types of discourse updating [1]. However, such accounts shed little light on the commonalities underlying the projection behaviour that is shared among the three classes.

We propose a unidimensional and incremental analysis of conventional implicatures, which highlights their correspondence to presuppositions, and anaphora. We focus on supplemental CIs, triggered by subordinated constructions such as appositives, e.g., *"John, a linguist, was not at the party"*. Our analysis is based on the observations that (i) CIs always attach to an anchor, and (ii) the anchor itself always projects, and (iii) CIs always project to their anchor. These observations have led to several syntactocentric analyses for CIs [e.g., 5, 9, 6], but these fail to capture the *semantic* properties underlying the projection behaviour of CIs, presuppositions and anaphora. We therefore propose a Montagovian semantic analysis that treats CIs as 'projection-anaphoric' (*p-anaphoric*) to their anchor, that is, they introduce an equality between their projection site and the one introduced by their anchor. At the same time, CIs contribute novel information to the discourse context created by the anchor. In contrast, presuppositions are 'reference-anaphoric' [cf. 11], which signals previously established content and entails p-anaphoricity. The analysis is formalized in Projective DRT [12], a representational framework in which projection sites are explicitly part of the semantic representations. It explains the interpretational differences between presuppositions and CIs, without stipulating a fundamental distinction between them.

CIs are projection-anaphoric. van der Sandt's [11] proposal to treat presupposition projection as anaphora resolution, formalized in DRT [3], is based on the observation that presuppositions behave in a way similar to anaphora. CIs, on the other hand, are more similar to regular assertions, since they are infelicitous in a context in which their content has already been established, as in *"John is a linguist.(...) #John, a linguist, .."*. Like presuppositions, however, CIs provide backgrounded information and project out of embedded contexts. These characteristics can be brought together by treating CIs as *projection-anaphoric* to their anchor: their content is novel (i.e., non-anaphoric), but projects along with the presupposition triggered by their anchor, thus contributing novel information to the interpretation context of the anchor. Moreover, since CIs are non-restrictive, they require a specific, and therefore projecting anchor. This explains why CIs are infelicitous when anchored to a non-specific indefinite, as in *#"No man, a linguist,.."*. Thus, besides 'piggybacking' on their anchor, CIs require their anchor to project, which explains why, like presuppositions, they tend to project globally. In order to formalize this behaviour, we need a framework in which projection is explicitly part of the semantic representation. This is part and parcel of Projective DRT [12], an extension of DRT [3] in which labels and pointers explicitly reflect the interaction between the introduction and interpretation context of projected content.

CIs in PDRT. In Projective DRT, the correspondence between anaphora and presuppositions is taken a step further by treating projection as variable binding. Each context introduces a *label* that can bind the *pointers* associated with the discourse referents and conditions, indicating where the content is interpreted. To formalize p-anaphoricity, we add structural information to PDRSs, via a subordination relation between contexts [cf. 8]. The projection of presuppositions is signalled by means of a strict subordination ($<$). CIs project as well, but also introduce an equality between their projection site and the one provided by their anchor. The PDRS in (1) has pointers for three contexts named 1, 2 and 3; x_i is a discourse referent pointing to (i.e., is interpreted in) PDRS i, and K_j is a PDRS labelled j. The constraints posed on the contexts are shown after the conditions.

(1) Mary, a linguist, laughs.
$[\ x_3,\ z_2 \mid Mary_3(x),\ linguist_2(z),\ x =_2 z,\ laugh_1(x) \mid 1 < 3,\ 1 < 2,\ 2 = 3]_1$

In contrast to a van der Sandtian analysis of CIs based on variable trapping, PDRT predicts the infelicity of attaching a CI to a non-projecting anchor. Due to the p-anaphoricity of CIs together with their projecting nature, this results in conflicting contextual constraints, as illustrated in example (2), with the conflicting constraints indicated in bold.

(2) #No man, a linguist, laughs.
$[|\neg_1[\ x_2,\ z_3 \mid man_2(x),\ linguist_3(z),\ x =_3 z,\ laugh_2(x) \mid \mathbf{2 < 3},\ \mathbf{3 = 2},\ 2 < 1]_2|]_1$

An incremental construction procedure is crucial for a proper account of CI content, because of its interaction with asserted content, e.g., via anaphoric dependencies [1]. In PDRT, this incremental construction can be formalized using Montague semantics [cf. 4]. Importantly, since projection is directly part of the incremental construction, in contrast to van der Sandt's account, anaphoric dependencies and conflicting contextual constraints are directly available during discourse construction. To test and evaluate the non-trivial procedure of dealing with projection variables during discourse construction, we have implemented PDRT as a Haskell library, called PDRT-SANDBOX.

Towards a unified account of projected content. Formal approaches to semantics aim to capture all aspects of the meaning of an utterance. This means incorporating different types of content (for example, *old* versus *new*), while taking into account the interaction between them. Our account paves way for such a unified analysis of projected content. By treating CIs as projection-anaphora, we can explain their kinship to presuppositions and anaphora, without introducing an extra level of complexity to account for the fact that they introduce novel information.

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Expanding the taxonomy of parenthetical 'as'-clauses

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Potts (2002) divides parenthetical *as*-clauses into those with a CP gap (1a) and those with a VP gap (1b). I argue that this distinction should be crossed with a second dimension of variation, *viz.*, whether the *as*-clause adjoins to a focus-marked constituent (the *host*). The test cases are *as*-clauses that premodify the focus-marked second conjunct of a DP coordination (2) (for conciseness, in what follows I only provide examples of CP gaps, but the argumentation extends to VP gaps). Note that, beyond necessarily bearing a pitch accent, the host may not be Given (3).

(1) a. Ames was a spy, [as the FBI discovered [$_{CP}$__]].
b. Ames stole secret documents, [as the FBI said he had [$_{VP}$__]].

(2) a. [$_{DP}$ Ames and, [as the FBI discovered [$_{CP}$__]], [$_F$ BOONE]], were spies.
b. [$_{DP}$ Ames and, [as the FBI said he had [$_{VP}$__]], [$_F$ BOONE]], stole secret documents.

(3) A: What did Ames and Boone steal?
B: Ames and (∗ , [as the FBI suspected [__]],) [$_G$ Boone] stole [$_F$ secret DOcuments].

Data & problems: Conjunction-internal *as*-clauses exhibit many of the properties of regular *as*-clauses documented in Potts (2002): (i) there are island effects internal to the *as*-clause (4), which indicate movement of a null operator ∅; (ii) there is a sisterhood effect, where the meaning of the gap is contingent on the meaning of the host (5); (iii) the gap corresponds to a propositional object, as it is licit in exclusively propositional positions (complement of *be aware*) and illicit in exclusively individual-type positions (complement of *be aware of*) (6); (iv) *as*-clauses are opaque to external operators (data not shown); and (v) they are truth-conditionally independent (data not shown). These parallelisms suggest a common analysis for both types.

(4) a. * Durians are delicious, [as Nina spoke with a grocer who claimed [__]].
b. * Durians and, [as Nina spoke with a grocer who claimed [__]], [$_F$ YAMS] are delicious.

(5) a. That space has four dimensions is widely known, [as they announced [__]].
As-clause = they announced that it's widely known that space has four dimensions.
As-clause ≠ they announced that space has four dimensions.
b. Ames and, [as the FBI discovered [__]], [$_F$ BOONE] were spies.
As-clause = the FBI discovered that Boone was a spy.
As-clause ≠ the FBI discovered that Ames and Boone were spies.

(6) a. The Earth is round, [as we are well aware (∗ of) [__]].
b. The Earth and, [as we are well aware (∗ of) [__]], [$_F$ the MOON] are round.

Regular *as*-clauses (1a) are defined as containing a variable over propositions inside the complement P of *as*. The function of *as* (7) is to apply $P_{\langle\langle st\rangle t\rangle}$ to the propositional host of adjunction $p_{\langle st\rangle}$: if $P(p)$ expresses a truth, the semantics of p is passed on unmodified. The other properties of *as*-clauses also follow from this analysis (see Potts 2002 for details).

(7) $\text{as}_{CP} = \lambda P \in D_{\langle\langle st\rangle t\rangle}[\lambda p \in D_{\langle st\rangle} : P(p) \text{ is true } [p]]$ [Potts 2002:654]

However, because (7) requires the host to be propositional, it can't be directly extended to (2a), where the host is an individual. Raising the host DP to a propositional type (Schein 1992) requires giving up compositionality entirely (Winter 2001). A reanalysis in terms of reduced clausal conjunction (so that the *as*-clause adjoins to an elliptical proposition) fails to predict that *as*-clauses pattern with DP conjunctions, and differently from clausal conjunctions, in their (i) ability to trigger cumulative plural agreement (8); (ii) collective/distributive ambiguity (9); (iii) binding/scope possibilities (data not shown); and (iv) DP-like distribution (data not shown).

(8) a. Ames and, [as the FBI discovered [__]], [$_F$ BOONE] { ✓ were spies / ∗ was a spy }.
b. Ames {∗ were spies/✓ was a spy}, and Boone {∗ were (spies)/✓ was (a spy)} too.

(9) a. Rudy and, [as Edna pointed out [__]], [$_F$ ALAN] lifted a piano. *[✓ coll. / ✓ distr.]*
b. Rudy lifted a piano, and Alan did (lift a piano) too. *[∗ coll. / ✓ distr.]*

Analysis The solution requires creating an individual variable in the *as*-clause, so that to enable composition with the individual host. This can't be done by extracting an $\langle e \rangle$-type operator from within the gap, given that gaps are deep anaphors without internal structure (Potts 2002). Instead, I propose to exploit the fact that creation of the relevant variable requires an application of Predicate Abstraction (PA) independent from the one necessary to handle movement of $\varnothing$ (Potts 2002). I model $\varnothing$ as anaphoric to a salient discourse antecedent (typically the host clause, but not necessarily so: see (12)), crucially including the latter's focus-background articulation (here I use Structured Meanings, but nothing depends on this). If PA abstracts over the entire content of $\varnothing$, it creates a variable over propositions, and a regular *as*-clause obtains; but if it abstracts over just the focus component of $\varnothing$, it creates a variable over the type of the focus (in this case, individuals), and the *as*-clause can compose with an individual host. This application of PA is consistent with Heim and Kratzer's (1998) implementation, which only requires coindexation of the abstractor and the abstractee. Note that this derivation requires defining the separate lexical entry (11) for *as*, but this falls within Potts's limits of *as* polysemy: its first argument contains a variable over some type σ, and its second argument is itself of type σ.

(10) $[\text{as } [Op_i \text{ the FBI discovered } t_i]] = \lambda q_{\langle e \rangle} : \mathsf{discover}(\langle \lambda z.\mathsf{spy}(z), q \rangle)(\mathsf{FBI})$ is true $[q]]$

(11) $\text{as}_{DP} = \lambda Q \in D_{\langle et \rangle}[\lambda q \in D_{\langle e \rangle} : Q(q)$ is true $[q]]$

This analysis preserves Potts' characterization of *as*-clauses as partial identity functions, where the difference between the subtypes of *as*-clauses reduces to the kind of semantic objects that they are partial identity functions on (i.e., full propositions/properties vs. the foci thereof). It also preserves Potts' explanation of locality effects ((4), by movement of $\varnothing$), as well as sisterhood effects (5), opacity effects, and truth-conditional independence (which depend on as/as_F having lexical entries along the lines discussed above). Finally, the restriction of the gap to propositional positions follows from the propositional nature of $\varnothing$.

Extensions: Because $\varnothing$ is anaphoric to a discourse antecedent, its Given content can be retrieved from a proposition other than the one that the *as*-clause is contained in, so long as it is sufficiently salient.

(12) *Context: Rudy and Alan are playing Trivial Pursuit; Edna overhears their conversation:*

R: Orthodox Jews can't wear garments that combine which two fabrics?

A: I know that wool is one of those fabrics, but I can't remember the other one.

E: *(leaning over to Alan)* Psst! The other fabric is [$_F$ LInen]!

A: That's it! Orthodox Jews can't wear garments that combine wool and [as Edna just reminded me [__]], [$_F$ LInen].
As-clause = Edna just reminded me that the other fabric is linen.
As-clause ≠ Edna just reminded be that Orthodox Jews can't wear linen.

Additionally, since the type of the variable created by $\varnothing$ depends on the focus of the antecedent proposition, the host of adjunction is not restricted to being a DP —cf. the adjectival host (13a), the VP host (13b), and the PP host (13c). Such examples require modifying (11) to accommodate hosts of different types, but this is still in well in line with the analysis defined above.

(13) a. This new and, [as Edna remarked [__]], [$_F$ disTURbing] report will ruin Ames' career.

b. Exercising regularly and, [as many doctors nowadays agree [__]], [$_F$ eating a plant-based DIET] are essential components of a healthy lifestyle.

c. After lunch and [as Edna likes to point out [__]] [$_F$ right before a SEminar] are both good times to get a cup of strong coffee.

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Self-interveners: the case of universal quantifier PPIs

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I. Following recent lines of thinking (Kadmon & Landman 1993, Krifka 1995 and Chiercha 2006), Negative Polarity Items (NPIs) are only fine in Downward Entailing (DE) contexts, since outside such contexts their semantics would give rise to a contradiction. According to Chierchia's (2006) implementation, this is due to the fact that NPIs are equipped with a syntactic feature [σ] that ensures obligatory introduction of domain alternatives; and that this feature must be checked by a covert exhaustifier EXH. **II.** A potential problem for this approach is that by the same logic a universal quantifier (*all*, *everybody* or *everything*) that carries a feature [σ] should be a Positive Polarity Item (PPI). Take the imaginary word *pevery* that would be semantically identical to English *every* next to being equipped with this feature [σ]. A negative sentence containing *pevery*, like (1), would have the syntax as in (2) and therefore the denotation as in (3), a clear contradiction.

(1) I did not read pevery book

(2) $[\text{EXH}_{|}\sigma_{|}\,[\text{I did not read }[\text{pevery book}]_{|}\sigma_{|}]]$

(3) $\neg\forall x.[x\in\{a,b,c\} \rightarrow \text{read}(I, x)] \,\&\, \neg\neg\forall x.[x\in\{a,b,c\} \rightarrow \text{read}(I, x)]$

But no language in the world seems to have a word meaning *all*, *everybody* or *everything* that is a PPI. Within the domain of quantifiers over individuals, most PPIs are actually existential quantifiers (e.g. English *some*), never universal quantifiers. This would suggest that for some unknown reason the approach by Kadmon & Landman, Krifka and Chiercha would not extend to universals. **III.** However, in the domain of modals, universal quantifier PPIs are indeed attested. As has been pointed out by Israel (1996), Iatridou & Zeijlstra (2013) and Homer (t.a.) universal modals that take wide scope with respect to negation, like English *must*, *should* or *ought to*, are indeed PPIs. The existence of such universal PPI modals thus forms evidence in favour of the approach that takes polarity effects to result from logical contradictions: the predicted elements are indeed attested. But it gives rise to a new question as well: why have universal quantifier PPIs only been attested in the domain of modal auxiliaries and never in the domain of quantifiers over individuals? **IV.** In this paper I argue that the reason lies in the syntactic differences rather than the semantic differences between modals (quantifiers over possible worlds) and quantifiers over individuals, in particular in their syntactic position in the sentence. More concretely, I argue that both universal modals and universal quantifiers over individuals with a feature [σ] can be attested, but that the syntactic properties of universal quantifiers over individuals with such a feature may obscure their diagnostic PPI properties. To see, this, take again the scopal ordering of a universal quantifier with a feature [σ], negation and the covert exhaustifier that gives rise to the logical contradiction. That is the ordering in (4).

(4) $^{\#}\ldots \text{EXH} > \text{NEG} > \forall_{|}\sigma_{|}$

If negation intervenes between the exhaustifier and the universal, a contraction arises. But nothing guarantees that a universal quantifier with a feature [σ] (henceforward $\forall_{|}\sigma_{|}$) has its exhaustifier scope higher than the negation: the feature [σ] only requires that the exhaustifier c-commands the $\forall_{|}\sigma_{|}$ and therefore has scope over it, but does not require that it has no immediate scope. An alternative underlying syntactic configuration for (1) would be (5). But (5) does not give rise to a logical contradiction! In (5) the proposition *I read pevery book*, denoting $\forall x.[x\in\{a,b,c\} \rightarrow \text{read}(I, x)]$, would be exhaustified (a vacuous operation, since it is already stronger than any of its alternatives) *before* it gets negated. The denotation of (5) is then just simply (6). The exhaustifier actually acts as an intervener.

(5) $[\text{NOT }[\text{EXH}_{|}\sigma_{|}\,[\text{I read }[\text{pevery book}]_{|}\sigma_{|}]]]$

(6) $\neg\forall x.[x\in\{a,b,c\} \rightarrow \text{read}(I, x)]$

Consequently, A universal PPI (or to be more precise: a universal quantifier that obligatorily introduces domain alternatives and that must be exhaustified) is fine in a negative / DE context as long as the exhaustifier is in between the negation or any other downward entailing operator and the universal quantifier itself. Universal quantifier PPIs may thus appear under negation without being ungrammatical and therefore being unrecognizable as such. **V.** The recognisability of universal PPIs, then, depends on the possibility of an intervening EXH. In order to assess the existence of universal PPIs, the question arises as to exactly when EXH may intervene. In this we follow Zeijlstra (2012), who for a number of different

phenomena has argued that covert operators in general must be included in a position immediately c-commanding the highest *overt* marker of an abstract operator, in casu $\forall_{[}\sigma_{]}$. This entails that the only orders where $\forall_{[}\sigma_{]}$ may not appear under the scope of negation are exactly those cases where either $\forall_{[}\sigma_{]}$ precedes negation or where it forms a morpho-syntactic unit with it. The modals in (7), thus, cannot reconstruct under negation (as this would yield the contradictory scopal order EXH>NEG>MUST), but a universal quantifier in object position, as in (8), may very well be a PPI and still be under the scope of negation, since EXH may intervene.

(7) a. John mustn't leave [EXH must precede *must*, so it cannot intervene]
b. Juan no-debe ir [EXH must precede *debe*, but it cannot intervene
Juan neg-must go between the negation and *debe*, since *no* is a clitic]

(8) John didn't see everybody [EXH can intervene between *didn't* and *everybody*]

On the basis of examples where a morphologically independent negation precedes a universal quantifier one cannot tell whether a universal quantifier like *everybody* is a PPI or not. **VI.** But how can we tell whether some universal quantifier over individuals is a PPI or not (i.e. whether it carries a feature [σ])? The only proper way to diagnose this would be by investigating its scopal behavior when it precedes negation. In that case the surface scope order would be EXH > $\forall_{[}\sigma_{]}$ > NEG. Under this configuration, the universal quantifier cannot reconstruct below negation (as this would give rise to a logical contradiction). If the universal quantifier were lacking [σ], it would be able to reconstruct below negation. Following this line of reasoning, we can actually establish that English *everybody* is not a PPI, but that Dutch *iedereen* ('everybody') is a PPI, a novel observation to the best of my knowledge. In English (and most other languages), for almost all speakers a universal quantifier that precedes negation may reconstruct under negation. However, for most speakers of Dutch (and several Northern German varieties), this reconstructed reading is not available (cf. Zeijlstra 2004, Abels & Marti 2011). This observation has never received a satisfactory explanation, but directly follows once universal quantifiers in Dutch are taken to be PPIs.

(9) a. Everybody didn't leave ∀>¬;¬>∀
b. Iedereen vertrok niet (Everybody left not) ∀>¬;*¬>∀

These data thus show that universal quantifier PPIs can actually even be attested in the domain of quantifiers over individuals; they are just not that easily recognizable. **VII.** Further evidence for this analysis comes from language like Dutch and German, where in main clauses a modal precedes negation, but where in subordinate clauses it follows the negation. The prediction that this analysis makes is that modals that take scope over negation in main clauses (due the their PPI-status), should be able to take scope below negation in a subordinate clause. This prediction is born out, as the data in (10) show.

(10) a. *Jan moet niet vertrekken, maar het mag wel
Jan must neg leave, but it may prt 'John mustn't leave, but it is allowed'
b. Ik weet dat Jan niet moet vertrekken, maar dat het wel mag
I know that Jan neg must leave, but that it prt may
'I know that John doesn't have to leave, but that it is allowed'

VIII. To conclude, universal quantifier PPIs do exist, both in the domain of quantifiers over individuals and in the domain of quantifiers over possible worlds, as is predicted by the Kadman&Landman-Krifka-Chierchia approach to NPI-hood. However, since the exhaustifier that is induced by these PPIs can act as an intervener between the PPI and its anti-licenser, universal quantifier PPIs often appear in disguise. Their PPI-like behaviour only becomes visible once they morpho-syntactically precede their anti-licenser.

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