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Collected Abstracts

Invited Speakers

A possible worlds semantics for (illocutionary) evidentials

Martina Faller

The precise relationship between evidentiality, the linguistic marking of the speaker's source of information for a claim, and epistemic modality, the marking of the speaker's evaluation of the truth of a proposition in terms of necessity, possibility or degree of certainty, is not yet fully understood. While these two phenomena are clearly distinct conceptually, it is not always possible to establish two distinct categories empirically in a given language because the two concepts are often expressed simultaneously by a single element. For example, English epistemic *must* expresses that the speaker *s* considers the proposition expressed *p* a necessity and in addition indicates that *s* has inferred *p* and does not have direct evidence for it. The two concepts are furthermore closely related in that the type of source information a speaker has will to a great extent determine the speaker's evaluation of the truth of the proposition.

Within formal semantics, evidentials are often analyzed as quantifiers over possible worlds with evidential presuppositions, that is, as a kind of epistemic modal. In this talk I will explore to what extent such an analysis is viable for evidentials that do not contribute to the main proposition expressed/at-issue content such as the evidentials of Cuzco Quechua (CQ). CQ has four evidentials which I have ananlyzed in previous work as contributing to the illocutionary level of meaning. The Direct indicates that the speaker *s* has direct evidence for *p,* the Reportative that *s* was told that *p,* the Conjectural that *s* conjectures that *p,* and the perceived evidence Inferential that *s* infers that *p* perceived evidence. I will argue that all four can be analyzed as quantifiers over possible worlds, because even the non-inferential evidentials involve some degree of inference. However, since their main contribution is to indicate what type of evidence this inference is based on, I will argue that the evidential requirement should not be analyzed as a presupposition. Instead, I propose that evidentials assert the existence of a set of facts acquired by direct means or from reports, from which *p* follows. If we assume that, in general, speakers come to believe a proposition *p* on the basis of some evidential event via a (possibly minimal) amount of reasoning, the difference between epistemic modals and evidentials lies in what part of this process they focus on. Epistemic modals focus on the inferential part, and evidentials on the evidential event. Unmodified assertions make no reference to this process at all but simply assert the proposition itself.

The acquisition of meaning: Evidentiality in semantics and cognition

Anna Papafragou

How do semantics and cognition make contact during language learning? This talk addresses this question by investigating the acquisition of evidentiality (the linguistic encoding of information source) and its relation to children's evidential reasoning. I present data from a series of experimental studies with children learning Turkish and Korean (two languages with evidential morphology) and English (a language without grammaticalized evidentiality) in order to test two hypotheses: (a) the acquisition of evidentiality is complicated by the subtleness and abstractness of the underlying concepts; (b) learning a language which systematically (e.g., grammatically) marks evidential categories might affect early reasoning about sources of information. The experiments show that the production and comprehension of grammaticalized evidentials can pose considerable difficulty to young learners; nevertheless, these problems are not (necessarily) conceptual in nature since the same learners successfully reason about sources of information in non-linguistic tasks. Furthermore, children's ability to reason about sources of information proceeds along similar lines in diverse language-learning populations and is not tied to the acquisition of the linguistic markers of evidentiality in the exposure language. I discuss implications of these findings for the relationship between linguistic-semantic and conceptual representations during development.

Meaning and use Kaplan (1999) writes, "When I think about my own understanding of the words and phrases of my native language, I find that in some cases I am inclined to say that I know what they *mean*, and in other cases it seems more natural to say that I know how to *use* them." At the 'meaning' end of the spectrum, we might be tempted to place common nouns and boolean connectives; at the 'use' end, expressives and (other) indexicals. The overarching question for this talk is, How would our investigations proceed if we had information only about use conditions, with no direct access to propositional content? What would our theories look like? What inferences would we make about the underlying meanings?

In the spirit of these questions, I've structured this abstract (and will structure the talk) around two mystery elements, M1 and M2, for which I supply a large amount of information about use conditions, in the form of quantitative evidence drawn from large corpora. I've also identified some elements with similar distributional properties — similar use conditions — to guide us.

Data This abstract involves data from Twitter (10 million 'tweets', each at most 140 characters; 10.2 million words) and from a collection of online product reviews (560,000 reviews; 39.7 million words; Davis and Potts 2009). Twitter has evolved into a tool for broadcasting information, so the contexts tend to be purely information-sharing. The reviews mix information-sharing with argumentation about the relative merits of the products under review. The talk will supplement these corpora with data drawn from OpposingViews.com (argumentative), Goodreads.com (reviews and social networking), and Thomas et al.'s (2006) Congressional Speech Data corpus (argumentative).

Mystery item M1 Figures 1–2 depict the distribution of a range of lexical items in the corpora, with M1 in the rightmost panels. In each case, M1 appears to be a milder version of the negative scalar modifiers, and it stands opposed to the positive scalar modifiers. The figures' captions provide additional details about the plots. The high-level picture is that M1, like *bad* and *terrible*, is used more heavily in contexts of negative sentiment, conflict, and disagreement. What is the source of these usage conditions?

Mystery item M2 Figures 3(a)–3(b) show that negative expressives amplify already negative messages. Intensional domain wideners (Rawlins 2008) like *who on earth* are negatively biased, and their expressive variants increase this bias. Similarly, the intensive *totally* has an expressive counterpart *fucking*, which veers more sharply to the negative end of the spectrum. Figure 3(c) depicts M1 occurring with M2 elements in its scope. Like the lexical negative expressives, M2 amplifies the negative bias seen with M1 alone. The evidence also suggests that repeating M2 items increases the negative effect (Potts 2007). What is at the root of this pragmatic connection between expressives and M2 items?

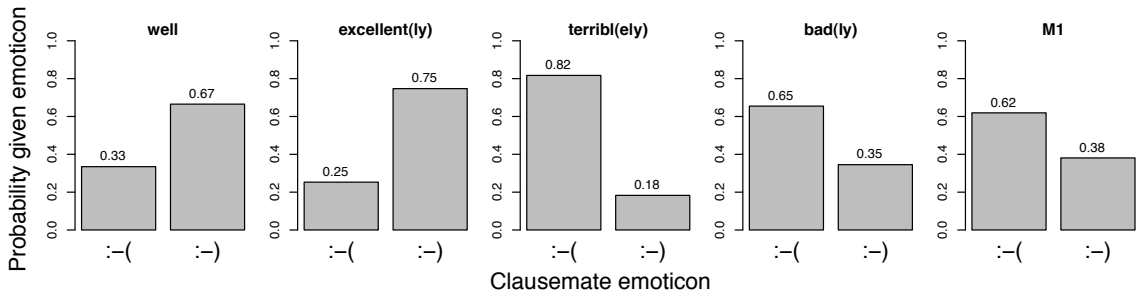


Figure 1: Twitter (information-sharing contexts): Emoticons are frequent on Twitter, where they are used as general markers of sentiment. These panels restrict attention to uses of the items in question where they have clausemate positive (smiley) or negative (frownie) emoticons. Positive language correlates with positive emoticons, negative language with negative emoticons, and the degree of biased aligns well with intuitions about lexical strength. M1 emerges as mildly negative by this metric.

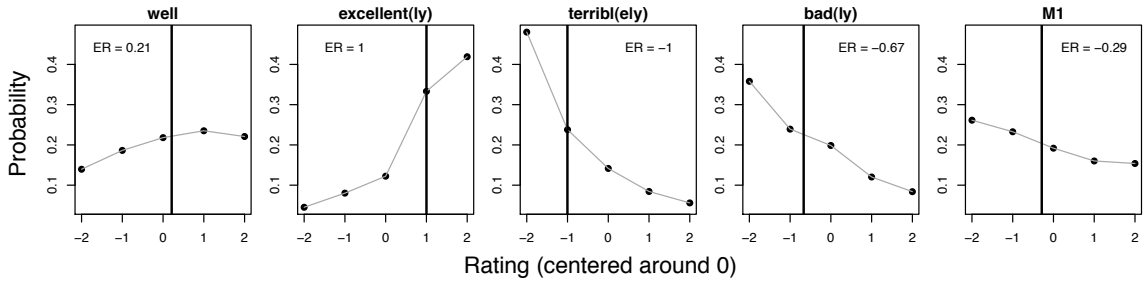
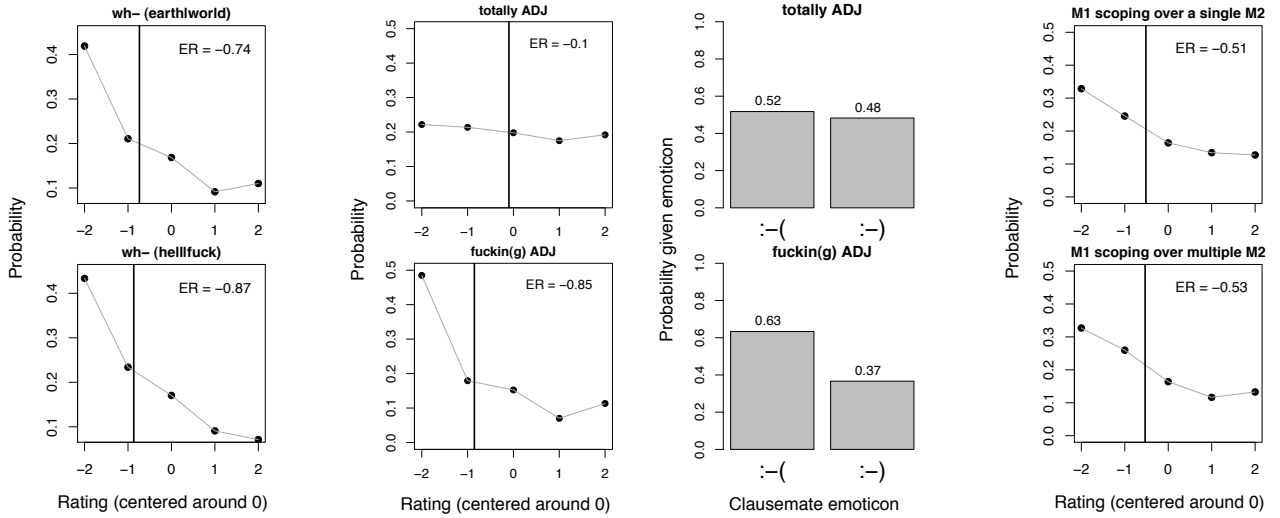


Figure 2: Review corpora (information-sharing and argumentative contexts): These panels depict relative frequencies across the five-star rating scale R, which is centered around 0 to reflect the fact that 1-2 star reviews are negative, 4-5 star reviews are positive, and 3-star reviews are lukewarm (Potts and Schwarz 2010). The expected rating (ER) values are weighted averages: $\sum_{r \in R} r\Pr(r)$. The higher (lower) the ER value, the more positive (negative) the item. M1 has a negative bias, reliable but mild compared with *terrible*. It is comparable to *well* on the positive side.



(a) The negative bias of normal intensional domain wideners is amplified by their expressive counterparts, as measured by, e.g., ER values.

(b) Whereas intensive *totally* has only a slight negative bias, *fucking* is used almost exclusively in negative contexts.

(c) M1 and M2 as clausemates. The negative bias seen in the rightmost panel of figure 2 is amplified, as measured by, e.g., ER values.

Figure 3: In figures 3(a) and 3(b), the negative expressives amplify negative biases. Figure 3(c) is simply another instance of this if M2 is an expressive. Figure 3(c) also suggests that repeating M2 items enhances negativity (Potts 2007).

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How we speak of Knowing How

Jason Stanley (co-authored with Carlotta Pavese)

Is knowing how to swim, or knowing how to ride a bicycle, a kind of propositional knowledge, that is, a kind of knowing that something is the case? Philosophers since Gilbert Ryle have generally assumed otherwise. However, in English, ascriptions of knowing how to do something appear to be embedded questions, which suggests an affirmative answer to the question. But in other languages, it is less obvious that ascriptions of knowing how to do something take the form of embedded questions. In this talk, we look at a swath of cross-linguistic data to see whether the weight of evidence best supports the view that when we speak in human first-languages of knowing how to do something, we are ascribing knowledge of propositions.

Oral and Poster Presentations
(alphabetical by first autor)

Triggering Verbal Presuppositions

Márta Abrusán (University of Oxford)

We argue that presuppositions of verbal predicates are predictable. Following Stalnaker (1974) among others, we assume that an entailment ψ of an atomic sentence S is turned into a presupposition of S if ψ is distinguished in some sense from the rest of the meaning that S expresses. We propose that entailments that are not *about* (in the formal sense to be defined below) the principal arguments of the sentence S are presupposed. Unlike previous approaches to presupposition triggering by Wilson and Sperber (1979), Simons (2001) and Abusch (2002), the present paper can avoid overgeneration (in contrast with Simons and Wilson and Sperber) and does not have to resort to lexical stipulation (as in the case of Abusch).

The proposal We use a sentence when we want to provide information about the principal arguments of its main predicate. Assume that the principal arguments of a sentence S are: (a) the participants of the event denoted by the matrix verb and (b) the event time of the matrix verb. Given this, the mechanism that turns certain entailments into presuppositions is as follows:

(1) The entailments of an atomic sentence S that are not about the principal arguments of the matrix predicate of S are presupposed.

The two types of principal arguments are treated separately by the triggering mechanism: It checks whether there are entailments that are not about the participants of the event, if yes, these are presupposed. Independently it also checks whether there are entailments of S that are not about the event time, if yes, these are presupposed as well. The above mechanism applies to atomic sentences. Presuppositions of complex sentences are derived from the presuppositions of atomic sentences they contain, via some projection mechanism (e.g. Heim 1983 or other)

Being about an argument Demolombe and Fariñas del Cerro (2000) defined what it means for a formula of FOL to be about an argument, which we extend for richer languages that can handle attitude verbs. The proposal has two parts: first we need to introduce the notion of *variants* of a possible world w with regard to an object c. Two worlds w and w' are c-variants if they only differ by the truth assignment to atomic sentences where *c* appears as an argument (or sentences equivalent to these): Given this, we might define aboutness as follows:

(2) A sentence S is **about** an object c iff there are two worlds w and w' which are c-variants and S(w)=1 and S(w')=0

The sentence *S=Fido is tired* is about Fido iff there are two *Fido*-variants w, w', st. S(w)=1 and S(w')=0. Notice that the definition above quantifies over all worlds, therefore the entailment ψ=*Some individual is tired* is also about Fido, because there are two worlds which differ only in the properties of Fido, st. and S(w)=1 and S(w')=0, e.g. if Fido is the only tired individual in w.

Example 1: *Know* Consider S =*John knows at t_1 that Mary is tired.* The principal arguments of S are *John* (the event participant) and t_1 (the event time). Let K be the set of all the propositions that S entails. K will contain (a) lexical entailments of S, (e.g. γ, φ, ψ, χ, ξ below), (b) entailments formed by replacing syntactic constituents by existentially quantified variables, and (c) disjunctions of any of the previous with any proposition.

(3) γ=John knows that Mary is tired; ψ=John believes that Mary is tired;

φ=John's belief is justified; χ=Mary is tired ; ξ=John is capable of having beliefs

Let's calculate first if there are any entailments that are not about the event participant, *John*. Let's look at the elements in K: (a) Among the lexical entailments in (4) above only χ is not about John. (b) existential sentences in K are about John (c) (as shown in the paper) among disjunctions in K the propositions that are not about John are tautologies or contain χ as a disjunct. Thus the intersection of the entailments that are not about the principal argument *John* is the proposition χ that Mary is tired, which is indeed the presupposition of S above[1]. (In general, it is shown that closing lexical entailments under entailment does not generate more presuppositions than can be derived from the set of lexical entailments alone). Second, we check if there are entailments of S that are not about the event time: ξ is such[2]. In general, we assume (extending some remarks in Magidor (2007)) that sortal presuppositions always express generic modal statement, where the modal involved is a circumstantial or ability modal. Hence, they will always be independent from the matrix event time, and thus presupposed.

Example 2: *Stop* Consider the sentence *John stopped dancing with Mary at t_1* which has two principal arguments (*John* and t_1) and is assumed to trigger the following lexical entailments:

(4) ψ=John does not dance with Mary at $\mathbf{t_1}$; φ=John danced with Mary at $\mathbf{t_2}$ (where t_2 refers to some time before t_1); χ=John stopped dancing with Mary at $\mathbf{t_1}$; ξ= John is capable of dancing .

Let's look at the event time ($\mathbf{t_1}$). Among the lexical entailments above the ones not about $\mathbf{t_1}$ are φ and ξ, which are also the entailments that are presupposed. (As before, the disjunctions in K that are not about t_1 will be tautologies or will contain φ as a disjunct.). Looking at the event participant, *John*, we can see that all of the entailments above are about John.

Example 3: *Discover* Consider *John discovered that Sue was tired at t_1*. The principal arguments are *John* and the event time. Analogously to *stop*, the entailment that is not about t_1 (besides sortal presuppositions) is that John did not know that Sue was tired at t_2 ($t_2 < t_1$). Analogously to *know*, the entailment not about John is the proposition that Sue was tired.

Example 4: *Kill* Consider the sentence *John killed Bill at t_1.* The principal arguments are *John, Bill* and t_1. The lexical entailments might be:

(5) ψ=John killed Bill at $\mathbf{t_1}$; φ=Bill is dead at $\mathbf{t_1}$ χ=Bill was alive at $\mathbf{t_2}$ (where t_2 refers to some time before t_1); ξ= John is capable of killing

Looking first at the participants in the event *John* and *Bill*, it seems that no lexical entailment is such that it is not about at least one of these. Considering the event time t_1, χ and ξ are not about t_1 and might indeed considered to be presuppositions of S.

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[1] Presuppositions of sentences with co-referential pronouns (e.g. *John knows that he is tired*) are derived by assuming that the presupposition is calculated on a level of representation that does not yet have the contextual information about co-reference factored in.

[2] Notice that if the embedded clause corresponding to χ did not have present tense, it would be predicted to be presupposed by this calculation as well, not just in virtue of not being about John.

Weak definites and reference to kinds

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In the analysis of definite articles one problematic class of examples is known as *weak definites* (Carlson & Sussman 2005). They do not seem to have the uniqueness presupposition typical of definites, given their felicity in contexts in which more than one object can satisfy their descriptive content (see also Birner & Ward 1994; Löbner 1985):

(1) (Context: Lola sitting on the sofa of a waiting room reading a newspaper. There are some more newspapers lying next to her.) Lola is reading *the newspaper*.

Carlson & Sussman mention a range of properties ("#" indicates that the definite does not have a weak reading). Weak definites allow 'sloppy' readings in VP-ellipsis (2), take 'narrow scope' (3), occur only with a restricted class of nouns (4) and a restricted class of governors (5), while modification is also limited (6). They often show an enriched meaning (7). They don't occur in subject position, unless with a generic reading (8).

(2) Lola went to the hospital and Alice did too. (Different hospitals are possible)
(3) Every boxer was sent to the hospital. (every boxer > the hospital)
(4) You should see the doctor vs #the surgeon.
(5) Sally checked the calendar vs read #the calendar.
(6) Lola is in #the big hospital vs. the psychiatric hospital.
(7) Eva called the doctor = Eva called a doctor + asked for medical assistance.
(8) #The newspaper was stolen. vs. The newspaper brings many people their daily news.

In the literature there are only a few informal suggestions about how this phenomenon can be analyzed (non-uniqueness, semantic incorporation, idioms), but these fail to take into account the role of the definite article and the productivity of weak definites. The first option should be to derive the meaning of sentences with weak definites compositionally while preserving the uniqueness presupposition of the definite article. Two possible approaches then present themselves: i) weak definites refer to ordinary entities that are unique with respect to an appropriately restricted domain, ii) they refer to unique abstract objects with concrete realizations in the sentence situation.

In Schwarz's (2009) situational uniqueness account a definite picks out its uniquely identifiable referent from a *minimal situation*, either the *topic situation* (that the sentence is about) or a *contextually salient* situation. The topic situation corresponds to an implicit question that the sentence would be answering:

(9) Lola took the train.
(10) Topic situation of (9) ≈ 'How did Lola travel from Amsterdam to Utrecht last morning?'

Among all the ways to travel from Amsterdam to Utrecht last morning, there must then be one and only one train which Lola took. However, the problem is that (9) is also true if Lola actually took *two* trains (i.e. she made a transfer). The alternative, that *the train* has unique reference with respect to a contextually salient situation, also does not work here, because no such situation is really necessary for (9) to be felicitous. In general, the problem with a situation-based approach is that in most cases the kind of minimal situations that give unique referents for ordinary definites can not be naturally assumed for weak definites.

We therefore assume that a weak definite is unique because it refers to one abstract object. More specifically, we propose that a weak definite like *the newspaper* or *the hospital* refers to a well-established kind, just like a singular definite generic like *the chinchilla* does (Carlson 1977, Krifka 2004), but unlike bare plurals, which refer to maximal entities. Treating weak definites in this respect like definite generics explains why they are lexically restricted (4) and resist modification (6) and why they can be used as generic subjects (8). Furthermore, weak definites are 'generic' in the sense that they are involved in expressing general, stereotypical patterns.

The difference between weak definites and definite generics lies in the predicates that apply to them. While definite generics are the argument of gnomic or inherently kind-level predicates (*has a long neck*, *died out*), predicates selecting weak definites are defined by a lexical rule taking an object-level two-place predicate P (like *read*, *check*, *be in*, *go to*, *take*) and defining an enriched kind-level interpretation for P, on the basis of certain conventionalized stereotypical properties:

(11) If for a kind k and a predicate P applying to realizations x_i of k, it is typically the case that for an agent a, ⟦ P ⟧(a,x_i) implies additional stereotypical properties E, then P has the following additional interpretation:
$\lambda x_k \lambda y\, \exists x_i$ [R(x_i,x_k) & P(y,x_i) & E(y,x_k)], where R is Carlson's realization operator and E is the sum of all enrichments for y and x_k.

For example, when someone is in a realization of a certain kind of institution (like a hospital or a shop), then typically this person will be there as a patient undergoing treatment or a customer buying goods (cf. Stvan 1998). This stereotypical regularity allows *be in* (but also *go to*) and *take* to be lifted to kind-selecting predicates, for example:

(12) $\lambda x_k \lambda y\, \exists x_i$ [R(x_i,x_k) & be-located-in(y,x_i) & active-in-institution(y,x_k)]
$\lambda x_k \lambda y\, \exists x_i$ [R(x_i,x_k) & take(y,x_i) & use-as-transportation(y,x_k)]

The ∃ is part of the derived verb and therefore takes narrowest scope, accounting for (2) and (3). The realization relation R allows sums as realizations (e.g. two trains in (9)). Finally, not all predicate-kind combinations have developed the kind of stereotypicalities that allow (11) to apply; *check* + *calendar* has, but *read* + *calendar* hasn't and hence the contrast in (5). In this way, a kind-based analysis allows us to explain how language through weak definites can make reference at a more abstract and stereotypical level.

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Crossing the Appositive/At-issue Meaning Boundary

Scott AnderBois, Adrian Brasoveanu, Robert Henderson – UC Santa Cruz

I. Introduction This paper's goal is to provide systematic evidence from anaphora, presupposition and ellipsis that appositive meaning, e.g. as contributed by the relative appositive in (1), and at-issue meaning, contributed by the main clause in (1), have to be integrated into a single, incrementally evolving semantic representation. While previous literature has provided partial arguments to this effect (Nouwen 2007 for anaphora, Amaral et al 2007 for both anaphora and presupposition), the systematic nature of this evidence – in particular, the evidence from ellipsis we will introduce – has been previously unnoticed.

1. John^x, who$_x$ nearly killed a^y woman with his car, visited HER$_y$ in the hospital.

We propose an analysis of these phenomena that integrates the dynamic account of anaphora and ellipsis as discourse reference to individuals and properties (respectively) with an account of at-issue meaning as a *proposal* to update the input Context Set (CS, see Stalnaker 1978) and of appositive meaning as an *actual* update of the CS that is not up for negotiation.

II. The Phenomena The example in (2) shows that anaphora (*her*) and presuppositions (*too*) in the main clause can retrieve antecedents in – or be satisfied by the propositional content of – the appositive. Example (3) shows that anaphora and presupposition can also occur in the other direction: from the appositive to the main clause. Plural anaphora to (certain) quantifiers is felicitous, both in the at-issue→appositive direction (4), and vice-versa (5). This bidirectionality is exemplified in (6) and (7) for modal anaphora (and subordination), in (8) and (9) for the restorative reading of *again* and in (10) and (11) for *stop*.

2. John, who had been kissed by Mary, kissed HER TOO.

3. John kissed Mary, who kissed HIM TOO.

4. Every speaker, all of THEM PhD students, gave a great talk. (see Potts 2005)

5. Jones, who graded each student's final paper, gave THEM detailed feedback.

6. John, who might give a presentation, WOULD use slides. Bill WOULD just use the board.

7. John might punch Jorge, who WOULD punch John back.

8. John, who has been sick, is now healthy AGAIN.

9. The window will be opened by Mary, who will then close it AGAIN.

10. John, who is now building a sandcastle, will STOP soon.

11. The sandcastle was only halfway built by John, who had suddenly STOPPED.

Data from NP- and VP-Ellipsis (NPE/VPE) point in the same direction. Since NPE does not require a linguistic antecedent (i.e., is a type of Hankamer and Sag (1976)'s 'deep anaphora') we might expect (12)-(13) to be possible regardless of the status of appositive content. But we also find examples of VPE (a type of surface anaphora, requiring a *linguistic* antecedent) in both directions, such as (14)-(15) from the Corpus of Contemporary American English (COCA, `americancorpus.org`). Finally, the examples in (16)-(17) show that both strict and sloppy readings are available, e.g., Jane was told to help Mary's sister (strict) vs Jane's (sloppy) in (16), suggesting that the appositive and at-issue components require access not only to each other's linguistic form, but also to their *semantic representation*.

12. Melinda, who won three games of tennis, lost because Betty won SIX.

13. Melinda lost three games of tennis to Betty, who lost SIX to Jane.

14. Mr. Gore at first believed the president, and even defended him to Tipper, who DID NOT.

15. So Lalonde, who was the one person who could deliver Trudeau, DID.

16. Mary, who doesn't help her sister, told Jane TO.

17. John, who helps people if they want him to, kisses them even if they DON'T.

III. Outline of the Account We work with an extension of Dynamic Predicate Logic (Groenendijk & Stokhof 1991): models consist of the disjoint domains of individuals $\mathfrak{D}$ and possible worlds $\mathfrak{W}$ and the basic interpretation function $\mathfrak{I}$ that assigns a subset of $\mathfrak{D}^n$ to any n-ary relation R relative to any world w, i.e., $\mathfrak{I}_w(R) \subseteq \mathfrak{D}^n$. We have variables over individuals $x, y, \ldots$, over worlds $w, w', \ldots$, over propositions / sets of worlds $p, p', p^*, \ldots$, individual constants JOHN, …, properties WOMAN, …, binary relations VISIT, … etc.

Formulas are interpreted relative to a pair of assignments $\langle g, h\rangle$, i.e., they are binary relations between an input assignment g and an output assignment h. Dynamic conjunction is interpreted as relation composition: $[\![\phi \wedge \psi]\!]^{\langle g,h\rangle} = \mathbb{T}$ iff there exists a k such that $[\![\phi]\!]^{\langle g,k\rangle} = \mathbb{T}$ and $[\![\psi]\!]^{\langle k,h\rangle} = \mathbb{T}$. New variables are introduced by means of random assignment formulas like $[x]$, $[p]$, etc. For any variable v, $[\![[v]]\!]^{\langle g,h\rangle} = \mathbb{T}$ iff g differs from h at most with respect to the value h assigns to v, that is: for any variable $v' \neq v$, $g(v') = h(v')$.

We use a variable p^* to encode the Context Set (CS, Stalnaker 1978) that is incrementally updated in discourse. The at-issue component puts forth a proposal (which the addressee can accept or reject) to update the CS by restricting it to a subset p. Appositives automatically update / constrain the input CS p^*, separately from the speaker's proposal. Appositives also contrast with presuppositions: presuppositions are preconditions for the proposal, explicitly taken for granted by the speaker and required to be satisfied by the input CS.

Sentence (1) above is represented as in (19) below. First, (19a) introduces the proposal to update the CS: we introduce a new variable $p \subseteq p^*$ containing worlds satisfying the subsequent at-issue update. The at-issue and the appositive updates are as in (19b): we introduce a new variable x whose value is John and comment that x nearly killed a woman y. The appositive nature of the update is captured by the fact that the appositive content is interpreted relative to p^* rather than relative to the new proposal p. Relations relativized to propositions are distributively interpreted, e.g., $[\![\text{WOMAN}_{p^*}(y)]\!]^{\langle g,h\rangle} = \mathbb{T}$ iff $g = h$ and for all worlds $w \in h(p^*)$, $h(y) \in \mathfrak{I}_w(\text{WOMAN})$. The final update in (19b), i.e., $\text{VISIT}_p(x, y)$, is part of the at-issue proposal, so it is interpreted relative to p. Note that, despite the possible non-maximality of the set of worlds p, our CS update procedure will not actually differ from the one in Stalnaker (1978) since, after (19b), there will be an assignment h such that $h(p)$ contains the *maximal* set of worlds in the current CS p^* that satisfy the at-issue relation $\text{VISIT}_p(x, y)$. Finally, (19c) contributes the proposal to update the CS p^* by resetting it to p.

19. a. $[p] \wedge p \subseteq p^* \wedge$

b. $[x] \wedge x = \text{JOHN} \wedge [y] \wedge \text{WOMAN}_{p^*}(y) \wedge \text{NEARLY-KILL}_{p^*}(x, y) \wedge \text{VISIT}_p(x, y) \wedge$

c. $[p^*] \wedge p^* = p$

The full paper analyzes VPE by extending the above dynamic framework with discourse referents / variables for properties along the lines of Hardt (1999) and Stone & Hardt (1999).

In sum, the robust patterns of anaphora, ellipsis and presupposition between at-issue and appositive meaning are accounted for in a unidimensional framework that captures the backgrounded/non-proposal nature of apposition in its semantics as well as its pragmatics.

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Sluicing as anaphora to issues

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I. Introduction: Sluicing is the ellipsis process in (1) where an interrogative clause (subscript E) is elided under identity with a prior clause (subscript A). Merchant (2001) argues that (modulo focus) the needed identity condition is a *semantic* one: symmetric entailment between A and E. The present paper addresses two open issues for such an account. First, what are the semantic constraints on possible licensors of sluicing in the A clause, such that they include not only indefinites, as in (1), but also disjunctions, as in (2). Second, how can the identity condition on sluicing be formulated so as to account for the contrast between the ungrammatical (3) and the truth-conditionally equivalent, yet grammatical, (4).

1. [Someone left]$_A$. [Who ~~left~~]$_E$?
2. [John or Fred left]$_A$. Tell me [which (one) ~~left~~]$_E$?
3. *[The cake was eaten]$_A$, but I don't know [who ~~ate the cake~~]$_E$
4. [The cake was eaten by someone]$_A$, but I don't know [who ~~ate the cake~~]$_E$

We argue that the symmetric entailment condition fails only if we equate semantic content with truth-conditions alone. If we instead take it to comprise not only truth conditions, but also *issues*, as in Inquisitive Semantics (Groenendijk & Roelofsen (2009), Ciardelli (2009) *a.o.*), we can distinguish between the A clauses in (3) and (4) while capturing the parallelism between (1) and (2). Additionally, we extend the account to handle novel data: the infelicity of sluicing in 'backgrounded' environments (e.g. appositives and absolute adjuncts).

II. The semantics of issues: Taking seriously the idea that assertion is a *proposal* to update the common ground (Stalnaker (1978), Bruce and Farkas (to appear)), inquisitive semantics treats assertions, like questions, as denoting sets of *sets* of possible worlds. In many sentences, this set will be the singleton set containing only the classical denotation. Sentences with widest-scope inquisitive elements – the indefinite in (5), the disjunction in (6) – propose a non-singleton set of alternatives, raising the issue of which one(s) holds, but not obliging a response (ALT excludes non-maximal would-be alternatives). Crucially, the logic lets distinguishes two truth-conditionally equivalent existentials: the inquisitive one in (6) and the classical one in (7) (! is Groenendijk & Roelofsen (2009)'s non-inquisitive closure operator). Since entailment is defined by inclusion of alternatives, a sentence with an inquisitive indefinite will asymmetrically entail one with a classical indefinite.

5. $[\![\varphi \vee \psi]\!]^{\mathcal{M},g} = \textsc{Alt}\{\alpha \subseteq \mathrm{W} \mid \exists \beta \in [\![\varphi]\!]^{\mathcal{M},g} : \alpha \subseteq \beta \textit{ or } \exists \gamma \in [\![\psi]\!]^{\mathcal{M},g} : \alpha \subseteq \gamma\}$
6. $[\![\exists u\varphi]\!]^{\mathcal{M},g} = \textsc{Alt}\{\alpha \subseteq \mathrm{W} \mid \textit{there is some } d \in \mathcal{D}_e \textit{ s.t. } \exists \beta \in [\![\varphi]\!]^{\mathcal{M},g[u/d]} : \alpha \subseteq \beta\}$
7. $[\![!\exists u\varphi]\!]^{\mathcal{M},g} = \textsc{Alt}\{\alpha \subseteq \mathrm{W} \mid \forall w' \in \alpha \textit{ there is some } \beta \in [\![\exists u\varphi]\!]^{\mathcal{M},g} \textit{ s.t. } w' \in \beta\}$.

The at-issue content of a wh-question in (8) is the same as the indefinite since the wh-indefinite *who* contributes an inquisitive existential. The question differs only in that its proposal is rendered *uninformative* by its classical existential presupposition, yielding roughly a Hamblin semantics. Other ways to achieve uninformativity are possible (see Groenendijk & Roelofsen (2009)), but less convenient for our current purposes.

8. $[\![\text{Who left?}]\!]$ = Presupposes: $!\exists x.\text{left}'(x)$, At-issue: $\exists x.\text{left}'(x)$

III. Sluicing and symmetric entailment: Combining this semantics for questions with symmetric entailment, we predict the grammaticality of (1) as in (9) since the antecedent and elided clauses entail one another. Given the contextual restriction of *which*, we also predict the felicity of (2) since the at-issue component of both the disjunction and the question in (10) will consist of two alternatives. Implicit passive agents intuitively differ from overt indefinites in that they expressly avoid raising the issue of who the agent is. As such, we translate them as classical existentials, contributing only the *information* that there is someone satisfying the predicate. As seen in (11), we predict the infelicity of (3) since the question, with an inquisitive existential, will asymmetrically entail the passive with the implicit agent.

9. $[\![(1)_A]\!] \Leftrightarrow [\![(1)_E]\!]$ i.e. $\exists x.\text{left}'(x) \Leftrightarrow \exists x.\text{left}'(x)$.
10. $[\![(2)_A]\!] \Leftrightarrow [\![(2)_E]\!]$ i.e. $\text{left}'(\text{j}) \vee \text{left}'(\text{f}) \Leftrightarrow \exists x.x \in \{\text{j},\text{f}\} \wedge \text{left}'(x)$
11. $[\![(3)_A]\!] \not\Leftrightarrow [\![(3)_E]\!]$ since $!\exists x.\text{eat}'(x,\text{cake}) \not\Rightarrow \exists x.\text{eat}'(x,\text{cake})$

IV. Backgrounded content and sluicing: The sentences that raise issues are those which denote proposals to update the common ground with non-singleton sets of alternatives. We expect, then, that semantic content which is not a *proposal* at all should be unable to raise issues. We argue that appositives and absolute adjuncts are such cases, constituting *actual* updates on the common ground rather than proposals to be accepted or rejected by the addressee. We capture this intuitive characterization of backgrounded content by positing the comma operator in (12) which takes the possibly inquisitive content of the appositive/absolute adjunct and returns the set of worlds where some alternative in it holds (note that backgrounded content is of type st, whereas at-issue content is of type stt).

12. $[\![\textsc{comma}(\varphi)]\!] = \{w \mid \textit{there is some } \alpha \in [\![\varphi]\!] \text{ s.t. } w \in \alpha\}$

Since backgrounded content simply denotes a set of possible worlds, we expect that any inquisitive elements within them will be unable to raise issues in the common ground and therefore that sluicing in these environments is severely degraded as seen in the contrasts in (13)-(14), a fact previously unnoticed in the sluicing literature. Moreover, these same environments readily allow VP-Ellipsis as in (15)-(16) (N.B. the opposite pattern as MAX-ELIDE cases), showing that these facts cannot be explained by appeal to discourse parallelism of the sort proposed by Takahashi & Fox (2005) or Hardt & Romero (2004).

13. Joe, who once killed a man in cold blood, doesn't even remember who *?(it was).
14. Having defeated a masked enemy, the valiant knight wonder who *?(it was).
15. Mary, who didn't help her sister, told Jane to instead.
16. Having defeated the enemy, the valiant knight's comrades were inspired to too.

V. Sprouting: Whereas the above examples involve anaphora to a previously raised issue, there are also sluices as in (17) (termed 'sprouting') where the elided clause introduces a discourse-new issue. Such cases differ from the implicit passive agent and inquisitive elements in backgrounded environments discussed above since the latter involve a linguistic form specifically committed to *non*-issuehood while the antecedents of (17) and Chung et al. (1995)'s (18) neither raise nor suppress an issue; they take no stance whatsoever.

17. [Bill stirred the soup]$_A$, but I'm not sure [with what ~~he stirred the soup~~]$_E$.
18. [John is working on War and Peace]$_A$, but I don't know [which chapter]$_E$

Following Merchant (2001), we assume that the key to understanding such cases lies in the observation that the material in the E clause is focused/ not given. In a theory of sluicing as anaphora to issues, these data can be captured as accommodation of the focal alternatives introduced by the focused phrase (e.g. 'which chapter'), much in the way that bridging definites allow for the accommodation of novel discourse referents.

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A Montegovian Treatment of Modal Subordination

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Examples, like those given in (1) and (2) from [6], involve anaphoric links between pronouns and their antecedents not predicted by standard versions of dynamic semantics such as DRT [3,4]. These are known as examples of *modal subordination* (MS).

(1) A wolf might enter. It would growl.
(2) A wolf might enter. *It will growl.
(3) A wolf enters. ?It would growl.

While most accounts of MS have exploited DRT or other dynamic frameworks [6,3,7,8], our account uses the higher order, Montagovian framework of [1], using the functional programming technique of *continuations*. Our approach shares all the advantages of the general framework of [1], embedding dynamic logics within a classical setting where quantifiers and variables receive their standard interpretation and assignments and discourse referents are not elements of basic types (as in [2] or as in Dynamic Montague Grammar). We extend [1]'s continuation based approach to MS phenomena, showing how the modifications needed to deal with MS amount to particular choices about the lexical entries of various terms and a particular precisification of the binder properties of the monad used to model discourse semantics.

Like Montague, [1] exploits the homomorphic interpretation of syntactic types and structures into semantic types and terms. But instead of Montague's simple t for the interpretation of the sentence type s, $[\![s]\!]$, [1] has: $\gamma \to (\gamma \to t) \to t$ where γ is the type of the environment or discourse context already given; $\gamma \to t$ is the type of the discourse "to come". This is the *continuation* of the sentence that is being evaluated. In particular, if this sentence introduces "dynamically speaking" a new discourse referent x, given an environment e and a continuation k as parameter, it can provide $(x :: e)$ (with $\cdot :: \cdot$ a list constructor) as parameter to k, so that it makes the value of x available for k.

Then, we have the standard interpretations: $[\![np]\!] = (e \to [\![s]\!]) \to [\![s]\!]$ and $[\![n]\!] = e \to [\![s]\!]$. In particular, pronouns are interpreted as follows: $[\![it]\!] = \lambda P.\lambda i k.P\,(\mathtt{sel}\,i)\,i\,k$, where $i\colon \gamma, k\colon \gamma \to t$, and where $\mathtt{sel}\,e$ is a function that selects a *suitable* discourse antecedent inside e (note that here the antecedents are explicitly given in e and ordinary bound objectual variables rather than discourse referents and computed over the representation as in DRT).

For MS we need one environment for discourse entities introduced in the actual world and another for discourse entities introduced in a modal context (or in possible worlds). So instead of having only one environment, we have two of them[1]. Then, we also use two continuations: one that contains facts about the actual world, one that contains facts about live possibilities the discourse describes. The result is a pair[2]. So we interpret sentences with the type[3]: $[\![s]\!] = \gamma \to \gamma \to (\gamma \to \gamma \to t) \to (\gamma \to \gamma \to t) \to (t \to t \to t) \to t$.

Using suitable lexical entries together, we get:

$$\begin{array}{lll}
[\![\textit{A wolf might enter}]\!] & = \lambda i_1 i_2 k_1 k_2 f.f & (\Diamond(\exists x.(\mathbf{wolf}\,x) \wedge ((\mathbf{enter}\,x) \wedge (k_1\,(x :: i_1)\,i_2)))) \\
 & & (k_2\,i_1\,i_2) \\
[\![\textit{It would growl}]\!] & = \lambda i_1 i_2 k_1 k_2 f.f & (\Box((\mathbf{growl}\,(\mathtt{sel}(i_1 \cup i_2))) \wedge (k_1 i_1 i_2))) \quad (k_2\,i_1 i_2) \\
[\![\textit{It will growl}]\!] & = \lambda i_1 i_2 k_1 k_2 f.f & (k_1 i_1 i_2)((\mathbf{growl}\,(\mathtt{sel} i_2)) \quad (k_2\,i_1 i_2))
\end{array}$$

[1] We could have used a pair, or a record.

[2] Modelled with the higher-order type of functions taking functions with two arguments—i.e., the type $(t \to t \to t) \to t$.

[3] The first of the two environments and the first of the two continuations are the modal ones.

The combination rule between modalized sentences, which, using the categorial terminology of monads, states the binder property of the monad, tells us how to put two sentence types to get another. For us the binder property is sensitive to modal features of its arguments—here is the modal composition when the second sentence has a modal mood:
$[\![S_1.S_2]\!] = \lambda i_1 i_2 k_1 k_2 f.[\![S_1]\!]\,i_1\,i_2(\lambda i'_1 i'_2.[\![S_2]\!] i'_1 i'_2 k_1 k_2 \Pi_1)\,k_2\,f$
With $\Pi_1 = \lambda ab.a$ the first projection, we get[4]:
$[\![(1)]\!] = (\Diamond(\exists x.(\mathbf{wolf}\,x) \wedge ((\mathbf{enter}\,x) \wedge (\Box((\mathbf{growl}\,(\mathtt{sel}(x :: \mathtt{nil}) \cup \mathtt{nil})) \wedge \top))))) \wedge \top$
$[\![(2)]\!] = (\Diamond(\exists x.(\mathbf{wolf}\,x) \wedge ((\mathbf{enter}\,x) \wedge \top))) \wedge (\mathbf{growl}\,(\mathtt{sel}\,\mathtt{nil}))$
In the first case, the `sel` function has access to x, so (1) is predicted to be good, whereas (2) is predicted to be bad, because x is not part of the accessible environment.

While we omit detailed lexical entries here[5], note that the fact that modalities have scope over the quantifiers and that $\Box$ is embedded under $\Diamond$ in the analyses of (1) and (2) results from a choice in lexical entries rather than from the compositional formalism; other lexical entries determine different scope possibilities for the modal operators and quantifiers.

We also give an account of MS using local accommodation, with a more complex type interpreting s. We need two additional parameters for the continuations: one of type t which is the restriction of the current modal structure (and the scope of the previous one) and one of type $t \to t \to t$ which expresses how the scope and the restriction have to combine (typically $\lambda b_1 b_2.b_1 \wedge \Diamond(b_1 \Rightarrow b_2)$). For *A wolf might enter. It would growl. It would eat you first* we get: $\Diamond\exists x.((\mathbf{wolf}\,x) \wedge (\mathbf{enter}\,x) \wedge \Box(((\mathbf{wolf}\,x) \wedge (\mathbf{enter}\,x)) \Rightarrow ((\mathbf{growl}\,(sel((x :: \mathtt{nil}) + \mathtt{nil}))) \wedge \Box(((\mathbf{wolf}\,x) \wedge (\mathbf{enter}\,x)) \Rightarrow ((\mathbf{eat\ you}\,(sel((x :: \mathtt{nil}) + \mathtt{nil}))))))))$.

Our continuation based framework is lexically based, flexible and powerful. It can model Veltman's [9] semantics for epistemic modalities by complicating the environment type. It can also analyze DRT's treatment of anaphorically linked yet independent attitudes. For example, you may want to marry an Italian and you may hope that she (or he) is rich. But you don't want to hope that she is rich; you hope that she is rich. A more famous example is the Hob-Nob sentence. A natural move to TY2 in our type-theoretic setting allows us to treat these examples with quantification over concepts. In TY2 with the appropriate lexical entries and a coercion story about the move from objectual quantification to concept quantification (x below is a variable of type $w \to e$), the Hob Nob sentence yields something logically equivalent to:

(4) $\exists x \forall w' \in \mathcal{B}_{h,w}(((\mathrm{witch}(x(w'), w') \wedge \exists! u(h's\ \mathrm{mare}(u, w') \wedge \mathrm{blighted}(x(w'), u), w')) \wedge \forall w'' \in \mathcal{B}_{n,w}(\exists! v(h's\ \mathrm{cow}(v, w'') \wedge\ \mathrm{killed}(x(w'), u, w''))$

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[4] To simplify, all examples are interpreted with empty environments ($\mathtt{nil}$), trivial continuations ($\lambda i_1 i_2.\top$) and conjunction of the two components ($\lambda b_1 b_2.b_1 \wedge b_2$) yielding the type t.

[5] For instance $[\![might]\!] = \lambda v s.\lambda i_1 i_2 k_1 k_2 f.f\,(\Diamond(v\,s\,i_1\,i_2\,k_1\,k_2 \Pi_1))(k_2\,i_1\,i_2))$.

Numerals and Number Marking in English, Turkish and Armenian

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In this paper, we propose that, cross-linguistically, there are two different interpretations for numerals: subsective versus intersective. These two interpretations can account for three types of languages: (i) those in which numerals exclusively combine with singular nouns (e.g., Turkish); (ii) those in which they exclusively combine with plurals (e.g., English); and (iii) those in which they combine with either type (e.g., Armenian).

Proposals & Controversy: Cross-linguistically, numerals (greater than one) behave differently with respect to the requirements they impose on the nouns they modify. The numeral *two* in English requires a plural noun (1a), whereas the Turkish counterpart of *two*, *iki*, requires a bare, singular noun (1b). In contrast to both, the Armenian counterpart, *yergu*, can modify either a plural or bare, singular noun (1c).

(1) a. two boys/*boy
b. iki çocuk/*çocuk-lar (two boy / boy-PL)
c. yergu dəgha / dəgha-ner (two boy / boy-PL)

Ionin & Matushansky (2006) [hereon IM] proposed that bare, singular nouns in any language denote sets of individuals and that underlyingly, all languages are similar to Turkish, where numerals exclusively combine with singulars. Similar to Krifka (1995), they suggest that the plural nouns in (1a&c) are converted to singular denotations via a classifier. Given this perspective, they hypothesize that numerals such as *two/iki/yergu* are interpreted as functions from singular predicates to sets containing groups of two: see (2), where *x* ranges over groups, *PART(x)* is the set of all partitions of the group *x*, and | | is the standard cardinality operator.

(2) $[\![two]\!] = \lambda P_{sg}.\{x: \exists Y(Y \in PART(x) \ \& \ |Y|=2 \ \& \ \forall z(z \in Y \rightarrow z \in P_{sg}))\}$

The function in (2) maps singular denotations to the set of groups such that each group can be partitioned into two and each member of the partition is a member of the singular noun. The variable P_{sg} ranges over sets without sums: $\forall P_{sg}(\forall x,y[x,y \in P_{sg} \rightarrow \sim\exists z[z \in P_{sg} \ \& \ z=x \oplus y]])$. According to IM, the phrase $[\![two\ boys]\!]$ would be equivalent to $[\![two]\!]([\![boy]\!])$. If $[\![boy]\!]$ were {*a, b, c*}, then $[\![two]\!]([\![boy]\!])$ would be {*ab, ac, bc*}. Under this proposal, numeral modifiers could be called privative (in the sense of Partee, 2009): the modified noun denotation does not contain any of the same members as the original denotation.

In contrast to IM, Link (1983) and others have proposed that numeral modifiers simply restrict plural nominal denotations and thus are non-privative, just like most adjectival modifiers. A non-privative semantics for the numeral could be represented as in (3a) or (3b).

(3) a. $[\![two]\!] = \lambda P_{pl}.\{x: x \in P_{pl} \ \& \ \exists Y(Y \in PART(x) \ \& \ |Y|=2 \ \& \ \forall z(z \in Y \rightarrow z \in MIN(P_{pl})))\}$
b. $[\![two]\!] = \{x: \exists Y(Y \in PART(x) \ \& \ |Y|=2 \ \& \ \forall x(z \in Y \rightarrow z \in ATOM))\}$

The interpretation of *two* in (3a) is subsective since it is a function from plural denotations to groups that can be partitioned into two minimal parts of the plural denotation. The variable P_{pl} ranges over sets that are closed under $\oplus$: $\forall P_{pl}(\forall x,y[x,y \in P_{pl} \rightarrow x \oplus y \in P_{pl}])$. *MIN* is a function that restricts a denotation to its atomic minimal parts. As a result, it is only defined if the minimal parts are non-overlapping: *MIN(P)* is defined iff $\forall x,y(x,y \in P \ \& \sim\exists z(z \in P \ \& \ z<y \vee z<x) \rightarrow x \cap y=\varnothing)$. Note, (3a) relativizes the criteria for counting to the noun it modifies. In (3b), *two* is interpreted as the set of groups that can be partitioned into two atoms, without any relativization to the modified noun. As a result, this type of denotation can modify a plural noun through intersection: $[\![two\ boys]\!] = [\![two]\!] \cap [\![boys]\!]$. On the surface, the subsective and intersective interpretation seem to be incompatible with the data in (1b) and (1c).

Theory Comparison: Surprisingly, the semantics in (3) provides a better account of the cross-linguistic variation we see in (1). To understand why, one must investigate the details of plural and singular denotations in English, Turkish and Armenian. In English, the denotation of the bare singular noun contains individuals but not plurals. This is demonstrated by the use of the noun in predicative position as shown in (4).

(4) a. John is a boy.
b. ?John and Harry are a boy.

Singular boys, such as John, can serve as the subject to the predicate and yield a true sentence, as in (4a), but groups cannot, as in (4b). Note that syntactic agreement is not an issue here since singular mass nouns can often take plural subjects (e.g., *That couch and chair are furniture*). In contrast, singular nouns in Armenian and Turkish can have groups serving as subjects. As shown in (5), the group consisting of John and Brad can serve as the subject to the singular bare nouns *çocuk* in Turkish and *dəgha* in Armenian. The resulting sentences have a meaning identical to *John and Brad are boys*.

(5) a. John ve Brad çocuk. (John and Brad boy)
b. John-ə yev Brad-ə dəgha en. (John-def and Brad-def boy are)

As shown in (6), the singular nouns can also have singular subjects.

(6) a. John çocuk. (John boy)
b. John-ə dəgha e. (John-def boy is)

In contrast to English, singular nouns in Turkish and Armenian are actually semantically plural. The denotations of such nouns contain not only atomic minimal parts, but also any group that can be formed from those parts. The denotation of plural nouns in Armenian and Turkish are similar to the singular denotation, in that they can be predicated of groups, as shown in (7).

(7) a. John ve Brad çocuk-lar. (John and Brad boy-PL)
b. John-ə yev Brad-ə dəgha-ner en. (John-def and Brad-def boy-PL are)

However, as shown in (8), the plural noun cannot be predicated of singular individuals.

(8) a. *John çocuk-lar. (John boy-PL)
b. *John-ə dəgha-ner e/en. (John-def boy-PL is/are)

Thus, the plural denotations differ from the singulars in that they contain groups but no atomic minimal parts.

The nature of the singular denotations in English, and the assumption that *two* is interpreted as subsective or intersective modification, explains why English numerals can only combine with plural nouns. Subsective and intersective modification requires that the modified noun contain groups. Only the plural nouns in English contain such groups.

The natures of the singular and plural denotations in Turkish, and the assumption that *iki* is interpreted as a subsective modifier, explain why Turkish numerals can only combine with singulars. The subsective interpretation in (3a) requires that the modified noun be closed under $\oplus$ and that it have atomic minimal parts. The singular denotation, unlike the plural one, is **both** closed under $\oplus$ and has atomic minimal parts.

Finally, the natures of the singular and plural denotations in Armenian, and the assumption that *yergu* is interpreted as an intersective modifier, explain why Armenian numerals can combine with both singulars and plurals. The intersective interpretation in (3b) only requires that the denotation be closed under $\oplus$; no mention of atomic minimal parts is made. Since both the singular and plural are closed under $\oplus$, either can be modified by the intersective modifier.

Quantity implicature and access to scalar alternatives in language acquisition

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In this study, we argue that children are capable of deriving quantity implicatures but fail in certain cases (e.g., *some/all*) because they are unable to access the relevant scalar alternatives.

The Controversy: Recent experimental studies of pragmatic development have reported that children as old as 7 have difficulty deriving quantity implicatures.[1-6] For example, upon hearing *Mary ate some cake*, a competent adult: (1) computes the basic meaning of the sentence (e.g., *Mary ate at least some of the cake*), (2) generates alternative utterances (e.g., replacing *some* with *all*, yielding *Mary ate all of the cake*), and (3) negates these alternatives by a process of "exhaustification" or strengthening (e.g., *Mary ate some but not all of the cake*). Children often fail to compute these strengthened meanings. The source of children's difficulty has been hotly debated. Noveck[1] has argued that children do not calculate implicatures and are more literal than adults. Similarly, Papafragou & Musolino[6] have proposed that children are generally incapable of deriving implicatures without a strong push from context. By both accounts, children's difficulty can be described as a failure to pragmatically exhaustify utterances (Step 3, above), due to a generally immature pragmatic competence. In contrast, Chierchia et al.[7] and Barner & Bachrach[8] have argued that young children are able to exhaustify sentences, but fail to derive implicatures in some cases because they cannot access relevant scalar alternatives (Step 2). For example, Barner & Bachrach claim that 2-year-olds can derive implicatures for numerals, because they begin numeral acquisition by memorizing an explicit count list; thus, the scalar alternatives for numerals are readily available early in acquisition, whereas the alternatives for quantifiers like *some* are never memorized in a list, and therefore are less accessible. Deciding between these accounts is relevant to determining whether quantity implicatures are a product of gradual learning that emerge late in acquisition, or whether the machinery for such implicatures is part of a child's early competence. Also, the question has important consequences for the theory of *Horn Scales*, and how they are detected in acquisition.

Experiment: Existing developmental accounts can be contrasted by testing children in contexts that manipulate the availability of alternatives, and by grammatically forcing the activation and denial of these alternatives. If children's difficulty is due to pragmatic exhaustification, then forcing exhaustification grammatically should allow them to strengthen utterances involving quantifiers like *some*. However, if their difficulty is specific to accessing scalar alternatives, then children should fail to strengthen even grammatically exhaustified sentences, since it is still necessary to generate and negate alternatives in such cases. Fortunately, in English this hypothesis is easily tested because the algorithm for calculating quantity implicatures is grammatically mirrored by the semantics of *only*. Thus, it is possible to grammaticality force exhaustification with *only*. For example, consider the sentences in (1).

(1) a. Mary ate only some of the cake.
b. Mary ate all of the cake.

Here, the truth of (1a) entails that (1b) is false; this is part of the meaning of (1a), where the relevant *Horn Scale* contains *some* and *all*.

In our experiment, we provided children with sentences that either included *only* or did not. Also, we manipulated the availability of alternatives. As noted by Hirschberg[9], scales that determine alternative sentences can be broadly categorized into two classes: those whose accessibility is almost completely dependent on context and world knowledge and those whose accessibility is mostly independent of such factors, like *Horn Scales* (e.g., <*some*, *all*>). In the first case, alternatives are readily available in the context, whereas in the second case they must be retrieved from memory. We predicted that if children's primary difficulty in computing implicatures is due to access to alternatives, then they should have significantly less difficulty with context-dependent alternatives than with alternatives specified by memorized scales. To test this, we presented 53 4-year-old children (mean age 4;5) with pictures in which 3 animals were performing activities. On critical trials, all three animals were performing the same activity (e.g., reading). Children were asked either:

(2) a. Are some of the animals reading?
b. Are *only* some of the animals reading?
c. Are the cat and the dog reading?
d. Are *only* the cat and the dog reading?

If children's main difficulty is exhaustification, then providing *only* should allow them to strengthen the interpretation of *some* to mean *"some but not all"*. Also, they should accept (2c) but deny (2d). However, if their difficulty is accessing alternatives, then they should be able to use *only* to exhaustify only when provided with alternatives contextually (in 2d), but not when they must be generated from memory (in 2b).

Data strongly supported the hypothesis that children's primary difficulty is accessing alternatives (see Fig.1a & 1b). Although children had no difficulty using *only* to exhaustify when alternatives were context dependent (as in 3d), they often failed to strengthen utterances that included *only some*. This suggests that children can use *only* to exhaustify when the relevant alternatives are available but not otherwise.

Consequences: The experimental data presented here indicate that children's difficulty in computing quantity implicatures is due to their failure to access relevant scalar alternatives, thus supporting the hypotheses of Barner and Bachrach.[8] The current study also raises questions about the nature and origin of Horn scales. Despite knowing the syntax and semantics of scalar items like *some* and *all*, children do not activate *all* as an alternative when interpreting *some*. This suggests that *all* and *some* are not automatically treated as scale mates by virtue of their monotonicity or substitution based on the preservation of syntactic simplicity (contrary to Katzir[10]).

Refs: [1]Noveck, 2001, [2]Barner et al., 2009, [3]Huang & Snedeker, 2009, [4]Hurewitz et al., 2006, [5]Musolino, 2004, [6]Papafragou & Musolino, 2003, [7]Chierchia et al., 2001, [8]Barner & Bachrach, 2010, [9]Hirschberg, 1985, [10]Katzir 2009.

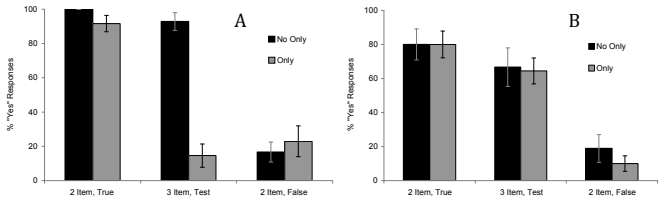

Fig. 1. A: Percentage of children who said "yes" to sentences with contextually determined alternatives (*dog, cat, cow*). Contexts included either 2/3 or 3/3 animals performing an activity. B: Data for conditions with context independent alternatives (*some, all*).

What projects and why

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It is now broadly recognized that all that projects is not (standard, classical) presupposition. Elements of meaning lacking other standard characteristics of presupposition can also project. Chierchia & McConnell-Ginet (1990) observe that the content of non-restrictive relatives projects, although the content is by default new information for the addressee, and Beaver (2001) comes to similar conclusions regarding parentheticals. Levinson (1983), Kadmon (2001), and Simons (2005) have observed that certain kinds of conversational implicature can project (with each author drawing different conclusions), and Potts (2005) takes robust projection behavior to be a core property of the components of meaning he classes as conventional implicatures (including inferences triggered by parentheticals, expressives, and honorifics). The heterogeneity of projective meaning poses a serious difficulty for existing accounts of projection, which, to date, either stipulate projective behavior, or derive projection from a property of presuppositions under the false assumption that projection is a signature property of presuppositions alone. In this paper, we offer a unified characterization of projective meanings that explains their projection properties.

We propose the following generalization: **meanings project *iff* they are not at-issue**. We define semantic content p as *projecting* over an operator O *iff* p is part of the meaning of a constituent which O takes within its syntactic scope, and p is interpreted as not within the semantic scope of O. Our notion of *at-issueness* is taken from the question-based analysis of discourse of Roberts (1995). We illustrate the generalization using a new diagnostic test: asserted at-issue propositions can be the target of a (non-sarcastic) affirmation, a diagnostic partly inspired by the standard observation that presuppositions are not targeted by simple denials (cf. Shanon 1976 and von Fintel 2004 on "Hey, wait a minute"). Meanings which do not project are at-issue, as illustrated by the felicity of the dialogues in which ordinary content (1) and conversational implicatures (2) are targeted by affirmations. Illustrations of projection tests are omitted.

(1) PROFFERED CONTENT: A. Fred ate a lot tonight. B. You're right, he did eat a lot.

(2) CONVERSATIONAL IMPLICATURE: A. You wanna know if Fred should be a neurosurgeon? Well, he's punctual and always cheerful. B. You're right, he'd suck.

Inferences that are known to project cannot be targeted felicitously by a "you're right" affirmation, and hence are not at-issue. We contrast felicitous affirmation of proffered content with infelicitous affirmation of a projective inference in (3) to (6):

(3) DEFINITE: A. The King of France will be at the exhibition. B. You're right, [he will be / # there is a King of France].

(4) FACTIVE: A. Fred doesn't know his wife is cheating on him. B. You're right, [he has no idea / # she is cheating on him].

(5) APPOSITIVE: A. Fred, a friend of John's, is here. B. You're right, [he is here / # he is a friend of John's].

(6) APPROXIMATIVE: A. Gore almost won. B. You're right, [he came close / # he lost].

It is important that at-issueness is a discourse property. We can force a particular entailment into at-issue status by manipulating the discourse environment:

(7) A. Does France have a king? B. The king of France was at the exhibition! A. You're right, there is a king of France.

And it is precisely when the environment has this effect that projection is suppressed:

(8) A. Does France have a king? B. The king of France wasn't at the exhibition.
$\neq$ *There is a king of France who was not at the exhibition.*

This leads us to hypothesize a simple explanation of projection: not at-issue material projects because embedding constructions (e.g. negation) comment on whatever is under discussion, and hence usually target at-issue components of meaning. Not at-issue components are not modified by the embedding construction, and so they project. Neither the generalization nor the explanation are clearly stated in prior literature, although they have commonalities with proposals in Abbott (2000) and Simons (2004).

Previous attempts to explain projection have derived it from an underlying property of presuppositions. According to one approach (from Stalnaker 1973,1974; Karttunen 1974), projection is a consequence of the requirement that presuppositions be entailed by the common ground (CG) which is to be updated by the presupposing utterance (Heim 1983, Beaver 1995). To satisfy this requirement, presuppositions not initially entailed by the CG may be added to it when a presuppositional utterance is made. But it is far from clear whether even standard presuppositions all have CG constraints, and there is no empirical support for extending the analysis to the full range of projective meanings. For example, the content of appositives like (5), which shows robust projection behavior, is typically intended as new information to the hearer.

Not only was the CG account never claimed to describe the full range of projection behavior we observe, but attempting to generalize it by extending the CG constraint to all triggers of projective meaning would have undesirable consequences. E.g. for some triggers accommodation would occur on nearly all occasions of use. Then accommodation, far from being a rescue strategy triggered by an apparent violation, would become the norm, and the idea of a prior common ground *constraint* would become essentially vacuous. And there is a further reason to doubt that the standard CG analysis provides a sound general account of projection. Of all the expression types which have been claimed to impose constraints on the CG, anaphors are surely the clearest case, requiring that salience/familiarity of the antecedent is in the CG. But this requirement of anaphors is well-known to resist accommodation. If in the paradigm case of a CG constraint, accommodation is generally ruled out, then a theory in which accommodation of CG constraints is the norm would seem to be problematic.

Another approach (van der Sandt 1992, Geurts 1999) explains projection as resulting from a requirement for an anaphoric antecedent. Like the CG approach, the anaphoric account was never claimed to cover our full range of projective meanings. Here we merely point out that it would be unnatural to so extend it: there is no evidence that e.g. appositives, expressives, or approximatives carry anaphoric requirements.

Ours is, to our knowledge, the first attempt at a unitary explanation of projection, and in our proposal projection is unrelated to the presence of CG constraints or anaphoric requirements. Projective meaning triggers emerge as a natural class on the basis of the not at-issue status of their projective inference. More broadly, the proposal that projection is a property of not-at-issue content, and is to be explained in terms of this property, opens up a substantially new direction in the study of this phenomenon. For example, the projective properties of prosodically backgrounded material (as in *JOHN didn't walk quickly* versus *John didn't walk QUICKLY*) (cf. Abbott 2000, van der Sandt & Geurts 2004) can be captured and unified with facts about projection of standard presuppositions without requiring an analysis of adverbials as lexically presuppositional: it suffices that there is a correlation between what is prosodically backgrounded and what is not at-issue.

Rullmann Ambiguities as Plural Comparisons

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This paper reexamines a phenomenon in comparatives called Rullmann ambiguities. An empirical study is conducted that casts doubt on the standard perception of the phenomenon. Since these ambiguities have been used as arguments for both a decomposition analysis of less-comparatives and scope interaction in than-clauses, they have played an important role for the development of semantic theory in this domain. The study is based on judgements of consistency vs. contradictoryness of short texts that bring out exactly one of the purported readings of Rullmann sentences. It shows that the ambiguity is not perceived by many speakers, and that less-comparatives are no different from more-comparatives. This is incompatible with proposals in the literature. A novel analysis is argued for in which such data involve a comparison to a plurality of degrees.

The semantic literature on comparatives contains a lively discussion of data like (1), called Rullmann ambiguities (e.g. Rullmann (1995), Meier (2002), Heim (2007, 2008), Büring (2008)). (1) is said to be ambiguous between (1'a) and (1'b). Suppose that (1) is used in a context in which there is a speed limit of 50mph and a minimum speed of 30mph. Then (1) could either claim that Lucinda's speed was less than 50mph ((1'a)), or that it was less than 30mph((1'b)). Giving the *than*-clause in (1) a standard denotation as a predicate of degrees, as in (2), makes the two interpretations look as if there were a choice between making a comparison to the minimal degree or the maximal degree described by the *than*-clause.

(1) Lucinda was driving less fast than was allowed.

(1') a. Lucinda was driving (legally) below the speed limit.
b. Lucinda was driving (illegally) below the minimum speed permitted.

(2) [λd.Lucinda was allowed to drive d-fast] = [30mph-50mph]

(2') a. Lucinda was driving less fast than
max([λd.Lucinda was allowed to drive d-fast]) max: 50mph
b. Lucinda was driving less fast than
min([λd.Lucinda was allowed to drive d-fast]) min: 30mph

A choice between a minimum and a maximum degree is not per se plausible, because comparatives as a rule permit no such choice. Analyses of the two readings in (1'a) and (1'b) have accordingly been rather more abstract. Heim's (2007) influential analysis decomposes *less* into *little* and the comparative, (3). This makes possible two different structural analyses of the *than*-clause, (4). The two LFs differ in terms of where *little* takes scope. Skipping over the steps of a detailed semantic derivation Heim provides, the two interpretations in (5a) and (5b) are derived, which match the description of Rullmann's ambiguity.

(3) a. *less* Adj = *-er* + *little* + Adj
b. degree predicate negation *little* (type <d,<<d,t>,t>>): [[little]]= λd.λP.P(d)=0

(4) a. L was driving -er little fast than [1[allowed [t1 little] [2[L drive t2 fast]]]
b. L was driving -er little fast than [1[[t1 little] [2[allowed L drive t2 fast]]]

(5) a. Lucinda was driving less fast than [she was allowed to drive slowly] =
Lucinda drove (illegally) below the minimum speed permitted
b. Lucinda was driving less fast than [she was not allowed to drive fast] =
Lucinda drove (legally) below the speed limit

This analysis sees the ambiguity in (1) as structural, in the sense that the ellipsis in the *than*-clause can receive two different resolutions. The ellipsis includes *little*=negation. The resolutions differ in terms of the scope that negation takes. The analysis has repercussions for our understanding of *little* and *less*. Moreover, it argues for scope interaction in *than*-clauses - a topic that is controversial and has given rise to a host of proposals in the semantic literature (e.g. Heim (2006), Gajewski (2008), van Rooij (2008), Schwarzschild (2008), Beck (to appear), besides the papers cited above).

For all their importance, semantic analysis of Rullmann sentences faces the problem that the data are far from clear. In this paper, I present the results of an empirical study which investigates such sentences in German. They are placed in a context in which only one of the two potential readings - the max-interpretation and the min-interpretation - is consistent. Then a judgement of consistency vs. contradictoryness is elicited. Two factors are varied in the test data: whether the sentence with the comparative is a *more*-comparative or a *less*-comparative, and whether there is a *than*-clause or a plural degree DP. Judgements are elicited for a total of 40 test items. (6)-(8) provide English translations of some of the test items.

(6) *than*-clause/DP combined with *more*, context to test availability of min-interpretation:
On this highway there is a speed limit of 50mph and and a minimum speed of 30mph. Yesterday, Sarah had a box of glasses in her trunk and wanted to drive very carefully. But she drove faster than was allowed/than the permissible speeds. This way she could not get a ticket.

(7) *than*-clause/DP combined with *more*, context to test availability of max-interpretation:
On this highway there is a speed limit of 50mph and and a minimum speed of 30mph. Yesterday, Sarah was in a rush. She drove faster than was allowed/than the permissible speeds. That's why she got a speeding ticket.

(8) *than*-clause/DP combined with *less*, context to test availability of max-interpretation:
On this highway there is a speed limit of 50mph and and a minimum speed of 30mph. Yesterday, Sarah was in a rush. But she drove less fast than was allowed/than the permissible speeds. This way she could not get a ticket.

The core results of the study are (i) that the original Rullmann sentences (with *than*-clauses and *less*) are largely, but not completely, judged unambiguous. The min-interpretation is much more acceptable than the max-interpretation; and (ii) that the version with *more* instead of *less* is the mirror image: The max-interpretation is much more acceptable than the min-interpretation. Furthermore, there is almost no difference between *than*-clauses and plural degree DPs. We need to conclude that the presence of *less* is immaterial, and so is ellipsis. The paper develops a novel analysis which takes its starting point from the fact that the plural degree DP versions of the Rullmann sentences involve a comparison to a plurality - a plurality of degrees. It is straightforward to argue that this is shared by the *than*-clause versions of the data. This distinguishes Rullmann data from ordinary comparatives like (12), where a comparison is made to just one degree. Hence, plural predication is the source of the readings we observe. Ordinary distributive predication predicts the following readings, which, notice, look like comparison with a minimum and a maximum respectively.

(12) Lucinda ran faster than the world record. -> there is a unique relevant world record
Lucinda drove faster than Bill did. -> there is a unique speed Bill reached

(13) a. Lucinda drove less fast than the permissible speeds.
b. ∀s ∈ [[the permissible speeds]]: Lucinda drove less fast than s min!

(14) a. Lucinda drove faster than the permissible speeds.
b. ∀s ∈ [[the permissible speeds]]: Lucinda drove faster than s max!

This analysis is extended to the original Rullmann data. I suggest that the leeway for interpretation that plural predication brings about is the source of the ambiguity. The dispreferred readings may arise when the domain of quantification is narrowed down contextually. The study highlights the importance of thorough empirical investigation for the development of semantic theory.

Principles of interdimensional meaning interaction

Raffaella Bernardi (Free University of Bozen/Bolzano) and Chris Barker (New York University)

Potts (e.g., 2005) argues that natural language meaning is multi-dimensional. For example, *John read the damn book* asserts that John read a particular book (its at-issue entailments), and simultaneously conveys that there is something about the situation that the speaker disapproves of.

Potts claims that any given formative can contribute either to at-issue entailments, or else to some other dimension of meaning, but not to both. This is intended to cover at least supplements (*John, who is smart, is here*) and expressives (*John read the damn book*). The claim that lexical items are dimensionally pure in this way has been challenged by a number of people, including Bach 2006, McCready 2009, Kubota and Uegaki 2009, and Gutzmann 2009, among others.

(1) John arrested the shyster.

For instance, Bach (following suggestions of Horn) argues that the epithet in (1) simultaneously contributes to the referential content of the noun phrase at the same time that it contributes information about the speaker's opinion of that referent.

We will propose a formal logic that seeks to characterize the possible interactions between multi-dimensional elements and the at-issue material that surrounds them.

On the system of Kubota and Uegaki, the contribution of each element is divided into two separate parts: the at-issue entailments (written below a horizontal line), and the expressive content (above the line). Because lexical items have access to the at-issue dimension and the expressive dimension, it is possible for them to make contributions at both levels simultaneously.

But the mechanism behind the two-level notation used by Kubota and Uegaki was originally designed to handle scope-taking expressions such as quantificaitonal DPs. Therefore, on their account, since expressives have access to the same formal resources as quantifiers, they have as much freedom to interect with at-issue material as quantifiers do. For instance, it would be easy to have a lexical item "negex" that, say, reversed the polarity of a subordinate expressives, so that *John negex read the damn book* meant something like 'John read the book, and that was a good thing'. As far as we know, such operators do not exist.

We propose the following refinement of Potts' descriptive generalization:

(2) The not-at-issue component of a multi-dimensional element does not interact with at-issue material.

This generalization is not guaranteed by Kubota and Uegaki's system.

We will show that LG (for "Lambek/Grishin", Moortgat 2009) offers a principled account of (2). LG is a categorial grammar with the usual syntactic types built from / and \, and in addition has dual connectives $\oslash$ and $\otimes\!\!\!/$. The usual connectives and the dual connectives interact only via structural inference rules proposed by Grishin 1983, most relevantly including the following two (compiled here with residuation rules, and assuming a display-calculus presentation of LG):

$$\frac{p \otimes\!\!\!/ (q \otimes r) \to s}{(p \otimes\!\!\!/ q) \otimes r \to s} \qquad \frac{p \otimes\!\!\!/ (q \otimes r) \to s}{q \otimes (p \otimes\!\!\!/ r) \to s}$$

At-issue composition proceeds as usual with / and \. The syntactic category of a not-at-issue element is given using the special dual categories, so that *shyster* might have category $(S \oslash S) \otimes\!\!\!/ N$. Interaction between local and non-local elements is regulated entirely by the Grishin interaction postulates. In particular, the Grishin postulates allow the expressive part $(S \oslash S)$ to climb in only one direction: upward to some enclosing clause.

John (arrested (the N))	$\vdash$	$(S \oslash S) \oplus S$
$(S \oslash S) \otimes\!\!\!/$ (John (arrested (the N)))	$\vdash$	S
John $(S \oslash S) \otimes\!\!\!/$ (arrested (the N))	$\vdash$	S
John (arrested $(S \oslash S) \otimes\!\!\!/$ (the N))	$\vdash$	S
John (arrested (the $(S \oslash S) \otimes\!\!\!/$ N))	$\vdash$	S
John (arrested (the shyster))	$\vdash$	S

Reading the derivation proof from bottom to top, *shyster* receives the syntactic category $(S \oslash S) \otimes\!\!\!/ N$. The nominal part, N, contributes a property that, in combination with the definite determiner, picks out an appropriate individual. The expressive component, $S \oslash S$, detaches and climbs upward by means of the Grishin interaction postulates, making its semantic contribution (that the speaker disapproves of individuals who satisfy the property given by N) only when it escapes to the right side of the turnstyle, which is where the non-local part of the language lives.

As in Kubota and Uegaki's system, the dual categories of LG provide an account of general quantificational scope-taking. For instance, the syntactic category of a quantificational DP is $(S \oslash S) \otimes\!\!\!/ DP$. The crucial difference is that LG has an additional semantic level of representation (technically, a CPS transform). It is only at this level that we can give quantifiers lexical values that allow them violate (2). Our hypothesis, then, is that what is special about multi-dimensional components is that their contribution can be encoded already in terms of the pre-CPS semantic representation (as we will explain, the pre-CPS semantics is encoded in the $\bar{\lambda}\mu\tilde{\mu}$ calculus of Curien and Herbelin 2000). Thus non-at-issue meaning stays entirely within the proof-theoretical derivation, as governed by the Grishin postulates, without access to the full power of the lexical semantics.

We give a full formal fragment in the paper, providing derviations of epithets, supplements, expressives, and the compositional expressives of Geurts 2007 and of Schwager and McCready 2009.

From a theoretical point of view, the situation is analogous to the treatment of indexicals, though with a reversal of direction in the flow of semantic information. That is, with indexicals, information flows from the context to the indexical: the enclosing context determines the value of an indexical, no matter how deeply embedded; but with not-at-issue implications, information flows from the deeply-embedded element to the context.

Indexicals differ from pronouns in that the values of indexicals (typically!) depend only on the context of utterance, and do not interact with intervening material. In Kaplan's classic account, this difference is modeled by providing two levels of semantic interpretation: character and content. A sentences type denotes a character. Characters combine with a context of utterance to produce a content, in which indexicals are replaced with their context-determined values. The content then contains normal pronouns that interact with quantifiers and other semantic elements in the normal way. (Refined systems also handle untypical 'monstrous' indexicals.)

LG was orignally designed with two semantic levels for purely technical reasons. We show how exploiting this independently-motivated feature provides exactly the right theoretical power to account in a pricipled and fully compositional way for one of the signature properties of multi-dimensional meaning. Just as a two-level conception of semantics can give an insightful account of the difference between indexicals and other pronouns, a two-level conception of non-local semantic scope-taking can provide new insights into the different kinds of multi-dimensional meaning.

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Quantity and gradability across categories

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Introduction. The goals of this paper are twofold: (a) use the distribution of the scalar modifier *half* in English as a window into the presence and types of scales found across categories; (b) extend a degree-based analysis that has become standard for gradable adjectives to the nominal and verbal domains. The proposed analysis captures the similarities between the different readings of *half* in two distinct syntactic/semantic environments:

(1) Half of the books are on the table. (*partitive* reading)

(2) Mary half washed the dishes. (*eventive* reading)

I argue that *half* always has a scalar meaning across these readings, and in particular targets an open degree argument in (1) and (2), parallel with the modifier's function with gradable adjectives. I also show that the scale structures in the partitive and eventive environments crucially depend on the part structure of an embedded nominal argument.

Scalarity and *half*. Following Kennedy and McNally (2005) I take *half* to be a degree term that modifies only gradable predicates with fully closed scales. Thus the acceptability of (3) and the infelicity of (4) can be ascribed to the scale structures associated with the gradable adjectives:

(3) The glass is half full. / The door is half open. (fully closed scales)

(4) ?? Taylor is half tall/old. (open scales)

Intuitively, *half* selects the midpoint of the closed scale and supplies the open degree argument with that value. I assume the following semantics for *half* as a function from gradable properties to properties of individuals, where $\textbf{mid}(S_G)$ returns the midpoint of the scale S associated with G:

(5) $[\![\ \textit{half}\ ]\!] = \lambda G_{\langle d,et\rangle}\lambda x_{\langle e\rangle}.G(x)(\textbf{mid}(S_G))$

In the absence of a degree modifier, a null degree morpheme *pos*, of the same semantic type as *half*, values the degree argument based on a contextual standard of comparison. For adjectives with upper-closed scales, *pos* returns the maximal value of the scale as the standard value, which follows from a principle of interpretive economy (Kennedy, 2007). As has been demonstrated by Kennedy and McNally (2005, 2009) gradable adjectives may take on a closed scale of QUANTITY, e.g. (6) may refer to the degree to which the meat is cooked (cooked-ness scale) or the proportion of meat that is cooked (quantity scale):

(6) The meat is half cooked.

Importantly, it is the part structure of the bounded nominal argument that imposes the (closed) quantity scale onto the gradable adjective.

Partitives. For partitives such as (1), *half* measures the proportion of the quantity of the embedded nominal argument. Just as in the adjectival case, the part structure of the nominal argument affects scale structure and crucially must be bounded to induce a closed scale over which *half* can operate (note: **half of books*, **half of applesauce*). I follow Schwarzschild (2002, 2006) in his analysis of measure phrases in partitives in relying on a function that maps entities onto intervals of a scale. The relevant scale for *half* in partitives is one of quantity, and I propose that the mediation between the part structure of the nominal and the quantity scale is a silent head μ_{PRT} (for *measure*) that formally introduces a degree argument above *of* that may be saturated by *half* (or other upstairs modifiers such as numerals or *most*), yielding the semantics in (8) for *half of the books* after existential closure (assuming a traditional semantics for partitive *of* (e.g. Ladusaw, 1982)):

(7) $[\![\ \mu_{PRT}\ ]\!] = \lambda P\lambda d\lambda x.P(x)\wedge\textbf{quantity}(x) = d$

(8) $[\![\ \exists\ [\ \text{half}\ [\ \mu_{PRT}\ [\ \text{of}\ [\ \text{the books}\ ]]]]\ ]\!] = \exists x.x \leq the.books\wedge\textbf{quantity}(x) = \textbf{mid}(S_{of.the.books})$

Degrees and events. The function of *half* in (2) has been analyzed as delimiting the extent to which an event is realized (Moltmann, 1997; Piñón, 2008). I follow Caudal and Nicolas (2005) who propose a mapping from degrees to events in order to capture the relation between scale structure and aspectual composition, replacing Krifka's (1992) classic mapping between objects and events. Yet again, it is the part structure of the internal nominal argument of the VP that has an effect on scale structure, such that only bounded, telic events can be modified by *half*, i.e. events that have a bounded incremental theme argument that 'measures out' the event (following Tenny, 1994). Some recent proposals have been put forward on how to incorporate degree semantics into aspectual composition. Kennedy and Levin (2008) propose that degree arguments are part of the lexical meaning of degree achievements. For other verb classes, Piñón (2000) proposes a degree function δ that allows verbs that lack a degree argument to acquire one. However, since δ applies directly to verb meanings, Piñón's analysis fails to capture the generalization that the incremental theme argument plays a crucial role in determining scale structure. Note that, like in the case of partitives, *half* is only felicitous with fully closed scales derived from bounded internal arguments:

(9) John half ate the apple.

(10) ?? John half ate apples / applesauce.

To formalize the link between the part structure of the nominal argument and the corresponding quantity scale over which *half* operates, I propose μ_{VP}, a variant of μ_{PRT}, whose semantics is given in (11). Like Piñón's δ degree function, μ_{VP} introduces an open degree argument that can be modified by *half* or other aspectual modifiers. However, since μ_{VP} also syntactically introduces the incremental theme argument, we are able to capture the fact that the part structure of the internal nominal argument plays a crucial role in determining scale structure. As the semantics for the VP *half wash the dishes* in (12) shows, the quantity scale targeted by *half* is based on the bounded incremental theme *the dishes*, yielding an event description that is true of an event of washing that is realized to the midpoint of the quantity scale.

(11) $[\![\ \mu_{VP}\ ]\!] = \lambda x\lambda P\lambda d\lambda e.P(e)\wedge\textbf{theme}(e)(x)\wedge\textbf{quantity}(x) = d$

(12) $[\![\ [\ \text{half}\ [\ \text{wash}\ [\ \mu_{VP}\ [\ \text{the dishes}\ ]]]]\ ]\!]$
$= \lambda e.\textbf{wash}(e)\wedge\textbf{theme}(e)(\text{the dishes})\wedge\textbf{quantity}(\text{the dishes}) = \textbf{mid}(S_{wash.the.dishes})$

In the absence of a degree modifier, a *pos* morpheme provides a value for the degree argument, defaulting to a maximal interpretation given an upper-closed scale.

Conclusions. As is the case for gradable adjectives, nominal arguments in partitives and event-denoting VPs play a crucial role in determining a scale structure that tracks quantity. For partitives and incremental theme verbs, a bounded nominal argument induces a fully closed scale over which *half* and other modifiers operate. In these two environments, the functions μ_{PRT} and μ_{VP} provide a formal mapping from nominal part structures to quantity scales. Moreover, since μ_{VP} can be derived from μ_{PRT}, this analysis appeals to a more basic notion of partitivity and measurement that is linked to gradability in both true partitives and event-denoting VPs, revealing further semantic parallels between the nominal and verbal domains.

'Gradable individuals' and the complexity of scale structure*

The topic of this work is an English construction illustrated in (1) (examples from web):

(1) a. Matching shirt and hat is so McDonalds. (≈ cheap, unfashionable)
b. Buying DVDs is so 2004! (≈ out-of-date)
c. Yeah, that is so Obama! (≈ cool)

In (1) a noun phrase is modified by a degree modifier, co-occurring typically with adjectives rather than nouns, and we aim to provide an account of what is happening in this construction. We are going to argue for the view that there is a type shift from individuals to gradable properties happening in the construction, and give an analysis of how exactly the result of the shift relies on the semantic properties of the source. We believe the study of this shift to fit into the broader perspective of type-shifting studies like Kennedy and McNally 2005 on deverbal adjectives, Partee 1986 on pseudoclefts and the like.

Properties of the construction. In (2-3) we show evidence that we are not dealing with 'gradable nouns' here (Morzycki to appear), but rather with 'true' gradable adjectives:

(2) a. George is a(n) {enormous/big/slight/minor/*so/#pretty/*very/*so very/*rather} idiot.
b. Matching shirt and hat is {*enormous/*big/*huge/*slight/*minor/so/pretty/very/so very/rather} {McDonalds/cheap}.
c. How very {Obama/*idiot/cool/cheap}!

(3) a. He {is/seems/felt/became} so Obama!
b. The martini always seems so James Bond, so "Sex in the City," so elegant.

Second, we argue that only individual (*e*) referring noun phrases are found in these construction, other types of NPs not passing the above tests and thus being instances of other *so*-constructions, which are numerous in modern English; maybe in these cases *so* is VP-attached:

(4) a. This {is/*seems} so a vegan brownie!
b. This {is/*seems} so professor.

We assume scale structure typology as described in Kennedy and McNally 2005 (similar observations made in Rotstein and Winter 2004): scales (sets of degrees totally ordered with respect to some dimension) can be (totally) open, lower closed, upper closed and totally closed. In addition, we assume the existence of 'extreme adjectives' as described in Morzycki in preparation – with the standard higher on the scale than any contextually salient degrees. We find that 'gradable individuals' pattern either with upper closed scale adjectives or with 'contextual extreme adjectives' like *brilliant*, *certain* etc, the choice varying with the speaker and the individual in the construction:[1]

(5) a. Those shoes are {totally/absolutely} {1994/clean}.
b. That's totally {Einstein/accurate}!
c. ??That's totally/absolutely {old/smart}.

(6) a. Those shoes are {downright/positively/straight-up} 1994!
b. These cookies are {flat-out/downright} St. John! (St. John being a good restaurant)
c. ??{downright/positively/straight-up} {safe/pure}.

The first straightforward attempt to formalize these meanings might be the following:

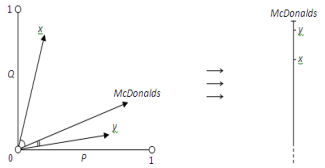
(7) a. $[[\textit{Godzilla}]] = [[\textit{big}_C]] = \lambda x \lambda d.\ x \in C \ \&\ x \text{ is } d\text{-big}$
b. $[[\textit{Godzilla}]] = [[\textit{gigantic}_C]] = \lambda x \lambda d.\ d > max(C) \ \&\ x \text{ is } d\text{-big}$

It doesn't capture several facts, though. First, scales associated with 'gradable individuals' can be upper closed even if the property they denote is not (cf. *smart* in 5c). Second, it is not always that easy to identify the exact single property the individual denotes in this construction:

(8) a. Her hair is so Madonna at Golden Globes! (curly? big? combination of both? sth else?)
b. That's so Harvey! (Harvey being very clumsy and charming)

Third, we still need to account for the fact that there are generally two readings possible – upper-closed scale and extreme reading – and what may govern the choice between them.

The analysis we propose is based on the vector space metaphor. Suppose there is some subset of the set of individual's properties that serve as parameters of comparison to calculate the resemblance measure. The number of these properties determines the number of dimensions in properties space. So each individual has a corresponding point/vector in this space that is determined by the individual's position on the space scales. We can now use traditional machinery for measuring distances between vectors. They can then be mapped to a scale that would order individuals by selected measure. On a figure there is a two-dimensional space with individuals *McDonalds*, *x* and *y* represented as vectors and a corresponding scale.



Our hypothesis is that the difference between upper-closed scale (we might call that 'resemblance') meaning and the extreme meaning is in the nature of a measure that maps individuals to the resulting scale. It might be the case that for an extreme reading to arise, the length of vectors should be mapped to degrees on corresponding scale; for a resemblance reading, some distance measure (say, Euclidian distance) should be mapped to degrees on corresponding scale. Thus the resemblance meaning is naturally upper-closed scale, and the extreme reading naturally arises when the individual is really prominent wrt the properties one picks as characteristic for it – than its vector is going to be extremely long.

We schematically formulate the two readings in 9:

(9) a. $[[\textit{McDonald's}]] = \lambda x \lambda d.\ x \in C \ \&\ x \text{ is } d\text{-}(\{(\|v(\textit{McDonald's}) - v(x)\|): x \in D_e\})$
b. $[[\textit{McDonald's}]] = \lambda x \lambda d.\ d > max(C) \ \&\ x \text{ is } d\text{-}(\{(\|v(\textit{McDonald's})\| - \|v(x)\|) : x \in D_e\})$

In 9a, $\{(\|v(\textit{McDonald's}) - v(x)\|): x \in D_e\}$ stands for a scale formed by Euclidian distance between vector pairs formed by McDonald's and all other individuals (the same ordering could be achieved by *cosine* metrics); in 9b, $\{(\|v(\textit{McDonald's})\| - \|v(x)\|) : x \in D_e\}$ stands for a scale formed by differences in magnitude of vector pairs formed the same way.

We believe that the distinction between two ways of comparing individuals has its reflection in English, in the 'gradable individuals' construction.

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[1] Some speakers noted that *It's so McDonald's* can be used in two slightly distinct senses: a. 'extraordinarily bad/cheap'; b. 'resembles McDonald's'.

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Acquiring maximality in free relatives and definite descriptions

IVANO CAPONIGRO, LISA PEARL, NEON BROOKS, DAVID BARNER

Introduction. Plural definite descriptions like "the things on the plate*"* have been argued to refer to the maximal (plural) individual of the set denoted by the nominal "things on the plate*"* (Link 1983). The same semantic analysis has been extended to free relative clauses (FRs) introduced by bare phrasal wh-words like "what is on the plate*"* (Jacobson 1995 and Rullman 1995, a.o.). However, these two constructions differ in their syntax-semantics mapping of maximality. In definite descriptions, maximality is triggered overtly by *the*, while in FRs, maximality has been argued to result from the application of a type-shifting operation that is triggered by a silent operator (Caponigro 2004). Previous studies have found that children have difficulty assigning a maximal interpretation to both definite descriptions (Munn, Miller, & Schmitt, 2006) and FRs (Modyanova & Wexler 2008). Nevertheless, the relationship between these two forms in acquisition has never been tested, and the age when children acquire adult-like interpretations for both forms has not been established. Also, different methods have been used to investigate the acquisition of FRs and definite descriptions, making it difficult to compare previous results.

Our study. We assessed children's understanding of both constructions using the same set of tasks to test the hypothesis that **(i)** plural definite descriptions and FRs are mapped onto the same meaning, and **(ii)** the same mechanism, i.e., a maximality operator, is responsible for this. We tested the acquisition of plural definite descriptions and FRs and found that children acquire a maximal interpretation for these constructions around the same time – even though maximality is triggered overtly in one and covertly in the other, and even though these two constructions differ massively in their frequency in children's input. This suggests a common underpinning for children's interpretation of maximality in these constructions.

Corpus analysis. Our corpus analysis (Table 1) finds that children encounter definite plural constructions more than seven times as frequently as they encounter FRs. Moreover, if children are tracking how often lexical items predict a maximal interpretation, the definite article *the* has perfect predictive power while the wh-words used in FRs are only associated with a maximal interpretation in subordinate clauses 8% of the time.

Experiments. We tested 3- to 7-year-old children and adult controls on two comprehension tasks: an act-out task and a truth value judgment (TVJ) task. Each task probed participants' interpretation of definite plurals and FRs, as well as for quantifiers (*some, all*). In the act-out task, we found that by 6 years of age, definite plurals and FRs were as likely as constructions involving *all* to generate maximal responses (Figure 1). In the TVJ task, only 7-year-old children (and not younger) distinguished both definite plurals and FRs from *some* constructions while showing no difference between definite plurals, FRs, and *all* constructions (Figure 2).

Discussion. The results of two experiments suggest that children assign a maximal interpretation to plural definites and FRs at the same point in development, between 6 and 7 years old. Since a corpus analysis finds that these constructions differ significantly in their frequency in child-directed speech, these results indicate a global change in how children interpret maximal expressions which appears to be independent of how frequently the words are used in their input. Interestingly, before the age of 6, children treat the two constructions as semantically similar to indefinite nominals like "some of the things on the table*"* (no maximalization but existential quantification), while they assign the correct interpretation to quantified nominals like "all the things on the table*"* (no maximalization, but universal quantification). This brings further support to the analysis of plural definite descriptions and FRs as semantically similar and non-quantificational.

Table 1. Corpus analysis. 205,320 word tokens (9365 word types) from portions of the VanHouten, Bates-Free20, Bates-Snack28, Bates-Story28, Valian, and VanKleeck datasets in CHILDES.

NPs	Definite-NPs	Definite-Plurals		Embedded clauses	WH-clauses	Embedded WH-clauses	FRs
79892	7901	1169		3618	8521	1963	157

Figure 1. Act-out Task results. The horizontal axis shows the different constructions used in the request "Give me *X* on the plate" (*some of the things, all of the things, what's, the things*). The vertical axis shows the percent of the time participants gave all four of the objects on the plate to the experimenter, indicating a maximal interpretation.

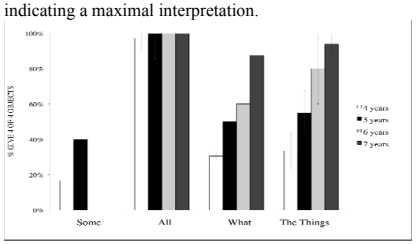
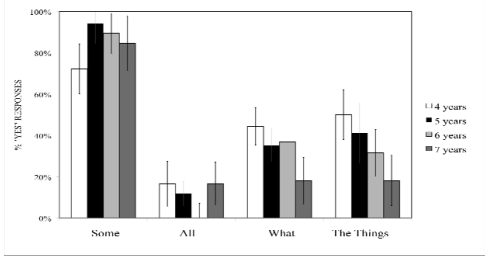


Figure 2. Truth Value Judgment Task results. The horizontal axis shows the different constructions used in the question "Does Cookie Monster like *X* on the plate?" (*some of the things, all of the things, what's, the things*). The vertical axis shows the percent of the time participants answered yes when Cookie Monster only liked some of the things on the table, which indicates a non-maximal interpretation.



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***De re* anaphors**. We motivate a binding theory for pronouns in intensional contexts with distributional facts about *de re*/*de se* ±anaphoric pronouns. We present new arguments that (a) *de se* readings are grammatically encoded and (b) that grammatical processes—e.g. Conditions A and B, Fox's (2000) Economy of variable binding—are *sensitive to* the *de re* vs. *de se* distinction, *pace* Anand (2006). An Economy condition on *de re* "introduction" is proposed and defended, with consequences for Zimmermann's (1991) argument that *de re* LFs are compatible with *de se* readings.

Heim (1994) observes that a *de se* pronoun (†) can "bind" a non-*de se* (‡) anaphor. For instance, (1) is judged true if Olympia doesn't realize the person she wants to criticize is herself:

(1) Olympia wants PRO† to criticize herself‡!

The standard view has it that *de se* attitudes stem from self-ascription of a property—cf. Lewis (1979). However, if in an attitude ascription this property originates via λ-abstraction—cf. Chierchia (1989)—mixed readings as in (1) should be impossible since *herself* must be locally bound:

(2) Olympia$_i$ wants λ_j PRO$_j$ to criticize herself$_{*i/j}$.

Heim proposes that an anaphor may be long-distance bound just in case its "normal" antecedent is *de se*. Using new data from nearly-free control—cf. Jackendoff & Culicover (2003)—we argue that long-distance binding cannot be the mechanism underlying mixed readings:

(3) Olympia$_i$ talked to Susan$_j$ about PRO$^{\dagger}_{i+j}$ criticizing each other$^{\ddagger}_{i+j}$!

(4) *Olympia$_i$ talked to Ben$_j$ about PRO$^{\dagger}_{i}$ criticizing himself$^{\ddagger}_{j}$!

Since reciprocal anaphors don't tolerate split antecedents, Heim's account predicts (3) to be ungrammatical with a *de re* anaphor. Absent stipulation, Heim's account also doesn't explain the contrast between (1) and (4). We conclude that a *de se* pronoun can bind a *de re* anaphor.

Sharvit (2009) argues that a *de re* pronoun cannot bind a *de se* reflexive and that if a *de re* pronoun binds a *de re* reflexive, the two must be construed relative to the same acquaintance relation:

(5) *Olympia$_i$ thinks she$^{\ddagger}_{i}$ burgled herself$^{\dagger}_{i}$.

(6) Olympia$_i$ thinks she$^{\ddagger_1}_{i}$ burgled herself$^{\ddagger_{1/?2}}_{i}$.

We argue that Sharvit is correct about (5) but mistaken about (6). In order: while an utterance of *Olympia thinks she burgled herself* seems *compatible* with a scenario in which Olympia sees the burgl-ee in the first-person way and and burglar in the third-person way, embedding in decreasing contexts—cf. Percus & Sauerland (2003)—reveals that this cannot be due to a *de re*–*de se reading* of (5), *per se*:

> Susan sees herself on TV without recognizing it's her. The woman on TV is defending "the junior senator from Maine"—i.e. herself. Susan thinks "How generous of her to stick up for her colleague." Mary sees herself defending Olympia without recognizing she's on TV. Mary, a suggestible amnesiac who's under the impression she's Olympia, thinks, "How generous of her to stick up for me."

(7) #Mary and Susan are both confused, but only MARY thinks she's defending herself.

(8) #Mary thinks she's defending herself, but Susan doesn't.

Context requires that only Mary has a *de se* belief about being defended by someone (who we take to be) identical to her. So if a *de re*–*de se* reading were available for *Mary thinks she's defending herself*, both (7) and (8) would be felicitous, contrary to fact.[1] As for (6), an utterance of e.g. *Olympia thinks she killed herself* is judged true if Olympia thinks x killed y, without taking them to be identical either to herself (though they are), or each other. Focal stress on both pronouns helps bring the reading out.

This is a surprising set of facts. It's been assumed since Zimmermann (1991) that the felicity of e.g. *everyone$_i$ thinks he$_i$ won re-election* in cases where some individuals have a *de se* belief but some only a *de re* belief entails that *de re* LFs are compatible with *de se* readings.[2] But if $\lfloor x_i^{\ddagger_1} \lfloor \dots x_i^{\ddagger_2}\text{-self} \rfloor \rfloor$ is licit, what could rule out $x_i^{\ddagger_2}$*-self* being construed *de se*—thereby contradicting $*\lfloor x_i^{\ddagger} \lfloor \dots x_i^{\dagger}\text{-self} \rfloor \rfloor$?

We assume the following (fairly standard) centered-worlds semantics for attitudes ($\mathcal{A}$):

- Following Percus & Sauerland (2003), G is a variable over *concept generators* of type $\langle e, \langle \sigma, e \rangle \rangle$, with '$\sigma$' the type of centered worlds. For any G, attitude relation $\mathcal{A}$, x_e, w_s, and any $\kappa'_\sigma = \langle w', x' \rangle \in \mathcal{A}^w_x$,[3] $[\![\mathsf{G}\ y_i]\!]^{g,\kappa'} := \iota y : R(x')(w')(y)$, with R an acquaintance relation constrained such that $\iota y : R(x)(w)(y) = g_{@}(i)$. This implements Kaplan's (1968) framework for *de re* attitudes.
- $\mathcal{A}(p)(x)(w) = 1 \Leftrightarrow \exists \mathsf{G} \forall \langle w', x' \rangle \in \mathcal{A}^w_x : p(\mathsf{G}(x')(w') = 1$. (cf. Anand 2006)

1 Crucially, parallel configurations with possessive pronouns are licit in belief ascriptions: $\lfloor x_i^{\ddagger} \lfloor \dots x_i^{\dagger}$'s NP$\rfloor \rfloor$, cf. Anand 2006.
2 See (11) below for one example of how a *de re* LF can yield a *de se* reading.
3 $\langle x', w' \rangle \in$ e.g. $\text{Dox}^w_x \Leftrightarrow x'$ is someone x thinks she might be in w, and w' is a world compatible with what x believes in w.

- Bare (i.e. G-less) pronouns get bound by a syntactic λ operator—c.f. (2). So they're *de se*.

Additionally, we assume *de re* pronominal DPs are *derived* from "bare" (i.e. *de se*) pronominal DPs via a structure-building operation: i.e. $[_{\text{DP}}\ x_i] \rightsquigarrow [_{\text{DP}}\ \mathsf{G}\ x_i]$. Fox (2000) argues that LF transformations should have semantic import. And plainly, if for any G, x_i, assignment g, world w, attitude relation $\mathcal{A}$, and doxastic state Dox^w_x, $\forall \kappa' \in \text{Dox}^w_x . \mathsf{G}([\![x_i]\!]^g)(\kappa') = g(i)$, the *de re* transform will be for naught. We propose that all G-introductions meet the following criterion: $\exists \kappa' \in \text{Dox}^w_x . \mathsf{G}([\![x_i]\!]^g)(\kappa') \neq g(i)$. Informally, Gs should *do something* in the information state of the belief ascribee. Given an LF $[[\mathsf{G}_1\ x_i] [\dots [\mathsf{G}_2\ x_i\text{-self}]]]$, this entails that neither pronoun can be interepreted *de se*. If the LF $[[\mathsf{G}\ x_i] [\dots x_i\text{-self}]]$ can be ruled out (see below), we derive $*\lfloor x_i^{\ddagger} \lfloor \dots x_i^{\dagger}\text{-self} \rfloor \rfloor$.

Of course, this proposal entails that *de re* pronouns of *all* sorts may never be construed *de se*. Isn't this inconsistent with Zimmermann's data? Evidence it's not comes from the following:

> Olympia, Susan, and Mary are watching TV. As it happens, some talking head is on the air criticizing Olympia, Susan, and Mary. Olympia and Mary, somewhat confused, realize only that the talking head is criticizing some politician. Each thinks, "I want to defend those poor souls." Susan, on the other hand, realizes what's going on and thinks, "I want to defend myself."

(9) Olympia wants to defend herself, and {✓Mary, ✓Susan} does too.

(10) ✓Each of those senators wants to defend herself.

Since $*\lfloor x_i^{\ddagger} \lfloor \dots x_i^{\dagger}\text{-self} \rfloor \rfloor$, we concluded *de re* anaphors couldn't be interpreted *de se*. Yet the reflexive is licensed in a mixed scenario (exactly as in Zimmermann's case)! Actually, the proposed Economy condition predicts this since only a "do-nothing" G can make *Susan wants to defend herself* true and thus yield true readings of (9) and (10) (parallel reasoning rescues Zimmermann's example):

(11) $\lambda \mathsf{G} [\forall \kappa' = \langle w', x' \rangle \in \text{Boul}^{w_@}_{\mathbf{s}} : \mathbf{defend}(\mathsf{G}(x')(\kappa'))(x')(w')](\lambda y_e \lambda \kappa_\sigma . y)$
$\rightsquigarrow_\beta \forall \kappa' = \langle w', x' \rangle \in \text{Boul}^{w_@}_{\mathbf{s}} : \mathbf{defend}(x')(x')(w')$ [**True in our scenario**]

Ruling $[[\mathsf{G}\ x_i]_j [\dots x_i\text{-self}]]$ out—while ruling $[x_i [\dots [\mathsf{G}\ x_i\text{-self}]_j]$ in—remains. We propose an account which (a) leaves "bare" objects in situ but (b) forces *de re* objects to raise at LF—à la object shift or focus movement. Taken together with the assumption that Binding Theory cares only about *extensional* covaluation, this derives the asymmetry:

(i) ✗$[[\mathsf{G}\ \text{she}_i]_j [\lambda_j [_{\text{VP}}\ t_j\ [\text{defends herself}_i]]]]$ (ii) ✓$[\text{she}_i [\lambda_i [\mathsf{G}\ \text{herself}_i]_j [\lambda_j [_{\text{VP}}\ t_i\ [\text{defends}\ t_j]]]]]$

In (i) *herself$_i$* must, given Condition A, be bound by the trace t_j of $[\mathsf{G}\ \text{she}_i]_j$. Since (given Economy of G introduction) $g(i) \neq g(j)$ this move is illicit. In (ii), by contrast, she$_i$ binds $[\mathsf{G}\ \text{herself}_i]_j$. Since (by Percus & Sauerland's 2003 rules for G) $[\![\mathsf{G}\ \text{herself}_i]\!]^{g,\kappa_@} = g(i)$, this move is licit.

We thus maintain, *pace* Anand (2006), that Binding Theory "sees" *de re* vs. *de se*—a conclusion I think the asymmetry between (1) and (7)–(8) impels. Some more evidence this is on the right track:

(12) Olympia said she voted for her bill, and Susan did too.

(12) lacks a STRICT–SLOPPY reading, a fact known as Dahl's (1973) puzzle. Fox (2000) proposes an account based on locality of variable binding: the missing reading requires long-distance binding of *her* by *Olympia*; however, this is ruled out since local binding yields a truth-conditionally equivalent result. If this mechanism is sensitive to the truth-conditional difference between *de re* vs. *de se* readings, we should observe obviations of Dahl's effect if a *de re* pronoun intervenes between a *de se* pronoun x_i and the *de se* abstraction operator λ_i. In fact, this is precisely what obtains:

> One day Olympia and Susan return home to find that both of their computers have been stolen. They discover that a plant has been knocked over in the living room and surmise that whoever the thief was, (s)he must have been the one who knocked over that plant. In reality, Olympia knocked the plant over the previous evening in a drunken stupor, an incident she has completely forgotten.

(13) Well this is funny. Olympia thinks SHE stole her computer, and SUSAN does too.

Finally, we note that obviations of Condition B effects can occur if the binding pronoun is *de re*:

(14) Well this is funny. Olympia thinks SHE($_i$'s the one who t_i) robbed her.

Though (14) should induce a Condition B violation—see Sharvit (2009) on Condition B effects for *de re* pronouns—the construction is only slightly deviant, and the parenthetically given form is impeccable.

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On *le même* 'the same' in French

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The goal of this paper is to propose a semantic analysis of French *le même* 'the same' in its sentence-internal use (cf. (1)-(2), as opposed to sentence-external readings (anaphoric or deictic) in (3) and comparative constructions in (4))

(1) Luc et Flore ont lu le même livre. 'Luc and Flore read the same book.'
(2) Tous les enfants ont lu le même livre. 'All the children/every child read the same book.'
(3) Luc possède une Citroën Xsara./Regarde là ! Je crois que je vais acheter la même voiture.
'Luc owns a Citroën Xsara./ Look at that! I think I am going to buy the same car.'
(4) J'ai lu le même livre que toi/l'année dernière/celui que tu as emprunté à la bibliothèque.
'I read the same book as you/last year/the one you borrowed at the library.'

As noted for *same* in English (cf. Carlson 1987, Moltmann 1992, Barker 2007), French *même* raises two main issues: a- the definiteness puzzle: though combining with a definite determiner, DPs involving *même* do not behave the way typical definite descriptions do; b- the problem of compositionality: the elements that need to be combined for the interpretation of *même* do not form a syntactic constituent (e.g. in (1) Luc et Flore/le même livre).

Concerning the first issue, definite DPs with *même* indeed differ from standard definite DPs.

- They can occur in existential constructions:

(5) Il existe le même type de lentilles chez tous les opticiens.
'There exists the same type of contact lenses at all the opticians'.'

- They do not need to be mentioned in the previous context:

(6) C'est drôle: hier, ces enfants ont lu le même livre sans s'être concertés.
'It is funny: yesterday, these children read the same book without consulting each other.'

- They do not yield presupposition of unique existence: as observed by Barker, whether or not there is a unique book read by Flore and Luc is precisely what is at issue in (7).

(7) Est-ce que Luc et Flore ont lu le même livre ? 'Did Luc and Flore read the same book?'

Furthermore, they also differ from indefinites in that they yield an existence presupposition: in (7), it is presupposed that Luc and Flore read a book. However, uniqueness is asserted: (1) asserts that the book read by Luc and Flore is unique. Therefore, *le même* exhibits mixed properties with respect to definiteness (presupposition of existence; assertion of uniqueness (that will be here represented by a choice function (like Barker)).

Besides, note that unlike English, French also licenses the indefinite determiner with *même*. In this case, there is no presupposition of existence: (8) is felicitous (as opposed to the same sentence with a definite determiner) even if Luc and Flore did not live in a house (but in a studio for example), whether it was unique or not.

(8) Est-ce que Luc et Flore habitaient dans une même maison?
'Did Luc and Flore live in a same house?'

Moreover, *même* does not behave like a standard adjective: it cannot be used predicatively (9), it cannot combine with determiners other than the definite or the indefinite (10), it cannot be modified by adverbs (11), it cannot coordinate with any adjective (12).

(9) *Ces livres sont mêmes. vs. Ces livres sont les mêmes.
(10) a. Ils ont lu *quelques/*divers/*certains/*plusieurs/*trois/*des/les mêmes livres.
'They read *some/*various/*certain/*several/*three/*ø/the same books.'
b. Ils ont lu ?un/*leur/#ce/le même livre. 'They read *a/*their/#this/the same book.'
(11) Luc et Flore ont lu le (*vraiment/*très/*presque/*tout) même livre.
'Luc and Flore read the (really/very/almost/very) same book.'
(12) Luc et Flore ont acheté le (*petit et/*premier et/*seul et) même livre.
'Luc and Flore bought the (*small and/*first and/*only and) same book.'

That's why I propose that *le même* is a complex determiner (cf. Romanian *acelaşi),* which has mixed properties with respect to definiteness.

Concerning the second problem, I argue first (like Barker; unlike Moltmann) that the syntactic relation between the DP with *même* and its licenser is the same as the one between a quantifier and another scope-taking element. It does not obey c-command (13) and exhibits sensitivity to islands (among others: Adjunct constraint (14) and Coordinate Structure Constraint (15)).

(13) Le même serveur a servi toutes les tables. 'The same waiter served every table.'
(14) # Luc et Flore sont en colère parce que la même personne a été élue.
'Luc and Flore are angry because the same person got elected.'
(15) # Anne et Flore ont rencontré Luc et la même femme.
'Anne and Flore met Luc and the same woman.'

Note that the hypothesis of *le même* as a complex determiner (vs. an adjective) avoids the problem of violating syntactic constraints in QR (unlike Barker): it is not *même* itself that undergoes QR but the whole DP pied-piped by *le même*.

Furthermore, based on data not mentioned yet in the literature (cf. 16-20), I propose that *même* takes a plural event as an argument (unlike Barker; like Moltmann and Carlson based on other examples involving conjoined VPs, PPs…etc). Indeed, all these examples involve several aspectual notions (frequentativity, iterativity, habituativity, continuativity, durativity) expressed by various categories (adverbs, nouns, adjectives…etc); they therefore have in common to contain a plural event, which thus appears to be the licensing condition for *même*.

(16) Lucie commet souvent la même erreur.'Lucy often makes the same mistake.'
(17) La répétition de la même erreur n'est pas acceptable. 'The repetition of the same mistake is not acceptable.'
(18) Il avait coutume/l'habitude d'inviter les mêmes personnes chez lui.'He used to invite the same people at his place.'
(19) Il a un désir constant/continu du même objet. 'He has a constant/continuous desire of the same object.'
(20) Cela fait longtemps que Marc habite au même endroit. 'Marc has been living at the same place for a long time.'

Furthermore, given that a plural event can be partitioned along different dimensions (participants, times), the licensing condition for *même* (plural event) also holds in the first examples (cf. 1-2); in this case, the participants only need to be distributable (to obtain multiple subevents); that's why collective nouns for example (21) do not license *même*.

(21) # La classe a lu le même livre. 'The class read the same book.'

So, I propose that *le même* is an existential complex determiner that quantifies over parts of events and raises above the event variable to get interpreted (<: part relation; f: choice function): ⟦le même⟧ $=\lambda P_{<et>}\lambda Q_{<e,vt>}.\forall e',e''<e_{<v>}(e'\neq e''), \exists f_{<et,e>}$ such that Q(f(P))(e')=1 and Q(f(P))(e")=1 Presupposition: $\exists x_{<e>}$ such that P(x)=1 and Q(x)(e)=1

This yields the following meaning for (1): *Presupposition*: Luc and Flore read a book; *Assertion*: there exists a unique way of choosing a book such that the chosen book was read by Flore and it was read by Luc.

Finally, note that interestingly, *le même* is licensed in the very same context as the one marked by pluractional morphology in certain languages like Chechen (Yu 2003): pluractional markers indicate a multiplicity of actions, whether involving multiple participants (distributive reading) or multiple times (frequentative/durative readings). This means that *même* reveals the relevance of pluractionality in languages lacking pluractional morphology.

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Salish languages lack generalized quantifiers after all!

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Introduction It is more than a decade since Jelinek (1995) launched her influential claim that Northern Straits Salish (NSS) lacked generalized quantifiers (GQs), and thus constituted a counterexample to Barwise and Cooper's (1981) NP-Quantifier Universal. Subsequently, that claim has been challenged by Matthewson (1998, 2001) - see also Giannakidou (2004) - on the basis of a set of structures containing DP-adjoined strong quantifiers. In this paper I present new data involving cumulative readings of strong (proportional) quantifiers and the absence of strong crossover effects to show that in fact these structures are not GQs after all, thus re-establishing Jelinek's claim (albeit in a different form). As a result, Salish languages once again pose a challenge to the NP-Quantifier Universal.

Background Jelinek's original claim was that all strong quantifiers in NSS had both the syntax and the semantics of unselective A-type quantifiers like English *always* (Lewis 1975). This cannot be correct: all Salish languages which have been investigated (including NSS) display structures of the form [$_{DP}$ Q [$_{DP}$ D NP]], as illustrated in (1-2):

(1) ƛ̓əm̓-ət=ɬ=kʷəʔ [$_{DP}$ *məḵʷ* [$_{DP}$ ksə=sqʷəlqʷəméy̓]]
hit-TR=1PL.SU=INFR [$_{DP}$ *all* [$_{DP}$ DET=dog(PL.REDUP)]]
'We hit all the dogs.' (*NSS; Central Salish*)

(2) čáqʷ-an̓-əm [$_{DP}$ *tákəm* [$_{DP}$ ʔi=šc̓úqʷaż=a]]
eat-TR-1PL.ERG [$_{DP}$ *all* [$_{DP}$ PL.DET=fish=EXIS]]
'We ate all the fish.' (*St'át'imcets (ST'); Northern Interior Salish)*

In this structure, *Q* is most frequently represented by a universal quantifier, but in ST', *šáq̓ʷuɬ* 'half' and *x̌q̓ʷaẇš* 'both' may also adjoin to DP (evidence is lacking for other Salish languages). A variety of syntactic tests support the structure in (1-2), including co-ordination with non-quantified DPs and movement to pre-predicative positions. Matthewson (2001) concludes that the structures in (1-2) are standard GQs, in contrast to non-quantified DPs (including those containing cardinality predicates), which are interpreted via choice functions. On standard assumptions, this predicts that the two classes will differ in scope. Non-quantified plural DPs should show no scope interactions, whereas GQs should be subject to QR, and therefore show scope ambiguities.

Data The first set of predictions is borne out: non-quantified plural DPs in ST' (including those containing weak quantifiers such as numerals) only yield cumulative rather than distributive readings, as illustrated in (3):

(3) qʷuš-xit-ítaš [$_{DP}$ ʔi=*nx̌ʷəx̌ʷʔúčin*=a] təwtwíẇt] [$_{DP}$ ʔi=*kaɬóɬš*=a míx̌aɬ]
shoot-IND-3PL.ERG [$_{DP}$ PL.DET=*four*=EXIS boy(PL) [$_{DP}$ PL.DET=*three*=EXIS bear]
'4 boys shot 3 bears.' (i.e., a total of 4 boys shot a total of 3 bears, in any combination.)

These findings are compatible with an analysis where only a DP-adjoined quantifier creates a GQ. However, crucially, in examples with two DP-adjoined quantifiers, the same facts hold: only cumulative – not distributive – readings are possible:

Context: Four children are meant to read four books over the summer holidays.

(4) [$_{DP}$ tákəm [ʔi=šḵʷəmḵʷúḵʷmiʔt=a]] paqʷal̓ikšt-mín-itaš [$_{DP}$ šáq̓ʷuɬ [$_{DP}$ ʔi=púkʷ=a]]
[$_{DP}$ all [$_{DP}$ PL.DET=child(PL)=EXIS]] read-RED-3PL.ERG [$_{DP}$ half [$_{DP}$ PL.DET=book=EX]]
'All the children read half the books.' (Good on all readings where each of the 4 children reads at least one of the books, and a total of 2 out of the 4 titles are read; bad otherwise.)

(5) [šáq̓ʷuɬ ʔi=šḵʷəmḵʷúḵʷmiʔt=a] paqʷal̓ikšt-mín-itaš [$_{DP}$ tákəm [$_{DP}$ ʔi=púkʷ=a]]
[$_{DP}$ half [$_{DP}$ PL.DET=child(PL)=EXIS]] read-RED-3PL.ERG [$_{DP}$ all [$_{DP}$ PL.DET=book=EX]]
'Half the children read all the books.' (Good on all readings where exactly 2 of the children between them read a total of 4 titles; bad otherwise.)

These data show not only that DPs containing adjoined *tákəm* 'all' do not show the behaviour of GQs, but even more surprisingly, that neither do those containing the inherently proportional quantifier *šáq̓ʷuɬ* 'half'.

Further evidence for the non-GQ status of DPs with adjoined quantifiers is provided by (the absence of) Strong Crossover effects (SCO) with *tákəm* 'all'. In ST', a pronoun may c-command a covalued lexical DP in a subordinate clause (Davis 2009). In such cases, the DP may contain an adjoined strong quantifier without inducing an SCO violation (6):

(6) čút=*wit*=tuʔ [$_{CP}$ kʷ=š=xʷuż naš c̓uqʷaż-am
said=*3PL*=REM [$_{CP}$ DET=NOM=going.to go fish-MID
[$_{DP}$ tákəm [$_{DP}$ ʔi=n-šnəḵʷnúḵʷʔ=a]] natxʷ]
[$_{DP}$ all [$_{DP}$ PL.DET=1SG.POSS-relative(PL.REDUP)=EXIS] tomorrow]
'My family all said they were going fishing tomorrow.'
(Literally: '*They* said that *all my relatives* were going fishing tomorrow.')

Since SCO effects are diagnostic of QR, and QR is one of the hallmarks of a GQ, this provides further evidence that adjoined strong quantifiers are not GQ-creating in ST'.

Analysis I assume a basic semantics for pluralities along the lines of e.g. Schwarzchild (1996). Cumulative readings are derived by the ** operator of Beck and Sauerland (2000), which is simply the equivalent of the * (plural) operator for transitive predicates. Since the principal use of DP-adjoined universals quantifiers in ST' is to enforce maximality (plain plural DPs allow exceptions, but plural DPs with *tákəm* 'all' do not), either an approach which picks out the maximal set denoted by a plural DP (e.g., von Fintel and Heim's 2001 *Max*), or one which enforces the distributive sub-entailments of a plural predicate (Dowty 1987, Brisson 2003) is potentially available. Following Ferch (2009), I choose the former because it correctly allows *tákəm* 'all' to appear with purely collective predicates, which have no distributive sub-entailments. For *šáq̓ʷuɬ* 'half', I assume a denotation as in (7), which treats it as a special kind of choice function that picks out a subset of the set denoted by the plural DP, and is defined only if the cardinality of the subset chosen is exactly half of that of the superset.

(7) $[[\text{šáq̓ʷuɬ}]]^g = \lambda P: \mid (g(i)) (P) \mid = \frac{1}{2} \mid P \mid . (g (i)) (P)$

Consequences The result is that ST' - and by extension other members of the Salish family - lack GQs altogether, contra Matthewson, but in line with Jelinek's original conjecture. Salish thus once again stands as an important counter-example to Barwise and Cooper's NP Quantifier Universal. Furthermore, the existence in a language of an inherently proportional quantifier such as *šáq̓ʷuɬ* 'half' can no longer be taken as prima facie evidence for a GQ; cumulative versus distributive readings need to be checked individually for each quantificational element.

Generic sentences and subjective probability

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Introduction: Cohen (1999a, 1999b, and later) has convincingly argued that generic sentences express probability judgments on a frequentist interpretation of probability. His main analysis provides an account of a wide class of generic sentences and is characterized by three additional components: (a) the use of alternative semantics to restrict the domain of the generic quantifier, (b) an alternative-based distinction between the truth conditions for absolute and relative generics, and (c) the imposition of a constraint on the homogeneity of reference classes.

In this paper, we develop a new analysis of generic sentences built on a subjective/Bayesian interpretation of probability. Our analysis is more parsimonious and uniform, relying on a sparser ontology and analytical ingredients. Specifically, it provides a simpler expression of the notion of invariant probability across admissible histories (Cohen 1999a) by invoking stationarity of probability measures, and eschews the need for a homogeneity constraint on reference classes. We also treat absolute and relative generic readings uniformly (unlike Cohen 2001), by relating the felt truth/falsity of generic sentences to comparability of probability distributions. For the purpose of this abstract, we will restrict ourselves to generics with bare plural NPs in subject position.

Problem: As observed in Krifka et al (1995) and much previous literature, generics express non-accidental regularities expected to persist in time: (1-a) is judged false. They may tolerate exceptions to extreme degrees making a simple quasi-universal analysis over 'typical' or 'normal' individuals unteneble: (1-b) is judged true, though the proportion of man-eating tigers is small. They cannot express purely quantificational generalizations: (1-c) is judged true, but (1-e) is judged false, despite picking out essentially the same set. Similarly, (1-d) is judged false even if most carpets are from Persia. Finally, (1-f) fails to be judged true.

(1)
a. *Supreme court judges have a prime social security number*. FALSE
b. *Tigers eat people*. TRUE
c. *Peacocks have beautiful tails*. TRUE
d. *Carpets are Persian*. FALSE
e. *Peacocks are male*. FALSE
f. *Americans have a small ecological footprint*. FALSE

Framework: An influential view in work from psychology and economics (e.g. Gärdenfors and Sahlin (1988), Oaksford & Chater (2007)) argues that human reasoning is, at least to a good approximation, based on Bayesian statistics. The beliefs of an individual underlie judgments (for instance, of truth and falsity of sentences) and are represented by probability distributions over the parameters of interest. Specifically, to judge the probability p that a proposition holds (a value between 0 and 1), the individual's belief is represented by a probability distribution on the interval [0,1]. This can be formalized in the following way:

Let BEL, representing an individual belief system, be a function from the set of propositions R into the set $\mathcal{P}([0,1])$ of probability distributions on [0,1]. For any proposition g, the area between the graph of BEL(g) and the interval $[a,b] \subset [0,1]$ is the belief or confidence in the assertion "The probability of g lies in $[a,b]$". When the graph of BEL(g) is highly peaked around a particular value p_0 it may be loosely said that "the probability of g is judged to be p_0". Then, for any pair of propositions, g, h, where $BEL(g)$ is highly peaked at p_1, and $BEL(h)$ is highly peaked at p_2, we will say that $BEL(h) \succ BEL(g)$ iff $p_2 > p_1$.

Analysis: The truth/falsity of generic sentences involves a comparison of the probability distributions output by BEL – along a taxonomic hierarchy (**salience**), and along the time dimension

(**stationarity**). For any generic of the form $\phi\ are\ \psi$, we take $\phi_t\ are\ \psi_t$ to be its time-relativized version for some time t. Then, we claim,

(2) $\phi\ are\ \psi$ is (judged) a true generic iff $\phi_t\ are\ \psi_t$ is **salient** with respect to BEL for each time t and $BEL(\phi_t\ are\ \psi_t)$ is **stationary**.
   a. *Salience:* $\phi_t\ are\ \psi_t$ is salient with respect to BEL iff there is a $\phi' \supset \phi$ such that $BEL(\phi_t\ are\ \psi_t) \succ BEL(\phi'_t\ are\ \psi_t)$. Any such ϕ' will be called a 'supercategory' in the discussion below.
   b. *Stationarity:* $BEL(\phi_t\ are\ \psi_t)$ is stationary iff $BEL(\phi_t\ are\ \psi_t)$ does not vary with time t.

Salience formalizes the intuition of 'striking'-ness (Leslie 2007, 2008). *Tigers eat people* satisfies salience because we are confident about assigning a higher probability (a distribution that peaks at a higher value) to this proposition, than to a proposition expressed by a sentence like *Animals eat people* (where *animals* expresses a supercategory of *tigers*). Similarly for *Peacocks have beautiful tails*. Note that *Tigers eat people* and *Bears eat people* are both salient on our analysis (see Leslie (2007)'s objections to Cohen (1999)), and therefore, if they also meet the stationarity requirement, are judged true generics. *Stationarity* formalizes the intuition of generalization across a time index, and is implicit in some form in Cohen (1999) as well as previous work on generics.

A frequentist reduction of this Bayesian proposal would be to say that $\phi\ are\ \psi$ is true at some time t if $P(\psi|\phi) > P(\psi|\phi')$ at t and $P(\psi|\phi)$ is time-invariant. However, our approach provides an additional source of false generics ((3-b) below), that has the effect of eliminating the homogeneity requirement in Cohen (1999b).

Accounting for false generics: There are three ways in which generics can fail to be true.

(3)
   a. The stationarity requirement is not satisfied.
   b. $BEL(\phi_t\ are\ \psi_t)$ and $BEL(\phi'_t\ are\ \psi_t)$ are *incomparable* in the partial order $\succ$.
   c. They are comparable but $BEL(\phi'_t\ are\ \psi_t) \succ BEL(\phi_t\ are\ \psi_t)$ holds.

(3-a) is self-explanatory: only generalizations for which we believe time-invariance with confidence will be judged true, ruling out (1-a) and its like. (3-b) can itself arise in two ways: first, if either $BEL(\phi_t\ are\ \psi_t)$ or $BEL(\phi'_t\ are\ \psi_t)$ is a "spread-out" distribution on [0,1], and second, if both $BEL(\phi_t\ are\ \psi_t)$ and $BEL(\phi'_t\ are\ \psi_t)$ are highly peaked but around the same point in [0,1]. Note that a highly peaked belief distribution indicates a high degree of confidence in the probability of the proposition. In contrast, a spread-out belief distribution (which, for example, could arise from inadequate knowledge) indicates uncertainty about the probability of the proposition. Thus the falsity of (1-d) derives from the fact that for a possible supercategory like *man-made objects*, we do not know with any confidence what proportion of its members are Persian, leading to a spread-out belief distribution and incomparability. The falsity of (1-e) is rooted in the fact that for *Birds are male* (or other supercategories of peacocks), our belief is peaked at the same value ($\approx$ 1/2) as our belief about *Peacocks are male*. Finally, (1-f) is false even though one might believe it to satisfy stationarity and one's belief distributions for *Americans have a small ecological footprint* and *Humans have a small ecological footprint* are comparable, since the ordering is in the wrong direction.

Conclusion: The Bayesian notion of representing belief by a probability distribution does not disavow the role of real world facts that underlies traditional approaches, since the belief distribution is significantly influenced by observation. Taking such belief distributions (rather than underlying facts) as primitives, we capture the perceived truth/falsity of generics in a unified manner.

The importance of being small: an implicature-based approach to epistemic indefinites

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This paper explores the semantics/pragmatics interface by showing how a unified implicature-based approach to polarity sensitivity (along the lines of Chierchia (2008)) derives the meaning of semantically dependent existentials. On the empirical side, I focus on the distribution of the Romanian determiner *vreun* and provide support for the existence of a class of *epistemic* items (which also includes French *quelque* (Jayez & Tovena 2007) and Spanish *algún* (Alonso-Ovalle & Menéndez-Benito 2009)). Next, I contrast the properties of epistemic items with those of existential FCIs (*irgendein*, *un N qualsiasi* (Chierchia 2008), *un N quelconque* (Jayez & Tovena 2006)) and show that their meaning differences can be reduced to a difference in the size of the alternatives that are relevant for their computation.

1. **THE ROMANIAN CHALLENGE TO POLARITY SENSITIVITY TYPOLOGY:** Taking as a starting point the definition of polarity items as elements "excluded from positive assertions with simple past" (Giannakidou 2009), I show that the kind of semantic dependency exhibited by the Romanian indefinite determiner *vreun* (1) differs from all well-known patterns of polarity sensitivity (e.g. negative polarity, free-choiceness, nonveridicality):

(1) * Paul a văzut ***vreun*** prieten.
Paul has seen V-A friend

Farkas (2002) shows that *vreun* can occur in both negative polarity contexts (e.g. questions, if-antecedents) and 'positive' environments (e.g. hypothetical sentences). Refining these observations, I present new empirical evidence and show that *vreun* occurs in epistemic modal contexts (2), disjunctions and the scope of attitude verbs like the non-factive epistemic verbs *think*, *suppose*, *assume*, but also the preference verb *hope*.

(2) *Trebuie* că are Magda ***vreo*** soluție, ea mereu ne ajută.
must that have.3SG Magda V-A solution, she always CL help.3SG
'Magda must have a solution, she always helps us out.'

In order to capture this distribution, I contend that *vreun* is an **epistemic** determiner, i.e. an item sensitive to what an epistemic agent holds to be true. More precisely, I argue that the key licensing factor is the semantic properties of the operator embedding *vreun*, which must satisfy the constraint in (3):

(3) LICENSING CONSTRAINT: OPERATOR […*vreun*...] - Op *p* entails that the epistemic agent's doxastic alternatives include *non p*-worlds

This constraint imposes that *vreun* occur below operators which cannot be used in situations where that their complement proposition is established to be true. To illustrate, consider the contrast between *want* and *hope*:

(4)* *Vreau* să cumpăr ***vreo*** carte despre India.
want.1SG SUBJ buy.1SG V−A book about India
'I want to buy a book about India'

(5) *Sper* să găsesc ***vreo*** carte despre India.
hope.1SG SUBJ find.1SG V−A book about India
'I hope to find a book about India'

The preference verbs *want* and *hope* differ with respect to their epistemic properties, a contrast that is relevant for the licensing of *vreun*. In particular, Scheffler (2008) shows that the meaning of *hope* includes an epistemic component, which only makes it compatible with situations where the truth of the embedded proposition *p* is not established, a restriction which *want* lacks. Accordingly, when *p* is established to be true, e.g. when I can see that is raining, I cannot say *'It is raining and that is what I hope'*, but I can felicitously say *'It is raining and that is what I want'*. In other words, whenever we use *hope*, we allow for the existence of *non p*-worlds among our beliefs, as captured by the constraint in (3). The same line of thinking can be extended to epistemic modals (upon seeing that it rains, I cannot felicitously say *'It must be raining'*) and the other contexts that license *vreun*, by resorting to their strengthened meaning. Whereas the *basic* meaning of epistemic *must/might* amounts to quantification over epistemically accsssible worlds, its *strengthened* meaning involves an evidentality component: the speaker only has indirect evidence for her claim, and hence is not in a position to rule out the possibility that *not p* might hold (von Fintel & Gillies 2009, Kratrzer 2009). This distributional pattern cannot be captured by other licensing constraints, like Giannakidou's nonveridicality-based approach: *vreun* is licensed in contexts which are claimed to be veridical (e.g. *believe, suppose*) and ruled out in some nonveridical contexts (deontic modals, verbs like *want, insist*).

2. EPISTEMIC ITEMS AS A NATURAL CLASS: Putting together similar facts discussed for French *quelque* and Spanish *algún*, I show that epistemic items form a natural class, sensitive to the what an epistemic agents holds to be true. Epistemic determiners are similar to existential FCIs (Chierchia 2008), which are also dependent items interpreted as an existentials. The two classes differ, however, in at least two important respects: (i) epistemic indefinites are only licensed by epistemic operators, whereas existential FCIs are licensed by any kind of modality, (ii) a property dubbed by Jayez & Tovena (2007) the NO LOSER constraint: epistemic items allow for the explicit exclusion of a member of the restriction set (7) ('there can be a loser'), whereas existential FCIs preclude it (6) ('there can be no loser'):

(6) ??Marie a rencontré ***un*** diplomate ***quelconque***, *qui ne peut pas être mon frère*.
'Mary met some diplomat or other, who cannot be my brother.

(7) Yolande a probablement rencontré ***quelque*** amie, *qui n'était pas Marie*.
'Yolande has probably met some friend or other, who wasn't Mary'

3. AN IMPLICATURE-BASED APPROACH TO EPISTEMIC ITEMS: In order to account for these data, I endorse the unifying theory of polarity in Chierchia (2008), which relies on the hypothesis that all polarity items come with *active alternatives* – they require the insertion of an exhaustification operator (akin to *only*), and give rise to implicatures, used for enriching the basic meaning of assertions. Crucially, in this framework, implicatures can affect semantic composition, and hence their computation can sometimes lead to ungrammaticality (rather than pragmatic infelicitousness). Building on Chierchia's analysis of existential FCIs like *un N qualsiasi*, I argue that (i) like all indefinites, *vreun* triggers scalar alternatives and (ii) like all polarity-sensitive items, it activates domain alternatives, which I argue to be restricted to singletons. The switch to singleton alternatives is shown to derive the meaning difference in (6)-(7): if the domain alternatives are *non-minimal*, the resulting meaning is a free-choice interpretation: there is a single individual satisfying the existential claim, and any member of the domain is a possible value (existential FCI); if the domain alternatives to which we apply the exhaustification operator are *minimal* (singletons), we allow for situations where one of the members of the domain is excluded (epistemic items). We therefore derive the different behavior with respect to the NO LOSER constraint, and hence the semantic properties of these subclasses of dependent elements by making use of a small set of primitive switches. The difference in the size of domain alternatives leads to different implicatures, which once added to the basic meaning determine the observed patterns.

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On the Semantics of Temporal *When*-Clauses

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Introduction. Temporal *when*-clauses are non-interrogative embedded clauses introduced by the wh-word *when*, as exemplified by the bracketed clause in (1). (In this paper, we do not deal with the atemporal/conditional *when*-clauses discussed in Farkas and Sugioka 1983.)

1) You called me [when she left for London].

Syntactic analyses have treated them as free relatives with the wh-word *when* licensing a gap (or silent pronoun) since at least the 1970s (Grimshaw 1977, Bresnan and Grimshaw 1978, a.o.). The few available semantic proposals, instead, have analyzed *when* as a two-place relation that takes the two events associated with the main clause and the embedded clause and returns the value true if a certain temporal relation holds between those two events, much like the temporal connectives *before* and *after* (Bonomi 1997, Vikner 2004, a.o.).

In this paper, we reconcile the syntactic nature and the semantic properties of temporal *when*-clauses by proposing a semantic analysis that crucially relies on treating them as free relatives. Also, we show that our analysis is superior in (i) dealing with the ambiguity that temporal *when*-clauses exhibit between a time point/interval reading and an occasion reading and (ii) handling the complex semantic interaction between the aspectual properties of the matrix and the embedded clause.

Proposal. Developing insights from Jacobson's (1995) semantic analysis of free relatives introduced by *who* or *what*, we argue that temporal *when*-clauses are referential and denote a maximal individual. We assume a structure for free relatives (and bring new syntactic evidence supporting it) and a logical translation like those in (2). The wh-word *when* moves, leaving a trace that translates into a variable. Standard lambda-abstraction over the variable applies first; then the resulting set is restricted to the subset of time points/intervals or occasions by the semantic contribution of the wh-word (TIME(x) ∨ OCCASION(x); see further discussion below); finally, the subset is type-shifted to its maximal individual by the ι operator (along the line of Partee's 1987 ι type-shifting for NPs).

2) [when$_m$ she left [[$_P$ e] t_m]]] ⇝ ιx[TIME(x) ∨ OCCASION(x) ∧ **leave**(AT(x))(she) ∧ PAST(x)]

Following Caponigro and Pearl (2008), we assume that the variable (and its wh-word) is an NP that combines with the predicate by means of a silent preposition AT. Another silent preposition takes the whole *when*-clause as its complement and allows it to combine with the matrix clause (3).

3) You called me [$_{PP}$ [$_P$ e] [when$_m$ she left [[$_P$ e] t_m]]].

As independent support, the very same pattern is observed with temporal adverbial nominals like *the time, the day, the moment, yesterday*: they look like NPs but syntactically and semantically behave like PPs/adverbials (4) (McCawley 1988, Caponigro and Pearl 2009 a.o.).

4) You called me [the moment/the day she left].

Our analysis can also shed light on two further properties that temporal *when*-clauses exhibit.

(i) Ambiguity. The ability to paraphrase *when*-clauses with nominals highlights two distinct readings: one anchored to a time interval, the other anchored to an occasion. For instance, the calling in (1) can happen at the time of the physical leaving event, in a situation where you are calling me as she is walking out the door. In this case, the *when*-clause is anchored to a time interval (5). However, the calling event can also happen sometime after the physical leaving event, in a situation where she is gone and you called me the next day, while she is gone. In this case the *when*-clause is anchored to an occasion (6).

5) You called me [at the time she left for London].
6) You called me [the time she left for London].

It is also possible to have both kinds of *when*-clauses occurring within the same matrix clause. In (7), the left-most *when*-clause is interpreted as denoting the occasion in which they went hiking together, whereas the other *when*-clause is interpreted as denoting a time point/interval at which the sun rose.

7) [When they went hiking together], she got up [when the sun was still down].

Our analysis handles the ambiguity of the *when*-clause in (1) or the different interpretations of the two *when*-clauses in (7) by assuming that the wh-word *when* allows the variable it licenses to range over both occasions and time intervals, with instants being an extreme case of an interval (Bonomi 1997 makes a similar point, though his analysis is radically different). Variety in the range of the variable is attested in other free relatives as well. For instance, free relatives introduced by *what* can range at least over inanimate concrete/abstract atomic/non-atomic individuals, including propositions as in (8). Also, the temporal pronominal *then* appears to range over both occasions and time intervals as illustrated in (9) where *then* refers to an occasion and (10) where *then* refers to a time interval.

8) I don't like [what you cooked/said/thought/imagined/felt].
9) Remember that time we went camping? I had so much fun then.
10) I leave work at 5:30. Will you be free then?

(ii) Aspectual properties. The temporal alignment of the matrix clause and the *when*-clause appears to be sensitive to the aspectual properties of the two clauses. The same pattern is also observed with temporal adverbials that are headed relatives that do not contain *when*. This is seen in (11-13).

11) I wrote that book [when you lived in Colombia].
12) I wrote that book [the year you lived in Colombia].
13) I wrote that book [during the year you lived in Colombia].

In these examples, the matrix event is contained within the *when* state. Since it is the same in all three cases, even when *when* is not present, the temporal alignment appears to be due to factors other than the meaning of *when*. Our analysis reduces the temporal alignment to general aspectual restrictions and general semantic properties of the silent/overt preposition that takes either *when*-clauses or adverbial NPs as its complement. On the other hand, the previous semantic analyses have problems handling these facts. Since they put the burden of the temporal relation between the two clauses on the meaning of the wh-word *when* as a two-place relation, whenever there's a variation in the temporal relation, it should be due to a change of the meaning of *when*. But a multiple ambiguity of *when* is not only stipulative, but also needs to be linked to the aspectual properties of the predicates of both clauses, which is not straightforward at all. Also, the previous analyses fail to capture the differences between the behavior of temporal clauses introduces by when and those introduced by *before* or *after*.

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The Metalinguistic Use of Vague Predicates in Conditionals

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This paper deals with the semantic and pragmatic contributions of conditionals like those in (1), which have prominent readings that can be paraphrased as given in (2).

(1) a. If I hate anything, it's bad acting.
b. If anyone was drunk at last night's party, it was Mary.
c. If any book impressed me, it was *Finnegan's Wake*.

(2) a. What I hate most is bad acting.
b. The drunkest person at last night's party was Mary.
c. The book that impressed me most was *Finnegan's Wake*.

Crucially, the sentences are compatible with a situation where there is more than one thing that the speaker hates, more than one person being drunk at last night's party, etc. The existence of these readings is unexpected, since standard assumptions about the meaning of conditionals in combination with ones about clefts lead us to expect readings according to which the conditions in (a) and (b) are fulfilled to be the only ones available:

(a) The speaker is not sure whether an entity exists in the world of evaluation that satisfies the predicate introduced by the antecedent.

(b) If this is the case, there is only one such entity, and this entity is identical to the one mentioned in the consequent.

Observe that such a reading is indeed the only one that is available to the structurally parallel examples in (3):

(3) a. If anyone can solve this problem, it's Peter.
b. If Peter bought anything at the store, it was pizza.

Intuitively, what seems to make the difference is that the antecedent predicates in (1) are vague, and thus gradable (you can hate something to a higher or lesser degree, be drunk to a higher or lesser degree, etc.), while the ones in (3) are not (a problem is either solved or not solved etc.). Crucially, in the case of vague predicates, the standard of interpretation is left open and can be fixed by the context (cf. von Stechow 1984, Kennedy 1999 on gradable adjectives), i.e. the intensity of the negative stance a person must have towards an entity in order for the pair consisting of the person and the entity to be in the denotation of *hate* can vary from context to context.

I will show that the 'unexpected' interpretation of conditionals like those in (1) can be explained as arising from the interplay of the following factors:

(A) Since the predicate in the antecedent is vague, the standard of interpretation can be manipulated, i.e. the positive value associated with the respective predicate can be set to the maximal degree.

(B) The respective vague predicates can be used metalinguistically within the antecedent.

(C) Conditionals are analysed as involving universal quantification over those worlds maximally similar to the world of evaluation where the antecedent is true (Kratzer 1986, Nolan 2003; see also Lewis 1973 on counterfactuals).

(D) The cleft structure of the sentences enforces an interpretation according to which the entity occurring to the right of the copula is the only one that satisfies the antecedent predicate.

Ignoring the factors in (A) and (B), the combination of (B) and (C) straightforwardly accounts for the 'expected' readings of the examples in (1): first, use of the pronoun *it* in combination with the fact that the main accent most naturally falls on the NP occurring to the right of the copula indicates a cleft structure. It is well known that clefts are interpreted exhaustively:

(4) a. It is Paul who solved all problems. #And Mary did, too.
b. Paul solved all problems. And Mary did, too.

Applying the analysis of conditionals sketched in (C) to our example (1a) thus gives us the reading shown (in simplified form) in (5):

(5) a. $\forall w' [R(w, w') \wedge \exists x [\text{hate}(sp, x)(w')] \rightarrow \iota y.\text{hate}(sp, y)(w') = \text{bad\_acting}]$
'In all worlds that are accessible from the world of evaluation where there is an entity *x* such that the speaker hates *x*, the unique entity that the speaker hates is *bad acting*.'

Note that this reading is dispreferred for (1a), since by using an indicative conditional the speaker implicates that she is not sure whether the antecedent is true or false in the world of evaluation. This is a strange implicature in the case of (1a), however, since persons are expected to know about their own emotions.

Turning to the 'unexpected' readings, the basic idea alluded to in (A) is that vague predicates can in principle be interpreted with respect to different standards, and that these standards can be manipulated. Technically, I (roughly) follow von Stechows's (1984) analysis of gradable adjectives, and assume that also verbs like *hate* and *impress* take an additional degree argument which can be saturated by overt degree expressions like *more* or *less*. Furthermore, I make the simplifying assumption that in the absence of an overt degree expression, the respective predicate is combined with a covert morpheme *pos*, which introduces a standard of comparison in the form of a free variable d_s ranging over degrees whose value is fixed by the context:

(6) $[[\text{pos}]] = \lambda f_{<d,<e,<e,st>>>} . \lambda y. \lambda x. \lambda w. \exists d[f(d)(y)(x)(w) \wedge d \geq d_s]$

Concerning the examples in (1), I assume that the respective antecedent predicates can be used metalinguistically within the antecedent, i.e. the worlds quantified over do not (possibly) differ from the world of evaluation with respect to some extralinguistic state of affairs, but only with respect to the way the predicates are interpreted: the value associated with *pos* is set to the maximal (reasonable) value. This gives us (7) as the denotation of (1a):

(7) $\forall w' [R(w, w') \wedge \iota d. \forall x \forall y \forall d'[d' \geq d \wedge \text{hate}(d')(y)(x)(w') \rightarrow [[\text{pos}]]([[\text{hate}]])(y)(x)(w')] \wedge \forall z \forall k \forall d''[d'' < d \wedge \text{hate}(d'')(k)(z)(w') \rightarrow \neg [[\text{pos}]]([[\text{hate}]])(k)(z)(w')] = d_{MAX} \wedge \exists x [[[\text{pos}]]([[\text{hate}]])(x)(sp)(w')] \rightarrow \iota y. [[\text{pos}]]([[\text{hate}]])(y)(sp)(w') = \text{bad\_acting}]$

Crucially, the sentence now says that in all worlds which only differ from the world of evaluation insofar as the standard relative to which *hate* is interpreted is set to the maximal (reasonable) value and in which there (still) is some entity such that the speaker hates this entity, the unique entity that the speaker hates is identical to *bad acting*. Now note that it would be completely superfluous to raise the standard of interpretation if there was no entity such that the pair consisting of the speaker and this entity satisfies the predicate with respect to some lower standard. This has the following consequence: The sentence is interpreted as conveying that (a) there are other entities such that the pairs consisting of the speaker and the respective entity satisfy the predicate with respect to some lower standard, which is the one that is in effect in the world of evaluation, and (b) the unique entity which survives after the standard has been raised is the one the speaker hates most in the world of evaluation.

Compositional States

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Since at least Verkuyl (1972), aktionsart has been considered a property of VPs minimally resulting from a combination of the verb and its internal argument. This has been demonstrated most clearly in the literature on telicity where certain verb-argument combinations allow for terminative interpretation while others permit only durative interpretation. The properties shared by nominals and events and the manner of their composition has been the source of much debate, leading to a rich literature on event composition. Left out of this debate, however, has been the role that arguments might play, if any at all, in the composition of states. One area deserving of further research is the availability of existential interpretation of subjects (EIS) in states. Fernald (1994) noted that the availability of EIS depends on the internal argument (1, 2).

(1) a. Monkeys live in trees. (*EIS)
b. Tycoons own banks. (*EIS)

(2) a. Monkeys live in these trees. (EIS)
b. Tycoons own this bank. (EIS)

Most accounts of (1) and (2) rely on discourse constraints. Kratzer and Selkirk (2007), for instance, propose that the availability of EIS is related to the requirement of a syntactically represented topic. Having quantificationally strong arguments to fill in as topics, the subject in (2) may remain low and receive existential interpretation. Weak arguments, however, cannot be topics (Jäger, 2001). With no other argument capable of being the topic, the subject in (1) must raise and becomes too high to receive existential interpretation. This analysis assumes that the weak/strong distinction between the objects in (1) and (2) accounts for the alternation, but there are other distinctions between *trees/banks* and *these trees/this bank*, and a wider range of arguments is needed to uncover the relevant distinction.

Examples (3–5) examine a wider range of arguments and demonstrate two broad classes of behavior (summarized in (6)). Statives with mass or bare plural objects completely block EIS (3). All other object types license EIS. Statives with bare numeral or weak determiner objects are generally less acceptable, though EIS is possible (4). Statives with weak quantifier, strong determiner, or strong quantifier objects are fully acceptable with EIS (5). This finding argues against the assumption that the availability of EIS in (1) and (2) results from the weak/strong distinction of objects. Instead, (3–5) make a cut around the mass/count distinction, similar to that found between atelic and telic events. States and events, then, are sensitive to the same mass/count object properties, suggesting they may be more similar than traditionally thought.

(3) a. Monkeys live on land/in trees. (*EIS)
b. Tycoons own silverware/banks. (*EIS)

(4) a. Monkeys live in a/three tree(s). (?EIS)
b. Tycoons own a/two bank(s). (?EIS)

(5) a. Monkeys live in several/many/the/these/each tree(s). (EIS)
b. Tycoons own many/the/this/every bank(s). (EIS)

(6)

	Mass Noun/ Bare Plural	Bare Numerals/ Weak Determiners	Strong Determiners/ Weak-Strong Quantifiers
Bare Plural	*EIS	?EIS	EIS

Given this similarity, I propose that state and event VPs are composed via the same mechanisms while the distinction between states and events arises from their relationship to their subjects. Event VPs, as properties of events, map subjects to event part-structures; however, state VPs, as properties of states, map states to subject part-structures. I propose that these part-structure mappings are mediated by voice heads which also introduce the subject (Kratzer, 1996). The stative voice head specifies a part-structure mapping between the temporal trace of the subject and the state (7). Assuming Kratzer's (2004) composition of VPs (which maps objects to eventualities) and the availability of stages of individuals (Carlson, 1977), the availability of EIS results from the homogeneity of the VP. When the VP is homogeneous (has a mass object), the state applies to homogeneous stages of the subject (8a). As these stages compose the individual itself, no particular spatiotemporal stage of the individual is acquired and EIS is blocked. When the VP is quantized (has a count object), the state applies to only a quantized stage of the subject (8b). This quantized stage, as a particular spatiotemporal slice of the individual, guarantees existence.

(7) $[\![\text{Voice}_S]\!] = \lambda x \lambda s[\text{Holder}(s)(x)\ \&\ \forall s'[s' \leq s \rightarrow \exists x'[x' \leq x\ \&\ \tau(x') = \tau(s')]]]$ where x ranges over stages of individuals and s over states

(8) a. $[\![\text{Tycoons own banks}]\!] = \lambda s[\text{Holder}(s)(\text{tycoons})\ \&\ \forall s'[s' \leq s \rightarrow \exists y'[y' \leq \text{tycoons}\ \&\ \tau(y') = \tau(s')]]\ \&\ \text{own}(s)(\text{banks})\ \&\ \forall x'[x' \leq \text{banks} \rightarrow \exists s'[s' \leq s\ \&\ \text{own}(s')(x')]]]$
b. $[\![\text{Tycoons own this bank}]\!] = \lambda s[\text{Holder}(s)(\text{tycoons})\ \&\ \forall s'[s' \leq s \rightarrow \exists y'[y' \leq \text{tycoons}\ \&\ \tau(y') = \tau(s')]]\ \&\ \text{own}(s)(\text{this-bank})\ \&\ \forall x'[x' \leq \text{this-bank} \rightarrow \exists s'[s' \leq s\ \&\ \text{own}(s')(x')]]]$

I also argue that reference to homogeneous or quantized stages of individuals clarifies several other stage-level/individual-level phenomena, including possible temporal modification of individual-level predicates (Percus, 1997) and the triggering of lifetime implicatures (Musan, 1997).

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Universal laziness of pronouns

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It is well-known that certain kinds of pronouns are difficult to analyze as just individual type variables. Famous examples include e-type pronouns and different kinds of pronouns of laziness, including paycheck pronouns.

In this talk, we propose that there is yet another kind of pronouns of laziness, namely, these are the pronouns that stand for universally quantified NPs like "every boy". We claim that such pronouns exist but have very limited distribution. The core examples for this work come from Russian, although we consider it more than likely that similar examples can be found in other languages.

Puzzle

Take the following scenario:

> There are two brothers, Sam and Jeremy, and two sisters, Mary and Claire, non-related to Sam and Jeremy. Sam and Jeremy are thinking about marrying Mary and Claire.

With this scenario, the sentence in (1) is grammatical and interpretable. Moreover, it is trivially true.

(1) *(Pogovorim o Sème i Džeremi. /'Let's talk about Sam and Jeremy.')*

Esly	by	[každyj	iz	nix]$_1$	ženils^{i}a	na	odnoj	iz	sestër,
if	would	every	from	them	married	on	one	from	sisters
ego$_1$	brat		stal		by	ego$_1$	svojakom.		
his	brother		became		would	his	brother-in-law		

'If each of them married one of the sisters, his brother would become his brother-in-law.'

How could the seeming binding interpretation be obtained? There are several options that one could try, most of them giving infelicitous results.

a) Quantifier variable binding

Suppose that the QNP "každyj iz nix"/'every one of them' in (1) could directly bind the pronoun "ego"/'his'. For it to be possible, this QNP would have to undergo QR out of the conditional clause, which in itself seems improbable. But even it were a legitimate movement, it would result in a logical form with very different truth conditions. For example, it would predict that if Sam marries one of the sisters, and Jeremy doesn't, they would become brothers-in-law, which is not true.

b) Situation binding

Another possibility would be to say that binding in (1) is merely an illusion, the crucial mechanism for getting the interpretation being situation binding, as proposed in (Fox & Sauerland 1997) for universal quantifiers in generic contexts in English, see also (Sauerland to appear) for a similar analysis for negative and interrogative quantifiers in Greek. Crucially, the analysis involves quantification over minimal situations involving just a singleton set denoted by the restrictor of the universal quantifier, so that the meaning of *every NP* would be trivialized to *the NP*. The core English example is given in (2).

(2) Her thesis year is the hardest for every student. (Fox and Sauerland 1997)
'For every minimal situation ***s***, [the student in s]'s thesis year is the hardest for [every student in s].'

The pronoun is interpreted as a definite description and the QP, essentially, too, since its restrictor in every minimal situation denotes just a singleton set.

The semantics of (2) then will be as shown in (3):

(3) For every minimal situation ***s*** in which [the brother in ***s***] marries one of the sisters, [the brother in ***s***]'s brother becomes [the brother in ***s***]'s brother-in-law.

Again, this analysis faces the same problem as the one sketched in (a).

Analysis

There might be a point missing. For (1), a minimal relevant situation couldn't involve just one individual — the context and the presupposition carried by the plural pronoun inside the QP would require a minimal situation to have both brothers in it. If so, the interpretation of (1) would be the following (pre-final version):

(4) For every minimal situation ***s*** in which [each of the two brothers in ***s***] marries one of the sisters, [each of the two brothers in ***s***]'s brother becomes [each of the two brothers in ***s***]'s brother-in-law.

But (4) is not the correct interpretation again, as *his* in *his brother-in-law* cannot be a GQ. The correct truth conditions for (1) should be as in (5) (final version):

(5) For every minimal situation ***s*** in which [each of the two brothers in ***s***] marries one of the sisters, [each of the two brothers in ***s, x***]'s brother becomes ***x***'s brother-in-law.

So the first occurrence of a pronoun (*he*) in the consequent in (1) is interpreted as a GQ, and the second occurrence *(his)* is interpreted as a variable bound by it[1].

Theoretical consequences

We would like to claim that examples like (1) illustrate a phenomenon that might be called Quantifier Replacement. It is a rule by which a pronoun can be interpreted as a universal generalized quantifier (UGQ) that includes a situation variable. It may well be the same phenomenon is at stake in (2): the pronoun stands for a UGQ, which is in that case equivalent to a definite description. In (1), the effect of Quantifier Replacement is more transparent, as the universal quantifiers there quantify over sets of two elements, not singleton sets, as in (2).

The interpretation of pronouns as universal quantifiers strongly reminds of the transformation-era (much criticized) rule of Pronominalization. Such an operation couldn't possibly come for free. It is restricted in many ways, not all of them well understood. At the very least, the principle formulated in (6) holds:

(6) If the pronoun could be interpreted as bound variable, it can't be interpreted as a universal quantifier.

The principle in (6) prevents the UQ interpretation of pronouns in sentences like (7):

(7) Everybody$_1$ thinks he$_1$ is a genius.

Moreover, this interpretation is subject to some more (possibly language-specific) constraints on situation binding, which are also discussed in the talk.

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[1] We could assume the ban on binding from non-c-commanding position and situation semantics for the consequent in (1), as in (Büring 2004), but we believe it is irrelevant for our purposes.

Even more evidence for the emptiness of plurality: An experimental investigation of plural interpretation as a species of scalar implicature.

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Research issue. Semanticists have long been puzzled by the fact that plural nominals can sometimes include atoms in their denotations [1,2,3,4,5,6]. If Professor Brown has exactly one book on her desk, then she cannot truthfully utter (1a), should lock her office according to (1b-c), and should answer 'yes' to (1d).

1a. There are no books on my desk.
1b. If there are books on your desk, please lock the office door when you leave.
1c. Every professor who has books on her desk should lock her office door when she leaves.
1d. Are there books on your desk?

Various researchers [1,2] have responded to the challenge presented by these data by assuming a 'weak' semantics for plural morphology. That is, if the set of cookies in a model M is {a, b, c}, then we have the following denotations.

2a. $[\![\text{cookie-SG}]\!]^M$ = {a, b, c} 2b. $[\![\text{cookie-PL}]\!]^M$ = {a, b, c, a + b, a + c, b + c, a + b + c}

Theories of this type face the challenge of explaining why a noun bearing plural morphology is typically false of singularities; that is, why (3) is false in the context we described.

3. Professor Brown has books on her desk.

Sauerland [4,5] argues that the 'more than one' meaning component of the plural is a scalar implicature (SI). Adopting a presuppositional treatment of number features, he proposes that whereas a number feature valued 'singular' (SG) is defined only for atoms, the plural value (PL) is always defined (4). SG and PL therefore form a scale <PL, SG>, where whatever is at the rightmost edge of the scale carries the most presuppositions. Given Maximize Presupposition [7], it is predicted that use of PL should implicate that the atomicity presupposition of SG is not satisfied.

4a. $[\![\text{SG}]\!] = \lambda x \in D_e$: ATOM(x). x 4b. $[\![\text{PL}]\!] = \lambda x \in D_e$. x

Some weight is lent to this proposal by the observation that the environments in which plural nominals can be true of atoms are those in which SIs are typically suspended [8]: downward entailing (DE) environments, as exemplified in (1). However, these facts could also be accounted for within a weak theory without appeal to SI. On any weak theory, a singular nominal's denotation is a subset of that of its plural counterpart, as in (2). Given that DE contexts license inferences from sets to subsets, it is unsurprising that, for example, there being no books on the desk entails that not even one book is on the desk. This is a case where linguistic data alone seem inadequate to adjudicate between competing theories, and it is worthwhile to conduct an experimental investigation.

Experiment. We tested Sauerland's theory using the 'covered box task' [9] to test for the presence of SIs by exploiting their cancelability. In this task, participants are given a choice between open boxes whose contents they can see, and a covered box, and hear a description that is compatible with one of the open boxes, but only if the scalar implicature is canceled. With the scale <some,all>, adults in this task were willing to cancel the implicature and choose the semantically compatible open box. We adapted this task to investigate whether the 'more than one' meaning of the plural is cancelable in a context where there is no plural match.

Method. We employed a variant of the covered box task using cards instead of boxes, each depicting Big Bird with various items; one card was placed face down and two face up on each trial. Thirteen adult participants were tested in a 2 condition between subjects design, manipulating the singular/plural marking of the description and the visible matches of the cards. A familiarization phase trained participants on the idea that when there was no visible match for the description, the intended card must be the one that was face down. Instructions of the form 'Give me the card where Big Bird only has kites/a kite?'[1] were given with mismatching visible card options: (1) for the plural description - one card with one kite, one card with no objects), face down card; (2) for the singular description - one card with two/three kites, one card with no objects, face down card. Sauerland's theory predicts that in the condition where a plural noun is used but does not match the visible options, the 'more than one' meaning of the plural should be canceled, and participants should choose the singular match.

Results. We analyzed participants' responses on the first trial in this task, reasoning that any changes in response patterns after this trial might reflect metalinguistic reasoning exploiting speakers' explicit knowledge about the meaning of plural morphology. All participants consistently chose the face down card in trials where the description was singular but only a plural match was visible. In contrast, participants in the plural noun condition were equally likely to choose or reject the visible card depicting a single kite. These participants were significantly less likely to reject the visible, numerically mismatched option, than those in the singular condition (Wilcoxon Signed Rank Test, Z=-2.05, $p < .05$).

Discussion. We take these results as evidence in favor of Sauerland's theory. Given a context that facilitates implicature cancellation, participants were willing to accept a single object as the target of a plural description. Note, moreover, that this cannot be accounted for by simple flexibility in responses in this task, as participants did not accept multiple objects when given singular number marking. Let's assume a presuppositional semantics for *only* [10], where 'Big Bird only has kites' presupposes that Big Bird has kites and asserts that Big Bird has nothing that is not a kite. What we found is that participants are willing to cancel the SI in the presence of a card satisfying the asserted component of the description. That is, Sauerland's theory predicts a choice between a strengthened presupposition, 'Big Bird has more than one kite', and a weaker one with no SI, 'Big Bird has at least one kite'; a card that satisifies the asserted component and the weaker presupposition is deemed an adequate match. The SI of the plural is clearly difficult to cancel [11], but it seems that occurrence within a presupposition facilitates cancellation. Precedents to the idea that SIs within presupposed material are less robust exist in the literature: Russell [12] notes that (5) is equally felicitous regardless of whether it is presupposed that some of George's advisors are crooks, or all are.

5. George knows that some of his advisors are crooks.

If Russell is right that speakers can go either way in deciding between a weak or strengthened presupposition, this would sit particularly well with our finding that participants were 50/50 as to whether they cancelled the implicature or chose the covered card. In sum, our findings not only support implicature-based theories of the plural, but they may also have implications for our understanding of the interaction of presuppositions and implicatures – an issue that in turn bears on the debate over whether SIs are computed pragmatically or within the grammar. Whether participants' willingness to trade off the implicature of the plural against some other requirement imposed by another aspect of the sentence's meaning is confined to implicatures within the presuppositional component is a question that we are currently investigating with a control condition involving instructions of form 'Big Bird has a cookie/cookies and nothing else'.

References [1] Krifka 1989 [2] Schwarzschild 1996 [3] Chierchia 1998 [4] Sauerland 2003 [5] Sauerland et al 2005 [6] Spector 2007 [7] Heim 1991 [8] Chierchia 2004 [9] Huang et al submitted [10] Horn 1969 [11] Chierchia et al 2008 [12] Russell 2006

[1] We used 'only' in the instruction to prevent participants from taking the description to apply to a subset of the items on the card, as this would allow 'a kite' to be consistent with a card with multiple kites on it, thereby obscuring any possible effects of a scalar implicature on the plural.

Internal Past, External Past, and Counterfactuality: Evidence from Japanese

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Goal: This paper shows that there are two different types of counterfactuality, which are overtly represented in Japanese by adding the past either to the main verb or to the modal. In Japanese, *if*-clause (1a) can be followed by (1b) or (1c). In (1b), the past tense morpheme is added to the main verb [Internal Past]. In (1c), the past is added to the modal [External Past]. Both of them have a counterfactual reading (as well as an epistemic reading):

(1) a. *Zyon-ga* *aite* *nara,*
John-NOM opponent COPULA.NONPAST.if
'If John had been (his) opponent,'

b. *Ken-wa* *kyoo-no* *siai-de* *make-ta* *kamosirena-i.*
Ken-TOP today-GEN game-DAT lose-PAST may/might-NONPAST
'Ken might have lost today's game.'

c. *Ken-wa* *kyoo-no* *siai-de* *make-ru* *kamosirena-katta.*
Ken-TOP today-GEN game-DAT lose-NONPAST may/might-PAST
'Ken might have lost today's game.'

Observations: The counterfactuality of Internal Past counterfactuals cannot be canceled, while the counterfactuality of External Past can be canceled when the proposition is concerned with the past or the present. First let us observe that the proposition is counterfactual in External Past, like Internal Past. Assume that under the situation in (2a), Tom utters (2b) on Monday. Although the possibility that John is Ken's opponent is arguably available in the past (i.e. on Monday), Tom cannot utter (2c) on Tuesday. On Wednesday after the game, Tom can felicitously utter (2d). These data suggest that the speaker knows that the proposition is counterfactual in External Past, when s/he utters the sentence felicitously:

(2) a. Situation: Ken is joining a chess tournament. His next game is scheduled for next Wednesday. Ken's friend Tom does not know who Ken's opponent is, but Tom believes that John is stronger than Ken is.

b. (1a), *Ken-wa* *tugi-no* *siai-de* *make-ru* *kamosirena-i.*
Ken-TOP next-GEN game-DAT lose-NONPAST may/might-NONPAST
'If John is (his) opponent, Ken might lose the next game.'

c. (1a), *Ken-wa* *tugi-no* *siai-de* *make-ru* *kamosirena-katta.*
Ken-TOP next-GEN game-DAT lose-NONPAST may/might-PAST
'If John had been (his) opponent, Ken might have lost the next game.'

d. (1a), (1c)

Further observe that Tom can utter (2c) on Tuesday if the situation in (3) is provided. This suggests that if the speaker knows that the proposition is counterfactual in the future of the utterance time, sentence (2c) is felicitous. Note that it is odd to utter (2c) on Tuesday under the situation in (4), where the proposition is factual in the future of the utterance time:

(3) Situation: On Tuesday, Tom hears that John decided not to participate in the tournament.

(4) Situation: On Tuesday, Tom hears that John becomes Ken's opponent.

The counterfactuality of External Past can be canceled, according to the context. Tom can utter (2d) and (5) after Wednesday's game, where the point of view is shifted into the past:

(5) *Sorede* *kaeri-no* *sitaku-o* *si-tei-ta.* *Jissai* *Zyon-ga* *aite*
So return-GEN packing-ACC do-PROG-PAST. Actually John-NOM opponent
dat-ta.
be-PAST
'So (I) was packing for (our) return. John was actually (Ken's) opponent.'

Proposal: These data suggest that when the proposition of the *if*-clause is counterfactual in the future of the utterance time (i.e. situations (6a-c) but not (6d)), External Past counterfactuals are felicitous. Unlike Internal Past, the counterfactuality can be canceled when it is concerned with the past or the present, as observed in (5):

(6) a. Situation: John is not Ken's opponent at/before the utterance time. (see (2d))
b. Situation: John is not Ken's opponent after the utterance time. (see (3))
c. Situation: John is Ken's opponent at/before the utterance time. (see (5))
d. Situation: John is Ken's opponent after the utterance time. (see (4))

Following Iatridou (2000), I assume that the past tense morpheme has an exclusion feature. For Internal Past, I appeal to Ogihara (2008) and for External Past, I appeal to Condoravdi (2002) and Ippolito (2003). I propose their semantics in (7) and (8) (Topic (T, P_t, c) stands for Topic Time, c_{time} stands for context time (i.e. utterance time), Topic (W, p, c) stands for Topic World, and c_{world} stands for context world (i.e. actual world), following Ogihara):

(7) In sentence ((1a) and (1b)), the past tense morpheme is employed to exclude the context world. The presupposition is $c_{world} \notin$ Topic (W, p, c), where Topic (c_{world}) is characterized as $\{w \mid w \text{ is closest to } c_{world} \text{ among those worlds in } \{w_1 \mid [\![\text{John-ga aite na (John is (his) opponent)}]\!]^{w1, Topic(T,Pt,c)}\} = 1$. If this presupposition requirement is satisfied, $[\![\text{sentence ((1a) and (1b))}]\!]^{cworld, ctime} = 1$ iff $[\![\text{kyoo-no siai-de make ((Ken) loses today's game)}]\!]^{w2, Topic(T,Pt,c)} = 1$ for some $w_2 \in$ Topic (W, p, c).

(8) In sentence ((1a) and (1c)), the past tense morpheme is used to exclude the context time. The presupposition is that $\{w_1 \mid w_1$ is an epistemic alternative of the speaker in c_{world} at $c_{time}\} \cap \{w_2 \mid$ There is a time t such that John is (his) opponent in w_2 at t, where $t > c_{time}\} = \emptyset$. If this presupposition requirement is satisfied, $[\![\text{sentence ((1a) and (1c))}]\!]^{cworld, ctime} = 1$ iff $\{w_3 \mid w_3$ is a metaphysical alternative of c_{world} at Topic (T, P_t, c)$\} \cap \{w_4 \mid [\![\text{John-ga aite na (John is (his) opponent)}]\!]^{w4, Topic(T,Pt,c)} = 1\} \cap \{w_5 \mid [\![\text{kyoo-no siai-de make ((Ken) loses today's game)}]\!]^{w5, Topic(T,Pt,c)} = 1\} \neq \emptyset$.

Conclusion: There are two different types of counterfactuality, where the past is added to the main verb or to the modal. They are similar in that the proposition of the antecedent is counterfactual when the speaker utters the sentence felicitously. The difference is that the proposition is counterfactual at the utterance time in Internal Past, while it is counterfactual in the future of the utterance time in External Past. The counterfactuality of External Past can be canceled when it is concerned with the past or the present.

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Sufficiency Reading of Anankastic Modals

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1. Background

Ambiguity of examples (1a) and (1b) remains a challenge for contemporary theories of comparatives since Stateva (2002) and Heim (2001). Heim (2001) proposes a (S)tructural (A)mbiguity account. In her analysis two readings result from the availability of two scope sites for the comparative morpheme relative to 'need', see (2) – (3). The crucial assumption of a SA account is a quantificational meaning of '–er'. Heim (2007) argues that 'less'-comparatives with embedded 'need' additionally require a decomposition of 'less' into a scopally mobile 'little' and '–er' to rule out 'asymmetrical' readings (4b) and (4c).

(1) a. Bill got 90 points. John needs to get exactly 5 points more than that to win.
b. Bill got 90 points. John needs to get less than that to win.

(2) need > –er
a. 'John can only win if he gets exactly 95 points.'
b. 'John can only win if he gets less than 90 (penalty) points.'

(3) –er > need
a. 'The score minimally required for John to win is exactly 95 points.'
b. 'The score minimally required for John to win is less than 90 points.'

(4) a. John needs to get less than Bill needs to get.
b. #'John can only win if he gets less than what Bill is minimally required to get.'
c. #'John is minimally required to get less than the score that Bill can only win with.'

2. Against SA

A known limitation of an SA analysis is that it predicts ambiguity with any intensional predicate, which is not borne out, cf. (5).

(5) a. Bill got 90 points. John should get less than that to win.
b. #'The score minimally required for John to win is less than 90 points.'

Though able to ban the asymmetrical readings of 'less' comparatives, a SA account has no means to ban them in comparatives with 'exactly' differentials, see (6).

(6) a. John needs to get exactly 5 points more than Bill needs to get.
b. #'John can only win if he gets exactly 5 points more than what Bill is minimally required to get.'
c. #'John's minimally required score exceeds the score Bill can only win with by exactly 5 points.'

Finally, 'need' and some other necessity modals trigger the same kind of ambiguity outside of comparatives. A SA account cannot treat ambiguity (7) and (1) uniformly, despite their striking parallelism.

(7) John needs to get exactly 5 points
a. … and he is the winner. / b. … no more and no less.

3. Sufficiency Reading

This paper argues that ambiguity in (1) stems from the interpretation of the so called anankastic (i.e. goal-oriented) modals to which 'need' belongs. Two assumptions that account for Stateva-Heim ambiguity are independently motivated.

First, following von Stechow et al. (2006), I assume that anankastic 'need' requires a totally realistic ordering source, i.e. it selects its accessible worlds according to their similarity to the actual one. In effect, I apply Kratzer's (1981) analysis of counterfactual conditionals to anankastic sentences. Following von Stechow et al. (2006), I treat 'in order to' clauses as antecedents.

Second, 'need' is sensitive to the focus structure of its propositional complement. The analysis of (7) proceeds along the following lines:

(8) For all contextually salient propositions k, s.t. $k \neq$ that John gets exactly 5 points: that John achieves the relevant goal and gets exactly 5 points is more possible relative to a totally realistic ordering source than that John achieves the relevant goal and k

'More possible' is defined as in Kratzer (1981) and 'the relevant goal' is usually a proposition expressed by an 'in order to' clause. Contextually salient alternatives are determined by the focus structure of the proposition under 'need', i.e. they would normally have the form 'that John gets exactly n points'.

I suggest that the relative possibility scale is sensitive to an effort scale that can be made prominent if an anankastic conditional occurs in a scalar context. Naturally, the use of 'exactly' is appropriate in a context, in which precision counts most, e.g. (7b). In such a context, (7) is understood to convey that, in view of the importance of precision, getting exactly 5 points is the best possibility among the relevant alternatives given the goal. If, however, getting a high score counts as difficult, (7) conveys that getting exactly 5 points is the best possibility given the goal, implying that it is minimally sufficient. In that case, getting more than 5 points is understood to be a remote possibility due to the unnecessary effort that it involves. This is the reading of (7a). I call this reading (S)ufficiency (R)eading.

4. New Account of Ambiguity

SR is a hallmark of anankastic modals like 'need' in scalar contexts, see (9).

(9) a. John got more points than he needed to.
b. John only needs to get 5 points to win.

However, since it hinges on the pragmatic setting, it may be unavailable in certain contexts, e.g. in the presence of 'exactly' as in (7) or (1a), whose analysis runs analogously. In (1b) SR can be lifted by the focus on 'less'. If the focus is on 'less' the alternative to the complement of 'need' has the form 'that John does not get less than that', see (10a). Otherwise, alternatives may vary in the position of the degree term corresponding to John's score.

(10) a. $g(C) = \{\lambda w\ \text{SCORE}_w(\text{John}) < 90 \text{ points}, \lambda w\ \text{SCORE}_w(\text{John}) \geq 90 \text{ points}\}$
b. $g(C) = \{\lambda w\ \text{SCORE}_w(\text{John}) = d \wedge d < 90 \text{ points}: d \in D_d\}$

If the alternative set is fixed as in (10a), (1b) is predicted true iff John's winning with a score of less than 90 points is more possible in view of what is the case than his winning with a score of 90 points or more, which corresponds to the reading in (2b). If we opt for the alternative set in (10b), (1b) is predicted true iff the fact that Sean wins with a score d that is under 90 points is a better possibility given the facts than that he wins with a score d' different from d that is under 90 points. If a context in which getting a high score counts as difficult, the necessary score is understood to be minimally sufficient, in view of John's intention to win with the minimum effort. This derives the reading in (3b) which corresponds to SR.

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Modes of Comparison and Question under Discussion:
Evidence from 'contrastive comparison' in Japanese

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The distinction between *explicit comparison* (EC) and *implicit comparison* (IC) has recently been recognized as an important cross-linguistic parameter of comparison constructions (cf, e.g., Kennedy 2008; Sawada 2009). This paper aims to advance this research by first bringing to light a hitherto unnoticed third type of comparison construction in Japanese—dubbed here *contrastive comparison*—and then by providing a uniform analysis of the semantics and pragmatics of the three types of comparison constructions in terms of the notion of Question under Discussion (Roberts, 1996).

Besides EC (1) and IC (2), Japanese has a type of comparison construction in which one of the arguments of the comparison operator (i.e., the one not marked by *-yori* 'than') is overtly marked by a contrastive marker *-hoo* (3). We call this construction *contrastive comparison* (CC).

(1) John-wa Mary-yori se-ga takai.
John-TOP Mary-than height-NOM high
'John is taller than Mary.' (explicit comparison)

(2) John-wa Mary-ni kurabe-{tara/reba} se-ga takai.
John-TOP Mary-DAT compare-if height-NOM high
'John is tall compared to Mary.' (implicit comparison)

(3) John-no-**hoo**-ga Mary-yori se-ga takai.
John-GEN-HOO-NOM Mary-than height-NOM high
'(Of the two,) John is taller than Mary.' (contrastive comparison)

Superficially, CC looks similar to EC, but they turn out to contrast with each other in terms of a set of distributional properties: (i) only EC is compatible with measure phrases (MPs) (4); (ii) only CC can occur with the expectation-reversal modifier *yoppodo* (Sawada, to appear) (5); (iii) only CC can occur with the judgment-enforcer (JE) adverbial *dotiraka-to ie-ba* 'if anything' (6).

(4) {John-wa/??John-no-**hoo**-ga} Mary-yori **3-senti** se-ga takai.
John-TOP/John-GEN-HOO-NOM Mary-than 3cm height-NOM high
'John is 3cm taller than Mary.'

(5) {??John-wa/John-no-**hoo**-ga} Mary-yori **yoppodo** se-ga takai.
John-TOP/John-GEN-HOO-NOM Mary-than YOPPODO height-NOM high
'(Contrary to the expectation,) John is much taller than Mary.'

(6) **Dotiraka-to ie-ba** {??John-wa/John-no-**hoo**-ga} Mary-yori se-ga takai.
if anything John-TOP/John-GEN-HOO-NOM Mary-than height-NOM high
'If anything, John is taller than Mary.'

In these phenomena, CC behaves more like IC, which exhibits the same patterns as CC.

However, we also find a set of phenomena in which CC behaves like EC rather than IC. Specifically, CC and EC share the following properties, which set them apart from IC: (i) crisp judgments; (ii) compatibility with minimum-standard predicates (8); (iii) non-existence of a negative implicature to the positive form (i.e., unlike (2), (1) and (3) don't entail that John isn't tall).

(7) {??John-wa Mary-ni kurabe-tara / John-no-**hoo**-ga Mary-yori} se-ga takai.
John-TOP Mary-DAT compare-if John-GEN-HOO-NOM Mary-than height-NOM high
'??John is tall compared to Mary.'/ 'John is taller than Mary.' (with John 180.5cm, Mary 180cm)

(8) {??Sao A-wa sao B-ni kurabe-tara / Sao A-no-**hoo**-ga sao B-yori} **magat-teiru**.
rod A-TOP rod B-DAT compare-if rod A-GEN-HOO-NOM rod B-than bent-NPST
'??Rod A is bent compared to rod B.' / 'Rod A is more bent than rod B.'

These mixed properties of CC are problematic for the previous two-way classification between EC and IC. This paper proposes an alternative perspective that solves this apparent dilemma by taking into account the independently motivated pragmatic properties of the three types of constructions. The key notion in our account is that of Question under Discussion (QUD; Roberts 1996). Specifically, in terms of their discourse function properties, the three constructions contrast with one another sharply in that, e.g., in question-answer pairs like the following, the EC, IC and CC sentences can each form a felicitous response only for one type of question in (9)–(11).

(9) **Q:** How tall is John? — **A: (1)** / #(2) / #(3)

(10) **Q:** Is John tall? — **A:** #(1) / **(2)** / #(3)

(11) **Q:** Which is taller, John or Mary? — **A:** #(1) / #(2) / **(3)**

We take this as evidence for the assumption that the QUDs of (1)–(3) are (9)–(11), respectively. That these are the QUDs for these constructions is natural given their compositional semantics as well: EC is a construction that measures the degree of an object on some scale against a fixed standard (**tall**(**j**) > **tall**(**m**)); IC lacks an overt *-yori* phrase introducing the standard, and hence the predication is in the positive form (**tall**(**j**) > **stnd**(**tall**); $C = \{\mathbf{j}, \mathbf{m}\}$) (cf. Kennedy (2008) and Sawada (2009)); CC involves the focus marker *-hoo*, which, from its function in non-comparative constructions, is known to set up a contrast between two objects by always involving a context set with exactly two members ($f(\mathbf{j}) = 1 \wedge f(\mathbf{m}) = 0; C = \{\mathbf{j}, \mathbf{m}\}$, where $f = \lambda x.\mathbf{tall}(x) > \mathbf{tall}(\mathbf{m})$).

This QUD-based approach, combined with the standard analyses of the semantics of the three constructions, explains their pragmatic functions and distributional properties uniformly.

First, EC is compatible with MPs since its function is to measure degrees, for which MPs are exactly suited. By contrast, IC and CC are incompatible with MPs since their primary function is to draw a distinction between two objects (cf. Kennedy (2008) and Sawada (2009) for IC and cf. the QUD for CC), where the exact amount of degree difference is irrelevant. Second, the (in)compatibility with expectation-reversal *yoppodo* also receives a natural pragmatic account. With IC and CC, the function of *yoppodo* is to reverse the expectations of negative answers to the QUDs (for CC, the relevant 'negative' answer is 'John isn't taller than Mary). However, with EC, since the QUD is not a polar question, no negative answer is available that makes *yoppodo* felicitous. Third, the distribution of JEs like *dotiraka-to ie-ba* is accounted for similarly. The function of JEs is to force a two-way yes/no judgment in contexts in which the judgment is subtle. Given this, it follows that both IC and CC are compatible with them since the essential pragmatic function of these constructions is to draw a distinction between two objects by making yes/no judgments with the same predicate. EC, by contrast, is inherently incompatible with the pragmatic function of JEs since its primary function is to measure the degree that an object has on a scale (cf. its QUD).

The phenomena for which CC behaves like EC are also straightforward in the proposed analysis. What crucially distinguishes CC from IC is the fact that the QUD involves the comparative form rather than the positive form. Thus, the comparison between the two objects under discussion is not made in terms of a context-dependent vague standard, but against a precisely fixed standard. This explains both why crisp judgments are possible and minimum-standard predicates are compatible with CC. Moreover, the negative implicature does not arise since, unlike IC, CC does not manipulate the context-dependent vague standard (cf. Sawada (2009) for how it arises in IC).

To conclude, the CC construction in Japanese necessitates a three-way distinction in the typology of modes of comparison, where the three constructions contrast with one another in a complex but systematic way. We have shown how this pattern can be captured by characterizing the pragmatic properties of these constructions in terms of Question under Discussion, a notion whose relevance for the semantics of comparison constructions has so far remained unnoticed.

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Marking aspect along a scale: The semantics of *-te iku* and *-te kuru* in Japanese

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The aspect markers *-te iku* and *-te kuru* in Japanese (where the verbs *iku* and *kuru*, when used as main verbs, mean 'go' and 'come', respectively) exhibit somewhat puzzling entailment patterns with open-scale and closed-scale change of state predicates. Specifically, as shown in (1)–(3), while the two markers behave in the same way with closed-scale predicates in inducing an entailment to the positive form only with minimally closed-scale predicates, with open-scale predicates they contrast with one another in that only *-te kuru* has an entailment to the positive form.

(1) Oyu-ga **same-te** it-ta/ki-ta. ⊨ The water was cool (in the end).
hot.water-NOM cool-TE IKU-PAST/KURU-PAST [entailment present only with *-te kuru*]
'The (hot) water came to be cool(er).' **(open-scale)**

(2) Too-ga **katamui-te** it-ta/ki-ta. ⊨ The tower was slanted (in the end).
tower-NOM lean-TE IKU-PAST/KURU-PAST
'The tower came to be slanted.' **(minimally closed-scale)**

(3) Ana-ga **husagat-te** ki-ta/it-ta. ⊭ The hole was closed (in the end).
hole-NOM close-TE IKU-PAST/KURU-PAST
'The hole came to be closed.' **(maximally closed-scale)**

This paper shows that these facts can be explained uniformly by analyzing *-te iku* and *-te kuru* as aspectual operators that are sensitive to the scale structures of verbal predicates. The central idea is that both markers entail movement along a scale associated with the verb, but that they refer to different points on the scale (specifically, the initial point and the endpoint, respectively) in characterizing the relevant movement (cf., e.g., Imani 1990). The analysis is formalized by building on Kennedy and Levin's (2008) (K&L) scale-based analysis of degree achievements. As will become clear below, the basis for this choice is two-fold: first, it enables a transparent implementation of the basic idea outlined above; second, the proposed analysis turns out to involve complex interactions between conventional and contextual meanings in how the *standard of comparison* is set, an issue that has general implications to scale-based semantics (cf. especially Kennedy (2007)).

In K&L's approach, a change of state verb denotes a *measure of change* function that takes as its arguments an individual and an event and returns a degree that the individual has at the end state of the event. Crucially, the scale involved in measuring out the change of state has a minimum endpoint (indicated by '$\mathbf{cool}(x)(init(e))$' in (4)) corresponding to the degree that the object has at the initial state. In this setup, the lexical entry for the verb *same* 'cool' is defined as follows:

(4) $[\![\text{same}]\!] = \lambda x \lambda e.\mathbf{cool}^{\uparrow}_{\mathbf{cool}(x)(init(e))}(fin(e))$

With this assumption, the meanings of *-te iku* and *-te kuru* can be defined as aspectual operators that apply to measure of change functions and return truth conditions along the following lines:

(5) a. $[\![\text{-te iku}]\!] = \lambda g \lambda x.\forall e[g(x)(e) > \mathbf{min}(g) \rightarrow \exists e'[e' \sqsubset e \wedge g(x)(e') \lessapprox g(x)(e)]]$
b. $[\![\text{-te kuru}]\!] = \lambda g \lambda x.\forall e[g(x)(e) > \mathbf{min}(g) \rightarrow \exists e'[e \sqsubseteq e' \wedge g(x)(e') \gtrapprox \mathbf{stnd}(g)]]$

-Te iku in (5a) represents a continuous movement *from* the initial point since it says that all events of which the predicate is true have smaller subparts terminating at a slightly shorter endpoint. By contrast, *-te kuru* in (5b) represents a movement *toward* some endpoint (specifically, the 'standard point') since it says that all events of which the predicate is true are part of a larger event that ends up in a degree that is slightly below that endpoint (this reference to the standard point is what crucially distinguishes *-te kuru* from *-te iku*, as will become clear below).

The entailment patterns observed above can now be explained as follows. First, the difference between minimally and maximally closed-scale predicates is essentially due to the fact that these predicates have asymmetrical entailment patterns in comparatives (cf., e.g., Kennedy and McNally 2005). Change of state predicates are comparative-like in that they assert that the degree at the end state is larger than the one at the initial state (Hay et al. 1999, K&L). Since both of the two aspectual markers do entail change of state along the relevant scale, it follows that, just as with ordinary comparatives, having an increased degree on the scale entails possessing a degree satisfying the positive form with minimally closed-scale predicates but not with maximally closed-scale ones.

The present analysis also captures subtle differences between the two aspectual markers in (2) and (3). First, (3) with *-te kuru* is predicted to mean that the hole was not completely closed. This prediction is borne out by the fact that (3) can be felicitously followed by the sentence 'And indeed the hole got completely closed just a few hours ago' only with *-te iku*. Second, (2) with *-te kuru* is of itself slightly awkward and becomes much more natural with the help of some degree expression (such as *daibu* 'quite') which indicates that some substantial change of state is involved (whereas (2) with *-te iku* comes with no such constraint). Now, it might initially appear as if the present analysis would simply predict (2) with *-te kuru* to be false (or infelicitous), since the scale for change of state is minimally closed (cf. (4)) and it is generally known that the standard is identified with the minimum endpoint for such scales (cf., e.g., Kennedy and McNally 2005). However, upon careful consideration of Kennedy's (2007) Interpretive Economy (a principle responsible for standard setting and one which dictates minimizing contextual dependence in calculating the meanings of sentences), this pseudo-problem goes away. Note first that Interpretive Economy is a processing-oriented (rather than a purely semantic) constraint. It is then naturally expected that its effect will be overridden if minimizing contextual dependence inevitably leads to semantic anomaly. This is in fact exactly what happens when *-te kuru* occurs with a minimally closed-scale predicate: if the standard were set to the minimum endpoint in (5b), there would be no way to make the sentence true simply because there is no degree below that standard. Thus, with minimally closed-scale predicates, the vague standard is instead chosen in interpreting the meaning of *-te kuru*. (I speculate that the difficulty in choosing the vague standard over the fixed minimum endpoint is the cause of the awkwardness of such sentence without degree modifiers.)

Finally, the contrasting entailment patterns that the two markers exhibit with open-scale predicates in (1) is explained due to the fact that only *-te kuru* makes reference to the standard point. The fact that *-te iku* doesn't induce the relevant entailment is straightforward. Again, this is because of the comparative-like nature of change of state predicates: asserting an increase in degree between the initial and end states of the event doesn't ensure that the final degree is above the standard. Now, strictly speaking, purely from the logical translation, the entailment doesn't go through with *-te kuru* either. I argue here that the entailment to the positive form nevertheless effectively arises due to the fact that the predication is vague. Note first that, here, just as with minimally closed-scale predicates, the standard is set to a contextually determined one, since setting it to the minimum endpoint leads to semantic anomaly. But then, a degree 'approximating' that vague standard is, for all practical purposes, one that satisfies the standard, given that the exact location of the standard on the scale is inherently unstable. Thus, the relevant entailment is felt to be present.

To summarize, the different entailment patterns of *-te iku* and *-te kuru* with open-scale and closed-scale predicates can be uniformly accounted for by analyzing them as aspectual markers that refer to scale structures of verbs. In doing so, the present analysis also brought out a case where Interpretive Economy forces a choice of a contextually determined standard for closed-scale predicates, thus providing further support for a general constraint along the lines formulated by Kennedy (2007), rather than hard-wiring standard setting for each type of gradable predicate.

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Gradable Epistemic Modals, Probability, and Scale Structure

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This paper examines the modal expressions *possible*, *likely*, *probable*, and *certain* (henceforth GEMs). Tests for scale structure suggest that they denote functions from propositions to degrees on an upper- and lower-bounded scale. Support for taking this scale to be the range of numerical probabilities [0,1] comes from examples with disjunction and existential quantification. I present evidence that Kratzer (1981)'s semantics of comparative possibility makes incorrect predictions for these cases, while numerical probability makes correct predictions.

As Portner (2009) notes, a semantics for gradable modals should be compatible with a general theory of gradable expressions. Following Kennedy (2007), gradable adjectives denote functions from individuals to degrees on a *scale*: a triple $\langle D, \prec, \delta \rangle$, where D is a set of degrees, $\prec$ a total ordering of D, and δ the *dimension* of the adjective (e.g., "closure"). Degree modifiers impose conditions on the degree denoted by a measure function, as in (1).

(1) a. $[\![closed]\!] = \lambda x.\ \lambda d.$ [x's degree of closure = d]

b. $[\![completely\ closed]\!] = \lambda x.\ \iota d.$ [x's degree of closure = $d \wedge d = \max(D_{closed})$]

Portner considers an analysis of GEMs as probability operators, i.e. as denoting functions from propositions to degrees on the scale $\langle [0,1], \prec, likelihood \rangle$. However, Portner is skeptical that GEMs denote on the same scale, because their degree modifiers are not uniform. But adjectives associated with the same scale may accept different modifiers (Kennedy 2007):

(2) The room is completely full/?#occupied.

In Kennedy's terms, this difference is due to the fact that *full* requires that an object possess a maximal degree of fullness, while *occupied* merely requires that an object possess a non-zero degree. I will argue that the distribution of degree modifiers with GEMs has a similar explanation: the differences are not because they denote on different scales, but because they denote different points on the same scale. I analyze each GEM in turn, showing that the distribution of degree modifiers is what we expect if they denote probability operators corresponding to Kennedy's **minimum-**, **maximum-**, and **relative-standard** adjectives.

In terms of Kennedy's typology, *certain* is a **maximum-standard** adjective like *full*: it requires its argument to have a (near-)maximal degree of likelihood, and is associated with the upper portion of an upper-bounded scale. This is shown by the fact that *certain* behaves like *full* on various tests. For example, both can be modified by *completely*, but not *slightly*.

(3) a. The room is completely/#slightly full.

b. It is completely/#slightly certain that Thunderbolt will win the race.

Possible is a **minimum-standard** adjective, like *occupied* or *bent*. Minimum-standard adjectives apply to objects that have a non-zero degree of the property in question, and are associated with the lower portion of a lower-bounded scale. Kennedy claims that, if an adjective can be modified by *slightly*, it falls in this class.

(4) a. Do slightly bent spokes matter? (google)

b. It's slightly possible that an asteroid could trigger a nuclear war. (google)

Likely and *probable* fall among the the **relative-standard** adjectives such as *tall*. Unmodified relative adjectives have a "greater than contextual standard" semantics (via a silent morpheme *pos*); and, according to Kennedy, they are odd with both *completely* and *slightly*.

(5) a. Mary is #completely/#slightly tall.

b. It is #completely/#slightly likely that Thunderbolt will win.

The facts we have seen show that GEMs are associated with a scale which has an upper and a lower bound. Why should we take this scale to be the scale of numerical probabilities? One reason is that, for a certain class of examples, probability makes correct predictions where its primary competitor, comparative possibility à la Kratzer (1981), does not.

Imagine you are watching a horse race. Horse A is in the lead, but B,C,D, and E are close behind. You might be inclined to agree with (6a), but be doubtful about (6b)-(6c):

(6) a. A is more likely to win than B, and A is more likely to win than C, and ... than E.

b. It is more likely that A will win than it is that B or C or D or E will win.

c. It is more likely that A will win than it is that another horse will win.

However, Kratzer's semantics predicts that no rational person should be able to make this judgment: in fact, all the statements in (6) are logically equivalent for her.

(7) p is more possible than q, $p \succcurlyeq q$ (relative to a modal base f and an ordering source g) iff:

a. $\forall u \in \bigcap f(w) : (u \in q) \rightarrow \exists v \in \bigcap f(w) : v \succcurlyeq_{g(w)} u \wedge v \in p$.

b. $\exists u \in \bigcap f(w) : (u \in p) \wedge \neg\exists v \in \bigcap f(w) : v \in q \wedge v \succcurlyeq_{g(w)} u$. (Kratzer 1981:48)

According to (7), a proposition is exactly as likely as the most likely world(s) it contains (this is the effect of the existential quantification in (7b)). Thus, p is more likely than q iff the top-ranked world in p outranks the top-ranked world in q. Assuming that $[\![p \vee q]\!] = [\![p]\!] \cup [\![q]\!]$, it follows from (7) that a disjunction is exactly as likely as its most likely disjunct, and thus that (6a) and (6b) are equivalent. And since (6b) = (6c) if there are no other horses, Kratzer's semantics predicts, against intuition, that all the sentences in (6) are equivalent.

In contrast, in a probability-based semantics (6a) is not equivalent to (6b) or (6c):

(8) a. $[\![(6a)]\!] = [prob(\text{A wins}) > prob(\text{B wins})] \wedge ... \wedge [prob(\text{A wins}) > prob\ (\text{E wins})]$

b. $[\![(6b,c)]\!] = 1$ iff $prob(\text{A wins}) > prob[(\text{B wins}) \vee (\text{C wins}) \vee (\text{D wins}) \vee (\text{E wins}) \vee (\text{F wins})]$
$= 1$ iff $prob(\text{A wins}) > \Sigma_{x \neq A}\ prob(\text{x wins})$

(8a) is true and (8b) false, e.g., if $prob(A\ wins) = .4$ and $prob(x\ wins) = \frac{1-.4}{4} = .15$ for $x \in \{B, C, D, E\}$. Intuitively, this situation is possible; the probability-based approach can model it, but Kratzer's semantics of comparative possibility cannot.

Facts about degree modification show that a probability-based approach is possible; facts about disjunctions and quantified statements with *likely* show that probability fares better than its main competitor. Thus, it appears, probability yields the right semantics for GEMs.

(9) a. $[\![p\ is\ pos\ likely/probable]\!] = 1$ iff $prob(p) \succ \mathbf{s}_{likely}$ (the contextual standard for *likely*).

b. $[\![p\ is\ possible]\!] = 1$ iff $prob(p) \succ \min([0,1])$ (i.e., if $prob(p) \succ 0$).

c. $[\![p\ is\ certain]\!] = 1$ iff $prob(p) = \max([0,1])$ (i.e., if $prob(p) \simeq 1$).

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Deriving Repetitive Readings with Additive Focus Particles in Blackfoot

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1.0 Introduction Frantz & Russell (1989) gloss Blackfoot *mattsista'-* as "again," however *mattsista'-* contrasts with English *again* in that it lacks a repetitive/restitutive ambiguity. The English ambiguity is illustrated in (1), where (1) can either presuppose that I opened the door before (repetitive), or that the door was open before (restitutive). (2) shows that *mattsista'-* is fully repetitive; the fact that the door was open before does not satisfy its presupposition.

(1) I opened the door again (REP: I opened the door before, RES: The door was open before)

(2) *omi kitsim* *iíka-ikowaistsii* *nit-á'-it-ipi-ssi* *it-yohkohpápoka*
dem door perf-be.open.vii 1-when-rl-enter-vai-cj rl-blow.shut.vii
"That door was aleady open, and when I went in, it blew shut."
\# *ki* *ni-**mattsista'**-ikowai'piksi-'p*
and 1-**again**-open.vti-1>inan
"So I opened it **again**." (Consultant: "**That means YOU opened it before")**

2.0 The Proposal I propose that the unambiguity of *mattsista'-* is derivable from its morphological complexity, specifically that it consists of two morphemes *matt-* and *ista'-*, where *matt-* corresponds to an additive VP-focusing *also*/*too.* This is shown in (3); informally, *matt-* presupposes that the subject of the asserted event was also the subject of another salient event:

(3) a) *nit-á-okska'si* b) *ni-**matt**-á-okska'si*
1-impf-run.vai 1-**add**-impf-run.vai
"I run." "I run **also**."(eg. I ride horses, I also run)

Evidence for this decomposition is shown in (4); other morphemes can occur inside *mattsista'-*:

(4) a) *nit-áák-**matt**-ohkott-**ista'**-waasai'noto-ok* b) *ni-**matt**-ooht-**ista'**-yistsini-'p*
1-fut-**add**-able-**again**-make.cry.vai-3>1 1-**add**-means-**again**-cut.vti-1>inan
"She will be able to make me cry **again**." "I cut it **again** with a knife."

Assuming *ista'-* encodes the basic meaning of *again* – i.e, that some event, whose properties match the asserted event's properties, precedes the asserted event - I propose, in the spirit of Beck 2006, that the event presupposed by *matt-* is identified as the same event presupposed by *ista'-*. This event-identification forces a repetitive reading. This is compatible with either a structural or lexicalist view for *again/ista'-*, where the structural view (von Stechow 1996) holds that there is only one *again,* ambiguity being derived via different syntactic positions: *again* can either scope over i) the entire predicate (yielding a repetitive presupposition) or ii) just a result state (yielding a restitutive presupposition). The lexicalist view (cf. Dowty 1979) proposes only one syntactic position, but that repetitive and restitutive *again* are separate lexical items, each giving rise to their respective presuppositions. In §3 I give a formal analysis and show how event-identification forces a repetitive reading, no matter which view is adopted for *ista'-*.

3.0 Formal Analysis I adopt an analysis for *matt-* as in (5):

(5) ||matt-||(p) is defined only if C provides p' where p'∈$||\alpha||^F$, p'≠$||\alpha||^o$, and p'(w) =1
Where defined, ||matt||(p)(w) = 1 iff p(w)=1 ($||\alpha||^o$= p, C = the context)
(cf. Rooth 1992, Kartunnen & Peters 1979)

Like the English additive focus particles *too/also*, *matt-* attaches to a proposition p and presupposes that a focus-alternative to p is true. Assuming default focus to be on the predicate P, where p=P(x), p's focus-alternatives consist of the set {P(x), R(x), Q(x),...}where the predicate varies, but the subject, x, remains a constant. Because *matt-* presupposes that one of these focus alternatives is true, we effectively presuppose that x also participated as the subject of some other event. The analysis I adopt for *ista-* is as in (6):

(6) Let P be a property of eventualities and let e be an eventuality.
||*ista'*-|| (P)(e)(e") defined only if [|| MAX|| (P) (e") =1 & e" < e].
Where defined, ||*ista'*-|| (P)(e)(e") =1, iff P(e) =1. (cf. von Stechow 1996)

Like *again*, *ista'-* encodes a presupposition that the context, C, provides was some maximal event, e", which temporally precedes the asserted event e, such that P(x) holds for both e and e". I analyse this presupposition as specific and anaphoric, as opposed to being existential (cf. Soames 1989, Heim 1990, Beck 2006) - e" is not existentially quantified over, but a free variable that must be supplied by the context as an argument to *ista'-*/*again*.

Now, let p stand for the asserted proposition, p' for the proposition presupposed by *matt-*, and p" for the proposition presupposed by *ista'-*; let e, e' and e" be the events described by these propositions respectively.When *matt-* and *ista'-* attach to a proposition p = "x opened the door," there are two presupposed propositions to consider: from *matt-,* p'="x did something else." From *ista'-* either i) p"="x opened the door before" (a repetitive reading), or ii) p"="The door was open before" (a restitutive reading). However, because the presupposition associated with *ista'-* is anaphoric, *ista'-* looks for the most salient event in C for satisfaction. As p' has been made salient by the addition of *matt-*, its corresponding event e' is the most salient event, and is therefore picked up by *ista'-*. This results in event-identification such that e'=e".

(7)assertion(p)	*matt-* event presupposition (p')	*ista'-* event presupposition (p")
e=X opened the door	e'=X did something else	e"= X opened the door before (rep)
e=X opened the door	e'=X did something else	e"= the door was open before (res)

Consider the requirements on e' and e", summarized in (7). The only way e' and e" can be identified is if *ista'-* is interpreted as fully repetitive – i.e., if the event of "x having done something else" is identified as the same event as "x having opened the door before." If *ista'-* is interpreted as restitutive, its anaphoric properties require the event of "x having done something else" to be identified as the same event as "the door having been open before." This is pragmatically incoherent, assuming that in order for events to be identified, they must have the same external arguments and aspectual type.

4.0 Consequences I have argued that the unambiguously repetitive reading associated with Blackfoot *mattsista'-* is compositionally derived. This suggests that full repetition is not a conceptual primitive, arguing against a cross-linguistic lexical distinction between repetitive and restitutive *again.* Thus while some languages may lexicalise the two notions separately, the compositional complexity associated with *mattsista'-* suggests that these languages should not be used to make a universal claim for lexical ambiguity.

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Simultaneous analyses for simultaneous present.

1. The question.

Sentences like (1) suggest that present tense is inherently indexical, denoting the temporal coordinate of the context parameter ((2),(3)). A puzzle for this view is that, across languages, embedded present tense can be used to convey "simultaneous" readings ((4)). Two kinds of accounts have been given for this that maintain that present is born as an indexical. On the *Tense Deletion* explanation (Ogihara 1996, cf Kratzer 1998), present can be converted into a simple bound variable when c-commanded by another present tense. On the *Shifting Indexical* explanation (e.g. Schlenker 2003), attitude verbs enable their complements to be evaluated with respect to a context whose time coordinate differs from that of the context of utterance. The former accounts well for simultaneous readings in English-type languages (assuming that *will* in examples like (4a) is a present tense form), but fails to account for Russian data like (4b) where there is no higher present tense. The second fares well for Russian-type languages but not for English data like (4a) where there is no attitude verb. Faced with these two accounts, one wonders: are two different mechanisms needed to account for "simultaneous present" ?

2. The answer.

Yes. A consideration of Romanian shows that both are needed (**3**). Moreover, the Romanian data have important consequences for what the *Shifting Indexical* analysis should look like (**4**).

3. The argument in brief.

In one dialect of Romanian (RA), we find "simultaneous present" in all of the environments where we find it in English, plus all of those where we find it in Russian. In another (RB), we find simultaneous readings in all the English-type environments, but if we look at the environments that permit "simultaneous present" in Russian but *not* in English, we find a complication: simultaneous readings are possible but come with a special condition on their use. On the two-mechanism view, we account simply for this typology, and in particular for the variation in Romanian. RA uses the English mechanism as well as the Russian mechanism. RB uses both as well, but in RB shifting is associated with a restriction that does not exist in RA.

4.Details: The non-commitment condition in RB and its theoretical consequences.

In RB, "simultaneous present" under past attitude verbs is associated with a *non-commitment condition* (*NCC*) which works basically as follows. Suppose a clause with present tense, S_{PRES} , expresses that property P holds of the utterance time. Then a speaker can *sometimes* use a sentence of the form *X verb-ed that* S_{PRES} to express that X attributed P to the time at which X located himself, but *cannot always* do so. A speaker is barred from doing so when she thinks that X was right and that P indeed held of the time at which X was located. Thus, in RB, we do not find "simultaneous present" under past factive verbs like *şti* ('know'), whose use would commit the speaker to the claim that the embedded clause property held at the time of the attitude, but we do find it under verbs like *crede* ('believe'). *Spune* ('say/tell') patterns with *crede* in a situation where the speaker does not know whether the embedded clause property held or not at the moment of saying ((5a)) or when the speaker knows that it did not ((5b)), but it behaves like a factive verb when the speaker considers herself to have evidence that the property held at the moment of saying, as in (6b), uttered by someone who takes Anca to be reliable about the local weather. (Table (7) summarizes. Similar facts seem to obtain in Hungarian and in German, cf. Rau 2009, but we don't have a full description of the data.)

A "shifting indexical" analysis of simultaneous present under past RB attitude verbs crucially must link the presence of shifting to the introduction of the NCC. The link between shifting and the NCC suggests that there is a specific element that is responsible for shifting that fails to appear when there is no shifting, and that also contributes the NCC. Since the NCC concerns the evaluation time of the attitude verb, this element must in some manner "see" the embedding verb's time argument. We thus propose that shifting is accomplished by a silent affix on the verb, which has the effect of "converting" the verb to an element that selects for a property of contexts. (8)-(10) sketches how this affix might work in RB (though we will also consider subtler analyses); the corresponding affix in RA would simply not have the partiality in its semantic value. Facts like the RB facts, we suggest, point to a picture on which indexical shifting is always mediated by verbal affixes. Facts like these cannot be captured naturally on approaches to indexical shifting like Schlenker 2003 (on which no specific element appears if and only if there is shifting) or Anand and Nevins 2004 (on which shifters never take as an argument either the verb or the verb's time argument).

(1) a. I photographed the woman who is dancing a waltz. b. John said that Mary is pregnant.

(2) $[[\text{ PRES }]]^{g,c} = T(c)$ (the interval that constitutes the temporal coordinate of c)

(3) a. the boy who is happy b. structure: [the [boy t_1 w_2] [(who) [3 ... [w_2 PRES t_3 happy]]]
c. $[[\text{ (3b) }]]^{g,c}$ = the unique boy at time g(1) in world g(2) who is happy throughout T(c) in world g(2) (if there is one; otherwise undefined)

(4) a. I will photograph the woman who is dancing a waltz.
(can be used to talk about a woman dancing at the time the photograph is taken)
b. Petja skazal, čto on plačet. (Schlenker 2003: 70)
Petja say-3.pst that he cry-3s.**pres**
(can be used to express that Petja said "I am crying")

(5) a. **Context A.** I have no idea whether or not Mirela was ever pregnant.
b. **Context B**. I know for a fact that Mirela was never pregnant. I was there when the doctor told her that she cannot have children.
c. Acum zece ani, Mircea mi-a spus că Mirela aşteaptă un copil.
now ten years, Mircea me has told that Mirela expect.**pres** a baby
✓ "Ten years ago, Mircea told me that Mirela was expecting a baby."

(6) a. **Context**. Two years ago, I spoke with Anca on the phone. She was in Seattle. Anca said: "It is raining." She obviously knew what she was talking about.
b. Acum doi ani, Anca mi-a spus că plouă în Seattle.
now two years Anca me has told that rain.**pres** in Seattle
♯ "Two years ago, Anca told me that it was raining in Seattle."

(7)

simultaneous pres. under past tense attitude verbs	*spune* 'say'/'tell'	*şti* 'know'	*crede* 'believe'
Romanian A	✓	✓	✓
Romanian B	✓ ♯	♯	✓

(8) a. Notation: $\text{SHIFTNOW}_c\ (F_{<k,\ <i,st>>}) = \lambda t_i.\ \lambda w_s.\ F(<W(c),\ \mathbf{t},\ A(c)>)(t)(w)$
(k here is the type of contexts, assumed to be world-time-individual triples.)
b. Example: $\text{SHIFTNOW}_c\ (\lambda c'_k.\ \lambda t'_i.\ \lambda w'_s.\ A(c')$ is happy at $T(c')$ in $w')$
$= \lambda t_i.\ \lambda w_s.$ A(c) is happy at **t** in w

(9) $[[\text{AFF}_{RB}]]^{g,c} = \lambda P_{<ist,\ cist>}.\ \lambda F_{<k,\ ist>}.\ \lambda x_e.\ \lambda t_i$: <u>At T(c) in W(c), A(c) entertains as a candidate for the actual world some world w'' such that $\text{SHIFTNOW}_c(F)(t)(w'') = 0$</u>. $\lambda w_s.$ $P(\ \text{SHIFTNOW}_c(F)\ )(x)(t)(w)$.

(10) AFF_{RB}-believe [‣ [ΛT 5 [w_5 PRES Mary happy]]]] (‣ here is an element analogous to ^ that "abstracts over the context parameter." ΛT is a type shifter.)

λt_i. λw_s. Mary is happy at T(c) in w

λc_k. λt_i. λw_s. Mary is happy at T(c) in w

λx. λt: At T(c) in W(c), A(c) entertains as a candidate for the actual world some world w'' such that Mary is not happy at <u>t</u> in w''. λw. For every <w',t'> such that, at <u>t</u> in w, x potentially locates himself at <w',t'>, Mary is happy at t' in w'.

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Type-Theoretical Semantics with Coercive Subtyping*

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Summary There have been a lot of interesting developments in lexical semantics including, for example, the Generative Lexicon Theory [9]. However, the research so far has failed to provide a satisfactory formal account to explain the important linguistic phenomena in the lexical theories. Most of the employed formalisms are based on (extensions of) Montague grammar [7] and unable to capture the linguistic phenomena satisfactorily. This paper studies type-theoretical semantics and shows that the modern type theory, together with the theory of coercive subtyping [5], offers a powerful and adequate logical language for formal semantics in which interesting lexical phenomena such as logical polysemy [9] and copredication [2] can be properly interpreted.

Type Theory and Coercive Subtyping Some of the basic ideas of studying logical semantics in type theory have been considered by Ranta based on Martin-Löf's type theory [10] where, in particular, common nouns are interpreted as types (rather than as functional subsets of entities as in Montague grammar). This is natural in type theory, but has some unwelcome consequences since there are fewer operations on types as compared with those on functional subsets. As shown in the paper, subtyping is not only useful but crucial in solving this problem and coercive subtyping provides us with such a framework.

Coercive subtyping [5] is a general theory of subtyping for dependent type theories such as Martin-Löf's type theory [8] and UTT [4]. The basic idea is to consider subtyping as an abbreviation mechanism: A is a subtype of B ($A \leq B$) if there is a unique implicit coercion c from type A to type B and, if so, an object a of type A can be used in any context $\mathcal{C}_B[\_]$ that expects an object of type B: $\mathcal{C}_B[a]$ is legal (well-typed) and equal to $\mathcal{C}_B[c(a)]$. For a type theory with nice meta-theoretic properties such as Strong Normalisation (and hence logical consistency), its extension with coercive subtyping has those properties, too. In computer science, coercive subtyping has been implemented in many proof assistants such as Coq, Lego, Matita and Plastic, and used effectively in interactive theorem proving. As shown in this paper, when applied to linguistic semantics, coercive subtyping plays a crucial role in application of type theory to logical semantics.

Coercive Subtyping in Type-Theoretical Semantics In a type-theoretical semantics, common nouns are interpreted as types and verbs and adjectives as predicates. For example, we have $[\![\texttt{book}]\!], [\![\texttt{human}]\!] : \mathit{Type}$, $[\![\texttt{heavy}]\!] : [\![\texttt{book}]\!] \to \mathit{Prop}$ and $[\![\texttt{read}]\!] : [\![\texttt{human}]\!] \to [\![\texttt{book}]\!] \to \mathit{Prop}$, where Prop is the type of propositions. Modified common noun phrases can be interpreted by means of Σ-types of dependent pairs: for instance, $[\![\texttt{heavy book}]\!] = \Sigma([\![\texttt{book}]\!], [\![\texttt{heavy}]\!])$.

Now, how could we reflect the fact that, for example, a `heavy book` is a `book`? Such phenomena are captured by means of coercive subtyping, by declaring the first projection π_1 as a coercion: $\Sigma(A, B) \leq_{\pi_1} A$. For example, if $h : [\![\texttt{human}]\!]$ and $b : [\![\texttt{heavy book}]\!]$, then $[\![\texttt{read}]\!](h, b)$, the interpretation of 'h reads b', is well-typed (by coercive subtyping). This shows that coercive subtyping solves a key problem in type-theoretical semantics. This problem is discussed in [10] (pp. 62-64), where three possible solutions are considered, but none of them is completely satisfactory. One of them is closest to ours where explicit first projections are employed; it is one step short: using π_1 as an implicit coercion, we have managed to capture the phenomena as intended.

Subtyping relations propagate through the type constructors such as Π and Σ (they become $\to$ and $\times$ in the non-dependent cases, respectively). For instance, they propagate through the function types, contravariantly: if $A' \leq A$ and $B \leq B'$, then $A \to B \leq A' \to B'$. For example, $[\![\texttt{book}]\!] \to \mathit{Prop} \leq [\![\texttt{heavy book}]\!] \to \mathit{Prop}$.

As another example, let's consider the dot-types as studied in [9]. Let PHY and INFO be the types of physical objects and informational objects, respectively. One may consider the dot-type PHY $\bullet$ INFO as the type of the objects with both physical and informational aspects. Intuitively, a dot-type is a subtype of its constituent types: PHY $\bullet$ INFO $\leq$ PHY and PHY $\bullet$ INFO $\leq$ INFO. A book may be considered as having both physical and informational aspects, reflected as: $[\![\texttt{book}]\!] \leq$ PHY $\bullet$ INFO. By contravariance,

$$\text{PHY} \to \mathit{Prop} \leq \text{PHY} \bullet \text{INFO} \to \mathit{Prop} \leq [\![\texttt{book}]\!] \to \mathit{Prop}$$
$$\text{INFO} \to \mathit{Prop} \leq \text{PHY} \bullet \text{INFO} \to \mathit{Prop} \leq [\![\texttt{book}]\!] \to \mathit{Prop}$$

Therefore, for example, for $[\![\texttt{burn}]\!] :$ PHY $\to \mathit{Prop}$ and $[\![\texttt{interesting}]\!] :$ INFO $\to \mathit{Prop}$, '`burn an interesting book`' can be interpreted as intended.[1]

Dot-Types, Lexical Entries and Coercion Contexts In the type-theoretical semantics with coercive subtyping, several useful constructions can be defined and used to model various linguistic phenomena. They include (and the details will be in the full paper): (1) *Dot-types*: Although the meaning of a dot-type [9] is intuitively clear, its proper formal account has been surprisingly tricky (see, for example, [1]). In type theory with coercive subtyping, a dot-type $A \bullet B$ can be defined by means of the product type $A \times B$ *together with* its two projections as implicit coercions, provided that 'the components of A and B are disjoint'. This gives, for the first time to our knowledge, an adequate formal treatment of dot-types and can hence be used in a satisfactory way in formal semantics to interpret, for instance, *copredication* as discussed in [2] and logical polysemy [9]. (2) *Lexical entries* as studied in the Generative Lexicon Theory [9] can be expressed formally as dependent record types [6]. (3) *Coercion contexts* can be introduced to model the more complicated phenomena such as those involving reference transfers [3].

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[1] In Montague grammar (and its extensions), common nouns are interpreted as functional subsets of type $e_0 \to t$, where t is the type of propositions and e_0 is a subtype of the type of entities. For instance, $[\![\texttt{book}]\!] :$ PHY $\bullet$ INFO $\to t$ and $[\![\texttt{heavy}]\!] : (\text{PHY} \to t) \to (\text{PHY} \to t)$. In such a situation, in order to interpret, e.g., '`a heavy book`', one would have to apply $[\![\texttt{heavy}]\!]$ to $[\![\texttt{book}]\!]$ by requiring, for example, PHY $\bullet$ INFO $\to t \leq$ PHY $\to t$, which is not the case – type clashes would happen, leading to unnatural and complicated treatments [1].

A new argument for embedded scalar implicatures

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Introduction. An important, recent debate concerns the existence of embedded scalar implicatures. Various methods have been used to access them: introspective judgments, as in Chierchia (2004); experimental methods, as in Chemla & Spector (2009); theoretical diagnostics, as in Chierchia, Fox and Spector (2008). This paper contributes a new diagnostics for implicatures and uses it to argue for embedded scalar implicatures.

Diagnostics. In Magri (2009), I argue for the empirical generalization (1).

(1) If a matrix sentence *Strong* is logically stronger than but contextually equivalent to a scalar alternative *Weak*, then *Weak* sounds odd and *Strong* sounds fine.

One of the examples I use to support (1) is repeated in (2), based on a (p.c.) by Emmanuel Chemla to Schlenker (2006). Although (2a) is contextually equivalent to (2b), the logically stronger alternative (2a) is fine while the logically weaker alternative (2b) sounds odd.

(2) Context: It is know that professor Smith always assigns the same grade to all students in his Semantics class, but the grade can vary from year to year.
   a. This year, professor Smith assigned an A to all of his students. $\surd$*Strong*
   b. #This year, professor Smith assigned an A to some of his students. #*Weak*

I develop an account for (1) that can be informally summarized as in (3).

(3) a. Since *Strong* is a logically stronger alternative of *Weak*, then *Weak* can trigger the scalar implicature that $\neg$*Strong*;
   b. since relevance is closed w.r.t. contextual equivalence, since *Weak* and *Strong* are contextually equivalent and since *Weak* is relevant because uttered, then *Strong* is relevant too;
   c. since the alternative *Strong* is relevant, the implicature $\neg$*Strong* is mandatory;
   d. since *Weak* and *Strong* are contextually equivalent, then the mandatory implicature $\neg$*Strong* contextually contradicts *Weak*, whereby the oddness of *Weak*.

According to (3), oddness can be used to detect scalar implicatures. In this talk, I use this diagnostics to provide a new argument for embedded scalar implicatures.

Facts. In this talk, I will look at oddness in Downward Entailing Contexts (e.g. the restrictor of 'every'). I will consider various DECs and show that the relevant cases split: in some cases, oddness in DECs flips as one might expect, as in (4); in other cases it doesn't flip, as in (5).

(4) Context: Every year, the dean has to decide: if the college has made enough profit that year, he gives a pay raise to every professor who has assigned an A to at least some of his students; if there is not enough money, then no one gets a pay raise.
   a. This year, every professor who assigned an A to some of his students got a pay raise from the Dean. $\surd$every(*Weak*)
   b. #This year, every professor who assigned an A to all of his students got a pay raise from the Dean. #every(*Strong*)

(5) Context: In this department, every professor assigns the same grade to all of his students.
   a. #This year, every professor of this department who assigned an A to some of his students got a prize from the dean. #every(*Weak*)
   b. This year, every professor of this department who assigned an A to all of his students got a prize from the dean. $\surd$every(*Strong*)

I suggest that the relevant difference between the two cases is whether the contextual equivalence of the two matrix sentences is established at the embedded level, as in (5); or only at the matrix level, as in (4). I thus suggest the generalization (6).

(6) Let *Strong* be a logically stronger alternative of *Weak* and $\mathbf{O}_{\text{DE}}$ be a DE operator:
   a. if the matrix sentences $\mathbf{O}_{\text{DE}}$(*Strong*) and $\mathbf{O}_{\text{DE}}$(*Weak*) are contextually equivalent without the embedded constituents *Strong* and *Weak* being contextually equivalent — as in the case of (4) —, then:
      i. $\mathbf{O}_{\text{DE}}$(*Weak*) sounds fine, ii. $\mathbf{O}_{\text{DE}}$(*Strong*) sounds odd;
   b. if the matrix sentences $\mathbf{O}_{\text{DE}}$(*Strong*) and $\mathbf{O}_{\text{DE}}$(*Weak*) are contextually equivalent as a consequence of the embedded constituents *Strong* and *Weak* being contextually equivalent — as in the case of (5) —, then:
      i. $\mathbf{O}_{\text{DE}}$(*Weak*) sounds odd, ii. $\mathbf{O}_{\text{DE}}$(*Strong*) sounds fine.

Account. Account (3) applied to the matrix level predicts oddness to flip in DECs as in (6a). But (6b) is mysterious. Following e.g. Fox (2007), let's assume that scalar implicatures are brought about by a covert 'only', called the *exhaustivity operator* (EXH). I argue that both (6a) and (6b) follow along the lines of (3) if we posit both a matrix and an embedded exhaustivity operator, as illustrated in (7) for the case of the restrictor of 'every'. Thus, oddness in DECs provides evidence for embedded implicatures.

(7) $[\ \text{EXH}\ [\ \text{every}_x\ [\ \text{EXH}\ \left\{ \begin{array}{c} \textit{Strong}(x) \\ \textit{Weak}(x) \end{array} \right\}\ ]\ ]\ ]$

Here is an informal sketch of the account I propose. Account for (6a): since the embedded constituents *Strong* and *Weak* aren't contextually equivalent, step (3b) does not apply at the embedded level; thus, the embedded implicature is not mandatory and we can forget of the embedded EXH; generalization (6a) straightforwardly follows by applying the reasoning (3) at the level of the matrix EXH, ignoring the embedded one. Account for (6b.i): since the embedded constituents *Strong* and *Weak* are contextually equivalent, then the embedded implicature is mandatory, along the lines of (3b)-(3c); thus the prejacent of the matrix exhaustivity operator is $[\ \text{every}_x\ [\ \textit{Weak}(x) \wedge \neg\textit{Strong}(x)\ ]\ ]$; but this constituent suffers from presupposition failure (the restrictor $\textit{Weak} \wedge \neg\textit{Strong}$ of 'every' is empty in every world compatible with common knowledge); this explains the oddness of the sentence. Account for (6b.ii): the embedded operator triggers no implicature, since *Strong* is logically stronger than *Weak*; furthermore, also the matrix exhaustivity operator triggers no implicature; in fact, the only matrix alternative is $[\ \text{every}_x\ [\ \text{EXH}\ [\ \textit{Weak}(x)\ ]\ ]$, obtained by replacing *Strong* with *Weak*; this alternative is equivalent to $[\ \text{every}_x\ [\ \textit{Weak}(x) \wedge \neg\textit{Strong}(x)\ ]\ ]$, which again suffers from presupposition failure; thus, this alternative is not contextually equivalent to the matrix prejacent and steps (3b)-(3c) are therefore mute at the matrix level.

Updating alternatives: focus on bound pronouns — *Clemens Mayr – Harvard University*

Overview A theory is developed how to deal with focused bound pronouns while still treating them as plain bound variables. Two steps are needed: First, focus operators are inserted locally, in the scope of the quantifier. Second, it is required that focus must add new alternatives.

The problem Jacobson (2000) and Sauerland (2000, 2008) observe that bound pronouns can bear optional stress (1a)-(1b) – that is, contrastive stress in (1a).

(1) a. Every student cut his (own) arm, and every TEACHER cut HIS arm
b. Every student cut his (own) arm, and every TEACHER cut his arm

Two questions arise w.r.t. (1). First, if both the stressed pronoun (1a) and the unstressed one (1b) are to be treated as bound variables, it is difficult to see how the pronoun in conjunct 1 would contrast with the one in conjunct 2 in (1a) but not in (1b). Since (1b) is grammatical, a principle like AvoidF (Schwarzschild 1999) that strives to minimize the number of foci would dictate that (1b) should be preferred over (1a). Second if we assume that bound pronouns have individual-denoting expressions as their alternatives, the focus value of conjunct 2 in (1a) would be (2).

(2) $[\![\text{C2}]\!]^f = \{p : \exists P_{\langle et\rangle}.\exists y_{\langle e\rangle}[p = \forall x[P(x) \rightarrow \text{cut}(x, y\text{'s arm})]\}$

Simplifying greatly, for Rooth (1992) focus is licensed if both the ordinary value of the antecedent constituent and of the utterance are members of the focus alternatives and these furthermore contrast. But neither the ordinary value of conjunct 1 nor the one of conjunct 2 is a member of the set in (2). Focus should not be licensed. A parallel problem obtains in Schwarzschild's 1999 theory.

New observation Sauerland (2000, 2008) (also cf. Jacobson (2000)) argues that (1a) and (1b) differ in that the bound pronoun in the former is a bound E-type pronoun (3) but not in the latter. The function in the pronoun is treated as a presupposition. The function attracts the focus.

(3) a. every student λ_1[t_1 cut the$_1$ student's arm]
b. every teacher$_F$ λ_1[t_1 cut the$_1$ teacher$_F$'s arm]

The focus value for (3b) is (4). Now both the value of conjunct 1 and conjunct 2 are members of the alternatives in (4) and they also contrast. Focus on the pronoun should be licensed. Moreover, (1b) cannot block (1a), because the plain variable version does not compete with the E-type one.

(4) $[\![(3b)]\!]^f$ = defined iff $\forall x$, $f(x) = 1$, if defined $\{p : \exists P.\exists f_{\langle et\rangle}[p = \forall x[P(x) \rightarrow \text{cut}(x, x\text{'s arm})]\}$

We find a problem for this view in cases where the restrictor of the quantifier and the function in the pronoun do not co-vary. Focus on the bound pronoun is also possible with additive *too*:

(5) Every director discussed his film, and every PRODUCER discussed HIS film, too

Following (Heim 1992:189) (also cf. Geurts and van der Sandt (2004)) we assume the anaphoric entry for *too* in (6). It focus-associates with $[\![\text{X}]\!]$ and presupposes that there is an alternative to $[\![\text{X}]\!]$ different from it such that the predicate used is true of that alternative.

(6) $\phi([\![\text{X}_F]\!])[\![\text{too}_i]\!]$ = defined iff $\exists y_i \in [\![\text{X}]\!]^f$ and $\phi(y_i) = 1$, if defined $\phi([\![\text{X}_F]\!])$

With the LFs in (7) where *too* focus-associates with the restrictor of the quantifier, (7b) presupposes that every director discussed his film and every director is a producer. (7a) does not guarantee this.

(7) a. every director$_5$ λ_1[t_1 discussed [the$_1$ director]'s film]
b. every producer$_F$ λ_1[t_1 discussed [the$_1$ producer]$_F$'s film] too$_5$

We cannot amend this by stipulating that *too* associates with both instances of *producer* in (7b). *too* does not associate with more than one focus. As (8) shows it cannot have the meaning in (8a) where exactly this would be required.

(8) John$_6$ kissed Mary$_8$, and BILL$_F$ kissed SUE$_F$, too$_{6,8}$
a. *'John kissed Mary, and in addition Bill kissed Sue.'
b. ?'John kissed Mary, and Bill kissed Mary and in addition Sue.'

1. Local focus operators We propose that (at least) focus operators associating with bound pronouns must be inserted locally – that is, in the scope of the quantifier binding them. We follow Rooth (1992) in assuming that the ∼-operator interprets focus. ∼ takes a contextually determined set C as an argument and presupposes that $g(C)$ is a subset of the focus value of ∼'s sister.

(9) $[\![\sim\text{X}]\!]$ = defined iff $g(C) \subseteq [\![\text{X}]\!]^f$, if defined $[\![\text{X}]\!]$

Conjunct 2 in (1a) has the LF in (10). We require that the λ-abstractor is below the ∼-operator, i.e., inside the alternatives. The semantics for (10a) is then as in (11). We assume that presuppositions project universally from the scope of the quantifier (Heim 1983). The first presupposition requires that for each teacher x the set of alternatives $g(C)$ contains predicates of the form *x cut a's arm*, *a* an individual. $g(D)$ is of the form *every x of some particular property cut x's own arm.*

(10) a. $\sim D$ [every teacher$_F$][$\sim C[\lambda_1$[t_1 cut 1_F's arm]]]
b. $[\![(10a)]\!]$ = defined iff $\forall x$[teacher$(x) \rightarrow g(C) \subseteq \{\lambda x.\text{cut}(x, y\text{'s arm}) \mid y \in D_e\}$, and
$g(D) \subseteq \{\forall x[Q(x) \rightarrow \text{cut}(x, x\text{'s arm}) \mid Q\}$,
if defined $\forall x$[teacher$(x) \rightarrow \text{cut}(x, x\text{'s arm})$]

2. Updating alternatives But why is the focus on the bound pronoun licensed? I propose the focus-requirement in (11). Each sentence has ∼ appended to the top. Further ∼s are optional.

(11) A proposition p denoted by sentence ϕ can be added to C, iff there is a q denoted by an antecedent ψ such that $q \subseteq [\![\phi]\!]^f$ and $q \neq [\![\phi]\!]$.

Moreover, focus on a given constituent embedded in ϕ is licensed iff the $g(C)$ that a given focus operator in ϕ makes use of is not unaffected by updating the context c with $[\![\phi]\!]$:

(12) Focus in ϕ is licensed iff $g(C_c) \neq g(C_{c+[\![\phi]\!]})$.

In other words, each sentence must have at least one focus to conform to (11). Second, a focus can only be used when new alternatives are added to $g(C)$. For (1a) this means that the two foci are licensed if the following obtains: First, conjunct 2 must add new alternatives of the form *λx.cut(x,a's arm)* to $g(C)$, *a* an individual. The meaning of conjunct 1 provides such alternatives with *a* being some student, as it entails that *cut(a,a's arm)*. Conjunct 2 adds *distinct* alternatives with *a* being a teacher. (12) is satisfied. Second, there must be alternatives of the form $\forall x[Q(x) \rightarrow$ *cut(x, x's arm)*, Q some property. Clearly, conjunct 1 provides such an alternative. Conjunct 2 adds a *distinct* one. (12) is again satisfied. The latter also applies to (1b). The theory allows optionality between (1a) and (1b). It would not allow dropping the focus on the restrictor, however. The top ∼ would not interpret a focus then. (11) also accounts for the obligatoriness of focus observed by Schwarzschild (1999). The theories differ, however, wrt. which foci are not licensed. Schwarzschild's theory rules out (1a). The present theory does not. The present theory also accounts for unfocusability in Schwarzschild's cases, though, because there $g(C)$ would not be affected by the utterance. (12) also explains the observation made by (Sauerland 2000:175) that the restrictors used must differ in order for bound pronouns to be focused. Only in (13b), but not in (13a) is the $g(C)$ used by ∼ attached to the VP affected by uttering the sentence.

(13) *Discourse:* I didn't expect every teacher to get what she wanted.
a. #But, every teacher GOT what SHE wanted.
b. In the end, every GIRL got what SHE wanted.

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Subject domain restriction and reference-tracking

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Summary. This paper explores how reference-tracking systems function with non-referring DPs. It argues that at least one system, switch-reference, tracks resource situation arguments instead of tracking the entities themselves. This allows a unified explanation of switch-reference (SR) for non-referring DPs, referring DPs, and apparent non-subject tracking. It also bears on the nature of some kinds of topic, and the relationship between resource situations and reference.

Phenomenon. Reference-tracking systems involve morphemes indicating co-reference or disjoint reference of some pair of arguments across or within clauses. These systems include logophoricity, obviation, and the focus of this paper, switch-reference.

Switch-reference (SR) is a morpheme generally indicating whether the subject of one clause is identical in reference to the subject of an adjacent clause (1).

(1) Yísàum cút ∅= hấugà **gàu/nàu** ∅= kấu.
Y. book [3s:3s]= buy.PF **and.SAME/DIFF** [3s:3s]= read.aloud.PF
'Yisaum$_4$ bought a book and he$_{4/other}$ read it out loud.'

Question. What happens when the subject is non-referring? Evidence elicited from speakers of Kiowa, an endangered language spoken in Oklahoma, shows that SR can mark co-reference between non-referring DPs— generics (2), partitives (9), universals, donkey subjects (3), and even negative expressions (4).

(2) Thò̀-gù á= kìya=**chè̀** góm+sǒjè ém= hóldá+dò̀-gù
cold-into [3p] exit.IMPF=**when.SS** wind+cozy [3p:refl] dress+put.on-IMPF
'When going out into the cold, one should dress warmly' (Watkins, p.c.)

(3) Qa̋hì̀ chè̀ ∅= dǒ=[chè̀] àn ∅= gú-gù
man horse [3s:3s]= own=**when.SAME** HAB [3s:3s] hit-IMPF
'When a man has a horse, he hits it.'

(4) Háun hájél [èm gún-máu=[chè̀]] èm dấu+jàu-gù
NEG x.one [3s.refl] dance-IMPF=when.SS [3s:refl] sing+act-NEG
'Nobody sang while they danced.'

Proposal. These phenomena have all been argued independently to involve resource situations, which restrict the domain of interpretation of an operator to create a kind of reference. (von Fintel 1994, Elbourne 2002, Kratzer 2004, et al.) I propose that with non-referring DPs switch-reference tracks the resource situation. That is, the pivot of a sentence is the subject's resource situation. "Same" marking indicates that this situation co-refers with the resource situation of the adjacent clause's subject. "Different" marking indicates disjoint reference.

Further evidence comes from examining cases where switch-reference is apparently not tracking referring subjects. Some cases involve types of DPs that have been shown to involve situations, notably with bridging. In (5), "same" marking appears despite different subject entities, when talking about a dance.

(5) Yáucáuigú ém= gún [gàu] jógú-dàu ém= dấu+vàigù̀
young.women [3p:refl] dance.PF **and.SAME** young.men [3p:refl] sing+fight.PF
'The young women danced and the young men sang.'

One other interesting case comes from Choctaw, a Native American language of the Muskogean family. Choctaw has a double-subject construction where the first nominative-marked DP restricts the interpretation of the second. In these cases, the first DP (the restrictor) is the pivot, not the second. The higher 'subject' is a description of the subject's resource situation.

(6) John-at ofi'-at im-ambiika-took [sa-kisili-tok-[at]]
John-NOM dog-NOM III-sick-PAST 1sPP-bite-when.SS
'John$_i$'s dog$_k$ was sick when he$_i$ bit me.' [Choctaw, Broadwell (2006)]

Subject-tracking SR also tracks resource situations. Building on proposals by Percus (2000), that all DPs contain a resource situation, this proposal becomes a null hypothesis that should explain even cases where SR clearly seems to track the subject. We thus propose that switch-reference *always* tracks the subject's resource situation. It is the 'canonical' subject co-reference that is apparent. In most cases, the subject is trivially restricted— it is restricted by a situation exemplifying it [8] (Kratzer 2007, McKenzie 2007). When a subject is trivially restricted, tracking its exemplifying situation is equivalent to tracking the subject referent itself.

Non-canonical SR also tracks resource situations. This proposal also improves upon McKenzie (2007), and avoids intractable problems with Stirling (1993)'s event-based analysis of SR. McKenzie argues for a bifurcated SR that canonically tracks subjects, and non-canonically, topic situations. Instead, non-canonical SR simply occurs when the subject's resource situation is non-trivial.

As McKenzie noted, (7) is felicitous when the letters are written together as part of some kind of plan situation. Under this hypothesis, the pivot of the SR-marked second clause, *Kathryn* is "the Kathryn in the plan", while the anti-pivot is "the Esther in the plan." Since the resource situation of each subject is "the plan", SR marks "same."

(7) Kathryn gà= gút **gàu** Esther=àl gà= gút.
K. [3s:3p]= write.PF **and.SS** E.=too [3s:3p] write.PF
'Kathryn wrote a letter and Esther wrote one too.' [Watkins 1993]

When there is no salient resource situation, the default is the situation exemplifying the subject—the unique Kathryn in the Kathryn situation.

(8) $[\![\text{Kathryn(plan)}]\!] = \iota x.\ \text{Kathryn}(x)(s^{\text{plan}})$ $[\![\text{Kathryn(Kathryn)}]\!] = \iota x.\ \text{Kathryn}(x)(s^{\text{Kathryn}})$

The role of topicality. Topicality plays a key role in non-trivial subject restriction. In (9), either same- or different-marking can be used to describe the same horses, depending on the context. In a context where the whole group of horses is salient (i.e. "What are the horses doing?"), same-marking is good. In a context where the different groups are salient, diff-marking is good.

(9) Fá són gà= fáu-yàu [gàu/nàu] fá tó gà= tô-màu
some grass [3p:3s] eat-IMPF and.**SAME/DIFF** some water [3p:3s] drink-IMPF
'Some are eating grass and some are eating water.'

With same-marking, the resource situation of each subject is identical, even though the horses selected are not. With diff-marking, the resource situations vary— they may be exemplifying the separate groups.

(10) a. (same) $\exists$x horses(x) in s^{herd} and.SAME $\exists$y horses(y) in s^{herd}
b. (diff) $\exists$x horses(x) in $s^{\text{group 1}}$ and.DIFF $\exists$y horses(y) in $s^{\text{group 2}}$

Topicality also played a role in (7). Many phenomena involve restricting the interpretation of the subject, including the cancellation of lifetime effects (Musan 1995). This proposal suggests a strong link between switch-reference pivots and some kind of topicality

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Uncovering the concealed question (and some shifty types).

Contra a number of recent analyses, this paper defends the view that the DP in English "concealed question" constructions like (1) denotes a question -- in this specific case, the question 'What price does milk have?' ((2)) Through a detailed examination of these and related sentences, it motivates a small group of type-shifting rules that operate on N and NP denotations, as well as a kind of hidden structure within propositional complements. In the end, the analysis fits with a constrained view of type-shifting on which type-shifting rules are for the most part "meaning-preserving" -- that is, with some minor exceptions, in changing the interpretation of an element, they do not add to its informational contribution, but simply reorganize it in a certain precise sense. The investigation is inspired by Nathan 2006, but the conclusions are rather different.

The basic argument relies on examples like (1a) with verbs like *ask* or *debate*. On the basis of examples that do not involve embedded DPs, these verbs have to be analyzed as combining with question meanings ((3)). When they combine with a DP like *the price of milk*, they behave just as though they combine with the question meaning (2), so the null hypothesis is obviously that the DP yields that meaning. (Other expressions with irreducibly question-selecting meanings can be used to make the same point.) To arrive at this question meaning, we argue, a type shift applies to *price*. This type shift produces a function that takes an object x and yields the singleton set containing the question 'What price does x have?' ((4b)). Importantly, this type shift is also involved in generating another meaning for *price* that is a predicate of questions: *price* in (5) is interpreted as "question of the form 'What price does x have?'" and this meaning is obtained by applying a second type shift on top of the first ((4c)). The idea that (1a) and (5) involve the same type shift explains why the relational nouns that can appear in the two constructions are subject to the same restrictions. The fact is that the two constructions only allow nouns that, roughly speaking, are presupposed to be functional, and not even all of those. (*Price* works; *flavor* and *father* do not.) This similarity can be understood if the initial type shift imposes these restrictions. (These are not the only type shifts that play a role in examples with question-selecting verbs. An additional type shift "relationizes" non-relational nouns like *year* in *He asked me the year Mary was born* in such a way that they come to select for a relative-clause-like meaning. Recognizing this, we show, leads naturally to an account for "Heim-style" ambiguities like the ambiguity in *John asked Mary the price Fred asked her*.)

When it comes to examples like (1b) with a proposition-selecting verb like *know*, we argue that the question-denoting expression is embedded within the complement of *know*. A sentence like (1b) has a structure whose ingredients essentially spell out "John knows the proposition truly answering the question 'What price does milk have?'." The higher *the* here is the one that is pronounced -- (6) sketches the idea. Assuming such structures, with a higher pronounced determiner that ranges over propositions and a lower unpronounced determiner *a* or *the*, allows us to account in a simple and especially transparent way for a variety of quantified "concealed question" and related constructions. For example, the reading of (7a) that expresses that John knows every proposition truly answering a question of the form 'What is the price of x?' arises out of a structure like (7c), which contains essentially the same ingredients as our paraphrase. (*Price* is interpreted here in the same way it is in (5).) Interestingly, NPs under *know* seem able to undergo a type-shift that is not available under *ask* ((8)-(9)). This is responsible for the fact that the relational nouns that appear under *know* are not restricted in the way they are under *ask*, as well as for the marginal "set readings" that have been discussed in the literature (Roelofsen and Aloni 2008, Schwager 2008).

The idea that "concealed question" constructions contain questions has not gone unchallenged in the literature, but the facts that have been brought up do not seem to us to pose devastating problems. A quick hand-waving summary: Possibly, the fact that certain question-selecting verbs, like *wonder*, do not combine with DPs like *the price of milk* is related to the more general fact that they can't combine with DPs headed by *question* (*I wondered the same thing* vs. **I wondered the same question*). Possibly, the fact that certain proposition-selecting verbs like *regret* don't either is related to the more general fact they don't combine with "syntactic questions" like *what the price of milk is*.

(1) a. John asked Mary the price of milk.
b. John knows the price of milk.

(2) { λw_s. milk has price p in w | p a possible price }

(3) a. [[ask]] = λx_e. $\lambda Q_{<st,t>}$. λy_e. λw_s. in w, y asks x to convey to him the (str. exh.) answer to Q.
b. [[debate]] = λX_e. $\lambda Q_{<st,t>}$. λw_s. in w, the members of X compare the likelihood of different conjunctions of propositions in Q

(4) a. [[price]] = λx_e. λp_p. λw_s. x has price p in w
b. **S1**([[price]]) = λx_e. $\lambda Q_{<st,t>}$. Q = { λw_s. [[price]](x)(p)(w) | p ∈ dom([[price]](x)) for some x }
c. **S2**(S1([[price]])) = $\lambda Q_{<st,t>}$. for some x, S1([[price]])(x)(Q) = 1.

(5) John asked Mary one price.

(6) a. John knows the price of milk.

b. "John knows the proposition that truly answers the question 'What price does milk have?'"

c. interpretation: "John" "knows" "the" "prop" "answers" "the" "S1-price" "milk"

structure: 1 w_1 John knows [$_{DP}$ the n [Op 2 [w_1 t_2 answers [$_{DP}$ the price of milk]]]]

pronunciation: John knows the price of milk

(7) a. John knows every price.

b. "John knows every prop. that truly answers a question of the form 'What price does x have?'"

c. interpretation: "every" "prop" "a" "S2-[S1-price]" "answers"

str. below *knows** : [$_{DP}$ every n [Op 2 [a price 3 [w_1 t_2 answers t_3]]]]

*Note that *a price* undergoes QR.

(8) **S3**([[flavor of ice cream]]) = $\lambda Q_{<st,t>}$. Q = { λw_s. [[f. of i.c.]](x)(w) | x ∈ dom([[f. of i.c.]]) }

(I.e., **S3**([[flavor of ice cream]]) gives us the singleton set containing the question 'What is a flavor of ice cream?')

(9) a. John knows every flavor of ice cream.

b. "John knows every prop. that truly answers the question 'What is a flavor of ice cream?' "

c. interpretation: "every" "prop" "answers" "the" "S3-[flavor of ice cream]"

str. below *knows* : [$_{DP}$ every n [Op 2 [w_1 t_2 answers [$_{DP}$ the flavor of ice cream]]]]

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Conversational backoff **Kyle Rawlins (Johns Hopkins University)**

The phenomenon Two types of dynamic updates are well-established. Uncontroversial statements lead to monotonic updates: tractable and easy to model e.g. with $\cap$ (Stalnaker 1978 etc.). Disagreements, however, lead to non-monotonic updates: less tractable, and requiring belief revision to model. This paper describes and analyzes a case in the middle, neglected but for Lewis 1979. This is a species of non-monotonic update that is nonetheless perfectly tractable; I term it *conversational backoff*. It is exemplified in the following two dialogues.

(1) A: Alfonso is going to lose.
B: What if he plays at B2? (*What if* question)

(2) A: Alfonso is going to lose.
B: What about the move at B2? (*What about* question)

In both examples, A makes an assertion, and B challenges it in an indirect way. The interesting property is that A's claim is the expected non-monotonic revision does not happen – the challenges allow A's claim to stand. However, they do limit the scope of A's claim. For example, B's question in (1) accepts that Alfonso will lose if he doesn't play B2 (though A meant it unconditionally). The question is limited only to the specific case where he plays B2. The question in (2) has a similar effect; the specific case is calculated from a nominal phrase instead of an "if"-clause.

There are other means to force conversational backoff, including questions of various other types, and assertions explicitly introducing further possibilities (as in Lewis's 1979 example 6). But it is difficult to accomplish conversational backoff with outright disagreement:

(3) A: Alfonso is going to lose.
B: That's not true; he can play at B2 to win.

This response challenges A's claim as a whole in a very different way than the earlier B responses.

Two main questions arise: (i) What is the characterization and analysis of conversational backoff? (ii) What makes the two types of questions highlighted above especially suited to it? We might imagine, following e.g. Asher and Lascarides 2003, that discourse representations are annotated with a BACKOFF relation (along the lines of their CORRECTION relation), and that the above questions force the instantiation of this relation. What I show here is that the conditions for and behavior of conversational backoff follow from general principles about discourse, and that the two types of questions above are special not in they linguistically mark a particular discourse relation, but in that they involve a combination of semantic properties leading directly to the pragmatic conditions for conversational backoff. In particular, they act as conditional questions anaphoric to some previous question under discussion in the discourse.

Analysis Following Lewis 1979, I propose that conversational backoff is the resolution of vagueness about what was in the common ground; this vagueness is resolved in a direction unexpected to the initial speaker (A in the above). That is, A makes a claim implicitly relativized to some construal of what is in the common ground. B makes a discourse move that forces public resolution of this vagueness in a different way, asking a question only relative to the gap between A and B's alternate precisifications of the common ground. In the end, A's claim stands relative to the initial implicit construal, but their implicit construal is no longer jointly taken to be exhaustive. This adjustment is forced (and accepted by A) in preference to rejecting A's claim entirely.

Let us represent the uncertainty about the common ground by parameterizing it with a speaker argument X (cf. Gunlogson 2001, 2008) and a world argument w, as in (4). (cs stands for "commitment set" in Gunlogson's sense). Each world corresponds to a way of making the common ground precise. Relative to some *conversational domain* $D \subseteq \mathcal{W}$ we obtain a set of commitment sets that represents the ways that the context could be. This construct is somewhat like Gunlogson's *reduction set*, but here instead of uncertainty about future discourse states we are modeling epistemic uncertainty about the present state. It is then easy to see how to reconstruct, given a conversational domain, a (speaker oriented) context set representing maximal certainty as in (5) , or a Stalnakerian joint commitment set a la Gunlogson ($cx_{\{S,H\},D}$). Assertion can then be defined as an operation that updates all versions of the alternative set, as in (6) (in the joint case, this reduces to standard dynamic update).

(4) Let $cs_{X,w} = \{p \in D_{\langle st \rangle} \mid X \text{ is publicly committed to } p \text{ in } w\}$ (*commitment set*)

(5) Let $cx_{X,D} = \bigcap_{w \in D}(cs_{X,w})$ (*certainty context set*)

(6) $D + [\text{Assert}_X\ \phi] = \{w \mid \exists w' \in D : cs_{X,w} = (cs_{X,w'} \cup \{[\![\phi]\!]\})\}$

What can lead to conversational backoff? I illustrate the idea here by focusing on "what if" questions ("what about" questions work similarly, but their conditional nature is less direct). Said questions act like conditional questions (Isaacs and Rawlins 2008), except that the question is supplied anaphorically, instead of by a main-clause interrogative. That is, they effectively serve to "re-ask" an earlier question. Following Isaacs and Rawlins, I assume that a conditional question raises an issue only relative to a temporarily restricted context where the content of the "if"-clause is true. Crucially, the question has no impact outside of the restricted context. With conversational uncertainty, this temporary restriction and relativized questioning would be calculated relative to every possible construal of the context. (I assume but in this abstract do not represent the idea that Suppose leads to a temporarily restricted view of the context as in I&R, and that $\phi?$ partitions the context as in Groenendijk 1999.)

(7) Where $\phi?$ is the salient issue, $D + [\text{what if } \psi] = (D + \text{Suppose } \psi) + \phi?$

What does this add up to? A's assertion proposes to completely resolve some issue (e.g. whether Alfonso will win or lose). B's conditional question raises the issue again restricted only to a special case (e.g. if he plays at B2). I assume (following Beck and Kim 2006) that questioning cannot be trivial; it must involve multiple possible alternatives. But re-asking an answered question, even in a restricted way, would lead to triviality. Something must give; we could simply drop A's claim and start over, but (I propose) complete revision is a last resort. The formula in (7) leaves a substantial portion of the context untouched – it only requires $\phi?$ to be non-trivial in regions of the context where ψ is true. A's claim will therefore be compatible with the "what if" in exactly the untouched portions. Further, at the time of A's utterance, D was vague about whether ψ was a possibility.

The **conversational backoff adjustment** involves the speakers assuming that A's claim was interpreted relative to a precisification of the common ground where ψ is not a possibility. The result is then imported into the alternate precisification, where ψ is a possibility, but leaving the ψ-true regions untouched. This alternate precisification is forced by the contribution of the "if"-clause, which (following Stalnaker) requires that its contents be possible. The net effect is an ex post facto conditionalization of A's initial claim, in order to avoid dropping the claim altogether.

The crucial step is that in order to resolve the clash between the utterances without rejecting either one, the speakers jointly back off to the more inclusive resolution of what the context could be, but only after assuming a less inclusive version and interpreting A's utterance relative to it. Ingredients leading to backoff in (1-2) are uncertainty about the context, anaphoricity to a prior question (re-asking), and conditionalized questioning. These two constructions combine all these ingredients in one place, setting up the ideal situation for conversational backoff.

Modals are monsters: on indexical binding in English

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1. Synopsis. I argue, *contra* Kaplan (1989), that all English indexicals are bindable. The argument is based on a puzzle involving epistemic modals ('EMs' henceforth): I present a solution on which indexicals are systematically bound in the scope of EMs. Thus EMs turn out to be monsters, though (interestingly) ones of a different breed from the monsters which populate recent semantic literature.

2. The puzzle. Consider this scenario:

> Two amnesiacs, Rudolf Lingens and Gustav Lauben, are informed that they will be subjected to the following experiment. A coin will be tossed. If the outcome is tails, Lingens will be released in Main Library, Stanford, and Lauben will be killed. If the outcome is heads, Lauben will be released in Widener Library, Harvard, and Lingens will be killed. The experiment is executed. Later, one of the amnesiacs wakes up in a library and says:

(1) If the coin landed tails, I am in Main Library, Stanford.

(2) If the coin landed heads, I am in Widener Library, Harvard.

Utterances of (1) and (2) are true, but standard accounts miss this prediction. Take an off-the-shelf version of Kratzer's semantics for conditionals, and for simplicity (even though it's not required) assume that modal bases of unembedded EMs default to the epistemic state of the speaker. Let Lingens be the speaker. (2) gets truth-conditions:

> $[\![(2)]\!]^{c,w}$ = true iff for all w' in Lingens's epistemic state such that the coin landed heads in w', Lingens is in Widener Library in w'.

and hence is wrongly predicted to be false: in the heads-worlds in Lingens's epistemic state, Lingens is dead. Conversely, (1) is false if the speaker is Lauben. The puzzle generalizes: similar problems arise when indexicals occur in antecedents; analogous examples can be constructed for all English indexicals.

3. Conservative attempts. A first attempt consists in diagonalizing (cf. Stalnaker (1978)) on the two conditionals. The strategy is ineffective: one of the two resulting propositions is still false. A second account provides a semantics for modals in the spirit of Kaplan's (1968) semantics for *de re* attitude reports. This semantics yields truth-conditions compatible with the data. But, as is well known, it suffers from important problems of implementation: it is non-compositional (cf. Cresswell & von Stechow (1982)); or it requires *ad hoc* syntactic assumptions about movement (cf. Anand (2006)). These flaws motivate the search for a better alternative.

4. A monstrous account. An intuitive diagnosis of the problem suggests: *I* in (1) and (2) doesn't denote the actual speaker, but rather the individual who's speaking in the circumstances individuated by the antecedent. My proposal endorses and implements this intuition. Indexicals embedded under EMs work as bound variables and range over *epistemic counterparts* of their actual referents: i.e., roughly, objects that, for all a relevant subject knows, might be their actual referents. The idea is grounded in philosophical work on attitudes and counterpart theory due to Hintikka (1969) and Lewis (1983).

The technical implementation involves treating EMs as Kaplanian monsters of a new kind. EMs will 'overwrite' the context parameter with an n-tuple of coordinates derived from the index by means of a *pairing function*, provided by context. Schematically:[1]

[1] Notation: 'χ' and 'ψ' are variables over sentences, 'i'-variables range over indices, '*MB*' denotes the modal base. For simplicity, throughout the abstract I ignore the time component of indices.

(3) $[\![\text{must [if } \chi] \text{ [}\psi\text{]}]\!]^{c,i}$ = true iff $\forall i'$: $i' \in MB(i)$ and $[\![\chi]\!]^{f_c(i'),i'}$ = true, $[\![\psi]\!]^{f_c(i'),i'}$ = true

The pairing function recovers counterparts of the elements of the context from the modal base. More precisely: it pairs with each index in the modal base a sequence of epistemic counterparts of elements of the actual context (speaker, hearer, time, etc.). I argue that, for the case of unembedded modals like those in (1) and (2), the relevant counterpart relations should default to identity. As a result, (2) is assigned plausible truth-conditions, which solves our puzzle:

(4) $[\![(2)]\!]^{\langle w_c,x_c\rangle,\langle w_i,x_i\rangle}$ = true iff for all $\langle w', x'\rangle$ s.t.: $\langle w', x'\rangle$ is compatible with what x_i knows in w_i, and the coin landed heads in w', x' is in Widener Library in w'.

5. Two breeds of monsters. It's interesting to contrast the operator in (3) with monsters that have gained currency in recent literature (cf. e.g. Schlenker (2003), Anand (2006)). The latter simply 'overwrite' the context with the index. Construing epistemic *must* on this model we get:

(5) $[\![\text{must [if } \chi] \text{ [}\psi\text{]}]\!]^{c,i}$ = true iff $\forall i'$: $i' \in MB(i)$ and $[\![\chi]\!]^{i',i'}$ = true, $[\![\psi]\!]^{i',i'}$ = true

New and old monsters differ both empirically and conceptually. The difference in predictions is brought out by embeddings. Consider e.g.

(6) John believes that, if the coin landed tails, I am in Main Library, Stanford.

On plausible assumptions about the interaction of attitude verbs and modals, the account in (5) wrongly predicts that *I* in (6) ranges over individuals that John takes *himself* to be, rather than individuals that John takes *the actual speaker* to be. By contrast, the account in (3) is flexible enough to accommodate (6). The counterpart relation which determines the range of *I* will be provided by the attitude verb, and will capture the way John locates the actual speaker in his belief state.

Conceptually, the two accounts differ in the kind of cognitive significance they associate with indexicals. The account in (5) lets the range of indexicals be fixed by their characters: for example an embedded *I* invariably picks out the individual speaking in all indices in the modal base. This reflects Kaplan's idea that the cognitive significance of indexicals coincides with their character. By contrast, the account in (3) divorces cognitive significance from linguistic meaning: the cognitive significance of indexicals is given by counterpart relations provided by context. This idea seems worthy of further exploration, in particular in connection with other non-metaphysical modals like belief operators.

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The meanings of positive polarity minimizers in Japanese: a unified approach

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Observe the following sentence:

(1) Kono doa-wa {*chotto/sukoshi*} ai-teiru. (NPIs = *chitto-mo/sukoshi-mo* +*-nai* 'neg')
This door-TOP a little open-PERF
'This door is a little open.'

(1) contains an absolute gradable adjective (e.g. Kennedy 2007), which posits a minimum standard. Thus, (1) is interpreted as, 'The degree of openness of this door exceeds the minimum standard by a small amount.' (Note that ***sukoshi*** and *chotto* in (1) are PPIs. If (1) is negated, the sentence becomes ungrammatical. However, if the particle *mo* is attached to ***sukoshi/chotto***, the resulting compound behaves as an NPI, and the negative version of (1) becomes grammatical.)

Interestingly, *chotto*, but not ***sukoshi***, can also appear in an environment where there is no gradable predicate it can combine with:

(2) {*Chotto*/**sukoshi*} kaimono-ni i-te ku-ru. (Assertion)
CHOTTO shopping-to go-TE come-NON.PAST
'lit. *Chotto* I will go shopping.'

Matsumoto (1985) observes that this type of *chotto* is used to weaken the degree of illocutionary force. I will call the type of minimizer in (1) an amount minimizer and the type of minimizer in (2) an expressive minimizer.

The purpose of this paper is to investigate the semantics/pragmatics of the amount minimizer and the expressive minimizer and provide a formal analysis that captures the symmetrical and asymmetrical relationships between them in a principled way. I will argue that the two kinds of minimizers are semantically parallel in that their interpretations are derived by a single lexical item. However, I will also argue that there is an asymmetrical relationship between them—i.e., the richness of their degree morphology. It will be shown that this asymmetry can naturally be explained by positing that there is a natural extension from a semantic scale to a pragmatic scale, but not vice versa.

Diagnostics for distinguishing between the two kinds of minimizers: Two pieces of evidence suggest that the amount minimizer and the expressive minimizer are logically/dimensionally different. First, unlike the amount minimizer seen in (1), the expressive minimizer seen in (2) can appear with negation. (Recall that the amount minimizers cannot appear with negation):

(3) {*Chotto*/**sukoshi*} jikan-ga nai-desu. (*Chotto* = the expressive minimizer)
A little time-NOM NEG-PRED.POL
At-issue: 'I don't have time.' CI: The degree of commitment of the assertion is low.

If *mo* is attached to *chotto*/***sukoshi*** in (3), the sentence means 'I don't have time at all.' Additionally, in (1) the negative response, 'No, that's not right' can target the meaning (i.e. amount) created by the minimizers, whereas in (2) such a negative response could not target the meaning created by the minimizer *chotto*. These evidence suggest that the two types of minimizers are compositionally and dimensionally different (Potts 2005).

In light of the above argument, how can we analyze the meanings of the two types of minimizers? I argue that although the amount minimizer and the expressive minimizer are different in terms of function, their meanings are derived by the same lexical item:

(4) $[\![\text{sukoshi/chotto}]\!] = \lambda G_{<d<X,t>>}\lambda X.\exists d[d > \approx \text{STAND} \wedge G(d)(X)]$
(where X is either an individual of type <e> or a speech act force of type <a>, and ***sukoshi*** always specifiies X as an individual.)

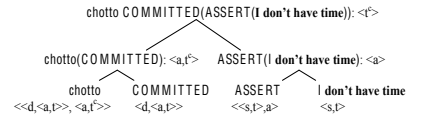
For example, if we combine the amount minimizer with the gradable predicate *ai-teiru* (i.e. $\lambda d\lambda x.\text{open}(x)=d$), we get the following truth condition:

(5) $[\![\text{chotto/sukoshi}]\!]([\![\text{ai-teiru}]\!]) = \lambda x.\exists d[d > \approx \text{STAND} \wedge \text{open}(x) = d]$

In words, (5) says that the degree of openness of *x* is slightly greater than a minimum standard. (Note that if the amount minimizer combines with a relative gradable adjective like *takai* 'expensive', STAND in (4) is interpreted as a contextual standard; e.g. Kennedy 2007).

The meaning of the expressive *chotto* can also be derived from (4). The semantic structure of (3) is shown in (6). (I assume that an illocutionary operator combines with a sentence radical meaning, e.g. Krifka (2001). The superscript c stands for conventional implicature (CI)):

(6)



The expressive *chotto* takes a null gradable predicate COMMITTED and an illocutionary force and returns a CI. Note that since COMMITTED is an absolute gradable predicate that posits a minimum standard, STAND in (4) is interpreted as a minimum standard. This argument shows that there is a parallelism between scale structure in the adjectival domain and the speech act domain, and the semantic status of *chotto* varies according its modification structure. **Ambiguity**: Note that the expressive *chotto* does not have to be at a sentence initial position:

(7) Kono hon-wa {***sukoshi/chotto***} takai
This book-TOP a little expensive
a. The degree of expensiveness of this book is slightly greater than a standard.
b. This book is expensive. (The degree of commitment of the assertion is slightly greater than a minimum.) (with *chotto*)

The following example supports the idea that (7) with *chotto* has an expressive reading:

(8) Kono doa-wa {chotto/*sukoshi} simat-tei-masu. (Please use another door.)
This door-TOP CHOTTO close-PERF-POLITE
'This door is closed.' (CI: The degree of commitment of the assertion is slightly greater than a minimum.)

(8) does not have an amount reading because the predicate ***simat-teiru*** 'closed' is an upper-closed scale adjective, which posits a maximum standard. It is impossible to measure the degree of 'closedness' from the maximum point. However, (8) with *chotto* has an expressive reading. This suggests that syntactically expressive minimizers do not always have to be at a sentence initial position. **Conclusion**: The theoretical implication is that there is a parallelism between the

adjectival domain and the speech act domain in terms of scale structure. This idea naturally explains the difference between the amount minimizers and the expressive minimizers in terms of the level of attachment. I explain the difference between *chotto* and *sukoshi* by positing that there is a natural extension from a semantic scale to a pragmatic scale, but not vice versa.

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A Third Reading for Specificational Subjects

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We compare two theories of specificational *be*: the asymmetrical theory and the symmetrical theory. We argue for the latter, based on a three-way ambiguity of specificational subjects.

The ambiguity. (1) and (2) show that the specificational subject *the professor that Fred thought was Mary* supports Readings A and B, in accordance with Romero (2005, 2007).

(1) The professor that Fred thought was Mary was (in fact) Sally.
Reading A: Mary≠Sally, and Fred is acquainted at least with Mary. There is a professor-question Q (e.g., 'Who is the physics professor?'); Fred answers Q by pointing at Mary (or providing a suitable description of Mary), but the actual answer to Q is *Sally*.

(2) The professor that Fred thought was Mary was the physics professor.
Reading B: Fred is acquainted with Mary. There is a professor-question Q (e.g., 'Who is the physics professor?'); Fred answers Q by pointing at Mary (or providing a suitable description of Mary). It is possible that his answer is not the actual answer.

We observe that the specificational subject in (3), with *unicorn* as the head of the relative clause and a definite description after the embedded copula, supports a reading that we call Reading C.

(3) The unicorn Fred thought was the unicorn he saw yesterday was the unicorn he had kissed the day before.
Reading C: Fred's answer to 'Which unicorn did you kiss the day before yesterday?' is *The unicorn I saw yesterday*. In a world without unicorns, the question doesn't have an answer.

We show that both the symmetrical and asymmetrical-*be* theories generate Reading C as a special case of Reading B, but only the latter generates for (3) an unattested reading.

The asymmetrical *be* theory (Romero 2005). This theory analyzes specificational subjects and concealed questions, which also exhibit a A/B ambiguity (see (4); Heim 1979), in a uniform way.

(4) John knows the price that Fred knows. (Context: Q = 'How much does milk cost?')
a. Reading A: Both John and Fred know the answer to Q.
b. Reading B: Fred knows the answer to Q; John knows the answer to the meta-question 'Which price-question does Fred know the answer to'?

be^{SPEC} and *know* have the semantics in (5) and (6) respectively (σ is a *be*-type; a *be*-type is e or <s,τ>, where τ is a *be*-type). Typewise, the "subject" of be^{SPEC} matches the "object" of *know*.

(5) $[\![be^{\text{SPEC}}]\!]^{\mathcal{F}} := [\lambda w{\in}D_s\,.\,\lambda y{\in}D_\sigma\,.\,\lambda x{\in}D_{<s,\sigma>}\,.\,x(w) = y]$.

(6) $[\![know]\!]^{\mathcal{F}} := [\lambda w{\in}D_s\,.\,\lambda y{\in}D_{<s,\sigma>}\,.\,\lambda x{\in}D_e\,.\,DOX_{x,w} \subseteq \{w'{\in}D_s : y(w') = y(w)\}]$

Accordingly, in (7) the type of the trace in the embedded clause is <s,e>. The external argument of the matrix be^{SPEC} is [*the* $PROF^{<s,<<s,e>,t>>}$-w_0 [1 [*Fred thought*-w_0 [2 [$t_1^{<s,e>}$ be^{SPEC}-w_2 *Mary*]]]]] (of type <s,e>, for Reading A), or its intension (of type <s,<s,e>>, for Reading B).

(7) Reading A – (1): [*the* $PROF^{<s,<<s,e>,t>>}$-w_0 [1 [*Fred thought*-w_0 [2 [$t_1^{<s,e>}$ be^{SPEC}-w_2 $Mary^c$]]]]] be^{SPEC}-w_0 $Sally^c$
Reading B – (2): [3 [*the* $PROF^{<s,<<s,e>,t>>}$-w_3 [1 [*Fred thought*-w_3 [2 [$t_1^{<s,e>}$ be^{SPEC}-w_2 $Mary^c$]]]]] be^{SPEC}-w_0 [3 [*the physics-professor*$^{<s,<e,t>>}$-w_3]]

In a parallel fashion, the embedded trace in (8) is of type <s,e>. Matrix *know* takes [*the* $PRICE^{<s,<<s,e>,t>>}$-w_0 [1 [*Fred knows*-w_0 $t_1^{<s,e>}$]]] (for Reading A) or its intension (for Reading B).

(8) Reading A – (4a): *John know*-w_0 [*the* $PRICE^{<s,<<s,e>,t>>}$-w_0 [1 [*Fred know*-w_0 $t_1^{<s,e>}$]]]
Reading B – (4b): *John know*-w_0 [3 [*the* $PRICE^{<s,<<s,e>,t>>}$-w_3 [1 [*Fred know*-w_3 $t_1^{<s,e>}$]]]]

Romero's analysis of concealed questions has been challenged on various grounds (Frana 2006, Nathan 2006). Independently of that criticism, our point here is that specificational subjects and concealed questions cannot receive a uniform analysis. The problem concerns Reading C of (3).

Reading C. Reading C of (3) may be generated as in (9) (cf. Reading B of (2)).

(9) [3 [*the* $UNICORN^{<s,<<s,e>,t>>}$-w_3 [1 [*Fred thought*-w_3 [2 [$t_1^{<s,e>}$ be^{SPEC}-w_2 [*the unicorn*$^{<s,<e,t>>}$-w_2 [4 [*he saw*-w_2 t_4^c *yesterday*]]]]]]]] be^{SPEC}-w_0 [3 [*the unicorn*$^{<s,<e,t>>}$-w_3 [2 [*he kissed*-w_3 t_2^c *TDB*]]]]

But the same assumptions also yield (10) – with an embedded trace of type <s,<s,e>> – predicting, counter-intuitively, that (3) may be felicitous when Fred entertains the belief that he saw two unicorns or no unicorns at all. (10) doesn't guarantee that $[\![$ [5 [*the unicorn*$^{<s,<e,t>>}$-w_5 [2 [*he saw*-w_3 t_2^c *ystrday*]]]] $]\!]^{\mathcal{F}}$ is defined in any of Fred's actual doxastic alternatives.

(10) [*the* ***UNICORN***$^{<s,<<s,<s,e>>,t>>}$-w_0 [1[*Fred thought*-w_0 [2 [$t_1^{<s,<s,e>>}$ be^{SPEC}-w_2 [5[*the unicorn*$^{<s,<e,t>>}$-w_5 [6[*he saw* t_6^c*ystrday*]]]]]]]] be^{SPEC}-w_0 [3 [*the unicorn*$^{<s,<e,t>>}$-w_3 [2[*he kissed*-w_3 t_2^c *TDB*]]]]

The only way to block (10) is to say that nouns cannot be of type <s,<<s,<s,e>>,t>> and/or traces cannot be of type <s,<s,e>>. But this would undesirably block higher order A/B readings (Heim 1979) of *John knows the price that Fred knows*. When Q='What is the price-question that Mary guessed the answer to?', either John and Fred know the answer to Q (A), or Fred knows it and John knows the answer to 'What is the question that Fred knows the answer to?' (B).

(11) Reading A: *John knows*-w_0 [*the* ***PRICE***$^{<s,<<s,<s,e>>,t>>}$-w_0 [1 [*Fred knows*-w_0 $t_1^{<s,<s,e>>}$]]]
Reading B: *John knows*-w_0 [3 [*the* ***PRICE***$^{<s,<<s,<s,e>>,t>>}$-w_3 [1 [*Fred knows*-w_3 $t_1^{<s,<s,e>>}$]]]]

Moreover, Readings A/B in (11) are felicitous when John and Fred don't believe in the existence of unicorns, as long as Q has an actual answer (e.g., 'Mary guessed that unicorns cost $1000'). But *John knows the price that Fred thinks _ is the price of unicorns* is infelicitous when Fred doesn't believe unicorns (exist and) have a price. Be^{SPEC} predicts a felicitous reading (similar to the one in (10)). Conclusion: *know* and specificational *be* require different analyses.

A symmetrical non-predicational *be* (Jacobson 1994, Sharvit 1999, a.o.). Non-predicational *be* is the symmetrical $be^{\text{NON-PRED}}$ in (12). There is no be^{SPEC}, as defined in (5). Unlike other verbs (including predicational *be*) and all nouns, $be^{\text{NON-PRED}}$ doesn't take a pronominal world-argument.

(12) $[\![be^{\text{NON-PRED}}]\!]^{\mathcal{F}} := [\lambda y{\in}D_\sigma\,.\,\lambda x{\in}D_\sigma\,.\,x = y]$

Assumptions about the syntax: (a) "functional" traces (i.e., traces that take pronominal arguments; Chierchia 1991, 1993, a.o.) may take pronominal world-arguments; (b) Full DPs cannot take pronominal world-arguments. Accordingly, in (13) t_1 is of type e and is interpreted *de re* via a suitable acquaintance relation; in (14)-(15) t_1 is of type <s,e>.

(13) A: [*the professor*$^{<s,<e,t>>}$-w_0 [1 [*Fred thought*-w_0 [2 [t_1^c $be^{\text{NON-PRED}}$ *Mary*]]]]] $be^{\text{NON-PRED}}$ *Sally*

(14) B: [*the* $PROF^{<s,<<s,e>,t>>}$-w_0 [1 [*Fred thought*-w_0 [2 [$t_1^{<s,e>}$-w_2 $be^{\text{NON-PRED}}$ *Mary*]]]]] $be^{\text{NON-PRED}}$ [4 [*the physics-professor*$^{<s,<e,t>>}$-w_4]]

(15) C: [*the* $UNICORN^{<s,<<s,e>,t>>}$-w_0 [1 [*Fred thought*-w_0 [2 [$t_1^{<s,e>}$-w_2 $be^{\text{NON-PRED}}$ *the unicorn*$^{<s,<e,t>>}$-w_2 [3 [*he saw*-w_2 t_3^c *yesterday*]]]]]]] $be^{\text{NON-PRED}}$ [4 [*the unicorn*$^{<s,<e,t>>}$-w_4 [3 [*he kissed*-w_4 t_3^c *the day before*]]]]

Reading C ((15)) is like Reading B ((14)), in that the embedded trace is of type <s,e> (so (15) mimics (9)). But (16) (which corresponds to (10)) is blocked by our assumption (b): it is ill-formed due to the "offending" world-argument (underlined in (16)) of the matrix subject DP.

(16) [*the* ***UNICORN***$^{<s,<<s,<s,e>>,t>>}$-w_0 [1 [*Fred thought*-w_0 [2 [$t_1^{<s,<s,e>>}$-w_2 $be^{\text{NON-PRED}}$ [5 [*the unicorn*$^{<s,<e,t>>}$-w_5 [3 [*he saw*-w_5 t_3^c *yesterday*]]]]]]]]-$\underline{w_0}$ $be^{\text{NON-PRED}}$ [4 [*the unicorn*$^{<s,<e,t>>}$-w_4 [3 [*he kissed*-w_4 t_3^c the *day before*]]]]

Assumption (b) doesn't render any of the LFs in (11) ill-formed; their felicity and the felicity of *John knows the price Fred thinks _ is the price of unicorns* depends on the context.

Further implications. The generation of an unwanted reading for (3) is also a problem for a uniform "clausal" treatment of specificational subjects and concealed questions (Romero 2007). This undermines the bi-clausal analysis of Connectivity in specificational pseudoclefts.

Negative Islands, Gradable Predicates, and Discreteness of Measurement in Japanese

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Introduction. Degree questions in Japanese (J) display the negative island (NI) effect familiar from English (E). Just as in E ([1]), in J the effect can be obviated by modal expressions. Our new observation is that NIs in J are obviated by the particle *wa*. We offer an analysis of this pattern: inspired by [2], we propose that gradable predicates in J have an *exactly*-semantics of the sort employed for E in [3] (alternatively: an interval semantics; see [2], [4]), but that an *at least* semantics can be derived by *wa*. This helps derive NI obviation by *wa* under the assumption that question denotations are presupposed to contain a maximally informative true answer ([1], [2]). More accurately, obviation is derived under the assumption that all scales can be treated as discrete in J, which is in direct opposition to [1], who argue for universal density of scales based on E data.

Obviation by *wa*. The contrast between (1) and (2) shows that J patterns with E in displaying the NI effect ([1]-[4]). What makes J data interesting is that, as illustrated by the fully acceptable (3), NIs can be obviated by the particle *wa* attaching to the degree predicate.

(1) Doitu-ni doredake nagaku taizaisimasu ka?
Germany-in how long stay Q
'How long will you stay in Germany?'

(2) */?? Doitu-ni doredake nagaku taizaisimasen ka?
Germany-in how long stay.not Q

(3) Doitu-ni doredake nagaku-wa taizaisimasen ka?
Germany-in how long-WA stay.not Q
'How long-WA will you not stay in Germany?'

While the best-known function of *wa* is that of a topic marker, the particle has a wider range of functions which are currently under investigation (e.g. [5], [6], [7]). The NI obviating potential of *wa*, however, does not seem to have been noted before.

A case of modal obviation? J also allows for so-called modal obviation of NIs, familiar from E ([1], [2], [4]). In particular, as (4) illustrates, addition of a wide scope epistemic necessity operator renders (1) acceptable.

(4) Doitu-ni doredake nagaku taizaisinai koto-ga kakuzitu-desu ka?
Germany-in how long stay.not KOTO-NOM certain-COP Q
'How long are you sure you will not stay in Germany?'

One account that comes to mind interprets NI obviating *wa* as a wide scope epistemic necessity operator, so that any analysis of modal obviation carries over to *wa*-obviation. However, such an epistemic interpretation of *wa* seems to lack independent support. Also, given the general scope rigidity in J, one would expect locality effects that are not in fact attested. In (5), for example, *wa* obviates the NI despite being separated from the higher negation by a clause boundary. An epistemic necessity analysis must stipulate that *wa* can scope non-locally out of the embedded clause.

(5) Hikoku-wa [doitu-ni doredake nagaku??(-wa) taizaisita to] syutyoosimasendesita ka?
defendant-TOP Germany-in how long-WA stayed that didn't.claim Q
'How long ??(-WA) did the defendant not claim that he stayed in Germany?'

An alternative. We take our cue for an alternative analysis from the observation, illustrated in (6), that certain occurrence of *wa* can be glossed as *at least* or *or more* (e.g. [5], [6]).

(6) Taro-wa haiku-o itu-tu-wa tukutta/tukuranakatta.
Taro-TOP haiku-ACC 5-CL-WA made/didn't.make
'Taro made/didn't make five or more haiku.'

Degree question architecture. (1), (2), (4) suggest that J degree questions share a familiar grammatical make-up with their E counterparts: we take J degree questions to feature derived degree predicates like those in (1)', (2)', (4)'. These express functions mapping degrees to possible answers.

(1)' λd[YOU STAY [d **LONG**] IN GERMANY]

(2)' λd[**NOT** [YOU STAY [d **LONG**] IN GERMANY]]]

(4)' λd[□ [**NOT** [YOU STAY [d **LONG**] IN GERMANY]]]

Maximality under an *exactly*-semantics. Following [1] and [2], we take questions to presuppose that their answer sets contain a unique maximally informative true answer. As noted in [2], this condition predicts the contrast between (non-modalized) positive and negative degree questions if gradable predicates are assigned an *exactly* semantics (see [3]), as in (7).

(7) |LONG| = λe.λd. e's length = d

Under (7), (1)' generates a unique true answer, which specifies the exact number of days for which you will stay in Germany, guaranteeing satisfaction of maximality. In contrast, (2)' generates many true answers, one for each degree other than the exact number of days for which you will stay in Germany; these true propositions are not related by entailment, so maximality cannot be satisfied. Under an *exactly*- semantics, then, NI effects can be due to contradictory presuppositions. Moreover, as [2] also notes, the contradiction is predicted to dissipate in cases like (4); this is because it is possible for some number to be the only number of days which you are sure is not the exact number of days you will be staying in Germany. (4)' will then generate a unique true answer, just like (1).

Wa: *at least* semantics. Inspired by data like (6), we propose to explain NI obviation by *wa* by letting the particle derive degree predicates with an *at least* semantics, as illustrated in (8).

(8) |LONG-WA| = λe.λd. e's length ≥ d

Under (8), the degree property in (3)' below can underlie a question satisfying maximality. This is so because the degree property in question will generate propositions that are related by entailment. More specifically, this degree property is strictly upward monotone, in the sense that it maps lower degrees to stronger propositions than higher degrees.

(3)' λd[**NOT** [YOU STAY [d **LONG-WA**] IN GERMANY]]

So the most informative answer will specify the lowest degree that the property maps to a true proposition. Assuming that length of stay is measured in days, and your stay in Germany will be, say, exactly nine days long, the most informative true proposition in the answer set will be the proposition that your stay will not be ten or more days long.

Discreteness of measurement. We have assumed that the length of stays in Germany is measured in days, i.e. that the scale in question is treated as discrete. Discreteness is indeed a necessary ingredient of the account, as otherwise maximality could not be satisfied ([1]). But NI obviation by *wa* is also found in cases of apparent scale density. Our proposal must posit that in such cases discreteness can nevertheless be accommodated. In this, our account is diametrically opposed to the groundbreaking proposal in [1], which posits scale density even in cases of apparent discreteness.

Outlook. (i) The position that J lexical degree predicates have an *exactly*-semantics may have to be revised. For example, while the maximality presupposition derived for (4) is satisfiable, it may still be too strong. One promising modification replaces the *exactly*-semantics with an interval semantics ([2],[4]), and lets *wa* perform downward closure of the intervals in question. (ii) Recent work discusses uses of *wa* that go beyond its well-known topic marking function ([5],[6],[7]). NI obviating *wa* can be added to the list, introducing a new desideratum for a complete unified theory of *wa*.

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Focus on reflexive anaphors

This paper compares three theories for the semantics of reflexive anaphors (*herself*) in English. Based on the distribution of stress in examples like (1) and (2) (from [1]), it is argued that reflexive anaphors should be treated as reflexivizing functions, rather than variables.

(1) A: Lucie praised Oscar.
B1: No, ZELDA praised herSELF.
B2: No, ZELDA praised herself. #

(2) A: Lucie praised herself.
B1: No, ZELDA praised herSELF. #
B2: No, ZELDA praised herself.

Focus theory I assume that stress assignment is read off the distribution of F(ocus)-features on syntactic structures (*focus respresentations*) and that the distribution of F-features is determined by information packaging. I follow [2] in assuming that the only relevant notion is that of *Givenness* in (3), and that competing focus representations are subject to an economy principle. I adopt the economy principle in (4) (based on Heim's (1991) Maximize Presupposition, cf. [3]). (4) simultaneously forces a preference for fewer F-markers and wider focus domains (i.e. the domain of evaluation of Givenness, the clause in all the examples in this paper)(cf. [4]). The stress assignment rules in (5) (cf. [4]) regulate the mapping from focus represenations to accent. To illustrate, consider (6). Stress assignment in B1 and B2 is compatible with the three focus representations in table (7). All are entailed by A's utterance and are, thus, *Given*. Maximize Presupposition, then, favors (7a), since it entails (7b) and (7c).

(3) An Utterance U counts as *Given* iff it has a salient antecedent A and, modulo ∃-type shifting, A entails the Existential F-closure of U.

(4) If α and β are focus representations of an Utterance U that are both Given, and the Existential F-closure of α entails the Existential F-closure of β, pick α.

(5) i. F-marked constituents are stronger than non-F-marked constituents.
ii. Within an F-marked constituent, apply default prosody.

(6) A: Max ordered a soup.
B1: No, OSCAR ordered a soup.
B2: No, OSCAR ordered a SOUP. #

(10) A: Lucie praised Zelda.
B1: No, ZELDA praised herSELF.
B2: No, ZELDA praised herself. #

(7)	**Focus representation**	**Existential F-closure**	**Givenness**	**MaxPres**
a.	[OSCAR]$_F$ ordered a soup.	*Someone ordered a soup.*	OK	←
b.	[OSCAR]$_F$ ordered [a SOUP]$_F$	*Someone ordered something*	OK	
c.	[OSCAR]$_F$ [ordered a SOUP]$_F$	*Someone did something*	OK	

The theories *Theory 1 Reflexives as pronouns (e.g. [5])* According to this theory reflexives (like pronouns) are translated into variables that can either be bound or remain free ($[\![\text{himself}_1]\!]^g = [\![\text{him}_1]\!]^g = g(1)$). This ambiguity gives rise to two (relevant) Existential F-closures for B2. As shown in tables (8) and (9) (for (1) and (2), respectively) the theory correctly predicts the stress pattern, at least as long as Maximize Presupposition is calculated at the level of the bound-referential ambiguity. The theory fails, however, with the variant of (1) in (10)(above).

(8)	**Focus representation**	**Existential F-closure**	**Givenness**
a.	[ZELDA]$_F$ praised [herSELF]$_F$	*Someone praised someone.*	OK
b.	[ZELDA]$_F$ praised herself *(ref)*	*Someone praised Zelda*	*
c.	[ZELDA]$_F$ praised herself *(bound)*	*Someone praised herself*	*

(9)	**Focus representation**	**Existential F-closure**	**Givenness**	**MaxPres**
a.	[ZELDA]$_F$ praised [herSELF]$_F$	*Someone praised someone.*	OK	
b.	[ZELDA]$_F$ praised herself *(ref)*	*Someone praised Zelda*	*	
c.	[ZELDA]$_F$ praised herself *(bound)*	*Someone praised herself*	OK	←

By allowing the referential construal of the reflexive, Theory 1 predicts the stress pattern in (10B2). This is shown in (11). We need a more restrictive theory, then, that excludes (11b).

(11)	**Focus representation**	**Existential F-closure**	**Givenness**	**MaxPres**
a.	[ZELDA]$_F$ praised [herSELF]$_F$	*Someone praised someone.*	OK	
b.	[ZELDA]$_F$ praised herself *(ref)*	*Someone praised Zelda*	OK	←
c.	[ZELDA]$_F$ praised herself *(bound)*	*Someone praised herself*	*	

Theory 2 Reflexives as bound variables (e.g. [6]) This is a variant of Theory 1 that poses the syntactic requirement that the variable must end up being bound . The deaccented VP *praised herself* can now only end up meaning *λx. x praised x*. The theory gives the right results for both (1) and (2), as shown in tables (12) and (13), respectively. Since the offending referential construal in (11b) is not available, table (12) also correctly predicts the pattern in (10).

(12)	**Focus representation**	**Existential F-closure**	**Givenness**
a.	[ZELDA]$_F$ praised [herSELF]$_F$	*Someone praised someone.*	OK
b.	[ZELDA]$_F$ praised herself	*Someone praised herself*	*

(13)	**Focus representation**	**Existential F-closure**	**Givenness**	**MaxPres**
a.	[ZELDA]$_F$ praised [herSELF]$_F$	*Someone praised someone.*	OK	
b.	[ZELDA]$_F$ praised herself	*Someone praised herself*	OK	←

Theory 3 Reflexives as reflexivizing functions (e.g. [7]) The empirical success of Theory 2 can also be achieved by a theory that builds the binding requirement in the semantics of the reflexive. Reflexives are reflexivizing functions that take a relation as an argument and return a reflexivized property ($[\![\text{himself}]\!] = \lambda R \lambda x.\ R(x)(x)$). Since the VP *praised herself* again means *λx. x praised x*, the Existential F-Closures we end up with are the same as in (12) and (13). Theories 2 and 3 are so far empirically equivalent. The next section decides between the two. **Prosodic asymmetry** Givenness requires the VP in (14B) to be F-marked and default prosody applies within it. [3] demonstrates that default prosody is sensitive to the semantic distinction between functions and their arguments, as summarized in (17). The stress pattern of (14B) is explained since *ordered* is the functor and *a soup* its argument. I argue that Theory 3 readily explains why stress is different in (15B). If *herself* is the functor and *praise* the argument, (15B) falls under (17b). Theory 2, on the other hand, where *herself* is an argument of type e, wrongly predicts the VP to fall under (17a) and display the same pattern as (14B). One might want to argue that *herself* is subordinated because it is an anaphor, and, thus, necessarily *Given*. It is argued that, even after granting the necessary adjustments that will have to be made to the focus theory adopted here, there is no obvious notion of *Givenness* that can capture both (15B) and (16B).

(14)A:What did Zelda do? B:Zelda [ordered a SOUP]$_F$

(15)A: What did Zelda do? B:Zelda [PRAISED herself]$_F$

(16) A:What did every girl do? B:Every girl [PRAISED herself]$_F$

(17) a. When a functor A precedes its complement B, the functor may be on a par with its argument or may be prosodically subordinated.
b. When a functor A follows the complement B, A is prosodically subordinated.

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Almost and Epistemic Approximation

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A naive analysis of *almost* can naturally establish a semantic parallel between *almost* and *approximately*. In view of the similarities *almost* can be assumed to be a scalar marker of approximation: indeed, it has been tentatively proposed to regulate scale granularity (cf. Sauerland and Stateva (S&S) 2007). This work considers the distinction between scalar and epistemic approximators established by S&S and argues that *almost* (and its counterpart *barely*) are epistemic modifiers similar to *definitely* and *clearly* but unlike these they are not related to higher order vagueness.

I. *Almost* and scale granularity To identify the meaning of *almost* we need the following ingredients: (i) *almost* integrates a proximal and a polar component illustrated in (1) (Sevi 1998, Horn 2002, etc.); (ii) *almost* seems to operate on a scale (Hitzeman 1992, Sevi 1998, Penka 2006), applying only in one (contextually given) direction from any point of a scale (Saddock 1981); (iii) *almost* is cross-categorial (Penka 2006). Focusing on (i) and (ii), we notice the similarity in meaning and distribution between *almost* and *approximately* (cf. (2)). The obvious difference relates to the exclusion of a polar component in the meaning of *approximately*, and the directionality mentioned in (ii). This naturally suggests that *almost* can be interpreted in (2a), relative to a granularity parameter *gran*, as related to the interval preceding the maximum on the coarsest granularity, as proposed by S&S (cf. (3)). This proposal reflects the properties of *almost* in (ii); it takes into consideration the proximity generalization from (i), and implies that we need more than one lexical entry to satisfy (iii).

II. Puzzling combinatorial properties (ii) lies at the core of S&S's proposal, so naturally, it represents *almost* as a scalar modifier, similar not only to *approximately* but also to modifiers like *exactly*, *completely*, *absolutely*, *precisely*, *perfectly*, etc. As predicted by S&S's proposal, approximators of this scalar class cannot be stacked (cf. (4)) because a granularity regulator within the scope of another regulator is used vacuously. However, *almost* disobeys the ban on modifier stacking (cf.(5)). It also differs from the class of scalar modifiers in that it is able to modify not only point-denoting predicates but all genuinely epistemically vague expressions (cf.(6)). A more careful observation shows that *almost* is just as combinatorially free as all epistemic modifiers like *definitely*, *certainly*, *clearly*, etc (7).

III. Proposal I argue that the parallel between *almost* and the *definitely*-class modifiers goes a long way. What seems like an exceptional behavior of *almost* from the point of view of scalar approximation, is in fact, the default in the case of epistemic modification. To define *almost*, I will fall back on Barker's (2002) proposal for *definitely*. In a dynamic semantic model, he characterizes *definitely* by three degrees: (a) $\iota(\max(\lambda d.c[d/\alpha]\in\alpha(x)))$, the maximal degree *d* to which an individual *x* has a property α in a world under consideration *c*; (b) $\iota(\max(\lambda d.c[d/\alpha]\in C))$, the maximal degree *d* out of all standards of comparison for the property α in the worlds under consideration in a context C; (c) $\mathbf{d}(c)([[\text{clearly}]])$, the degree (standard of comparison) that results from applying a delineation function ***d*** to the meaning of the gradable adjective *clearly* in a world *c*. For a house to be definitely expensive it must be the case that the degree that corresponds to the house on the *expensive* scale derived through (a) must exceed the respective standard of comparison derived through (b) by a certain amount defined by (c). In similar vein, I propose to characterize *almost* in (7a), by two degrees: (d) $\iota(\max(\lambda d.c[d/\alpha]\in\alpha(x)))$, the maximal degree *d* to which an individual *x* has a property α in a world under consideration *c* (importantly, it is required that *c* be a member of a contextually defined C`, such that C`⊂C where C is the relevant context); and (e) $\iota(\max(\lambda d.c[d/\alpha]\in C))$, the maximal degree *d* out of all standards of comparison for the property α in the worlds under consideration in a context *C*. (8) puts the requirements together in a suggested entry for *almost*. For (6b) to be true, it must be the case that the degree in (d) is greater than that in (e). Naturally, for the proposed semantics to reflect the meaning of *almost* correctly, we need to specify how the candidate worlds *c* are selected, and how the value of *C'* is defined. For example, suppose that (6b) describes a situation in which bread costs on the average 1.95 euro in a country in which the price of 2.00 euro per loaf of bread marks the psychological upper limit. *C* would then include only those worlds *c* in which bread costs 2.00 euro or less. *C'* is introduced in order to implement technically the idea that *almost* is an epistemic operator which involves universal quantification over standards of comparison. The value of *C'*, i.e. a specified set of candidate worlds is defined in a manner similar to that in representing definite plural exceptions (cf. Schwarzschild 1996, Brisson 1998). The suggested analysis assigns equal status to the polar and the proximal component of the meaning of *almost* and sides with earlier claims that the polar component is not implicated which seems to be a welcome result given (9).

IV. *Almost* and quantifiers; counterfactual life of *almost* The distribution of *almost*, like that of *definitely*, is much wider than discussed so far but the parallel between the two can still be maintained. The two epistemic modifiers can syntactically modify not only gradable predicates but also numerals, DPs, VPs as in (10) (Morzycki 2001, Penka 2006). In addition, as illustrated in (11) *almost* can trigger counterfactual readings (McCawly 1971, Rapp and von Stechow 1999). The proposal in **III.** implies that these cases, too, have to be analyzed as involving a sort of comparison. This work will suggest an implementation of that idea. Importantly, such a move is independently called for if one acknowledges the motivation for Barker's 2002 analysis of vagueness modifier *definitely*.

(1) a. The company has almost 1000 employees.
b. The company comes close to having 1000 employees. (proximal component)
c. The company does not have 1000 employees. (polar component)
(2) a. What you said is almost/approximately true. c. John weighs almost/approximately 70 kg.
b. Bill is almost/approximately as tall as me. d. Almost/approximately half of the votes are in.
(3) $[[\text{almost}]]^{\text{gran}} = \lambda f{\in}D_{<dt,et>}.\lambda x{\in}D_e.\exists D{\in}D_{<dt>}.D=\text{coarsest(gran)}(\min(\text{domain}(f)))\&f(\text{prev}_{\text{gran}}(D))(x)$
(4) a. #Lorrie found exactly approximately 30 articles on the topic.
b. #The fish was completely perfectly cooked.
(5) The fish was almost perfectly/completely cooked.
(6) a. Bread is expensive this year. b. Bread is almost expensive this year.
c. Bread is #exactly/#approximately/#completely expensive this year.
(7) a. Bread is definitely expensive this year.
b. The fish was definitely perfectly cooked.
(8) $[[\text{almost}]] = \lambda f.\lambda x.\lambda C.\{c{\in}f(x)(C)\colon \forall d.(c[d/f] \in C' \rightarrow c[d/f]{\in}f(x)(C)\}$
(9) #Bread is almost expensive, in fact, it is expensive.
(10)a. Almost/definitely all plants are dry. c. John weighs almost/definitely 100 kg.
b. All plants are almost/definitely dry. d. John almost/definitely finished first.
(11) Sally almost married Tim.

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Imagining Contradictions

This paper looks at the behavior of Moore-paradoxical and other "contradictory sounding" sentences when embedded under predicates like *imagine*, with a focus on knowledge reports, epistemic modals, and taste predicates. Using a semantics with Lasersohn's "judge" parameter helps to explain otherwise puzzling patterns involving these sentences.

The Puzzle

Yalcin (2007) has observed that sentences like (1b) containing epistemic modals behave differently than traditional Moore paradoxical sentences such as (1a), which contains a knowledge report. In particular, while (1a) becomes acceptable when embedded under an attitude predicate like *imagine*, (1b) does not, as seen in (2). (The pronoun is changed from *I* to *you* because of the imperative mood in the embedded cases.)

(1) (a) # It's raining but I don't know that it's raining.
(b) # It isn't raining but it might be raining.

(2) (a) Imagine that it's raining but you don't know that it's raining.
(b) # Imagine that it isn't raining but it might be raining.

Recently, Lasersohn (2005) and Stephenson (2007) have suggested that the meaning of a taste predicate such as *fun*, *tasty*, or *funny* depends crucially on an individual "judge" parameter which is essentially equivalent to the individual center of a centered world. On this view, a sentence like *That joke is funny* is true at a centered world iff the joke is funny to the individual center.

Given a semantics along these lines, we can also construct sentences with a Moore-paradoxical flavor using taste predicates as in (3). As it turns out, these behave like Yalcin's examples with epistemic modals rather than like traditional Moore-paradoxical sentences. Specifically, sentences like (3) remain odd when embedded under *imagine*, as seen in (4).

(3) ?? This joke is funny but it isn't funny to me.

(4) ?? Imagine that this joke is funny but it isn't funny to you.

The Generalization

If we adopt the semantics of epistemic modals and taste predicates proposed by Stephenson (2007), the truth conditions of sentences (1a), (1b) and (3) are predicted to be as shown in (5)–(7), respectively, where $[\![\alpha]\!]^{c, w, x}$ stands for the extension of α at the world-individual pair (centered world) <w,x>, as uttered in context c.

(5) $[\![$It's raining but I don't know that it's raining$]\!]^{c, w, x} = 1$ iff it's raining in w and the speaker of context c doesn't know in w that it's raining. *[contains no "x"]*

(6) $[\![$It isn't raining but it might be raining$]\!]^{c, w, x} = 1$ iff it isn't raining in w and it's compatible **with x's knowledge** in w that it's raining.

(7) $[\![$This joke is funny but it isn't funny to me$]\!]^{c, w, x} = 1$ iff the (intended) joke is **funny to x** in w but the joke isn't funny to the speaker of context c in w

Note that the examples with an epistemic modal (6) or taste predicate (7) depend crucially on the individual center ("x"). In Stephenson's terms, then, they are judge-dependent propositions. In contrast, the one with an overt knowledge statement (5) does not depend on the individual center.

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Proposal

Following Ninan (2007), Recanati (2007), and others, I suggest that attitude predicates with a hypothetical flavor such as *imagine* (when taking a *that*-clause argument) have two distinct uses: one where an event is imagined from an objective, external perspective, and one where it is imagined from the perspective of a participant or experiencer of the event. I will refer to these as objective and subjective uses, respectively.

I suggest that the objective use of *imagine* is similar to the use of *imagine* when it takes a DP complement: if I imagine a cat, for example, I am doing something like building up a mental image of an animal with four legs, a tail, and so on. Similarly, if I imagine – in the objective way – that it's raining, I have to build up a mental image of a rain event. Crucially, I assume that the objective use of *imagine* is only possible with non-judge-dependent propositions, since the thing being imagined is simply an event or a part of a world, and does not have an individual center.

I propose that the second, subjective way of imagining involves putting oneself hypothetically in the position of having direct perceptual evidence for the proposition imagined. For example, if I imagine in the subjective way that it's raining, I have to imagine the kinds of perceptual experiences that would give me direct evidence of rain (for example, the feeling of water on my head, the sound of raindrops on the roof, and so on). This kind of imagining is possible with either judge-dependent or non-judge-propositions, since (for example) the feeling of water falling on one's head can serve as direct perceptual evidence that it's raining (a non-judge-dependent proposition), while having the urge to laugh can serve as direct perceptual evidence that a joke is funny (a judge-dependent proposition).

This view of the two different uses of *imagine* lets us explain the contrast between judge-dependent and non-judge-dependent sentences with a Moore-paradoxical quality. A traditional Moore-paradoxical sentence such as (1a) expresses a non-judge-dependent proposition, so it can be imagined in an objective way. This simply requires the imaginer to build up a mental image of a situation where (for example) it is in fact raining but a particular person doesn't know this. On the other hand, since sentences like (1b) and (3) express judge-dependent propositions, they are only compatible with the subjective use of *imagine*. Thus to imagine that it isn't raining but it might be raining is to imagine having direct perceptual evidence of rain while at the same type having direct perceptual evidence of the fact that it's compatible with one's knowledge that it isn't raining. Since these kinds of evidence would necessarily contradict each other, the embedded sentence (2b) sounds odd. Similarly, to imagine that a joke is funny but isn't funny to oneself would require imagining having direct perceptual evidence that the joke is funny (for example, by feeling the urge to laugh) while at the same time having direct perceptual evidence that the joke isn't funny to oneself, which again creates a contradiction.

This view also correctly predicts that sentences like (4) become acceptable if the imagining is done crucially from another person's perspective (as has been discussed for dream reports). For example, (8) can be understood as telling the addressee to imagine from the perspective of James Dean that the joke is funny to James Dean but not to the addressee themselves.

(8) Imagine that you're James Dean and the joke is funny but it isn't funny to you.

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Incremental *more* and event pluractionality in English.

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Additive or incremental uses of *more*, as in *Give me some more*, have been studied only recently, notably in Greenberg (2009a,b,c) [henceforth Gr 2009a,b,c] and Thomas (2009a,b) [henceforth Th 2009a,b]. This talk proposes a critical revision of the analysis of Th (2009b). The revised analysis accounts for the previously undocumented similarity between incremental *more* and event pluractionals in English as analysed by Beck and von Stechow (2007). It is shown that the analysis avoids a number of shortcomings of Gr (2009a,b,c) and Th (2009a,b).

Data. Incremental uses of *more* [henceforth $more_{inc}$] are illustrated in sentences (1) and (2):

(1) Five customers bought a laptop yesterday, and one more customer bought a computer this morning.

(2) Bob ran three miles yesterday and he ran two more miles today.

(3) # Bob didn't have any coffee, but/and he wants to have some more.

In their incremental reading but not in their comparative reading, (1) is true even if only one customer bought a computer this morning, and (2) is true even if Bob ran only two miles today. It can be said that $more_{inc}$ contributes an assertion that some degree associated with an eventuality increments a degree associated with a previous and presupposed eventuality of the same kind, without necessarily being superior to it. The existence of such a presupposition is evidenced by the unfelicity of (3). Gr (2009a,b,c) and Th(2009b) note that the asserted and presupposed eventualities need not be the same:

(4) It snowed a lot this morning, and it [rained]$_F$ some more in the afternoon. [Th 2009b]

Gr (2009a,b,c) and Th (2009a,b) also observe a number of restrictions on the use of nominal and verbal $more_{inc}$. Gr (2009a,b,c) suggests that $more_{inc}$ is incompatible with non additive measure functions, as temperature in (5). Gr (2009a,b,c) and Th (2009b) note that verbal $more_{inc}$ generally cannot occur with some stative predicates (cf. (6) and (7)) and cannot occur with achievements, cf. (8). Th (2009b) notes that although synthetic *more* on stative predicates actually resists an incremental reading (9), $more_{inc}$ is possible with states and achievements if it occurs inside an overt durational phrase as in (10) and (11):

(5) *Bob spilled three °C more water on the carpet. [Gr 2009c]

(6) ??Mary was sad some more. [Gr 2009b]

(7) The rope is two meters longer. [Comparative only]

(8) #I arrived at the station some more. [Gr 2009b]

(9) Bob was happy all day long yesterday and he was happier today. [Comparative only]

(10) Bob was happy all day long yesterday and he was happy for some more time today.

(11) I managed to get to the city in three hours, and it took me two more hours to arrive at the station.

Although it hasn't been noted previously, these restrictions on the use of $more_{inc}$ are very similar to the restrictions on the use of the event pluractionality construction *VP and VP* studied in Beck and von Stechow (2007), which is also incompatible with states and achievements:

(12) Sally ran and ran. [B and vS 2007].

(13) *Sally was sick and sick [B and vS 2007]

(14) *The rope was long and long.

(15) *The train arrived and arrived [B and vS 2007]

Analysis. We give $more_{inc}$ the following lexical entry in both its nominal and verbal uses:

(16) $[\![\text{more}_{inc}]\!]^g = \lambda C.\lambda d'.\lambda e'.\lambda d.\lambda D_{\langle d,\langle e,t\rangle\rangle}.\lambda e : \text{CUM}(D) \wedge \neg(e' \otimes e) \wedge \exists D' \in C\,[D'(d')(e')].D(d)(e)$

$more_{inc}$ combines with a VP denoting a relation between degrees and eventualities D. $more_{inc}$ is also focus sensitive: C is a set of properties constrained by the focus semantic value of its VP argument. Lastly, $more_{inc}$ combines with a degree d. Once $more_{inc}$ has been applied to these arguments, it asserts that the relation D holds of the eventuality e and the degree d, and presupposes that D is cumulative (cf 17) and that there is a relation D' in C (possibly D, possibly an alternative of D, thus accounting for the variation illustrated in (4)) that holds of a contextually salient (and freely introduced in the LF) pair of an event e' and a degree d', such that e' does not overlap with e.

(17) $\text{CUM}(D) \leftrightarrow_{def} \exists d, e, d', e'\,(D(d)(e) \wedge D(d')(e') \wedge \neg(e \otimes e')) \wedge$
$\forall d, e, d', e'\,(D(d)(e) \wedge D(d')(e') \wedge \neg(e \otimes e')) \rightarrow (D(d + d')(e \oplus e'))$

Syntactically, nominal $more_{inc}$ originates inside a DP and QRs over the lower VP node (possibly to a position where it is adjoined to VP), leaving *in situ* a trace interpreted as a degree argument, identified with the cardinality of the NP measured by a silent MANY (Hackl 2001), cf. (18). Verbal $more_{inc}$ originates as an adjunct to the verb and QRs above the lower VP node, leaving *in situ* a trace interpreted as a degree that is taken as the first argument of a silent measure relation $\mu_{\langle d,\langle v,t\rangle\rangle}$ that then modifies the verb, measuring a parameter of the eventuality described by the verb (eg. its run time), cf. (19). In both cases the VP argument of QRed $more_{inc}$ is a relation of type $\langle d, \langle e, t\rangle\rangle$:

(18) $[_{\text{VP}} more_{inc}\ \lambda \text{d}\ [_{\text{VP}}\ [_{\text{DP}}\ \text{d}\ [\text{MANY boys}]]\ [_{\text{V}}\ \text{came}]]]$

(19) $[_{\text{VP}} more_{inc}\ \lambda \text{d}\ [_{\text{VP}}\ \text{John}\ [_{\text{V'}}\ [_{\text{V}}\ \text{ran}\ ]\ [\mu\ \text{d}]\ ]]]$

Consequences 1. The cumulativity requirement (17) straightforwardly derives the impossibility of the occurrence of $more_{inc}$ with non additive measure functions by presupposition failure, cf. (5). If Bob spilled 3°C of water on the ground in e and 5°C of water in e' it doesn't follow that he spilled $8°C$ of water on the ground in $e \oplus e'$. Likewise, the impossibility of occurence of $more_{inc}$ in (6) is explained by presupposition failure if we assume that the only degree that $more_{inc}$ can measure is on the scale of intensity of the adjective: relations between states of happiness and degrees of happiness are not cumulative. It is also shown that, although measure functions such as *length* are additive, the relation between degrees and states that $more_{inc}$ would apply to in a stative predication such as (7) is actually not cumulative. The fact that $more_{inc}$ is allowed with adjectives when an overt durational measure phrase is available as in (10) also follows straightforwardly: relations between states of happiness and their duration are cumulative. The ungrammaticality of (8) follows for the same reason: the relation between singular events of arriving somewhere and duration of the arriving is not cumulative because the sum of two singular events of arriving cannot be a sin-

gular event of arriving (with a single culmination). The acceptability of (11) is due to the fact that the verbal measure phrase *it takes α time to* is interpreted as a property of states (spatio-temporal locations); in this case $more_{inc}$ takes as an argument relations between states and their durations, which are cumulative. The fact that durational measure phrases that are not verbal (and hence do not contribute an eventuality) do not allow $more_{inc}$ with achievements supports this hypothesis, cf. (20):

(20) #I managed to get to the city in three hours, and I arrived to the station in two more hours.

Consequences 2. In this analysis, the distribution of $more_{inc}$ and event pluractional AND are similar because of a common cumulativity requirement, as shown by the analysis of event pluractional AND that this talk advocates, revised from Beck and von Stechow (2007), cf.(21):

(21) $[\![\text{AND}]\!]^g = \lambda\text{Cov}.\lambda D.\lambda d.\lambda e : \text{PART}(Cov, e + d) \wedge \text{CUM}(D).{}^{**}[\lambda d'.\lambda e'.Cov(e') \wedge Cov(d') \wedge D(d')(e')](d)(e)$

AND combines with a cover *Cov*, a relation *D*, a degree *d* and an eventuality *e* and presupposes that *Cov* partitions *e* and *d* and that *D* is cumulative. If so, it returns the truth value true iff the pluralization of *D* with ** holds of the elements of the cover of *e* and *d*. In this analysis, (13), (14) and (15) are ungrammatical for the same reason as (6), (7) and (8), namely due to a failure of the presupposition that the relation between eventuality and degree that $more_{inc}$ and AND take as an argument has to be cumulative. The difference between $more_{inc}$ and pluractional AND is then that AND only *asserts* that its relation argument holds of (elements in the cover of) its eventuality and degree arguments, whereas $more_{inc}$ both *asserts* that its relation argument holds of its eventuality and degree arguments, and *presupposes* that a similar relation holds of some salient pair of eventuality and degree.

Advantages of the analysis. This analysis is the first to put in evidence and to explain the similarity between $more_{inc}$ and event pluractional AND. It also accounts for exceptions to the incompatibility of verbal $more_{inc}$ with stative predicates and achievements (cf. (10) and (11)).

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On the acquisition of a disjunctive licensing condition in semantics

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The problem: In this paper, we examine an analysis of negative polarity item (NPI) licensing in declaratives and interrogatives and its implications for child language acquisition; we then present novel evidence from children's spontaneous speech production that show that the predictions that arise from the theoretical semantic analysis are borne out. We take as our theoretical starting point the following two claims about NPI licensing in English: ① The licensing condition on weak NPIs is disjunctive (Guerzoni & Sharvit, 2007): in declarative sentences, weak NPIs require a downward-entailing (DE) environment (Ladusaw, 1979), while in questions, they require a strongly exhaustive environment (cf. 1). ② In declarative sentences, three classes of NPIs exist (weak, strong, and superstrong), which are licensed accordingly by three classes of NPI licensers that differ by strength (cf. 2): weak NPIs are licensed in the scope of a DE operator, strong NPIs require anti-additive (AA) licensers (which are also DE), and superstrong NPIs require anti-morphic (AM) licensers (which are also AA and DE) such as sentential negation (Zwarts, 1998) (cf. 3-4). Superstrong NPIs are thus licensed in a subset of the environments that license strong NPIs; strong NPIs are licensed in a subset of environments that license weak NPIs. Given these two claims from the semantics literature, the question arises as to how children can acquire such a complex grammatical phenomenon. We argue that children take a conservative approach to the acquisition of NPIs, and offer evidence that three particular predictions of a conservative approach are borne out.

Predictions: Assuming children take a conservative approach (cf. Snyder's (2007) *Grammatical Conservatism*), we predict the following: ❶ We should see very few errors, i.e. instances of unlicensed NPI *any*. ❷ Assuming the NPI *any* that appears in both declaratives and interrogatives is a single lexical item, the child should not produce NPI *any* in either environment until she has clear evidence of its disjunctive licensing condition. *Any* should therefore surface in both declaratives and interrogatives concurrently. ❸ The initial hypothesis regarding possible licensers in declaratives should be the narrowest compatible with the evidence available in the input (cf. *subset principle*, Berwick & Weinberg, 1984; van der Wal, 1996). With positive evidence, the child can expand her class of licensers to include non-AM and non-AA licensers.

Results: To test these predictions, we studied the spontaneous speech production of 18 children acquiring American English, whose corpora are available on CHILDES (MacWhinney, 2000). The ages represented in the transcripts ranged from 0;11,28 to 5;02,12. ❶ Error rates ranged from 0-13.46%, though in absolute terms, the raw number of unlicensed NPI *any* was very low – the maximum number of apparently unlicensed NPI *any* produced by a single child was 7 out of a total of 52 occurrences of NPI *any*. For the most part, children seem to make very few NPI licensing errors, as is consistent with a conservative learning strategy; the children proceed cautiously and generally do not produce the NPI *any* until they have figured out the appropriate licensing conditions for their language. Given that the "errors" are interspersed among adult-like usage of the NPI, it appears the children are indeed proceeding conservatively. Moreover, in the majority of cases of apparently unlicensed *any*, children clearly intend a negative meaning, and are therefore simply omitting negation; this is consistent with a conservative approach under which the child tends to omit certain elements rather than make commission errors. ❷ NPI *any* is a relatively low frequency construction; for the prediction concerning the time course of acquisition (i.e. the relative order of acquisition of *any* in declaratives and interrogatives), we thus considered only four children who had a sufficient frequency of *any* in both declaratives and interrogatives. While there was great variation in the age of onset of *any* across the four children (ranging from 2;03,21-3;02,16), whenever *any* surfaced in one construction, it surfaced in the other as well. For no child was the gap between the onset of *any* in the two constructions statistically significant (by Binomial Test), suggesting concurrent emergence of *any* in declaratives and interrogatives. ❸ None of the 18 children pose an exception to the Subset Principle; they all appear to start with the narrowest subset of licensers compatible with the evidence they receive in the input. The most frequently occurring licenser in both the input and the children's production is sentential negation, which happens to align with the narrowest subset of NPI licensers in English. Not surprisingly, first uses of NPI *any* always involved licensing by sentential negation. In the remainder of the transcripts, occurrences of other licensers were adult-like, and thus consistent with the children following a conservative 'subset-to-superset' route.

Conclusion: The results suggest that conservative learning strategies are active in the acquisition of semantics, and particularly of conditions on NPI licensing. The narrowest subset option compatible with the input is taken as the initial hypothesis, allowing the child to move to a superset option with increasing positive evidence. Moreover, given the disjunctive licensing condition for the two environments, the results further support a conservative approach, according to which the child acquires productive use of questions and sentential negation, figures out the disjunctive licensing condition for English *any*, and only then begins to use NPI *any* in both environments.

(1) John knows who left.
   a. Weakly exhaustive reading: For every x, if x left, John knows that x left.
   b. Strongly exhaustive reading: For every x, if x left, John knows that x left, and if x didn't leave, John knows that x didn't leave. (Guerzoni & Sharvit, 2007:369)

(2) Strengths of negation (Zwarts, 1998)
   $f(x) \vee f(y) \rightarrow f(x \wedge y)$
   $f(x \vee y) \rightarrow f(x) \wedge f(y)$ Downward-entailing (*weak NPIs*)
   $f(x) \wedge f(y) \rightarrow f(x \vee y)$ Anti-additive (*strong NPIs*)
   $f(x \wedge y) \rightarrow f(x) \vee f(y)$ Anti-morphic (*superstrong NPIs*)

(3)a. Anti-morphic: sentential negation *not* (Zwarts, 1998)
   b. Anti-additive: *no, nothing, never, no one, nowhere, without, before, nobody...*
   c. Downward-entailing: *less than n, not every, hardly, rarely, only, at most, few, not many…*

(4)a. *Weak:* I **hardly/never/don't** have any time to read these days.
   b. *Strong:* ***Not everyone/No one** has seen him in years.
      I have**n't** seen him in years.
   c. *Superstrong:* I was ***hardly/not** one bit happy with that ending.
      *I was **never** one bit happy with that ending.

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The role of nominalization in Northern Paiute embedding

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Embedded clauses in English have different structures depending on the embedding context. Headed relative clauses, which modify NPs, trigger abstraction to produce a predicate of individuals (Heim and Kratzer 1996), as do free relatives, which stand in for DPs (Caponigro 2003); the complements of perception verbs, which denote an event, are bare infinitives (Higginbotham 1983); and, in temporal adjunct clauses, *when* takes two verb phrases as its arguments and expresses a relation between events (Bonomi 1997, Vikner 2004). When a language has embedding constructions with identical truth conditions, if it does not distinguish between different embedded clauses formally in the same way, this poses something of a combinatoric puzzle (Caponigro and Polinsky 2008). Drawing on original fieldwork data, I demonstrate that Northern Paiute (an endangered Uto-Aztecan language of the western United States) uses a single embedded clause type, marked with the verbal suffix *-nna*, in all four embedding contexts above. I give a single meaning for *-nna*—it requires that one of the verb's arguments, other than the subject, remain unsaturated—and I show how a *-nna*-phrase composes with the matrix clause to yield the correct truth conditions for free and headed relative clauses, perceptual reports, and temporal adjunct clauses.

The suffix *-nna* derives action nominals from verbs in Northern Paiute. It also occurs in most embedded clauses, specifically: i) in headed object relative clauses (1); ii) in free object relatives (2); iii) in the complement of perception verbs (3); and, iv) in temporal adjunct clauses (4).

(1) Isu kutsu i=saa-**nna** pisa kamma-kwü.
this.SUBJ meat 1SG.OBJ=cook-NOM good taste-IRR
'This meat I am cooking is going to taste good.' (elicitation, BP10-1)

(2) Usu ka=nana pü-maku tütüha-**nna** mayü.
that.SUBJ OBJ=man 3SG-from steal-NOM find
'He found what the man stole from him.' (Snapp et al. 1986:85)

(3) Nümmi u=ükwi ka=tüba u=saa-**nna**.
1PL.EXCL 3SG.OBJ=smell OBJ=pinenut 3SG.OBJ=cook-NOM
'We smelled her cooking the pinenuts.' (elicitation, BP31-2)

(4) Ka=nana hubiadu-**nna** nüü akwisi'e.
OBJ=man sing-NOM 1SG.SUBJ sneeze
'When the man sang, I sneezed.' (elicitation, BP31-1)

The *-nna* suffix does also appear in the antecedent of conditionals, in *before* and *after* phrases, and in concessive, reason, and purpose clauses—but these are temporal adjunct clauses augmented by pragmatic inference (data not shown). All other embedded clauses are marked either with the quotative particle *mi* (for the complements of verbs of saying and propositional attitude verbs) or with a participial suffix *-dü* (for subject relative clauses).

Syntactically, I treat *-nna* as an n, a nominal functional projection that subcategorizes for either AspP or vP; it assigns objective case to the subject of the embedded verb phrase in Spec-nP, as in (2). This nP, which I will continue to call the *-nna*-phrase, stands in a different relation to the matrix clause in each of (1–4). For relative clauses, it modifies the head noun. For free relatives, it occurs in canonical preverbal object position. For perception verbs, it occurs postverbally, while a pronominal clitic occupies object position. For temporal adjunct clauses, it appears in left-peripheral position. To capture *-nna*'s distribution in these, and only these, environments, I treat it as an identity function on one-place predicates, predicates of either individuals or events:

(5) $[\![\text{-nna}]\!] = \lambda F(F) : \langle\langle\tau,t\rangle,\langle\tau,t\rangle\rangle$, where τ is e (an individual) or s (an event)

The *-nna* suffix constrains the type of its sister. One of the verb's nonsubject arguments must remain unsaturated or be saturated by a variable that can be abstracted over. Thus, a *-nna*-phrase cannot function as a subject relative clause, since if the verb's subject argument were abstracted over, there would be no DP in Spec-nP to receive objective case. Nor can a *-nna*-phrase occur under a verb of saying or under an attitude verb, since these predicates take propositional arguments.

The route by which one of the *-nna*-phrases in (1–4) composes with the matrix clause depends on: i) whether *-nna*'s complement is AspP or vP, and ii) whether the *-nna*-phrase occurs under a determiner. If *-nna*'s complement is AspP, the verb's event argument will already be existentially bound, so one of the verb's e-type argument positions must contain a variable that can be abstracted over to form a predicate (to prevent a type clash). In this case, the *-nna*-phrase denotes a one-place predicate of individuals, e.g. (6a) for (1). It functions as an object relative clause by combining with a head noun by set intersection (Montague 1973), as in (6b).

(6) a. $[\![[_{\text{nP}}\ \text{i=}[_{\text{AspP}}\ \text{saa}]\text{-nna}]\ ]\!] = \lambda x \exists e(\mathbf{cook}(x)(e) \wedge \mathbf{ag}(\mathbf{I})(e))$
b. $[\![(1)]\!] = \exists e(\mathbf{taste\text{-}good}(\iota x(\mathbf{meat}(x) \wedge \exists e'(\underline{\mathbf{cook}(x)(e') \wedge \mathbf{ag}(\mathbf{I})(e')}))(e))$

Like other noun phrases, *-nna*-phrases can serve as complement to D. There is a null D available in Northern Paiute that returns the unique maximal individual in the denotation of its sister. This produces what would in English be expressed by a free relative (Jacobson 1995, Caponigro 2003). The DP containing the *-nna*-phrase in (2) has the meaning in (7a), where ι represents the maximality operator. It composes with the matrix verb by Function Application, as in (7b).

(7) a. $[\![[_{\text{DP}}\ [_{\text{nP}}\ \text{ka=nana}\ [_{\text{AspP}}\ \text{pü-maku tütüha}]\text{-nna}]]\ ]\!] = \iota x \exists e(\mathbf{steal}(x)(\mathbf{he})(e) \wedge \mathbf{ag}(\mathbf{the\text{-}man})(e))$
b. $[\![(2)]\!] = \exists e(\mathbf{find}(\underline{\iota x \exists e'(\mathbf{steal}(x)(\mathbf{he})(e') \wedge \mathbf{ag}(\mathbf{the\text{-}man})(e'))})(e) \wedge \mathbf{ag}(\mathbf{he})(e))$

When *-nna* combines with a vP, the verb's event argument is not existentially bound. The predicate of events *-nna* returns, e.g. (8a) for (3), can serve as the argument of a perception verb. *Ükwi* 'smell' introduces existential quantification over the event variable, as in (8b), cf. Higginbotham (1983).

(8) a. $[\![[_{\text{nP}}\ \text{ka=tüba}\ [_{\text{vP}}\ \text{u=saa}]\text{-nna}]\ ]\!] = \lambda e(\mathbf{cook}(\mathbf{the\text{-}pinenuts})(e) \wedge \mathbf{ag}(\mathbf{she})(e))$
b. $[\![(3)]\!] = \exists e \exists e'(\mathbf{smell}(e')(e) \wedge \underline{\mathbf{cook}(\mathbf{the\text{-}pinenuts})(e') \wedge \mathbf{ag}(\mathbf{she})(e')} \wedge \mathbf{exp}(\mathbf{I})(e))$

Temporal adjunct clauses like (4) are produced when a *-nna*-phrase containing just a vP is sister to a determiner, so that the entire DP denotes an event. This event is related to the matrix clause by a null preposition that expresses a relation between events (McCawley 1988, Caponigro and Pearl 2008). The PP containing the *-nna*-phrase in (9a) combines with the matrix clause by Event Identification (Kratzer 1996), as in (9b). (I translate the null preposition as **when**, since the precise relation it express varies, as in other languages, with the Aktionsart of the predicates involved.)

(9) a. $[\![[_{\text{DP}}\ [_{\text{nP}}\ \text{ka=nana}\ [_{\text{vP}}\ \text{hubiadu}]\text{-nna}]]\ ]\!] = \iota e(\mathbf{sing}(e) \wedge \mathbf{ag}(\mathbf{the\text{-}man})(e))$
b. $[\![(4)]\!] = \exists e(\mathbf{sneeze}(e) \wedge \mathbf{ag}(\mathbf{I})(e) \wedge \mathbf{when}(\underline{\iota e'(\mathbf{sing}(e') \wedge \mathbf{ag}(\mathbf{the\text{-}man})(e'))})(e))$

I have argued that, in Northern Paiute, *-nna*-phrases have a single meaning, though they combine with a matrix clause to produce a variety of embedding constructions—constructions which, in English, require different kinds of embedded clauses. While the combinatorics of an embedding construction can vary across natural languages, its overall truth conditions do not.