

# MACSIM

# 4

Rutgers, the State University of New Jersey  
Oct 17–18, 2014

# Roundtable: Approaches to Semantic Research

Friday, Oct 17

<b>4–4:40</b>	<i>Lucas Champollion (NYU):</i> <a href="#">The making of Stratified Reference</a>	Room 108, Dept. of Linguistics
<b>4:40–5:20</b>	<i>Kathryn Davidson (Yale):</i> <a href="#">Gathering intuition on domain widening and narrowing across modalities</a>	Room 108
<b>5:20-6</b>	<i>Veneeta Dayal (Rutgers):</i> <a href="#">Uniqueness vs. Functional Pairing</a>	Room 108
<b>6–6:15</b>	Break	
<b>6:15-7</b>	General discussion	Room 108
<b>7</b>	Dinner	

# Conference

Saturday, Oct 18

<b>9:30–10</b>	Breakfast, registration, poster set-up	411 Student Center
<b>10–11</b>	Invited talk <i>Anna Papafragou (UDel)</i> : <a href="#">Encoding events in language and cognition</a>	411
<b>11–11:15</b>	[Break]	
<b>11:15–12:15</b>	Talk session 1 (2 talks)	411
<b>11:15</b>	<i>Jeremy Kuhn (NYU)</i> : <a href="#">Functional reference in American Sign Language</a>	
<b>11:45</b>	<i>Emily Wilson (CUNY)</i> : <a href="#">Deriving the <i>most</i> internal relative reading in English</a>	
<b>12:15–12:30</b>	Transition to poster session	411 to Red Lion Café
<b>12:30–1:45</b>	Lunch/Poster session I	Red Lion Café
<b>1:45–3</b>	Lunch/Poster session II	Red Lion Café
<b>3–3:15</b>	Transition to talk session	Red Lion Café to 411
<b>3:15–4:15</b>	Talk session 2 (2 talks)	411
<b>3:15</b>	<i>Kaitlyn Harrigan (UMD)</i> : <a href="#">Children’s knowledge of the meanings of <i>want</i>, <i>think</i>, and <i>hope</i></a>	
<b>3:45</b>	<i>David Rubio Vallejo (UDel)</i> : <a href="#">Stronger counterfactuality</a>	
<b>4:15–4:30</b>	[Break]	
<b>4:30–5:30</b>	Talk session 3 (2 talks)	411
<b>4:30</b>	<i>Mingming Liu (Rutgers)</i> : <a href="#">Mandarin <i>dou</i> as an exhaustification operator</a>	
<b>5</b>	<i>Kristen Johannes (JHU)</i> : <a href="#">Revisiting the case for underspecified spatial meanings</a>	
<b>5:30–6</b>	Business meeting	411
<b>6–10:30</b>	Dinner/party	Red Lion Café

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- Previous MACSIM organizers Florian Schwarz, Kyle Rawlins, Alexander Williams, and Valentine Hacquard for their organizational support and insight
- The local Linguistics organizing committee and graduate student hosts

## Poster session 1 (12:30–1:45)

- *Mao-Hsu Chen (UPenn)*: Accommodation of presupposition in quantified sentences
- *Pyeong Whan Cho (JHU)*: A single mechanism view of Noun-Noun compound comprehension
- *Amy Goodwin Davies (UPenn)*: Definite morphology in Swedish Determiner Phrases
- *Hillary Harner (Georgetown)*: *Want*, belief and likelihood
- *Sarah Hansen (Rutgers)*: Contrasting contrast connectives: What we can learn from *but*, *however*, and *nevertheless*
- *Yuki Ito (UMD)*: The composition of nominal/adjectival essentially plural predicates
- *Michael McCourt (UMD)*: Implicit agents and remote control
- *Billy Xu (Rutgers)*: Asking and expecting: What *nandao* tells us about bias in questions
- *Vera Zu (NYU)*: Discourse participants, attitude holders and pronoun binding

## Poster session 2 (1:45–3)

- *Vandana Bajaj (Rutgers)*: Scalar endpoints, rank orderings, and exclusivity in Hindi *-hii*
- *Haitao Cai (UPenn)*: Unity, plurality and the mass/count distinction
- *Yanyan Cui (Georgetown)*: Microvariations within embedded concord modals
- *Quinn Harr (UMD)*: Epistemic modals have been misunderstood
- *Sofia Kasyanenko (NYU)*: Group formation in Russian
- *Shih-Yueh Lin (NYU)*: Chinese Q-particles in (Non-) interrogative context
- *Drew Reisinger (JHU)*: Priority effects in context-dependent meanings
- *Einar Sigurðsson (UPenn)*: ‘By’-phrases in the Icelandic impersonal modal construction
- *Mengxi Yuan (JHU/City University of Hong Kong)*: The real meaning of the Mandarin adverb *zhende* ‘really’

# Friday Roundtable Abstracts

**Lucas Champollion**

NYU

**Stratified reference: The making of**

The repeated process of formalizing an intuition, checking whether the formalization works, and improving it as needed, is a routine task for experienced formal semanticists. But it can seem frustrating and daunting when you are new to it (and I speak from experience). In this roundtable presentation I want to highlight my own experience of going through many iterations of formalizing the same concept, and how they all didn't work except for the last one. I will use the example of stratified reference, a generalization of several mereology-related properties such as divisive reference and the subinterval property that plays a central role in the theory of distributivity, aspect, and measurement in Champollion (2010, 2014).

Champollion (2010). *Parts of a whole: Distributivity as a bridge between aspect and measurement*. Ph.D. dissertation, University of Pennsylvania.

Champollion (2014). Algebraic semantics and mereology. Lecture notes. Available online at [<http://ling.auf.net/lingbuzz/002174>](http://ling.auf.net/lingbuzz/002174)

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**Kathryn Davidson**

Yale University

**Gathering intuitions on domain widening and narrowing across modalities**

I'll discuss my recent work collaborating with Deanna Gagne (UConn) on a use of vertical space American Sign Language that has been argued to encode definiteness or specificity, but which we argue can be expanded to a more general notion of domain widening/narrowing. This project involves both traditional and experimental methodologies: we have recorded approximately 20 hours of production data with Deaf native signing consultants related to this topic for traditional analysis, and are creating an online experiment using video stimuli to test intuitions on this use in sign and (eventually) co-speech gesture in English using Qualtrics survey software. In both cases we are focusing on (i) the potential for gradient levels of domain widening/narrowing, and (ii) possible morphosyntactic combinations with loci using this space (e.g. quantifiers, inflecting verbs, etc.).

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**Veneeta Dayal**

Rutgers University

**Uniqueness vs. Functional Pairing**

Among the very first problems in linguistics that intrigued me was the switch from uniqueness in questions with one singular *wh*- expression (*Which book did you read?*) to a functional pairing in questions with more than one such expression (*Which student read which book?*). Why did this strike me as a worthy topic? Why was the formalization so hard? For that matter, why were the intuitions themselves open to negotiation? I want to share the history of my obsession with this topic by showing you how my ideas have played out over the years, referring to three distinct *wh*- constructions in three different languages: English questions, Hindi correlatives, Bulgarian free relatives.

# Saturday Invited Speaker Abstract



## **Encoding Events in Language and Cognition**

Anna Papafragou

The linguistic expression of events draws from basic, probably universal, elements of perceptual/cognitive structure. Nevertheless, little is known about how event cognition maps onto language production. Furthermore, languages differ in terms of how they segment and package events. This cross-linguistic variation raises the question whether the language one speaks could affect the way one thinks about events. This talk addresses how event cognition interfaces with language. Our studies reveal remarkable similarities in the way events are perceived, remembered and categorized despite differences in how events are encoded cross-linguistically.

# Student Presenter Abstracts

## Scalar Endpoints, Rank Orderings, and Exclusivity in Hindi *-hii*

Vandana Bajaj

*Department of Linguistics, Rutgers University*

Some lexical items require endpoints on a contextually-salient ordered scale. English *even* is said to presuppose that the proposition it is used with is minimally likely with respect to other focus alternatives (Rooth (1996)). English *only* asserts exclusivity of truth to its prejacent proposition, but has also been observed to possibly give rise to a scalar interpretation, indicating a minimal endpoint (Krifka (1993)).

This research sheds light on a typologically unique focus particle, Hindi *-hii*. Speakers insert *-hii* to the right of focused constituents, as in ‘JOHN hii aaya’ (JOHN hii came). *-hii* combines the truth-conditional function of exclusivity with the felicity condition of selecting for a MAX or a MIN of a set of rank-ordered propositions.

This poster inquires about two empirical issues with *-hii* and its potential for scalar meaning, listed in (1) and (2).

- (1) Does scalarity arise with *-hii* in non-negated sentences? If so, what endpoint does it select for?
- (2) Is the absence of scalarity when *-hii* scopally interacts with negation dependent on syntactic position?

Our Experiment 1 probed for a scalar meaning component beyond exclusivity, and further identified the nature of the scalar endpoint targeted. The results show that speakers find *-hii* felicitous with a MAX if the scale is based on likelihood, but find *-hii* felicitous with a MIN if the scale is based on speaker desirability. Experiment 2 investigated the availability of both an exclusive, non-scalar meaning and a scalar meaning when a *-hii*-marked NP in either subject or object position interacts with sentential negation. The results show that, regardless of whether *-hii* associates with the subject or object, speakers prefer an exclusive reading if the context favors a *-hii* > NEG interpretation, and prefer a scalar reading if the context favors a NEG > *-hii* interpretation.

Through this work we find that *-hii* can require either a MIN-desirable or MAX-likely proposition in a basic sentence, and this adds a new type of particle to the taxonomy of exclusives described recently by Coppock & Beaver (2013). We also see that *-hii*’s ambiguity when interacting with negation arises regardless of whether *-hii* associates with the subject or object NP, and this takes away any need for syntactic stipulations about the scalar and exclusive meaning components of *-hii*, as posited by Bhatt (1994).

# Unity, Plurality and the Mass/Count Distinction

Haitao Cai    University of Pennsylvania

**Introduction** The mass/count distinction is characterized by properties such as restriction of plural morphology and distribution of particular determiners. Despite that mass nouns tend to denote entities without salient atomic structures, there are many exceptions, e.g., **furniture** and **footwear**. Moreover, mass nouns and count nouns can be converted back and forth in particular contexts.

**Symbolic Primitives** The (mereological) sum/fusion of  $a$  and  $b$ :  $a \oplus b$ ; (unstructured) part-of:  $a \leq b$  iff  $a \oplus b = b$ ; proper part-of:  $a < b$  iff  $a \leq b \wedge a \neq b$ ; plurality formation:  $\sqcup$ ;  $a$  is among  $b$  (i.e.,  $a$  is contained in plurality  $b$ ):  $a \triangleleft b$  iff  $\exists A[a \in A \wedge b = \sqcup A]$ .

The mereological sum or ‘fusion’ of  $a$  and  $a'$  essentially comes with unity, namely, treating the combination of  $a$  and  $a'$  as a single entity. The atomic components in a mereological fusion are not grammatically accessible:  $\leq$  holds between a chair and a set of chairs as well as between a chair leg and a set of chairs. Two different pluralities may have the same mereological sum, e.g., the upper half of a glass of water and the lower half form a plurality that is not identical to the plurality formed by the left half and the right half, despite that the mereological sums of the two pluralities are the same. Plurality deviates from mereological sum/fusion: the water and the oil are respectively grammatically accessible in (1) though they form a plurality. Otherwise, if **the water and the oil** is interpreted as the fusion of the water and the oil, **repel** will be a relation between arbitrary parts of the fusion.

- (1) The water and the oil repel each other.

**Atomicity** All nominals are interpreted with respect to a complete Boolean algebra  $D$  with the sum operation  $\oplus$ . Particularly, each element  $d$  (e.g., a portion of water or the fusion of three apples) of  $D$  comes with unity, formally,  $\forall d, d' \in D[d' \leq d \rightarrow d' = d]$ .

Each mass noun  $\mathbf{N}_{\text{mass}}$  that denotes entities without salient atomic structures (e.g., **water** and **wood**) is interpreted as a complete Boolean subalgebra  $\llbracket \mathbf{N}_{\text{mass}} \rrbracket_c$  of  $D$  in context  $c$ . In contrast, a count noun  $\mathbf{N}_{\text{count}}$  is associated with a set  $N_c^{\text{AT}}$  of atomic entities in context  $c$  such that  $N_c^{\text{AT}} \subseteq D$ . Following Rothstein (2010), grammatically accessible atomic entities are formally indexed by the context and thus are of a type that is different from the type of entities denoted by mass nouns.

- (2)  $\llbracket \mathbf{N}_{\text{count}} \rrbracket_c = \{\langle d, c \rangle : d \in N_c^{\text{AT}}\}$

*Pluralization* is interpreted as an operation of plurality formation.

- (3)  $\text{PL}(\llbracket \mathbf{N}_{\text{count}} \rrbracket_c) = \{\sqcup S : S \subseteq \llbracket \mathbf{N}_{\text{count}} \rrbracket_c \wedge S \neq \emptyset\}$

Then, many properties characterizing the mass/count distinction, such as grammatical counting and determiner distribution, can be derived from a type match/mismatch.

**Atomic Mass Nouns** Mass nouns such as **foliage** denote entities with salient atomic structures (i.e.,  $\text{FOLIAGE}_c^{\text{AT}} \neq \emptyset$ ) and tend to denote atomic entities collectively. Also, atomic elements denoted by atomic mass nouns can be extracted by classifiers (e.g., (4)). In addition, the comparison of quantity with respect to atomic mass nouns is based on the number of individuals rather than volume (Barner and Snedeker 2005) e.g., (5). These observations point toward (6), e.g., **foliage** denotes the maximal plurality of individual leaves.

- (4) a piece of furniture, pieces of foliage  
 (5) Jack bought more furniture than Jane did.  
 (6)  $\llbracket \mathbf{N}_{\text{atom, mass}} \rrbracket_c = \{\sqcup N_c^{\text{AT}}\}$

Nonetheless, an atomic mass noun phrase serving as the antecedent of a reciprocal often leads to ungrammaticality (e.g., (7)), which is subject to cross-speaker variation and which is unexpected given (6).

- (7) (The) furniture is piled on top of each other.

The cross-speaker variation indicates that the semantic representation of atomic mass nouns is *underspecified* between (6) and the general interpretation of mass nouns, i.e., a complete Boolean subalgebra of  $D$ , formally, (8), which consists of atomic entities and fusions of them.

$$(8) \quad \llbracket \mathbf{N}_{\text{atom}, \text{mass}} \rrbracket_c = \{ \bigoplus S : S \subseteq N_c^{\text{AT}} \wedge S \neq \emptyset \}$$

As a mass noun, **furniture** is interpreted according to (8) by default, which accounts for characteristic properties of mass nouns and the ungrammaticality of (7). Nonetheless, the plurality alternative (6) is pragmatically activated as a ‘last resort’, e.g., because of the lack of a ‘grammatical’ antecedent of the reciprocal in (7) (though only grammaticized by some speakers). Analogously, it is usually senseless to compare the quantity of furniture by volume; but the quantity judgment based on the number of atomic entities requires the retrievability of FURNITURE-atoms and therefore invokes (6). The elements in (8) are fusions of atoms, thus the atoms are ‘invisible’. Similarly, furniture is normally not cut into pieces, so **piece of furniture** requires grammatically available atoms.

**Mass Usage of Count Nouns** A popular theory appeals to *grinding* (Pelletier and Schubert 1989; Rothstein 2010). For instance, the **banana** in (9) is claimed to denote *proper* parts of atomic bananas. However, this account cannot explain the interpretation of the **banana** in (10) where there is no reason to think that the bananas, which serve as ingredients that products are made *from*, are also all necessarily ground or at least contain no entire bananas. My informants also think the ice cream described by (11) can contain entire strawberries and most importantly, those entire strawberries in the ice cream also fall under the denotation of the mass **strawberry**<sub>mass</sub>.

(9) There is banana in the cake.

(10) products made *from* banana

(11) There is strawberry in the ice cream.

Instead, I propose that the mass version of a predominantly count noun  $\mathbf{N}_{\text{count}}$  denotes indefinite parts of the maximal fusion of all atomic entities denoted by  $\mathbf{N}_{\text{count}}$ , formally, (12).

$$(12) \quad \llbracket \mathbf{N}_{\text{count}, \text{mass}} \rrbracket_c = \{ d \in D : d \leq \bigoplus N_c^{\text{AT}} \}$$

The indefinite bare mass noun phrase **banana** in both (9) and (10) denotes indefinite parts of the maximal fusion of atomic bananas, which can be either entire bananas or fragments or other arbitrary parts of bananas. This is because, in the fusion of all bananas, atomic bananas are not grammatically accessible. Further, the grinding reading arises as a pragmatic implicature: **banana** and **strawberry** are predominantly count nouns (i.e., *unmarked*), whereas the mass usage is *marked*. Thus, the indefiniteness of atomicity, which is encoded in (12) and which is absent in the count interpretation, may implicate the absence of atomicity.

The contrast between (9) and (11) can be ascribed to world knowledge, i.e., the banana as a part of the cake tends to be ground (Cheng et al. 2008:56), while it is not the case for the strawberry in the ice cream.

**Conclusion** The mass/count distinction displays interaction between the plurality and the unity encoded in natural languages.

**Selected References** Bale, A. C. and Barner, D. (2009). The interpretation of functional heads: Using comparatives to explore the mass/count distinction. *Journal of Semantics*, 26:217–252. Barner, D. and Snedeker, J. (2005). Quantity judgments and individuation: evidence that mass nouns count. *Cognition*, 97:41–66. Cheng, L. L., Doetjes, J., and Sybesma, R. (2008). How universal is the universal grinder? *Linguistics in the Netherlands*, 25:50–62. Chierchia, G. (1998). Plurality of mass nouns and the notion of “semantic parameter”. In Rothstein, S., editor, *Events and Grammar*. Dordrecht: Kluwer. Chierchia, G. (2010). Mass nouns, vagueness and semantic variation. *Synthese*, 174:99–149. Link, G. (2002). The logical analysis of plurals and mass terms: A lattice-theoretical approach. In *Formal Semantics: The Essential Readings*, pages 127–146. Wiley-Blackwell. Nicolas, D. (2008). Mass nouns and plural logic. *Linguistics and Philosophy*, 31:211–244. Pelletier, F. J. and Schubert, L. K. (1989). Mass expressions. In *Handbook of philosophical logic*, pages 327–407. Springer Netherlands. Rothstein, S. (2010). Counting and the mass/count distinction. *Journal of Semantics*, 27:343–397.

# Accommodation of Presupposition in Quantified Sentences

Mao-Hsu Chen

University of Pennsylvania

Presuppositions are a type of inference associated with sentences containing certain words or grammatical constructions, known as presupposition triggers. The inferred information is taken for granted by speakers in a conversational context. Accommodation occurs when a hearer's knowledge state is adjusted to meet the speaker's presuppositions. Different types of presupposition inference result in different meanings in terms of *where* and *what* presuppositions are accommodated. Heim (1983) makes an explicit empirical generalization claiming that global accommodation is preferred to non-global accommodation, referred to as *preference for global accommodation*. Geurts' (2000) Buoyancy Principle suggests a preference for accommodating presuppositions as high as possible for all things being equal, according to the Discourse Representation Theory (DRT) of presupposition. Yeom (1998), Zeevat (1999), and Blutner (2000) justify the reason why presuppositions tend to float up by the strength, or informativeness, of the resulting readings. More informative, or stronger, readings are preferred, *ceteris paribus*, to less informative ones, dubbed as *Informativeness Principle* following Geurts (2000).

In addition to the contexts of accommodation, presupposition projection interacts with various linguistic operators and embeddings. The presupposition associated with quantified sentences, for example, remains a subject of empirical debates where extant theories make drastically different predictions about the judgments. The quantified sentences under discussion can be schematized in (1), where  $Q$  stands for a generalized quantifier,  $R$  for its restrictor, and  $S_p$  for its scope in which a presupposition  $p$  is triggered.

- (1) Quantified sentence:  $[Qx : R(x)]S_p(x)$
- a. Universal presupposition:  $[\forall x : R(x)]p(x)$
  - b. Existential presupposition:  $[\exists x : R(x)]p(x)$

Heim (1983) and Schlenker (2008, 2009) argue that sentences of the form given in (1) give rise to universal presupposition as illustrated in (1a): every individual satisfying the property  $R$  expressed in the restrictor should also satisfy the presupposition triggered from the scope of the quantifier. Beaver (2001) and van der Sandt (1992), on the other hand, derives much weaker existential presuppositions as denoted in (1b): some individual satisfying the restrictor property also satisfies the presupposition triggered in the scope. Still others, such as Chierchia (1995), assume that quantified sentences are ambiguous between projecting universal and existential presuppositions.

This paper presents the results of an experiment aiming to investigate what factors affect the types of presupposition inferences that are accommodated, and whether people have a preference for different types of inferences under certain circumstances. We focus on the quantified sentences with definite noun phrases as the presupposition trigger in their scope and use them as the stimuli with verification task set up in a concrete context. In particular, our results indicate the following implications: 1) people prefer the universal presupposition inference to the existential one when the quantifier is strong, but show no such preference difference with weak quantifiers; 2) it takes shorter time for people to accept the universal inference than the existential one with strong quantifiers and no such difference in the response times is observed with weak quantifiers, and 3) quantifier *none* patterns with strong quantifiers and more fine-grained division among weak quantifiers is noted.

## A Single Mechanism View of Noun-Noun Compound Comprehension

Pyeong Whan Cho<sup>1</sup> and Whitney Tabor<sup>2,3</sup>

<sup>1</sup>Johns Hopkins University, <sup>2</sup>University of Connecticut, <sup>3</sup>Haskins Laboratories

By noun-noun compounds, we mean any combinations of nouns that native speakers can understand. Noun-noun compounding seems productive such that native speakers can easily understand novel compounds (e.g., *mountain squirrel*). On the other hand, there are many compounds (e.g., *seahorse*) that have idiosyncratic meanings. We will call the two types as transparent and opaque compounds. According to the words-and-rules theory (Pinker, 1999), idiosyncratic meanings are retrieved from a mental lexicon while compositional meanings are computed on the fly by a rule system. It naturally follows that opaque compounds are treated by a lexical route but transparent compounds are treated by a rule system. We propose a single mechanism view of compound comprehension: all compounds are processed by a single mechanism and represented in the same mental space. The comprehension of both types requires building a constituent structure [<sub>NN/R</sub> N1 N2] that is shaded by a relation R (cf., Levi, 1978). We hypothesize that, in the mental space, idiosyncratic relations (used in opaque compounds) compete with common relations (used in transparent compounds) because ambiguity must arise in the comprehension of opaque compounds. Both component nouns (*sea* and *horse*) of an opaque compound (e.g., *seahorse*) can combine with other nouns to instantiate a common location relation but the combination of two nouns instantiates an idiosyncratic relation. Ambiguity can be solved only by developing inhibitory connections between common relations and idiosyncratic relations. Thus, we predict negative priming between transparent and opaque compounds.

In Experiment 1, we investigated the effect of structural parallelism between transparent compounds. We used a coordinate structure to introduce structural parallelism. An example sentence is “Sophia thought about *summer sports* [prime] and *midnight trains* [target] in the morning.” Structural similarity between prime and target was manipulated across four levels: given a target (*midnight trains*), the prime was an A+N phrase (*exciting sports*) in the NS (no similarity) condition, a compound instantiating a very different relation from the target (*ball sports*) in the LS (low similarity) condition, a compound instantiating a similar but slightly different relation from the target (*river sports*) in the MS (medium-level similarity) condition, or a compound instantiating a very similar relation (*summer sports*) in the HS (high similarity) condition. Forty undergrads read the sentences in a self-paced reading task. The analysis of residual log reading times across critical regions (the target compound [e.g., *midnight trains*] plus “in the”) revealed that participants read target compounds more quickly in MS and HS conditions than in NS and LS conditions ( $p < .05$ ). Reading speed was not significantly different between NS and LS conditions, suggesting that sharing the same syntactic construction is not enough for structural priming. We explain the result pattern based on the distance between two compounds in the mental space.

In Experiment 2, we investigated the effect of structural parallelism between transparent and opaque compounds. An example sentence is as follows: “Sophia thought about glass doors, leather pants, and sandcastles in the morning.” We used two primes (*glass doors* and *leather pants*) to introduce a stronger priming effect on a target (*sandcastles*). We used a 2x3 mixed factorial design in which target compound type (T: Opaq [opaque] vs. Tran [transparent]) was a between-subject factor and prime type (P: NS, LS,

and HS) was a within-subject factor. Primes in the NS condition were A+N (T=Opaq) or monomorphemic nouns (T=Trans). Primes in LS and HS conditions were transparent (T=Trans) or opaque compounds (T=Opaq). Primes and targets instantiated different relations in LS but similar relations in HS. Sixty undergrads read the sentences like the example in a self-paced reading task. The residual log reading times at the target and its following frame (“in the”) were analyzed. The main effects of target type ( $p < .05$ ) and prime type ( $p < .05$ ) were significant but the interaction effect was not. More importantly, reading time was slower in LS ( $p < .05$ ) and HS ( $p < .05$ ) than in NS, supporting the prediction of negative priming. Although the words-and-rules theory also can explain competition between opaque and transparent compounds, it cannot explain slower reading in LS and HS conditions than in NS conditions because in all three conditions, the lexical route would be primed when T=Opaq and the rule route would be primed when T=Trans. Thus, competition between two routes would be comparable in three conditions. We argue that a single mechanism view provides a better understanding of compound processing.

Levi, J. N. (1978). *The syntax and semantics of complex nominals*. New York, NY: Academic Press.

Pinker, S. (1999). *Words and rules: The ingredients of language*. Basic Books.



## MICRO-VARIATIONS WITHIN EMBEDDED CONCORD MODALS

Yanyan Cui  
Georgetown University

**1. Introduction:** The interpretation of an embedded modal may be restricted by the embedding operator in different ways. One phenomenon that is due to this kind of restriction is Modal Concord (MC), where the contribution of a modal in the complement of an attitude predicate appears to be trivial. For example:

- (1) a. The boss demands Dan must leave. ↔ b. The boss demands Dan leave.

Many native speakers share the judgment that (1a) and (1b) entail each other; and removing the modal from (1a) does not affect the truth conditions of the whole sentence.

To distinguish sentences like (1a) from canonical paradigm of MC, where the two concord modals are clause-mates (e.g. Students signed up for this class *must mandatorily* read this book), I will adopt the term EMBEDDED CONCORD MODAL CONSTRUCTION (E-CM Construction) instead through out the presentation.

This poster focuses on two empirical issues concerning E-CM Constructions: (i) the linguistic tests serve to determine whether a modal-under-attitude configuration is an E-CM Construction; and (ii) the micro-variations within E-CM's along the dimension of how the matrix verb binds the embedded modal.

**2. Identification of E-CM Constructions:** I propose the following pair of tests to identify E-CM's:

- (3) a.  $x \text{ Attitude Mod } p \ \& \ \neg x \text{ Attitude } p$  (Deletion Test)  
b.  $x \text{ Attitude } p \ \& \ \neg x \text{ Attitude Mod } p$  (Insertion Test)

The underlying rationale is as follows: if a modal (Mod) in the complement of an attitude verb is redundant, a sentence with the form “ $x \text{ Attitude Mod } p$ ” will be equivalent to “ $x \text{ Attitude } p$ ”. Since the two forms mutually entail each other, discourses of the scheme (3a-b) will be contradictory. A negative (i.e. contradictory) result of the Deletion Test (3a) suggests that “ $x \text{ Attitude Mod } p$ ” entails “ $x \text{ Attitude } p$ ”; and a negative result of the Insertion Test (3b) indicates that “ $x \text{ Attitude Mod } p$ ” is entailed by “ $x \text{ Attitude } p$ ”. A modal is an E-CM, if and only if both tests turn out negative.

**3. Pseudo-concord constructions:** Some configurations may disguise as E-CM Constructions. An embedded modal can appear to be an E-CM, if one of the following two conditions holds:

- (4) a. “ $x \text{ Attitude Mod } p$ ” entails “ $x \text{ Attitude } p$ ” AND “ $x \text{ Attitude } p$ ” implicates “ $x \text{ Attitude Mod } p$ ”  
b. “ $x \text{ Attitude } p$ ” entails “ $x \text{ Attitude Mod } p$ ” AND “ $x \text{ Attitude Mod } p$ ” implicates “ $x \text{ Attitude } p$ ”

Below is a concrete example in Mandarin Chinese:

- (5) #a. *Lao Li danxin Xiao Wang neng faxian ta-de mimi. Dan Lao Li bu danxin Xiao Wang faxian*  
Lao Li worry Xiao Wang can discover his secret but Lao Li not worry Xiao Wang discover  
*ta-de mimi.*  
his secret.

‘Lao Li worries that Xiao Wang can discover his secret, but Lao Li does not worried that Xiao Wang will discover his secret.’

- b. *Lao Li danxin Xiao Wang faxian ta-de mimi. Dan Lao Li bu danxin Xiao Wang neng*  
Lao Li worry Xiao Wang can discover his secret but Lao Li not worry Xiao Wang can  
*faxian ta-de mimi.*  
discover his secret.

‘Lao Li worries that Xiao Wang will discover his secret, but Lao Li does not worry that Xiao Wang can discover his secret.’

Scenario: *Lao Li secretly destroyed some experimental data of Xiao Wang. Lao Li is confident that Xiao Wang cannot figure out by himself who did it; but Lao Li still worries that someone else will discover the truth and tell Xiao Wang about it.*

The Deletion Test (5a) is contradictory, indicating that “ $x \text{ danxin neng } p$ ” entails “ $x \text{ danxin } p$ ”. The Insertion Test (5b) seems to be odd at first glance, but is actually coherent given the scenario described; it proves that “ $x \text{ danxin neng } p$ ” is implicated but not entailed by “ $x \text{ danxin } p$ ”. Therefore, the ability/circumstantial modal *neng* under *danxin* ‘worry’ is not a real E-CM.

**4. Real E-CM Constructions:** Depending on how the modal is bound by the matrix attitude, two types of E-CM's can be distinguished.

*Type A: Epistemics under representational attitudes* (doxastics, dubitative, doxastic-emotives...)

(6) #a. John hopes that it must be raining.

b. John hopes that it might be raining.  $\leftrightarrow$  c. John hopes that it is raining.

As (6) demonstrates, *hope* does not license universal epistemic in its complement, and is in concord with the embedded existential epistemic modal. The semantics of *hope* proposed by Anand & Hacquard (2013) as laid out in (7) explains these patterns:

- (7) a.  $[[a \text{ hopes}_c \text{ that Mod } p]]^{c,w,S,g}$  is defined iff  
 b.  $\text{Mod } p\text{-verifiers in } S' \neq \emptyset \ \& \ \text{Mod } p\text{-falsifiers in } S' \neq \emptyset$  [Uncertainty Condition]  
 c. If defined  $=1$  iff  
 $\exists w' \in S': [[\text{Mod } p]]^{c,w',S',g} = 1$  [Doxastic Assertion]  
 $\text{Mod } p\text{-verifiers} > \text{PROB}_{a,w} \text{ Mod } p\text{-falsifiers}$  [Preference Assertion]  
 d. where  $S' = \text{DOX}_{a,w}$  and  
 $\text{Mod } p\text{-verifiers in } S' = \lambda S''. S'' \subset S' \ \& \ \forall S''' \subset S'': \forall w' \in S''': [[\phi]]^{c,w',S''',g} = 1$   
 $= \text{pow}(S' \cap p)$

(7c) shows that the quantificational domain of the embedded epistemic (i.e.  $S'$ ) is anaphoric to that of the embedding verb. With a universal epistemic, the doxastic assertion (all worlds in  $S'$  are  $p$  worlds) will contradict the uncertainty condition; thus the unacceptability of (6a). In contrast, (6b) will be equivalent to (6c) in logic, because it contributes a vacuous layer of quantification over the same domain  $S'$ .

*Type B: Priority modal under jussive verbs* (directives, permissive, commissives...)

The Mandarin permissive verb *pizhun* 'permit' exhibits a behavior parallel to *hope*. It is not compatible with deontic modal of universal force; and (8c-d) indicate that *keyi* under *pizhun* is an E-CM.

(8) #a. *Lao Li pizhun Xiao Wang bixu likai.*

Lao Li permit Xiao Wang must leave

'Lao Li permitted Xiao Wang must leave.'  $\neq$  Lao Li permitted Xiao Wang to leave obligatorily.

b. *Lao Li pizhun Xiao Wang keyi likai.*

Lao Li permit Xiao Wang may leave

'Lao Li permitted Xiao Wang to leave optionally.'

#c. *Lao Li pizhun Xiao Wang likai. Lao Li mei pizhun Xiao Wang keyi likai.*

Lao Li permit Xiao Wang leave Lao Li not permit Xiao Wang may leave

'Lao Li permitted Xiao Wang to leave. Lao Li did not permit Xiao Wang to leave optionally.'

#d. *Lao Li pizhun Xiao Wang keyi likai. Lao Li mei pizhun Xiao Wang likai.*

Lao Li permit Xiao Wang may leave Lao Li not permit Xiao Wang leave

'Lao Li permitted Xiao Wang to leave optionally. Lao Li did not permit Xiao Wang to leave.'

Extending the analysis of (7) to data in (8), we make the domain of the deontic modal bound by the conversational backgrounds against which the embedding attitude is interpreted.

- (9) a.  $[[x \text{ pizhun Mod } p]]^{c,w,g}$  is defined iff  
 b.  $\text{Mod } p\text{-verifiers in BEST}(c) \neq \emptyset \ \& \ \text{Mod } p\text{-falsifiers in BEST}(c) \neq \emptyset$  [Optionality Condition]  
 c. if defined:  $=1$  iff  $\exists w' \in \text{BEST}(c): [[\text{Mod } p]]^{c,w',g} = 1$  [Deontic Assertion]  
 d. where  $\text{Mod } p\text{-verifiers in BEST}(c) = \text{pow}(\text{BEST}(c) \cap p)$

Given the semantics in (9), if Mod is universal, the deontic assertion of (9a) will be an obligation, contradicting the optionality condition. If Mod is existential, it contributes a vacuous layer of quantification over  $\text{BEST}(c)$ , thus it is a redundant modal or E-CM.

**5. Conclusion:** Following Anand & Hacquard (2013), I argue that E-CM arises when the domain of the embedded modal is anaphoric to the embedding attitude, and contributes a vacuous layer of quantification to the meaning of the sentence. Epistemic E-CM's share the same information states as the embedding verbs, and priority modals are relativized to the same conversational backgrounds as the matrix attitudes.

**References:** Anand, P. & V. Hacquard. 2013. Epistemics and Attitudes. *Semantics and Pragmatics*. Kratzer, A. 2013. Constructing domains for deontic (and other) modals. Handout of USC Deontic Modality Workshop. Zeijlstra, H. 2008. Modal concord is syntactic agreement. In: M. Gibson & T. Freidman (eds.). *Proceedings of Semantics and Linguistics Theory XVII*. Ithaca, NY: CLC Publications, 317-332.

# Definite morphology in Swedish Determiner Phrases\*

Amy Goodwin Davies, University of Pennsylvania

This project investigates how variability in Swedish (Sw) definiteness morphology is motivated by both underlying syntactico-semantic distinctions and morpho-syntactic constraints on affixation.

The following five patterns of definiteness morphology are discussed:

<i>DPs with unmodified noun:</i>	<i>DPs with modified noun:</i>	<i>Restrictive relative clauses (RRCs):</i>
(1) <u>mus</u> <b>en</b> mouse.DEF 'The mouse'	(3) <b>den</b> lilla <u>mus</u> <b>en</b> DEF little mouse.DEF 'The little mouse'	(5) <b>den</b> mus( <b>en</b> ) som åt DEF mouse(.DEF) that ate osten cheese.DEF 'The mouse that ate the cheese'
(2) <b>den</b> <u>mus</u> <b>en</b> DEF mouse.DEF 'The mouse' <i>Contrastive or deictic interpretation</i>	(4) lilla <u>mus</u> <b>en</b> little mouse.DEF 'The little mouse' <i>Referent must be uniquely identifiable w.r.t. common ground</i> (Simonenko 2014)	

In a current working analysis I posit two semantic features, located on D: [+specific] and [+unique]<sup>1</sup>. Following Simonenko (2014), I analyse [+specific] as domain-restricting, used to pick the intended referent from a set. [+unique] corresponds to a presupposition of uniqueness (Roberts 2003, LaCara 2011). I posit two determiners:

$$(6) \quad D \begin{bmatrix} +\text{specific} \\ \pm\text{unique} \end{bmatrix} \leftrightarrow \text{den} \qquad (7) \quad D \begin{bmatrix} -\text{specific} \\ +\text{unique} \end{bmatrix} \leftrightarrow \emptyset$$

The [+unique] feature is copied from D to N, via *Agree*. The dissociated [+unique] feature is realised as **-en**.

	D	(A)	N		D	(A)	N		D	N	RRC
(8)	$\begin{bmatrix} -\text{specific} \\ +\text{unique} \end{bmatrix}$		$[+\text{unique}]$		(9)	$\begin{bmatrix} +\text{specific} \\ +\text{unique} \end{bmatrix}$	$[+\text{unique}]$		(10)	$\begin{bmatrix} +\text{specific} \\ -\text{unique} \end{bmatrix}$	$[-\text{unique}]$
	$\emptyset$		<b>-en</b>			<b>den</b>	<b>-en</b>			<b>den</b>	$\emptyset$

**DPs with unmodified nouns:** When post-nominal only definiteness marking is exhibited (1), uniqueness is presupposed without domain-restriction (7). When a DP with an unmodified noun has double-definiteness marking (2), a deictic or contrastive interpretation results, as the domain-restricting [+specific] feature implies a comparison set (6).

**DPs with modified nouns:** Double-definiteness marking (3) is exhibited because Sw adjectives introduce a comparison set which necessitates domain-restriction (6). Post-nominal only definiteness marking (4) occurs in semantic environments in which the modified noun denotes uniquely w.r.t. common ground (Simonenko 2013:136). In these cases, the adjective does not introduce a comparison set, so domain-restriction is not required (7).

**RRCs:** Post-nominal definiteness marking is described as optional in RRCs (Börjars 1998:52), and it is obligatory in non-restrictive RCs. Perhaps there is an RRC subtype which is ungrammatical with **-en**, (10). There appear to be three patterns of definiteness marking in Sw RRCs<sup>2</sup>:

	<b>den</b>	<b>-en</b>
i.	✓	✓
ii.	✓	✗
iii.	✗	✓

Scandinavian definiteness morphology is discussed extensively (e.g. Julien 2005, Sandström and Holmberg 2006, Börjars and Delsing 2008, Hankamer and Mikkelsen 2005, 2013, LaCara 2011, Simonenko 2013). Comparisons will be made between alternative approaches.

Definiteness morphology is subject to dialectal variation in Sw, a topic which I will explore. For instance, speakers differ in the extent to which they allow (4), suggesting that the distribution has been reanalysed as morphosyntactically conditioned for some speakers, perhaps in line with the analyses of Embick and Noyer (2001), Embick and Marantz (2008), Hankamer and Mikkelsen (2005, 2013). I will also consider how morphosyntactic conditioning can account for differences between pre- and post-nominal modification in Standard varieties.

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<sup>1</sup>More precision in identifying and describing these semantic features is required.

<sup>2</sup>Absence of *den* and *-en* is ungrammatical (when a definite interpretation is intended).

## Contrasting contrast connectives: What we can learn from *but*, *however*, and *nevertheless*

Sarah Hansen  
Rutgers University

It is well established in the literature that discourse connectives, such as *but*, *however* and *nevertheless*, yield, in addition to their truth conditional content, a secondary meaning that contrasts the two connected propositions (Lakoff 1971, Blakemore 2002 and others). The subtle semantic differences between these connectives, however, have not been investigated at any length. In this talk, I identify a yet unidentified core component of meaning that distinguishes them. Blakemore observed from (1)-(3) (2002 slightly modified) that while these connectives all yield the same contrastive meaning, they have different felicity conditions.

(1) Jill is reliable, but/however/nevertheless she lost the papers. (Blakemore 2002:116)

(2) Context: [*In response to: Have you got my article?*]

I did, but/however/#nevertheless it is incomplete. (Blakemore 2002:116)

(3) Context: [*The speaker, who is in shock, has been given whiskey.*]

But/#However/#Nevertheless I don't drink. (Blakemore 2002:116)

*But* is the most general, being felicitous in any context that allows *however* or *nevertheless*. *However* and *nevertheless* carve out different overlapping subsets of the contexts where *but* is felicitous. The non-uniform distribution of these connectives suggests that each has a unique semantic component beyond the contrastive meaning that accounts for their functional similarity. Lakoff (1971) observed that *but* is usable in cases of simple contrast (sc) as in (4), as well as in cases of denial of expectation (DofE) as in (1)-(3). Notice that if either *however* or *nevertheless* is used in (4), they are felicitous only under a reading where there is a denial of expectation, that is, where John's poverty is surprising given Peter's wealth.

(4) Peter is rich but/#<sub>sc</sub>however/#<sub>sc</sub>nevertheless, John is poor.

In this talk, I first argue that the "contrastive" meaning component that these discourse connectives share is a not-at-issue entailment along the lines of Potts (2007). By examining the contextual constraints that distinguish *however* and *nevertheless* from *but* (and from each other), I argue for an account that semantically distinguishes *however* and *nevertheless*, and I show how the semantic analysis accounts for their contextual distribution.

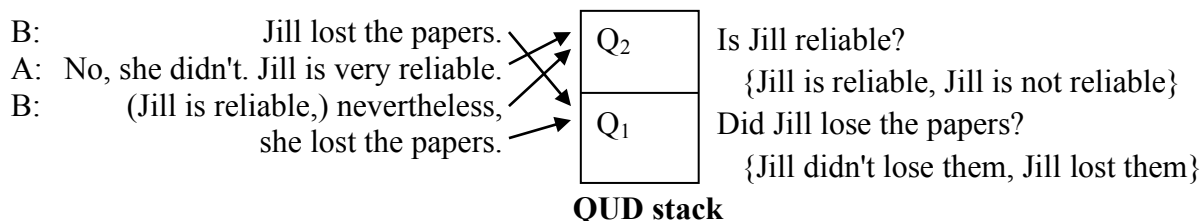
I suggest along with Blakemore (2002) that *however* is usable whenever the speaker wants to deny an expectation introduced by its antecedent *p* such as in (5), but not in cases of simple contrast as seen in (4).

(5) Jill is tall enough to ride (*p*), however she is too young (*q*).

The general idea is that the antecedent of *however*, *p*, leads to a reasonable inference, *e<sub>p</sub>*, that the prejacent, *q*, challenges. In the case of (5), one can reasonably infer on the basis of the height criterion  $\Diamond ride(j)$ , then *q* introduces the age criterion which entails  $\neg \Diamond ride(j)$ .

*Nevertheless* is also felicitous in DofE utterances, however I argue that *nevertheless* has one further contextual constraint. The context where *nevertheless* can be used is most easily understood under a discourse model such as Roberts (1996) proposes. The basic idea, is demonstrated in (6) in a *nevertheless* utterance. The relevant observation about *nevertheless* is that it can be used whenever the (most recent) QUD on top of the QUD stack (*Q<sub>2</sub>*) has a set of answers that potentially implicate the answers to the question below it in the stack (*Q<sub>1</sub>*), and the speaker wishes to accept that the proposed answer to *Q<sub>2</sub>* implicates an answer to *Q<sub>1</sub>*, while rejecting the implicated answer to *Q<sub>1</sub>*. Notice that this discourse mechanism is not necessary to describe the felicity conditions on *however* because *however* does not require that there be a *Q<sub>2</sub>* in the discourse context, as can be seen in (2).

- (6) Context: [The interlocutors are searching the office for some important papers that have gone missing. Only Jill and the interlocutors had access to the papers. B believes that Jill is responsible for losing them and A is defending her.]



I argue that *however* and *nevertheless* share an additional meaning component (that *but* lacks) beyond their contrastive not-at-issue entailment and that this component is concessive. I present as evidence for this claim the observation that it is possible to use *however* in Ann<sub>2</sub>'s response in (7) provided that an appropriate concession is made in the antecedent. In a similar fashion, *nevertheless* concedes the proposition of its antecedent in (5). Furthermore, utterance-initial *nevertheless* can be paraphrased with a concession followed by *but* (i.e. *That may be the case, but*). Thus, each makes an anaphoric reference to, and concedes, the clause that precedes it.

- (7) Frank: Jane will go with John, and Ann will come with me.

Ann<sub>1</sub>: But/#However/#Nevertheless I don't want to go with you.

Ann<sub>2</sub>: I acknowledge your authority in this situation, however/#nevertheless I don't want to go with you.

I argue, on the other hand, that *nevertheless* and *however* differ in that *however* has the added caveat that its antecedent proposition be spoken by the utterer, as seen in Ann<sub>1</sub>'s response in (7) and also in (8). It is notable that the proposition conceded by *however* may be in the extra-linguistic context but need not be in the discourse context. This is in contrast to in Ann<sub>2</sub>'s response with *nevertheless* which is infelicitous. The antecedent proposition that *nevertheless* references must be in the discourse context as seen in (7), but need not be spoken by the utterer as shown in (8).

- (8) A: It will rain this afternoon.

B: But/#However/Nevertheless, I will go for a walk.

Modern theories of discourse rely on the unique semantics of lexical items to predict their contextual distribution. These observations about the contextual distributions of contrast connectives, and the constraints thereon, provide important insight into the nature of their semantic contribution. Previous analyses of contrastive discourse connectives have not, to my knowledge, captured these observations. The semantic analysis that I propose for these connectives can account for their contextual distribution and can provide insight into the semantics of other contrastive connectives.

### Selected References

**Blakemore, D.** 2002. *Relevance and Linguistic Meaning: The Semantics and Pragmatics of Discourse Markers*. Cambridge: CUP. **Lakoff, R.** 1971. If's, and's and but's about conjunction. In C. J. Filmore & D. T. (eds.) *Studies in Linguistic Semantics*. Holt, Rinehart and Winston. New York. **Potts, C.** 2007. Conventional implicatures, a distinguished class of meanings. In G. Ramchand & C. Reiss, eds., *The Oxford Handbook of Linguistic Interfaces*, 475-501. Oxford University Press. **Roberts, C.** 1996. Information structure in discourse: Towards an integrated formal theory of pragmatics. *Working Papers in Linguistics-OSU Department of Linguistics*. 91-136.

**Introduction:** It is a commonly accepted notion that one can only want what one believes is possible (cf. Heim 1992, Giorgi & Pianesi 1997, Portner 1997, von Fintel 1999, Villalta 2008, Rubinstein 2012). This intuition is often formalized by making *want* an operator over doxastic modal bases. Heim's (1992) motivation for using such a modal base comes from Karttunen's (1973b, 1974) generalization, that an attitude holder is presupposed to believe the presuppositions in the complement of an attitude verb. For example, *sell* presupposes ownership, so according to Karttunen's generalization, Patrick is presupposed to believe that he owns a cello in (1).

(1) Patrick wants to sell his cello. (Heim 1992: 183)

This explains why the presupposition is not projected beyond the *want*-clause. We can provide further evidence that this presupposition need only be presupposed to be believed by the attitude holder with a sentence like (2).

(2) Patrick is under the misconception that he owns a cello and he wants to sell it.

Thus Heim makes *want* an operator over a doxastic modal base. (That *want* makes comparison between the worlds in this modal base follows from an intuition she finds in Stalnaker 1984.)

(3)  $c + \alpha$  wants  $\phi = \{w \in C: \text{for every } w' \in \text{Dox}_\alpha(w): \text{Sim}_{w'}(\text{Dox}_\alpha(w) + \phi) <_{\alpha,w} \text{Sim}_{w'}(\text{Dox}_\alpha(w) + \text{not-}\phi)\}$   
(Heim 1992: 197)

**Problem 1:** Limiting *want* to comparing belief worlds presents a serious problem: it predicts presupposition failure when either  $\phi$  or its negation is doxastically inaccessible. Suppose that John was sick: all of his belief-worlds are those where he was sick. This predicts that (4) is valueless, against our judgment that it is false.

(4) John wants to have gotten sick. (Based on Stalnaker 1984)

In response to Heim, Villalta (2008) gives a new semantics for *want*. Among the changes she makes, she proposes to loosen the doxastic restriction by allowing the desirability comparison to look outside of belief-worlds. *Want*'s complement  $p$  is compared to a set of contextually determined alternative propositions  $q$ , and the semantics is defined if all of these propositions have a non-empty intersection with  $\alpha$ 's belief-worlds. Then comparison is made between all  $p$ - and all  $q$ -worlds, regardless of their doxastic accessibility.

(5)  $[[\text{want}_C]]^g(p)(a)(w) = \text{defined iff } \forall q \in g(C): \text{Dox}_\alpha(w) \cap q \neq \emptyset$   
if defined,  $[[\text{want}_C]]^g(p)(a)(w) = 1 \text{ iff } \forall q: q \neq p \ \& \ q \in g(C): p >_{\text{DES}_\alpha, w} q$  (Villalta 2008: 480)

**Problem 2:** But as Villalta defines the desirability relationship (2008: 479),  $p$  ranks better than  $q$  so long as there is one  $p$ -world that outranks all other  $q$ -worlds and there is no  $q$ -world that outranks all  $p$ -worlds. This has the unwelcome effect of predicting *want*-clauses are true where we judge them false. Consider the following scenario (which is new to this work, but builds on Villalta 2008: 496).

(6) *Scenario:* Lisa prefers for Lara rather than John to teach syntax. Lisa believes that Lara is generally a good teacher but John a very bad teacher.

(6a) Lisa wants John to teach syntax next semester. (False)

Villalta's semantics predict that this sentence is false if there is no John-teaching-syntax  $p$ -world that outranks all Lisa-teaching-syntax  $q$ -worlds. But it is not clear that this is the case. Suppose that there is a  $p$ -world where John transforms as a teacher and becomes an excellent teacher. And suppose that Lisa finds a world where John transforms as a teacher to be the most desirable kind of world. This ranking of a  $p$ -world predicts that (6a) is true. But this prediction runs counter to our intuition.

**Intuition:** Although some worlds might rank as best by our bouletic ordering source, we tend to base our desires, as reported by *want*, on what we believe to be likely. Although it may be the case that  $p$ -worlds where John transforms are the best kinds of worlds to Lisa, she knows that realistically John will not change, and this is why her preference is for Lara over John.

**Formalization of our Intuition:** We represent this intuition by using an ordering source based on  $\alpha$ 's beliefs about likelihood. We use this in the semantics of *want* to provide an additional ranking on p- and q-worlds by identifying the most likely worlds in the modal base. (Likelihood correlates with the number of propositions that a world makes true). Most likely worlds are the best worlds from the modal base:

$$(7) \forall w': w' \in \text{Best}(f, g_{\text{likely}}(\alpha, w)) \text{ iff } w' \in f \ \& \ \neg \exists w'' [w'' \in f \ \& \ w'' <_{\text{likely}(\alpha, w)} w']$$

Thus we propose that ' $\alpha$  wants p' is true not if there is a p-world that outranks all q-worlds, but if there is a likely p-world that outranks all likely q-worlds.

$$(8) [\text{want}_C]^g(p)(\alpha)(w) = \text{defined iff } \forall q \in g(C): \text{Dox}_\alpha(w) \cap q \neq \emptyset$$

$$\text{if defined, } [\text{want}_C]^g(p)(\alpha)(w) = 1 \text{ if } \forall q \forall w' [q \neq p \ \& \ q \in g(C) \ \& \ w' \in q \ \& \\ w \in \text{Best}(\text{Dox}_\alpha(w), g_{\text{likely}}(\alpha, w))] \rightarrow \exists w'' [w'' \in p \ \& \ w \in \text{Best}(\text{Dox}_\alpha(w), g_{\text{likely}}(\alpha, w)) \ \& \ w'' <_{\text{DES}_{\alpha, w}} w']$$

**Problem with our Proposal:** But this analysis has flaws of its own. Suppose that  $\alpha$  only believes that p is likely, and none of the q-alternatives are likely. Then the best worlds from the doxastic modal base are only p-worlds. Furthermore, maintaining quantification over a doxastic modal base means that this semantics cannot account for a sentence such as (4).

**Solution:** We solve these problems by proposing to abandon the use of a modal base altogether. Instead, we say that for each of the contextually relevant alternative propositions, the ordering source based on  $\alpha$ 's beliefs about likelihood locates the most likely worlds for each of them. In effect, the desirability comparison is between only those most likely worlds, for each proposition.

$$(9) [\text{want}_C]^g(p)(\alpha)(w) = 1 \text{ if } \forall q \forall w' [q \neq p \ \& \ q \in g(C) \ \& \ w' \in \text{Best}(q, g_{\text{dox}}(\alpha, w))] \rightarrow \\ \exists w'' [w'' \in \text{Best}(p, g_{\text{dox}}(\alpha, w)) \ \& \ w'' <_{\text{DES}_{\alpha, w}} w']$$

This means that for (6a), comparison is between likely p-worlds, where John remains a bad teacher, and likely q-worlds, where Lisa remains a good teacher. Thus (6a) is accurately predicted as true. Likewise, this semantics is successful at accounting for (4), since "John did not get sick" is taken to be a contextually relevant alternative to compare to the complement, despite John having no doxastically accessible worlds where he did not get sick.

**Benefits to Our Solution:** We view this solution as satisfactory because our proposed ordering source maintains the presence of belief in the semantics of *want*. And because these beliefs are about likelihood, it incorporates probabilities in a different way than a probabilistic account such as given by Lassiter (2012). On his account, *want* is not a quantifier over worlds of any flavor, because it has a scalar semantics. Rather, a value is assigned to *want*'s complement, indicating its expected utility, and this value is compared to the average expected utility of a set of alternatives to the complement. It is true that ' $x$  wants  $\phi$ ' if the expected utility of the complement exceeds the value of the compared expected utility.

$$(10) x \text{ wants } \phi \text{ is true iff } \mathbb{E}(\phi) \geq \phi_{\text{want}}, \text{ where } \phi_{\text{want}} \text{ is a value significantly greater than } \mathbb{E}(\text{UALT}(\phi))$$

(Lassiter 2012: 182)

This semantics makes the right predictions for instances where bouletically high ranking worlds are viewed as highly improbable, such as in (6a). However, it is unclear how it can account for examples such as (4), since the attitude holder believes that the complement has a probability of 1 and the relevant alternative – of remaining healthy – has a probability of 0. Lassiter does not provide an account of presuppositions in the scope of attitude verbs, so we explore how it could work to explain (4). We do so by applying the intuition underlying our proposed new ordering source for our quantificational analysis of *want*.

**REFERENCES:** von Fintel, K. 1999. NPI Licensing, Strawson Entailment, and Context Dependency. *Journal of Semantics* 16: 97-148. Giorgi, A. & Pianesi, F. 1997. Tense and Aspect: From Semantics to Morphosyntax. New York: Oxford University Press. Heim, I. 1992. Presupposition Projection and the Semantics of Attitude Verbs. *Journal of Semantics* 9: 183-221. Karttunen, L. 1973b. The Last Word. Mimeograph, University of Texas, Austin. Karttunen, L. 1974. Presupposition & Linguistic Context. *Theoretical Linguistics* 1: 181-94. Lassiter, D. 2012. Measurement and Modality: The Scalar Basis of Modal Semantics. Doctoral Dissertation, New York University, New York. Portner, P. 1997. Semantics of Mood, Complementation and Conversational Force. *Natural Language Semantics* 5: 167-212. Rubinstein, A. 2012. Roots of Modality. Doctoral Dissertation, University of Massachusetts, Amherst. Stalnaker, R. 1984. Inquiry. Cambridge, MA: MIT Press. Villalta, E. 2008. Mood and Gradability: An Investigation of the Subjunctive Mood in Spanish. *Linguistics and Philosophy* 31.4: 467-522.

Epistemic Modals Have Been Misunderstood  
Quinn Harr  
University of Maryland

On standard accounts of modal expressions, sentences like (1) and (2) have been taken to express the same propositions, (2) making explicit the epistemic nature of the modality left implicit by (1).

- (1) Jones might be dead.
- (2) For all we know, Jones might be dead.

A problem for such accounts, however, is the fact that (1) and (2) do not support the same counterfactual continuations. (3), for example, is an acceptable follow-up to (2) but not to (1).

- (3) But that's just kind of a fluke, since we could have investigated his disappearance much more thoroughly.

This sort of problem does not generalize to other, non-epistemic modals, as (4) and (5) show.

- (4) You can get a license in Georgia when you're 16. But that's just kind of a fluke, since Georgia could have had the laws New Jersey did.
- (5) Given its laws, you can get a license in Georgia when you're 16. But that's just kind of a fluke, since Georgia could have had the laws New Jersey did.

Why should this implicit-explicit distinction be important for epistemic modals but not for non-epistemic ones? Some have argued on independent grounds that implicit epistemic modals exhibit idiosyncratic behavior (Yalcin (2007)), but such accounts are insufficient to handle the contrast exemplified by (1) and (2). I argue, instead, that there is a general restriction against modals being implicitly epistemic and that this explains the contrast between (1) and (2). The restriction against implicitly epistemic modals is not uniform, however. Implicitly epistemic modals seem not to be able to occur in main clauses or in clauses embedded under representational attitude verbs, but they can occur in the antecedents of conditionals. I explore possible reasons for why there should be a restriction of this sort and also consider implications of this restriction for some of the other idiosyncratic behavior of what have been presumed to be epistemic modals.



# Hope for Bootstrapping

Kaitlyn Harrigan  
University of Maryland, College Park

We explore how preschoolers interpret the verbs *want*, *think*, and *hope*, and whether syntactic environment influences interpretation. Previous research suggests that children have difficulty interpreting *think* but not *want* [3],[4]. However, these verbs have not been tested under the same conditions. We develop a new methodology for probing *think* and *want*. We also examine *hope*, which shares features with both verbs. We find that children are still adult-like with *want* but not *think*; and interpretation of *hope* is dependent on the syntactic frame it is presented in.

Belief and desire verbs occur in different syntactic frames, but *hope* can occur in both frame types (1-3). *Hope* also shares meaning components with both classes. Like *want*, it expresses a preference, but like *think*, it requires that its complement be consistent with the belief state of its subject. Out of 36,901 utterances in the Gleason corpus [1], [2], *hope* was used 23 times (.0006% of utterances). Thus, children likely have little exposure before age 4.

While previous work tested *want* and *think* under different conditions, we develop a task that makes both belief and desire relevant, for a fair comparison of *want/think* and to explore the role of syntax in the acquisition of *hope*. The child helps pull hearts and stars out of a box and shows them to a puppet who likes hearts but dislikes stars. Before the puppet sees what the next shape is, he sees its color. The distribution in the box makes color highly predictive of shape (table1). Thus, both desire (based on shape) and belief (based on color) are relevant. Another puppet utters the test sentences (4), and the child says whether he is correct. In a 4x2 design, we tested sentence type as a between-subjects factor (*want* (n=24), *think* (n=15), *hope-to* (n=24), *hope-that* (n=24)), and mental state type (conflicting v. non-conflicting) as a within-subjects factor, with the child's response of *yes* or *no* as the dependent measure.

If the asymmetry between *think* and *want* holds up, we expect children to succumb to conflicting mental state errors when interpreting *think* but not *want*. If children use *hope*'s syntactic frame to infer meaning, then we also expect an interaction between sentence type and mental state type for *hope-to* vs. *hope-that*. The syntax in (4c) should lead children to treat *hope* as a desiderative, patterning with children in the *want* condition; the syntax in (4d) should lead children to treat *hope* as a doxastic, patterning with children in the *think* condition.

We find an interaction between sentence type and mental state type ( $p < .0001$ ); children are adult-like in interpreting *want*, but influenced by reality when there is a conflict in the *think* case. Comparisons of *hope-to* and *hope-that* conditions reveal an interaction between frame type and mental state type ( $p < .0001$ ); children in the *hope-that* condition are more likely to be influenced by reality than children in the *hope-to* condition (figure1).

## References:

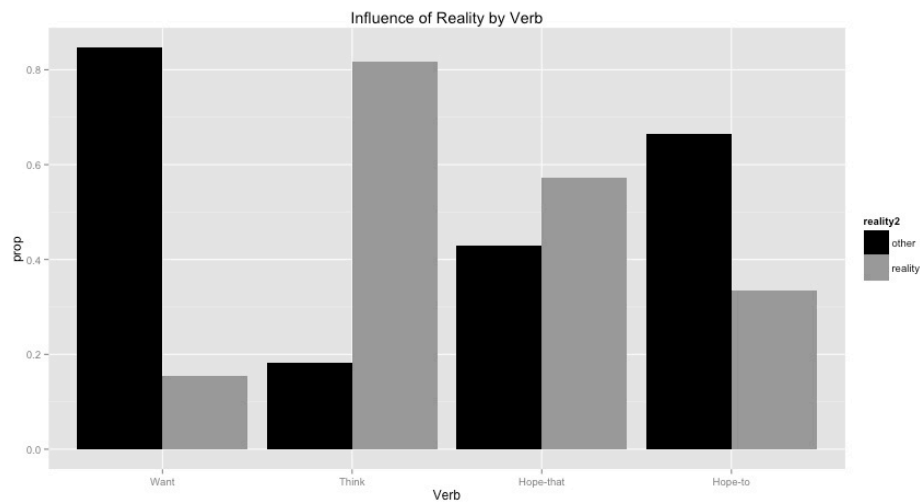
- [1] Gleason, J. B. (1980). The acquisition of social speech and politeness formulae. In H. Giles, W. P. Robinson, & S. M. P. (Eds.), *Language: Social psychological perspectives*. Oxford: UK: Pergamon. [2] MacWhinney, B. (2000). The CHILDES Project: Tools for analyzing talk. 3rd Edition. Vol. 2: The Database. Mahwah, NJ: Lawrence Erlbaum Associates. [3] Perner, J., Sprung, M., Zauner, P., & Haider, H. (2003). 'Want that' is understood well before 'say that', 'think that', and false belief: a test of de Villiers's linguistic determinism on German-speaking children. *Child Development*, 74, 179-188. [4] Rakoczy, H., Warneken, F., & Tomasello, M. (2007). 'This way!', 'No! That way!'—3 year olds know that two people can have mutually incompatible desires. *Cognitive Development*, 22, 47-68.

- (1)
  - a. *Froggy wants the shape to be a heart.*
  - b. *Froggy wants to get a heart.*
  - c. *\*Froggy thinks the shape to be a heart.*
  - d. *\*Froggy thinks to get a heart.*
- (2)
  - a. *Froggy thinks that the shape is a heart.*
  - b. *\*Froggy wants that the shape is a heart.*
- (3)
  - a. *Froggy hopes to get a heart.*
  - b. *Froggy hopes that the shape is a heart.*
- (4)
  - a. *Froggy wants it to be a heart.*
  - b. *Froggy thinks that it's a heart.*
  - c. *Froggy hopes to get a heart.*
  - d. *Froggy hopes that it's a heart.*

Table 1

Shape	Number in box
Red heart	15
Red star	5
Yellow heart	5
Yellow star	15

Figure 1



# The Composition of Nominal/Adjectival Essentially Plural Predicates

Yuki Ito (UMD)

I put forth an event-based (nouns/adjectives are predicates of states) analysis of nominal/adjectival essentially plural predicates (N/AEPPs; e.g. *friends*, *similar*; cf. Hackl 02). I argue that N/AEPPs consist of phrasal distributivity plus “2-place” multiparticipant nouns/adjectives.

The motivation for invoking phrasal distributivity comes from the interaction of N/AEPPs with group nouns. While group nouns exhibit the plural behavior (Pearson 11):

- (1) a. The family has gathered in the hallway. (collective predication)
- b. The basketball team is tall. (distributive predication)

they do not occur with N/AEPPs (Winter 02:fn.6):

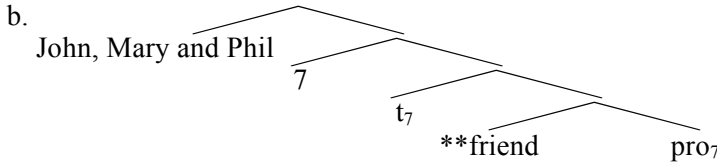
- (2) a. \*The committee is friends. cf. The committee members are friends.
- b. \*The committee is similar. cf. The committee members are similar.

This is explained if N/AEPPs involve phrasal distributivity, for distributive predication with group nouns is limited to lexical distributivity (Kratzer 07, de Vries 13):

- (3) a. The class is hiding somewhere. (can only mean: the children are all hiding in the same spot)  
(Compare: The children are hiding somewhere)
- b. The Jones family is blond or red-haired. (all the Jones need to have the same hair color)  
(Compare: The Jones are blond or red-haired)

This leaves the plural marking found on NEPPs as an explanandum. Building on Hackl’s (02) reflexivization analysis of NEPPs and extending Schwarzschild’s (11) analysis of mass plurals (e.g. *directions*, *belongings*, *preparations*) as multiparticipant nouns, I propose that the plural marking in question reflexes the fact that NEPPs are multiparticipant nouns with respect to their internal (but not to external) participant. Hackl’s (02) analysis of NEPPs is summarized in (4):

- (4) a. John, Mary, and Phil are friends.



- c.  $[[\text{friend}]] = \lambda x \lambda y: y \neq x. y \text{ is a friend of } x$

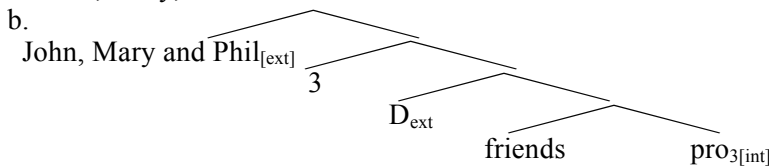
- d.  $**R(x)(y)=1$  iff  $R(x)(y)=1$  or  $\exists x_1 x_2 y_1 y_2: x_1 \oplus x_2 = x \ \& \ y_1 \oplus y_2 = y \ \& \ **R(x_1)(y_1)=1 \ \& \ **R(x_2)(y_2)=1$

(\*\* pluralizes a two-place predicate and introduces cumulativity between the two arguments)

Hackl attempts to derive NEPPs from their corresponding relational noun. He postulates a silent pronoun co-indexed with the external argument in the internal argument position, effectively creating a reflexive predicate ( $\lambda x. x \text{ is a friend of } x$ ). Because of the irreflexivity presupposition associated with the relational noun source, no singular individual can satisfy this predicate (for the presuppositional status of the irreflexivity associated with relational nouns, see Barker 99). The situation is rescued by pluralizing the relation via Krifka’s (86) \*\* operator. Thus, on Hackl’s analysis, the plural marking reflexes pluralization of the relation.

I adopt Hackl’s insight that the co-indexed pronoun and the irreflexivity presupposition associated with the relational noun source conspire to cause the plural marking on NEPPs. Under the event-based setting, however, I suggest that what has to be plural is only the internal participant of the *friend* state and crucially that the external participant of the *friend* state can be singular/atomic.

- (5) a. John, Mary, and Phil are friends.



- c.  $[[\text{friends}]] = \lambda s[\text{friend}(s) \wedge \text{Multiple}(\text{int}(s))]$

- d.  $[[D_\theta]] = \lambda V_{\langle vt \rangle} \lambda e [e \in * \lambda e' (V(e') \wedge \text{Atom}(\theta(e')))]$  (v: type for events)
- e.  $x \in *P = \exists C [x = \oplus C \wedge C \subseteq P]$  (x is the sum of all the elements of a subset C of P)
- f.  $\exists s [* \text{ext}(s) = j \oplus m \oplus p \wedge s \in * \lambda s' (\text{friend}(s') \wedge (\text{int}(s')) = j \oplus m \oplus p \wedge \text{Atom}(\text{ext}(s')))]$

(There is a state whose external participants sum up to  $j \oplus m \oplus p$ , and this state consists of *friend* states for each of which the external participant is an atomic individual and the internal participant is  $j \oplus m \oplus p$ )

I follow Champollion's (14) formulation of phrasal distributivity. While this structure yields too strong an interpretation (John is a friend of John, Mary, and Phil  $\wedge$  Mary is a friend of John, Mary, and Phil  $\wedge$  Phil is a friend of John, Mary, and Phil), I assume with Matushansky and Ionin (11) that the irreflexivity presupposition associated with the relational noun source excludes the atomic reflexive (John is a friend of John; Mary is a friend of Mary; Phil is a friend of Phil) from consideration.

For the plural marking, I extend Schwarzschild's (11) notion of multiparticiple nouns. In the event-based setting, Schwarzschild analyzes a subset of mass nouns such as *traffic* as multiparticiple nouns, nouns that only apply to multiparticiple events. The idea is that more than one participant (e.g. vehicles or pedestrians in transit) is present in (at least normal) *traffic* events. The analogy I draw here is based on his observation that some multiparticiple nouns bear overt plural marking (e.g. *directions*, *belongings*, *preparations*). While Schwarzschild only considered "1-place" nouns, relational nouns that are the source for NEPPs are "2-place" nouns (i.e. *friend* states involve a pair of participants, which I refer to as *ext* and *int*). I propose that NEPPs are multiparticiple nouns with respect to *int*: *friends* applies to *friend* states whose internal participants are multiple. The plural marking is a reflection of this. Notice that as in Hackl's analysis, *int* (= *pro*<sub>3</sub>) has to be plural because of binding by *\*ext*; if *int* is singular (which means *\*ext* and *int* are a coreferential singular individual) there can be no *friend* states that satisfy the irreflexivity presupposition. Given the parallel behavior of nominal and adjectival EPPs, I hypothesize that this analysis extends to those adjectival EPPs that have a relational adjective source (viz. *similar* and *different*).

**Support** for the phrasal distributivity part of the analysis comes from the correlation between the availability of phrasal distributivity with group nouns and the grammaticality of N/AEPPs with group nouns. There are cases where phrasal distributivity is available with group nouns, and in those cases N/AEPPs can occur with group nouns. The first case comes from British English. BE is known to allow plural agreement with group nouns. De Vries (13) observes that with plural agreement, group nouns allow phrasal distributivity:

- (6) a. The class are hiding somewhere. (can mean: each of the children is hiding in a different place)  
 b. The Jones family are blond or red-haired.  
 (compatible with: some of the Jones are blond while the others are red-haired)

With plural agreement, N/AEPPs are fine with group nouns:

- (7) a. The team are friends on track as well as off track, and are much family as we are friends.  
 (de Vries 2013:246)  
 b. The committee are (all) very similar/different.

The second case comes from partitives. Pearson (11) notes that partitives containing group nouns license plural agreement in all dialects of English:

- (8) Half of the family are doctors.

We observe that partitives also allow phrasal distributivity:

- (9) Half of the committee are hiding somewhere/are blond or red-haired.

N/AEPPs are also fine: (10) Half of the committee are friends/similar.

**Champollion 14** Covert distributivity in algebraic event semantics. Ms. NYU.

**Hackl 02** The ingredients of essentially plural predicates. NELS32. **Matushansky and Ionin 11** A singular analysis of three plurals. Ms. **Pearson 11** A new semantics for group nouns. WCCFL28.

**Schwarzschild 11** Stubborn distributivity, multiparticiple nouns and the count/mass distinction.

NELS 39. **de Vries 13** Distributivity and agreement: new evidence for groups as sets. 19th

Amsterdam Colloquium. **Winter 02** Atoms and sets: A characterization of semantic number. LI 33.

# Revisiting the Case for Underspecified Spatial Meanings

Kristen Johannes/ Johns Hopkins University

Spatial terms in languages of the world tend to constitute a small closed class set (Landau & Jackendoff, 1993; Talmy, 1985). In English, for example, this set is typically limited to the spatial prepositions including *in*, *on*, *over*, *above*, etc. To linguistically encode spatial relations with this limited inventory, a speaker must systematically abstract over fine-grained properties of objects and configurations. Modeling the nature of this abstraction – i.e., the way in which speakers systematically encode relations – to account for the range of uses of particular spatial terms has remained a long-standing problem in the cognitive sciences. Many of the earliest attempts to define spatial prepositions appealed to coarse-grained geometric properties of configurations as a means for abstracting away from particular objects. As just one of many examples, Bennett (1975, p. 71) defines *in* and *on*, provided in (1) and (2), respectively, using only the notions of location at the interior of an object (for *in*), and location at the surface of an object (for *on*), specifying nothing beyond the intuitive notion of interiors and surfaces.

- (1) A is *in* B: A [locative [interior of B]]
- (2) A is *on* B: A [locative [surface of B]]

Traditional geometry-based accounts of prepositional meaning have been consistently criticized for failing to predict the range of cases covered by prepositions like *in* and *on*. These accounts are often replaced by proposals that prioritize world knowledge and pragmatic inference (see e.g., Herskovits, 1986) or incorporate large sets of features beyond geometry (see e.g., Feist, 2000; Vandeloise, 2010; Xu & Kemp, 2012). In this talk, we explore a new proposal that revisits the notion of underspecified meanings for prepositions the context of an inventory of English spatial expressions that minimally includes both prepositions and a limited set of lexical verbs (e.g., *attach*, *connect*, *fit*, *hang*, *stick*, etc.). Focusing on the spatial categories of containment and support, we demonstrate that a handful of predominantly geometric features, combined in different ways, predict fine-grained usage patterns of spatial expressions over a wide range of spatial relations.

Our account exploits three assumptions about spatial language: first, that there are multiple possible expressions for encoding a given spatial relation; second, that the mapping from expressions to relations is graded, so that a given relation might be a better or worse instance of an expression; and finally, that an adequately sensitive measure of spatial expression use should reflect the graded structure of spatial categories. We empirically evaluated this proposal by collecting estimates of gradable features and using them, in principled combinations to statistically predict spatial expression use in speakers' descriptions for the same spatial relations.

Specifically, we developed a set of 64 containment and 64 support relation scenes, which were sampled so that they varied systematically across two sets of geometric features (all features listed in Table 1.) for each category. Scenes also varied freely on the functional feature of Locational Control – the control that one object exerts over the location of another object (Garrod et al., 1994). Ratings provided by 40 adults confirmed that geometric features varied systematically and established a range of functional feature variation across scenes. We then elicited spatial descriptions for the same scenes from a new set of 40 adults and used different combinations of features to predict the use of four types of expressions, in (3). Using logistic mixed-effect regression and a nested model search, we found that different combinations of features reliably and robustly predicted the use of each expression ( $r^2$  values for the best-fitting models were all between 0.59 - 0.84;  $p < .01$ ). The order of expressions in (3) reflects the order (highest to lowest) of variance

accounted for in the respective model, with features combinations best predicting speakers' use of specialized preposition expressions like "*The X is inside/on top of the Y*" across scenes.

- (3) X is [inside/on top] of Y (e.g., The ball is inside the cup; The book is on top of the table)  
 X is [in/on] Y (e.g., The egg is in the bowl; The box is on the chair)  
 X [lexical verb] [preposition] Y (e.g., The shoe is hanging from the tree)  
 X is [preposition] Y (e.g., The spider is below the branch)

This work shows that speakers' distribution of spatial expressions across a wide range of relations can be accurately modeled by appealing to a small set of gradable geometric and functional features. The proposal revisits a view of underspecification in spatial meanings, in which a few simple features can be combined in different ways to account for the use of multiple spatial expressions.

**Table 1.** Features of interest for containment (top) and support (bottom) relations, associated experimental rating prompts, and endpoints of 4-point rating scale.

Containment Feature	Rating prompt	Scale endpoints [4...1]
Enclosure	<i>How much of object A is enclosed by object B?</i>	All of A is enclosed by B Hardly any of A is enclosed by B
Volume Match	<i>How much empty space is present between object A and object B?</i>	There is a lot of empty space between A and B There is hardly any empty space between A and B
Locational Control	<i>If object B is moved, how likely is it that object A will move with it?</i>	A is extremely likely to move where B moves A is unlikely to move where B moves
Support Feature	Rating prompt	Scale endpoints [4...1]
Vertical Position	<i>How much of object A is situated higher than object B?</i>	All of A is higher than B None of A is higher than B
Surface Match	<i>How much of object A's surface is in contact with object B?</i>	All of A is in contact with B Hardly any of A is in contact with B
Locational Control	<i>If object B is moved, how likely is it that object A will move with it?</i>	A is extremely likely to move where B moves A is unlikely to move where B moves

## References

- Bennett, D.C. (1975). *Spatial and Temporal Uses of English Prepositions: An Essay in Stratificational Semantics*, London: Longman.
- Feist, M. I. (2000). *On in and on: An investigation into the linguistic encoding of spatial scenes*. (Ph.D.dissertation, Northwestern University)
- Garrod, S., Ferrier, G., & Campbell, S. (1999). *In and on: investigating the functional geometry of spatial prepositions*. *Cognition*, 72, 167-189.
- Herskovits, A. (1986). *Language and spatial cognition: an interdisciplinary study of the prepositions in English*. Cambridge, England: Cambridge University Press.
- Landau, B. & Jackendoff, R. (1993). 'What' and 'where' in spatial language and spatial cognition. *Behavioural and Brain Sciences*, 16(2), 217-265.
- Talmy, L. (1985). Lexicalization patterns: Semantic structure in lexical forms. In Timothy Shopen (ed.), *Language typology and syntactic description*. Cambridge: Cambridge University Press, 57-149
- Vandeloise, C. (2010). Genesis of spatial terms. In V. Evans & P. Chilton (Eds.), *Language, cognition and space: the state of the art and new directions*. London: Equinox, 171-192.
- Xu, Y. & Kemp, C. (2010). Constructing spatial concepts from universal primitives. *Proceedings of the 32nd Annual Conference of the Cognitive Science Society*.

## Group Formation in Russian

Sonia Kasyanenko  
New York University

My project explores the semantics of collectivity in three Russian constructions: the ordinary coordinate construction, the comitative construction, and the *together-with* construction. Whereas the ordinary coordinate construction is common across languages, the comitative construction is relatively infrequent. I present new data on the predicative use of the comitative construction to support the claim (McNally, 1993) that there exists a semantic difference between group-forming comitative coordination and ordinary coordination. I propose that this difference limits the predicative use of the comitative construction. Further, I introduce the *together-with* construction, which has escaped attention in the literature on formal semantics. Like the comitative construction, the *together-with* construction favors the collective interpretation. However, the distribution of the *together-with* construction is more limited than the distribution of the comitative construction: collective predicates (i.e. *vstretitsja* 'meet'), reciprocal predicates (i.e. *videt drug druga* 'see each other'), and predicates involving sentence-internal plural *different* (i.e. *zhit v raznyh gorodah* 'live in different cities') do not apply to the *together-with* construction. This limit on the distribution of the *together-with* construction supports the claims that sentence-internal plural *different* (Beck, 2000) and collective predicates (Hackl, 2002) have a silent reciprocal component in their meanings. Additionally, the *together-with* construction strongly disprefers, if allows at all, the collective responsibility interpretation (Landman, 2000; Winter, 2001), sometimes referred to as “kolkhoz collectivity” (Verkuyl, 1994) or “nonthematic collectivity” (Champollion, 2010). Rather, the *together-with* construction requires all members of the group to share relevant properties (“collectivity as dependence interpretation” Mari, 2005). This discussion leads me to conclude that the distribution of the *together-with* construction, its difference from the comitative construction, as well as its limited range of interpretations support the claim (Mari, 2005) that theories representing groups as sets or mereological sums cannot describe the notion of collectivity in full detail.

### REFERENCES:

- Beck, Sigrid. 2000. The semantics of Different: Comparison operator and relational adjective. *Linguistics and Philosophy* 23(2): 101–139.
- Champollion, Lucas. 2010. *Parts of a whole: Distributivity as a bridge between aspect and measurement*. PhD thesis, University of Pennsylvania, Philadelphia, PA.
- Hackl, Martin. 2002. The Ingredients of Essentially Plural Predicates, in *Proceedings of the Thirty-Second Conference of the North Eastern Linguistics Society (NELS)*: 171-182. University of Massachusetts. Amherst, MA: GLSA (Graduate Linguistic Student Association).
- Landman, F. 2000. *Events and plurality: The Jerusalem lectures*. Kluwer, Dordrecht, Netherlands.
- Mari, Alda. 2005. Intensional epistemic wholes: A study in the ontology of collectivity. In *The compositionality of meaning and content*, eds. Markus Werning, Edouard Machery, and Gerhard Schurz, Vol. I: Foundational Issues: 189–211. Ontos Verlag.
- McNally, Louise. 1993. Comitative coordination: A case study in group formation, *Natural Language and Linguistic Theory* 11: 347-379.
- Verkuyl, Henk. 1994. Distributivity and collectivity: a couple at odds. In *Dynamics, polarity, and quantification*, eds. Kanazawa, M. and Pinon, C.: 49–80. CSLI Publications, Stanford, CA.
- Winter, Yoad. 2001. *Flexibility Principles in Boolean Semantics: coordination, plurality and scope in natural language*. MIT Press, Cambridge, Massachusetts.

## Functional reference in American Sign Language

Jeremy Kuhn  
New York University

Functional reference in natural language can be seen in a variety of phenomena. These include functional uses of pronouns ("Three boys each saw a girl. They each waved to her."), functional questions, functional readings of indefinites, and "internal" readings of certain adjectives (e.g. *same*, *different*).

In American Sign Language, discourse referents can be established in space: singulars may be indexed at points; plurals may be indexed over areas. Plurals can be indicated in two ways: either by a sweeping "arc" movement over the area or with a reduplicated motion across the area. Plural morphology appears cross-categorially, including on pronouns, numerals, and adjectives. In this talk, I show that functional reference can be established in ASL by indexing two plurals over the same area of space: one plural provides the domain of the function and the other the range. This spatial representation of functions allows dependencies to be overtly realized.

I focus on two case studies. First, in the case of **dependent numerals**, I show that ASL patterns with a wide range of other languages (for overview, see Henderson 2014) in allowing plural morphology on a numeral to express dependence on a higher distributive operator. ASL, however, goes further: when there are multiple distributive operators in a sentence, ASL can use co-location to overtly specify which one the numeral depends on (below, spacial indexing is marked with lowercase 'a' and 'b').

(1) ALL-a BOY-a GAVE ALL-b GIRL-b ONE-redup-b BOOK

'Every boy gave every girl one book each.'

--> books must be scopally dependent on girls.

--> books may be scopally independent from boys.

Second, I examine the case of the adjective **SAME**, which may move in space to show that the 'sameness' is distributed over.

(2) a. JOHN-a GAVE ALL-b GIRL-b SAME-arc-b BOOK.

b.\*JOHN-a GAVE ALL-b GIRL-b SAME-arc-a BOOK.

'John gave all the girls the same book.'

However, the presence of agreement (shown above as '-arc-x') is contingent on the presence of a functional witness; in particular, SAME cannot agree in space under the quantifier NONE.

(3) a. NONE STUDENT-a READ SAME-*nonagreeing* BOOK.

b.\*NONE STUDENT-a READ SAME-arc-a BOOK.

Finally, I discuss the interaction of these patterns with the two types of plural morphology. I argue that reduplication allows individuated reference to the pairs in the



function, but that arc-movement collapses the individuals into a collective plural. The result is that certain functional pair-list readings are available for reduplication that are not available with arc-movement.

(4) a. STUDENT, WHO IX-redup SEE?

'The students, who did they see?'

- i. President Obama.
- ii. Their mothers.
- iii. John -- Mary, Bill -- Susan, Phil -- Teresa.

b. STUDENT, WHO IX-arc SEE?

'The students, who did they see?'

- i. President Obama.
- ii. Their mothers.
- iii.\* John -- Mary, Bill -- Susan, Phil -- Teresa.

Cheng (1991) claims that Chinese has three (sentence final) Q-particles for clause-typing purpose: *ma* for polar question, *ne* for *wh*-question, and empty  $\emptyset$ . However, it has been pointed out by Li (2006) that *ne* and *ma* also appear in non-interrogative context, and that *ne* can be used not only for *wh*-questions, but also for alternative questions and A-not-A questions (one special type of polar questions). On the other hand, it still remains puzzling as why questions attached with *ma* are always (variants of) polar questions.

This paper aims to present an Inquisitive Semantics account to these interrelated problems. Specifically, in Inquisitive Semantics (AnderBois (2012) and Ciardelli, Groenendijk, and Roelofsen (2013)), a proposition  $\mathcal{P}$  is a set of sets-of-worlds  $w$ , and a possibility  $p$  is a set-of-worlds. A proposition that has more than one possibility is *inquisitive*, and a proposition that excludes some world(s) is *informative*. A question then is characterized as a *non-informative* and *inquisitive* proposition. Assuming the theoretical framework, we argue that (i) the empty particle  $\emptyset$  functions as the Q-particle, but (ii) *ne* is a contrastive topic marker, and *ma* is a emphatic assertion marker. Each indicates different semantic operations. Specifically, following Cheng (1991), we assume that  $\emptyset$  syntactically types its clause as interrogative, but further propose that  $\emptyset$  semantically corresponds to the interrogative operator  $?$  in Inquisitive Semantics, which forms a possibility out of the so far excluded world(s) and adds it to the proposition (EXPAND).

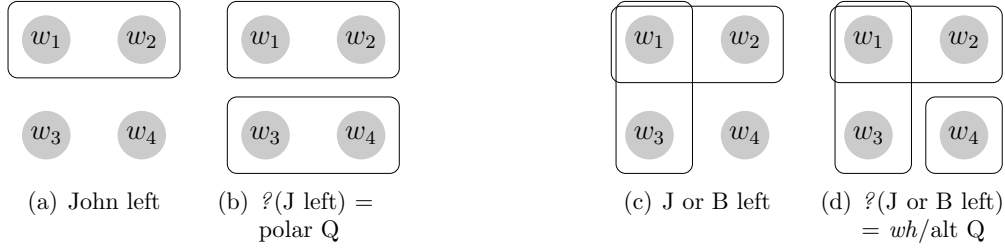


Figure 1:  $?$  interrogative operator

*Ne* indicates SHRINK operator (*S*-Op), which preserves possibilities and restricts the domain of a proposition. Given *S*-Op, the subsequent operation is operative and defined only within the restricted domain. In Figure (2b), the domain of proposition is restricted by *S*-Op. Consequently, in Figure (3b), no new possibility can be formed by  $?$  within the restricted domain ( $\emptyset$  only functions to type the sentence as interrogative).

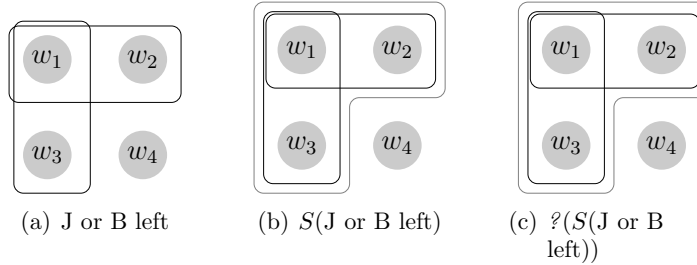


Figure 2: *S*-Op followed by  $?$

*Ma* indicates the non-inquisitive closure  $!$  that forms *non-inquisitive* propositions by uniting all existing possibilities in a single one (FLATTEN), as shown in Figure (3b). In

interrogative context, the empty  $\emptyset$  is present and the complement is added. As a result, the outcome is always a (variant of) polar question, as in Figure (3c).

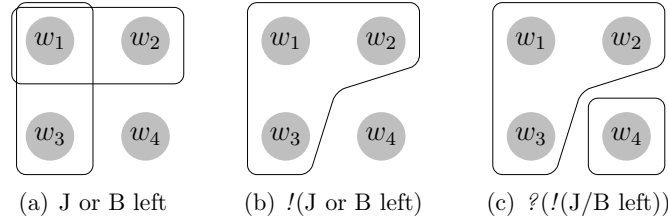


Figure 3: ! followed by ?

**[Predictions and consequences]** Firstly, the analysis predicts that *ne* only can attach to *inquisitive* propositions in interrogative context, since *S-Op* does not form new possibilities. As a result, *ne* appears in *wh*-/A-not-A/alternative questions (each of which already contains multiple possibilities). However, *ne* is unable to turn an atomic declarative sentence (which contains only one possibility) into a question, since the result is still *non-inquisitive*, as in example (1).

- (1) Nǐ jiàn-guò John le (\*ne)?      (2) John xǐ-bù-xǐhuān Bill (\*ma)?  
 you meet-ASP John ASP NE      John li(ke)-not-like Bill MA

Secondly, non-inquisitive closure ! in *ma* explains why *ma*-questions are always polar questions (one with two non-overlapping possibilities). Additionally, it is correctly predicted that *ma* is incompatible with A-not-A question, since the result of flattening two non-overlapping possibilities is *ignorant* (example (2)). Thirdly, the compositional approach to *ne* and *ma* captures their semantic contribution in non-interrogative context. On the one hand, the fragment or sentence attached with *ne* is in contrast to others in the context. This is attributed to the function of *S-Op*, since it restricts the domain, marking the possibilities already in the proposition as particularly important and relevant (example (3)). On the other hand, following Szabolcsi (to appear), emphatic assertion is analyzed as double negation (= non-inquisitive closure !), expressing *verum focus* that affirms the truth of a proposition (example (4)). Finally, the unified semantic analysis of Q-particle lends support to Jayaseelan (2008)’s identification.

- (3) Do you like them?  
 John(-ne), wǒ hěn xǐhuān(-ne); (Bill-ne ...)  
 John(-NE) I very like(-NE) (Bill-NE ...)  
 ‘As far as John is concerned, I like him very much. (As for Bill, ...)’  
 (4) I don’t like J or B, so I don’t want their friend Sue to host the party, because  
 Tā huì yāoqǐng John huò Bill ma!  
 she will invite John DISJ Bill MA  
 ‘She WILL invite John or Bill! (= it is not the case that she won’t!’)

[References] AnderBois, S. 2012. Focus and un informativity in Yucatec Maya questions. NLS 20:349-390| Cheng, L. 1991. On the typology of *wh*-questions. PhD. Diss. MIT| Ciardelli, I., J. Groenendijk, and F. Roelofsen. 2013. Inquisitive Semantics: A new notion of meaning. L.&L. Compass 7:459-476| Jayaseelan, K. A. 2008. Question particles and disjunction| Li, B. 2006. Chinese final particles and the Syntax of the periphery. PhD. Diss. Leiden Univ.| Szabolcsi, A. to appear. What do quantifier particles do? L&P

## Mandarin *dou* as an exhaustification operator

Mingming Liu (Rutgers University)

This talk argues against the standard view that Mandarin *dou* is an overt distributive operator (Lin 98, Yang 00, Chen 08). It analyzes *dou* as an *even*-like exhaustifier (cf. Chierchia 13), deriving distributivity from its interaction with alternatives. Empirical arguments are also presented to argue against another exhaustification-&-alternatives account (Liao 11). **The distributive effect:** *dou* forces a distributive reading when it comes between a plural DP and VP (1); to express simple universal quantification, *mei*-NP (*every*-NP) has to co-occur with *dou* (3). These *distributive effects* motivate Lin (98) to treat *dou* as a distributive operator (2) and Mandarin *every*-NP as (essentially) referential (4) (or its shifted predicative form  $\lambda P[P(\sigma x.student(x))]$ ), synonymous with *the*-NP.

- |   |   |
|---|---|
| <p>(1) <i>Tamen dou mai le yi liang chezi.</i><br/> they DOU buy ASP one CL car<br/> ‘They <u>each</u> bought a car.’ (Distributive only)</p> <p>(2) <math>\llbracket dou \rrbracket = \lambda P \lambda x \forall y[(y \leq x \wedge Atom(y)) \rightarrow P(y)]</math></p> | <p>(3) <i>Meige xuesheng *(dou) xihuan Lisi.</i><br/> every student DOU like Lisi<br/> <math>\forall y[(y \leq_{Atom} \sigma x.student(x)) \rightarrow like.Lisi(y)]</math></p> <p>(4) <math>\llbracket meige\ xuesheng \rrbracket = \sigma x.student(x)</math></p> |
|---|---|

We present three novel arguments against the standard analysis where *dou* is treated quantificational and *every* referential.

**The quantificational variability problem:** When *dou*’s associate is a definite DP, another quantificational element  $Q_{adv}$  can be added before *dou*, with the resulting sentence carrying various quantificational force expressed by  $Q_{adv}$  (5). However, QVE crucially cannot happen with *every*-NPs (6).

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|---|--|
| <p>(5) <i>Tamen daduo/henduo dou xihuan Lisi.</i><br/> they most/many DOU like Lisi<br/> ‘Most/many of them like Lisi.’</p> | <p>(6) <i>meige x.s (*daduo/*henduo) dou x.h Ls.</i><br/> every student most/many DOU like Ls<br/> Intended ‘Most/many of the students like Ls.’</p> |
|---|--|

(5) is already a problem for (2): it shows *dou* doesn’t uniformly contribute  $\forall$ -quantification, if it is indeed quantificational (note the *most/many* in (5) don’t have event-related readings, cf. Nakanishi & Romero 04). Taking  $Q_{adv}$  to combine with the definite, giving rise to *most of them* and treating *most of them* as another referential expression, perhaps *one specific majority of them*, is not a good option either. It is syntactically implausible since *most* occupies an *adv* position (and cannot be floated back) in (5); it also seems to predict iteration of determiners in Mandarin, an unattested phenomenon.

Even if the above problem can be solved, (6) is an additional challenge. A comparison of (5) and (6) suggests Mandarin *every*-NPs are quantificational while definite NPs are not (and thus the latter but not the former allow for another quantificational element); yet this distinction is hard to maintain within a quantificational analysis of *dou*.

**The scope problem:** (7)-(8) seem to suggest that the surface positions of *dou* and negation fix their relative scope. But (9)-(10) show this does not generally hold: when *every* is present, a wide scope negation has to be positioned before *every* at the surface structure, suggesting Mandarin *every* takes scope and *dou* does not.

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|--|--|
| <p>(7) <i>Tamen dou bu xihuan Lisi.</i><br/> they DOU not like Lisi<br/> ‘They all don’t like Lisi.’ <math>\forall &gt; \neg</math></p> <p>(9) <i>bu-shi meige xuesheng dou xihuan Lisi.</i><br/> not-be every student DOU like Lisi<br/> ‘Not every student likes Lisi.’ <math>\neg &gt; \forall</math></p> | <p>(8) <i>Tamen bu-(shi) dou xihuan Lisi.</i><br/> they not-(be) DOU like Lisi<br/> ‘Not all of them like Lisi.’ <math>\neg &gt; \forall</math></p> <p>(10) <i>*meige xuesheng bu-(shi) dou xihuan Lisi.</i><br/> every student not-(be) DOU like Lisi</p> |
|--|--|

We seem to have a dilemma: (7)-(8) suggests *dou* takes scope, while (9)-(10) shows the opposite. Yet the dilemma is superficial: *dou* need not take scope since we can have a covert  $\forall_{cvt}$  encoding the quantificational information. Further,  $\forall_{cvt}$  can be overt, and a wide scope negation must appear before this overt  $Q$  (11)-(12). This supports that even in (7)-(8),  $\forall_{cvt}$  bears scope, while *dou* does not. In short, *dou* never takes scope, unexpected under a quantificational analysis.

- |   |   |
|---|---|
| <p>(11) <i>Tamen bu-shi quanbu /<math>\forall_{cvt}</math> dou xihuan Lisi.</i><br/> they not-be all /<math>\forall_{cvt}</math> DOU like Lisi<br/> ‘Not all of them like Lisi.’ <math>\neg &gt; \forall</math></p> | <p>(12) <i>*Tamen quanbu /<math>\forall_{cvt}</math> bu-(shi) dou xihuan Lisi.</i><br/> they all /<math>\forall_{cvt}</math> not-(be) DOU like Lisi</p> |
|---|---|

Some clarifications: under an account where *every* (and the covert  $\forall_{cvt}$ ) is quantificational while *dou* is not, (10) and (12) are predicted to have  $\forall > \neg$ . Yet the two are bad; this is because, we suggest, the default position of (a narrow scope) negation is low (cf. Beghelli and Stowell 1997), and there is no motivation to move it across *dou*.

**Association with nobody:** *dou* can be associated with a *nobody* occurring to its right (13). This has not been mentioned much; we speculate it’s because it’s usually assumed that *dou* only does leftward-association. However,

Li (92) noticed that *dou* can also be rightward associated with a *wh*-phrase in questions. Agreeing with Lin (98), we treat the difference between left-right association to be syntactic (overt vs. covert movement, Lin 98).

- (13) *Dou meiyou.ren lai.* (Association with *nobody*)  
 DOU no.body come 'Nobody came'

The existence of (13) casts doubt on the standard analysis. For a distributive-operator advocate, it's important that the associate of *dou* can introduce a plurality so that it can be distributed over by *dou*. *Nobody*, being inherently quantificational, is unable to provide such a plurality, thus is predicted incompatible with *dou* by the standard account. **A non-quantificational analysis:** We present an exhaustification-&-alternatives analysis in the framework of Chierchia (13) (similar to Liao 11). The central ideas are: *dou* semantically is *even*; the 'distributive'-*dou* is only an *even*-less *dou* with its 'even' meaning trivialized; since this trivialization happens when a distributive operator is present, we have a correspondence between distributivity and the *even*-less *dou*, thus the prominent distributive effects.

The analysis presupposes a covert distributive operator (14), which is justified by (15) where *dou* is absent but a distributive reading is possible and strongly preferred for every speaker we consulted. In this respect, our judgement agrees with Xiang (08), but differs from Lin (98). Next, for *dou*, we adopt Karttunen and Peters' (79) analysis of *even* (16), which straightforwardly accounts for *dou*'s 'even'-use (17). Finally, we follow Link (83) and Landman's (89) theory of plurality (with the group operator) and we assume a sum has its subparts as its alternatives (18) (alternative being in the sense of Rooth (85)), while a group has other groups as its alternatives (19).

- (14)  $\llbracket Dist \rrbracket = \lambda P \lambda x \forall y [(y \leq x \wedge Atom(y)) \rightarrow P(y)]$  (16)  $dou(p)$  presup:  $\forall q \in C[\neg(p=q) \rightarrow p \prec_{likely} q]$   
 (15) [Context: Among these kids, I asked who drew two pictures, and you say:] (17) Lisi dou lai le.  
 Jieke he Lisi hua le liang fu. Lisi dou come ASP 'Even Lisi came.'  
 Jack and Lisi draw ASP two CL  
 'Jack and Lisi each drew two pictures.' (18)  $\llbracket z \text{ and } l \rrbracket = z \oplus l$ ;  $\llbracket z \text{ and } l \rrbracket^f = \{z \oplus l, z, l\}$   
 (19)  $\llbracket \uparrow(z \text{ and } l) \rrbracket^f = \{\uparrow(z \oplus l), \uparrow(z), \uparrow(z \oplus w) \dots\}$

Now it's clear why (1) does not have an *even* flavor and only has a distributive reading. Assuming its LF to be  $DOU[Dist(bought\ a\ car')](z \oplus w \oplus l]_F]$ , *dou*'s preadjacent  $Dist(bought\ a\ car')(j \oplus m \oplus b)$  necessarily entails all the other alternative propositions such as  $Dist(bought\ a\ car')(j \oplus m)$ . Assuming entailment is stronger than likelihood, the *even*-presupposition of *dou* is trivialized because it is weaker than the assertion and automatically satisfied. In this way, we get an *even*-less ('distributive') *dou*. On the other hand, under a collective construal of the sentence, *dou*'s preadjacent does not entail its alternatives; thus the *even*-presupposition obligatorily surfaces, a correct prediction.

**Departure from Liao:** The above analysis shares many of the same assumptions as Liao (11) but with one crucial difference: Liao assumes a *cover*-based analysis of the distributive/collective distinction (Schwarzschild 96), while the present analysis adopts the Link-Landman approach. This has a non-trivial empirical consequence:

- (20) a. Even [Jil, Mary and Sue]<sub>F</sub> can't lift the piano. c.  $EVEN[Dis_{cover}(can't\ lift\ the\ piano')(j \oplus m \oplus s_F)]$   
 b.  $EVEN[can't\ lift\ the\ piano'](\uparrow j \oplus m \oplus s)_F]$

(20a) has a collective reading where we are comparing the likelihood of  $\phi$ : *j, m and s together can't lift the piano* with its alternatives such as  $\psi$ : *j and m together can't lift the piano*. The present theory (20b) captures this by allowing  $\uparrow j \oplus m$  to be an alternative of  $\uparrow j \oplus m \oplus s$ . Instead, Liao assumes that collectivity is encoded by  $Dis_{cover}$  (20c). Since  $Dis_{cover}$  is not in focus, the *Cover* function (similar to an assignment function) cannot vary among the alternatives of  $j \oplus m \oplus s$ . But a single *Cover* cannot work: the collectivity of  $\phi$  requires  $j \oplus m$  not to be in the range of *Cover*, but the collectivity of  $\psi$  requires the opposite. As such, Liao's theory is unable to capture the collective reading of (20a).

**Conclusion:** We have shown a distributive-operator analysis of *dou* fails because *dou* doesn't really behave quantificationally and its associate is not always referential. We have instead presented a non-quantificational account of *dou* which by its nature does not have the above problems and captures the distributive effect. In the talk, we will further show how *dou* is associated with *every*-NP, which in our account is a quantifier with a domain variable and triggers subdomain alternatives, thus requiring *dou*'s exhaustification (cf. Chierchia 13). We will also discuss *dou*'s association with *many/most* based on the idea of scalar alternatives (Horn 89) and pragmatic scales. Finally, we will compare our account with recent analyses treating *dou* as a maximality operator (Giannakidou & Cheng 06, Xiang 08).

**Selected Refs:** Chierchia 13 *Logic in Grammar OUP*. Liao 11 *Alternatives and Exhaustification*. Harvard thesis. Lin 98 *Distributivity in Chinese NALS*. Yang 00 *Chinese NPs: Quantification & Distributivity SALT X*.

Grice (1989) describes a number of ways speakers can manage to convey more than the literal meanings of the sentences they utter. Certain cases, however, apparently cannot be explained by means of Gricean implicatures. For example, Perry (1998) argued that (1) can be used to assert (2), though no audible part of (1) means 'there.' This doesn't seem to involve standard Gricean reasoning. Semantic minimalists such as Cappelen and Lepore (2005) insist that such implicit constituents are not part of the grammatical representation of (1). But building on Partee 1989, Stanley (2000) disagrees, since in the scope of a quantifier the implicit role may be interpreted as a dependent variable, as in (3).

(1) It's raining.

(2) It's raining there.

(3) Everyone who visited a beach found that it was raining.

This argument from binding is persuasive, but it applies only to implicit roles with a "definite" interpretation (Fillmore 1986). Those with an "indefinite" interpretation – like the thief and victim in (4) – are never bindable (Williams 2013). (5) has no reading where either thief or victim covary with the choice of vixen.

(4) The rooster was stolen.

(5) No rooster eaten by a vixen was stolen more than two days before.

In general there is no reason to think that "indefinite" roles are grammatically represented. But for short passives there is: the implied 'agent' can control an infinitival reason clause (Roeper 1987). In (6) the implied trader can also be the intended acquirer. Ordinarily, only explicit constituents can enter into this control relation. Mauner et al. (1995, 2000) also give behavioral evidence suggesting that (6) is no more difficult to interpret as intended than is (7). This has suggested the Grammatical Theory: at some level of syntax, (6) is identical to (7), and control is stated as a relation at that level.

(6) Two outfielders were traded to acquire a better pitcher.

(7) The team traded two outfielders to acquire a better pitcher.

Here we question this on the basis of sentences like (8) (Williams 2013).

(8) Two outfielders were traded. The reason was to acquire a better pitcher.

A fortiori, understanding the acquirer as the trader in (9) does not involve construal of any *grammatical* dependency, since these do not cross sentences. So if the Grammatical Theory is correct, the interpretation of (6) and (8) must deploy different mechanisms. To test this we performed a series of self-paced reading studies, initially comparing the four conditions in (6-9).

(9) The team traded two outfielders. The reason was to acquire a better pitcher.

If different mechanisms are involved in the interpretation of (6) and (8), we might expect this difference to be reflected behaviorally. We do indeed find a difference in reading times between (6) and (8) around the point of control resolution (i.e., around 'to'), possibly supporting the view that there are two mechanisms involved in remote versus local control. However, readings times in the remote condition were faster than in the local condition (6), suggesting that there may be two mechanisms involved, with the grammatical mechanism for local control being slower.

Pushing in the other direction, we find a significant difference in reading times within the local condition, with implicit control (6) causing a slowdown as compared to explicit control (7). This result challenges the earlier findings in Mauner et al. 1995 and 2000, where no significant difference was observed between implicit and explicit local control – a result that was taken to support the Grammatical Theory. Thus, the results of our first study are mixed, apparently providing both indirect support for the Grammatical Theory and an indirect challenge.

We are currently analyzing the results of a first follow-up study, in which we attempt to deconfound the roles of subjecthood and implicitness by comparing (6) and (8) with their long passive counterparts, (10) and (11).

(10) Two outfielders were traded away by the management to acquire a better pitcher.

(11) Two outfielders were traded away by the management. The reason was to acquire ...

We are also running a third follow-up, in which we attempt to control for a few other confounding effects that may have obtained in the first study, including the difference in the amount of time readers have before encountering the reason clause, and the difference in predictiveness of control in the local versus remote conditions.

## References

- Cappelen, H. and E. Lepore 2005. *Insensitive semantics*. Blackwell.
- Fillmore, C. 1986. Pragmatically controlled zero anaphora. *Berkeley Linguistics Society (BLS)* 12, 95-107.
- Grice, H. P. 1989. *Studies in the ways of words*. Harvard University Press.
- Mauner, G. et al. 1995, Implicit arguments in sentence processing. *Journal of Memory and Language* 34, 357-382.
- Mauner, G. and J.-P. Koenig 2000. Linguistic versus conceptual sources of implicit agents in sentence comprehension. *Journal of Memory and Language* 43, 110-134.
- Partee, B. 1989. Binding implicit variables in quantified contexts. *CLS* 25, 342-356.
- Perry, J. 1998. Indexicals, context and unarticulated constituents. In the Proceedings of the 1995 CSLI-Amsterdam Logic, Language and Computation Conference. Stanford: CSLI Publications.
- Roeper, T. 1987. Implicit arguments and the head-complement relation. *Linguistic Inquiry* 18, 267-310.
- Stanley, J. 2000. Context and logical form. *Linguistics and Philosophy* 23, 391-434.
- Williams, A. 2014. *Arguments in syntax and semantics*. Cambridge University Press.

## Priority Effects in Context-Dependent Meanings

Drew Reisinger, Johns Hopkins University

In this poster, I propose an extension to Kratzer [1977]’s ordering semantics to model how modal expressions depend on a feature of context I call *salient priority*, which encodes how contradictory desires, moral principles, or causal laws override each other. I add a contextually determined *priority order*, a partial order over a set of propositions, to the denotation of modals, and outline how a priority-ranked ordering source induces an ordering on possible worlds. This extension addresses the fact that restricted-quantifier accounts are not designed to handle rankings of propositions or constraints; this move is analogous to that of Villalta [2008] for Heim [1992]’s account of desire predicates.

Although it is well known that the meanings of modal expressions are highly context-sensitive [Kratzer, 1977, 1981], there are many features of context that they could depend on. A formal theory of modality that makes testable semantic predictions should precisely specify both a) the kind of contextual information available to the interpretation module and b) how modal meanings depend on this information.

The following scenarios exemplify one such feature of context, *salient priority* (distinct from Rubinstein [2012]’s priority in her account of weak necessity), that can affect the truth conditions of deontic modals in (1) and (2) and counterfactuals in (3) and (4).

**Scenario 1:** Alex and Bailey are two students in the same class. They are both working on a take-home exam, and although Alex is almost done with hers, Bailey is struggling with his. Alex and Bailey are good friends, and all things being equal, Alex believes she should help Bailey when he’s having trouble. On the other hand, their instructor has given instructions that explicitly forbid collaboration on this particular exam.

- (1) A: What should Alex do?  
B: Well, even though Bailey is her friend, it’s more important that she doesn’t cheat.  
B: She #should/shouldn’t help Bailey with his exam.
- (2) A: What should Alex do?  
B: Well, even though it’s not good to cheat, it’s more important to support your friends.  
B: She should/#shouldn’t help Bailey with his exam.

**Scenario 2:** Last night, there was a huge party. Bailey really wanted to go, but doing so would’ve prevented him from finishing his take-home exam, which was due today. As Bailey wrestled with this dilemma, Alex called from the party to tell him that Casey, who Bailey greatly dislikes, was there too. In light of this new information, it was easy for Bailey to decide not to attend the party.

- (3) A: What if Casey hadn’t been at the party?  
B: Well, Bailey had an exam to work on instead, but he cares way more about partying.  
B: If Casey hadn’t been at the party, Bailey would/#wouldn’t have gone.
- (4) A: What if Casey hadn’t been at the party?  
B: Well, Bailey really wanted to go to that party, but he cares way more about his grades.  
B: If Casey hadn’t been at the party, Bailey #would/wouldn’t have gone.

The difference between (1) and (2) is in the relative salient priority of the principles “Help your friends” and “Don’t cheat”, and the difference between (3) and (4) is in the relative salient priority of Bailey’s desires to go the party and to finish his exam. In each scenario, both of the relevant principles or desires compete to determine the truth value of the modal expression.



I claim that the well-known doubly relative account of modality [Kratzer, 1977], in which modal denotations are sensitive to a contextually determined *modal base* and *ordering source*, can predict these effects of salient priority, but that an additional layer of abstraction on these contextual parameters leads to a simpler and more intuitive explanation of modals' context sensitivity.

My formal account is an extension of doubly relative modals that introduces a third contextual parameter, a partial order on the ordering source called the *priority order*. I propose a way of inducing an order on possible worlds from a partially ordered ordering source that can be implemented using the machinery of Optimality Theory [Prince and Smolensky, 2008], a model of grammar inspired by connectionist computation. Although there is a reduction from the priority order account to the original doubly relative account, the ordering sources that result from this reduction are difficult to interpret and do not make salient priority information explicit.

## References

- I. Heim. Presupposition projection and the semantics of attitude verbs. *Journal of Semantics*, 9:183–221, 1992.
- A. Kratzer. What 'must' and 'can' must and can mean. *Linguistics and Philosophy*, 1(3):337–355, 1977.
- A. Kratzer. The notional category of modality. In H. J. Eikmeyer and H. Rieser, editors, *Words, Worlds, and Contexts*, pages 38–74. De Gruyter, 1981.
- A. Prince and P. Smolensky. *Optimality Theory: Constraint interaction in generative grammar*. John Wiley & Sons, 2008.
- A. Rubinstein. *Roots of Modality*. PhD thesis, University of Massachusetts Amherst, September 2012.
- E. Villalta. Mood and gradability: an investigation of the subjunctive mood in spanish. *Linguistics and Philosophy*, 31:467–522, 2008.

## ‘By’-phrases in the Icelandic Impersonal Modal Construction

Einar Freyr Sigurðsson (University of Pennsylvania)

The Impersonal Modal Construction (IMC; Sigurðsson 1989, Sigurðsson and Egerland 2009), which is limited to five modal verbs, has no overt subject but still the embedded infinitival verb can take a structural accusative case object (1). In addition, binding of anaphors is grammatical in the IMC (2), and so are secondary predicates (3) and subject-oriented adjuncts. As expected, ‘by’-phrases have been reported to be ungrammatical in the IMC (Jónsson 2009), cf. (4).

- (1) Á morgun **verður/á/þarf** að lesa **bókina**.  
tomorrow has.to/is.supposed/needs to read.INF book.the.ACC  
‘One has to/is supposed to/needs to read the book tomorrow.’
- (2) Það **verður/á/þarf** að reka **sjálfan sig**.  
EXPL has.to/is.supposed/needs to fire.INF self.ACC REFL.ACC  
‘One has to/is supposed to/needs to fire oneself.’
- (3) Það **verður/á/þarf** að æfa sig **óþreyttur**.  
EXPL has.to/is.supposed/needs to practice.INF REFL.ACC untired.M.NOM.SG  
‘One has to/is supposed to/needs to practice while not tired.’
- (4) \*Í dag **þarf** að skila skattframtali **af útlendingum**.  
today needs to hand.in.INF tax.return by foreigners  
‘Foreigners have to hand in their tax returns today.’

Surprisingly, however, ‘by’-phrases are sometimes grammatical in the IMC. Compare (4) and (5):

- (5) Það **þarf** að rannsaka þetta betur **af fræðimönnum**.  
EXPL needs to investigate.INF this.ACC better by scholars  
‘This needs to be studied further by scholars.’

The main difference between (4) and (5) is that in (4), the foreigners (the agent expressed in the ‘by’-phrase) are obliged to hand in their tax return whereas in (5) the scholars are not obliged or required to do an investigation—the matter, however, needs further investigation and scholars are needed to do the job.

I analyse the IMC as having a PRO subject (Strong Implicit Argument in Landau’s 2010 terms). For PRO and ‘by’-phrases to be possible in the same clause, I pursue an explanation where the difference between grammatical and ungrammatical ‘by’-phrases lies in existential vs. universal quantification, respectively. For ‘by’-phrases to be grammatical in the IMC, narrow scope is necessary with respect to the modal; the ‘by’-phrase winds up restricting the quantifier after existential closure.

**References** Jónsson, Jóhannes Gísli. 2009. The new impersonal as a true passive. In *Advances in Comparative Germanic Syntax*, 281–306. • Landau, Idan. 2010. The explicit syntax of implicit arguments. *LI* 41:357–388. • Sigurðsson, Halldór Ármann. 1989. *Verbal Syntax and Case in Icelandic*. In *a Comparative GB Approach*. Doctoral Dissertation, University of Lund. • Sigurðsson, Halldór Ármann, and Verner Egerland. 2009. Impersonal null-subjects in Icelandic and elsewhere. *Studia Linguistica* 63:158–185.

## Stronger counterfactuality

David Rubio Vallejo, University of Delaware

**Background:** It is widely assumed (Iatridou 2000; and references therein) that the counterfactual inference associated with the antecedent of subjunctive conditionals is a conversational implicature. The main argument in favor of this claim is that counterfactual conditionals (henceforth CFCs) can be used to argue for the proposition in the antecedent. If cancelling counterfactuality were impossible, attempting to do so would make the classical example in (1) infelicitous:

- (1) If Fialka had the measles, she would show the exact same symptoms she currently shows. Therefore, she has the measles.

There exist other constructions, however, where counterfactuality is not cancellable. These consist of a circumstantial modal with past indicative morphology that embeds what appears to be the perfect tense marker. I believe these constructions to be within the group Condoravdi (2002) called *metaphysical* (i.e. modal constructions that express an open possibility in the past that did not materialize in the present), even though she originally intended this label to cover a subclass of non-root modals. Example (2), where the context provided highlights the circumstantial reading, illustrates this kind of non-cancellable counterfactuality (I resort to Spanish because its richer modal morphology highlights the difference between the conditional and indicative cases).

- (2) (Context: Fialka happens to be in New York for the weekend, where her friend Mario lives. She considers calling him to meet up, but instead she chooses to go on a tour of the Statue of Liberty.)

*Fialka pudo haber visitado a Mario. (# De hecho, lo hizo.)*

Fialka could.<sub>pst.prfv.indic</sub> have visited to Mario

“Fialka could have visited Mario. (# In fact, she did.)”

**Proposal:** I suggest that the domain widening mechanism that Condoravdi (2000) proposes in order to derive the counterfactuality of metaphysical modals (which relies on the past marker *haber* outscoping the modal in the semantics) is inadequate. According to Condoravdi (2000), because the set of accessible worlds in the past is a superset of those accessible at utterance time, the addressee in (2) infers that the speaker would only backtrack if he meant that the actual world at utterance time is not a member of the proposition expressed by the event embedded below the modal. My first argument against this mechanism was already noted in Portner (2009), who observed that the conversational means through which counterfactuality is derived in these cases predicts that it should be cancellable. That this is actually not so was already shown in (2) above. The second argument I would like to put forward is brought to the surface by the richer verbal morphology of Spanish. If the only function of *haber* were to mark past tense on the modal (via scope-reversal), we would not expect to see a difference between (2) and (3) below, where the modal bears past tense *directly*:

- (3) *Fialka pudo visitar a Mario.*

Fialka could.<sub>pst.prfv.indic</sub> visit to Mario

“Fialka was able to visit Mario.”

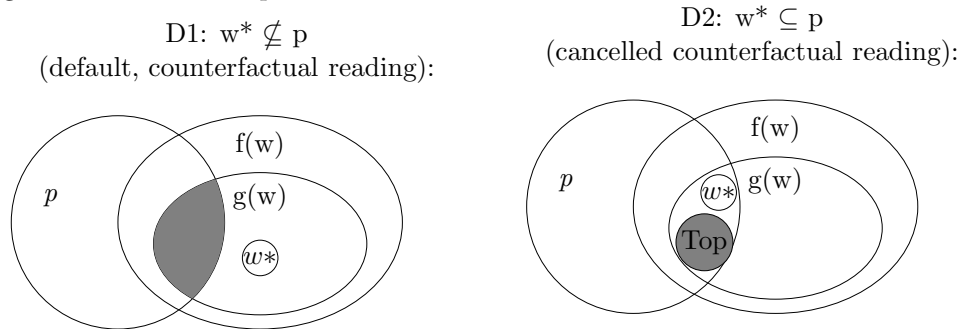
However, (3) differs from (2) in that (i) it gives rise to an actuality reading in addition to the counterfactual reading, and (ii) its counterfactual meaning is indeed cancellable:

- (4) *Fialka pudo visitar a Mario, y lo hizo.*  
 Fialka could.<sub>pst.prfv.indic</sub> visit to Mario, and CL did  
 “Fialka was able to visit Mario, and she did.”

Instead, I propose that the relative semantic scope between the modal and *haber* is the one seen on the surface. Moreover, and following Iatridou (2000), I take past tense morphology to express the skeletal meaning in (5a), which receives the name of Exclusion Feature (ExclF). Crucially, the ExclF can range over both times and worlds. When the latter happens, the meaning in (5b) obtains. This accounts for how counterfactuality is conveyed in CFCs.

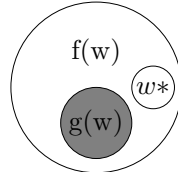
- (5) a. Topic (x) exclude the (x) of the speaker.  
 b. Topic worlds exclude the world of the speaker.

Furthermore, I assume that conditional sentences of the form ‘if p, then q’ to have a tripartite structure where the abstract modal *woll* takes *p* as its restriction and *q* as its scope (Ippolito 2013). Thus, I take their truth-conditions to be evaluated with respect to the worlds in  $p \cap g(w)$ . Leaving aside the exact means through which the ExclF ranges over worlds, and assuming that the Topic worlds it refers to can be identified with a subset of  $p \cap g(w)$ , I propose that the default reading of a CFC is represented in D1. The possibility to cancel counterfactuality is achieved through a reduction of the Topic worlds so that  $\text{Topic} + w^* = p \cap g(w)$ . I take this reduction in the Topic worlds to be the extra cognitive work that comes associated with cancelling the default reading of CFCs. This is captured in D2:



Building on these assumptions, I propose that the reason why the counterfactuality of metaphysical constructions like (2) is non-cancellable is because, in the absence of an antecedent, the modal quantifies over the *whole* set of accessible worlds (cf. D3). This means that Topic worlds =  $g(w)$ . I take the presence of indicative mood on the modal in (2) to be a morphological reflex of this. Upon application of the ExclF to this configuration, the actual world is excluded from the set of accessible worlds, which amounts to saying that  $w^*$  is a sub-optimal world with respect to *g*. That’s precisely what (2) expresses: a *better* actual world according to the *f* and *g* would have been one where Fialka does visit Mario but, crucially, that didn’t materialize.

D3: non-cancellable counterfactuality



**References:** Condoravdi (2002) Temporal interpretation of modals: Modals for the present and for the past. *The Construction of Meaning*. Iatridou (2000) The grammatical ingredients of counterfactuality. *Linguistic Inquiry* 31, 2. Ippolito (2013) *Subjunctive conditionals*. Portner (2009) *Modality*.

## Deriving *the most* internal relative reading in English

Emily C. Wilson, CUNY Graduate Center

This paper addresses a gap in the literature on quantificational superlatives in English by providing a novel syntax and semantics for a construction with *the most* that allows an NP-internal relative reading. This construction is illustrated in (1).

- (1) *Mary has the most books by Chomsky.*  
a. “Mary has more books by Chomsky than anyone else (does)”  
b. “Mary has more books by Chomsky than by any other author”

Although the **NP-external relative reading** paraphrased in (1a) is the most salient, many English speakers are also able to get the **NP-internal relative reading** paraphrased in (1b). This reading can be facilitated by context, and by rise-fall intonation on *most* and focus stress on *Chomsky*. The NP-internal relative reading is not available with the superlatives of gradable adjectives:

- (2) *Mary has the newest books by Chomsky.*  
a. “Mary has newer books by Chomsky than anyone else (does)”  
b. \* “Mary has newer books by Chomsky than by any other author”

Slavic languages allow the NP-internal relative reading not only for quantificational superlatives but also for the superlatives of other gradable adjectives (Pancheva & Tomaszewicz, 2012).

- (3) *Ivan ima naj-mnogo/naj-novi knigi na/ot Chomsky.* (Bulgarian)  
Ivan has SUP-many/ SUP-new books of/from Chomsky.  
“Ivan has more/newer books by Chomsky than by any other author”

Pancheva & Tomaszewicz note that in Bulgarian the NP-internal relative reading is *only* available in the *absence* of definite marking. They conclude that when present, the definite morpheme prevents QR of the superlative out of the DP. When it is trapped inside the DP, its restrictor is unable to associate with a focused element in that local domain.

However, in English, the definite article is necessary for the NP-internal relative reading to obtain with *most*. Without it, the ‘more-than-half’ reading (4a) becomes salient and the relative readings are unavailable (4b):

- (4) *Mary has most books by Chomsky.*  
a. “Mary has the majority of books (that exist) by Chomsky.”  
b. \* “Mary has more books by Chomsky than anyone else (does)/ than by any other author.”

While P&T’s analysis seems valid for Bulgarian, the data in (2) and (4) raise new questions for English. Why does the NP-internal relative reading require the *presence* of the definite article in English while it requires the *absence* of the definite article in Bulgarian? Why is the DP-internal reading available only for quantificational *most* and not for other adjectival superlatives in English? To answer these questions I propose a novel derivation. I argue that the definite article forms a constituent with *most* and a null noun. This DP occupies a specifier position in the extended projection of the overt noun.

Schwarzschild (2006) has argued that QPs, as well as measure phrases that are interpreted monotonically, are linked to their substance nouns by a functional head, which he labels  $\text{Mon}^0$ . This head is spelled out as *of* when its specifier contains an overt measure noun, but is silent when it contains a Q-adjective such as *many* or *few*.

The construction that gives rise to the NP-internal relative reading, I argue, contains both the superlative form of *many* and a covert measure noun. I assume that the null noun has a generic meaning such as ‘units’ or ‘amount’. The syntax of the proposed derivation is given in (4):

- (5)  $[_{\text{TP}} \text{ Mary has } [_{\text{MonP}} [_{\text{DP}} \text{ the } [\text{est-UC}][\text{d-many } \emptyset_{\text{UNITS}}]] \text{ Mon}^0 [_{\text{NP}} \text{ books by Chomsky}_F ] ] ]$

Evidence for the null noun comes from Roelandt’s (2014) analysis of an agreement mismatch in Flemish. The non-agreeing form of *the most*, in which neuter singular *het meeste* (‘the most’) modifies a plural

noun allows the NP-internal relative reading. Roelandt argues that the *het meeste* forms a constituent with a null noun, and this entire DP occupies an (unnamed) specifier of the NP projected by the overt noun. Importantly, this agreement mismatch construction only occurs with quantificational adjectives such as *meeste*, not with other gradable adjectives.

I take this as indirect evidence that, although there is no agreement morphology on determiners in English to signal the presence of the null noun, one is nevertheless present. And I assume that in English, as in Flemish, only quantificational adjectives can license the null noun construction. In fact, it is not the case that the derivation in general is unavailable for non-quantificational adjectives, only that the measure noun and  $\text{Mon}^0$  must be pronounced, as in (6)

(6) Mary has [the largest *amount*/the newest *collection*] **of** books by Chomsky.

Simplifying from Schwarzschild's approach, I treat  $\text{Mon}^0$  as directly encoding the part-whole relationship between something of a particular size (the referent of the measure phrase) and the external argument of the noun.

(7)  $[[\text{Mon}^0]] = \lambda P \lambda y \lambda x [P(x) \ \& \ y \sqsubseteq x]$

Since the DP containing *the most* in this construction is a separate subconstituent of the indefinite NP, it is possible for it to move out of the NP at LF, stranding the overt noun with its lower modifiers. In this way the restrictor of the superlative (UC) ends up in a position discontinuous with the focus operator which binds the NP-internal focused element, *Chomsky*.

(8)  $[_{TP4}[_{DP} \text{the}[_{est} \cup C][d\text{-many } \emptyset_{UNITS}]]_2 [_{TP3} \sim C[_{TP2}[_{MonP} t_2 \text{Mon}^0[_{NP} \text{bks by Ch}_F]]_1 [_{TP1} \text{Mary has } t_1]]]$

I assume Heim's (1985, 1999) semantics for the superlative, and follow the recent convention (Hackl 2009 and others) of treating *many* as a gradable adjective that takes an individual and maps it to a degree representing its numerical measure. The superlative DP composes to have the meaning in (9):

(9)  $[[DP]] = (\lambda x: \exists d[UNITS(x) \ \& \ \mu_{\#}(x) \geq d] \ \& \ \forall y \in \cup C [y \neq x \rightarrow \neg[UNITS(y) \ \& \ \mu_{\#}(y) \geq d]])$

This points to the unique individual for which it is true that there is some degree, *d*, such that it is *d*-many units and no other individual is *d*-many units. By focus association, the comparison class ( $\cup C$ ) is restricted to sets of books by someone that Mary has. The rest of the derivation proceeds as in (10):

(10)  $[[TP_2]] = \lambda y[\text{has}'(j, y) \ \& \ *book(y) \ \& \ \text{by-Chomsky}'(y) \ \& \ t_2 \sqsubseteq y]$  by  $\exists C$  and PA  
 $\Rightarrow \lambda z \exists y[\text{has}'(j, y) \ \& \ *book(y) \ \& \ \text{by-Chomsky}'(y) \ \& \ z \sqsubseteq y]$  is equivalent to  
 $\Rightarrow \lambda z[\text{has}'(j, z) \ \& \ *book(z) \ \& \ \text{by-Chomsky}'(z)]$   
 $[[TP_4]] = [[TP_3]](\lambda x) = \text{has}'(j, \lambda x) \ \& \ *book(\lambda x) \ \& \ \text{by-Chomsky}'(\lambda x)$

This will be true just in case the unique entity out of the comparison class that is “the most units” is books by Chomsky that Mary has. Switching focus from *Chomsky* to *Mary* derives the external relative reading.

I predict that further research into Bulgarian measure phrases will clarify why this derivation is unavailable for the definite-marked form of the quantifier, *naj-mnogo*, (the most) in that language. For the moment, I observe that definite marking on the NP containing *naj-mnogo* always acts as syntactically as part of the maximal projection of the overt noun, but for English *most*, that is not the case.

Treating *the most* as a DP measure phrase embedded inside an indefinite NP makes it possible to derive the elusive NP-internal relative reading in just those cases where it is available. This finding also furthers the general research program into the compositional semantics of quantifier words and the semantics of the extended projection of NP.

REFERENCES: Pancheva R. & B. Tomaszewicz. 2012. “Cross-linguistic differences in superlative movement out of nominal phrases.” *Proceedings of WCCFL 30*, UC Santa Cruz. Roelandt, Koen. 2014. “(The) *most* in Flemish Dutch: Definiteness and Specificity” unpublished manuscript 12/02/2014. CRISP – KU Leuven / HU Brussel. Schwarzschild, R. 2006. The Role of Dimensions in the Syntax of Noun Phrases, *Syntax* 9.1: 67-110.

ewilson2@gc.cuny.edu

## Asking and Expecting: What *Nandao* Tells us about Bias in Questions

Beibei Xu (Rutgers University)

**Introduction to Bias.** Bias is a phenomenon that is found in questions. When we talk about it, we think of Negation Polar Questions (NPQ), Questions with Minimizers (MQ), Questions with compelling evidence (EQ), Questions with Verum focus (VQ), Rhetorical Questions (RQ), and so on (cf. Ladd 1981, Büring&Gunlogson 2000, Guerzoni 2003, Romero&Han 2004, Caponigro&Sprouse 2007). Different people have different views of bias and there are different ways to model bias. On one hand, Romero (2006) and Asher&Reese (2007) regard bias as epistemic belief or expectation on the speaker's side to a specific answer. On the other hand, Büring&Gunlogson (2000) think that the bias in a question comes from the compelling evidence available in the conversational context. Sudo (2013) takes it another step further by assuming both views are correct yet incomplete and proposes that a feature-base description system of bias. He calls the first kind of bias as “epistemic bias” and the second one as “evidential bias” which together form a feature matrix. However, no matter how diverse those views are, there is still a consensus that a particular answer is expected to be correct while the others are not in a bias question. I call such a phenomenon **question bias**.

**Modeling Bias: How Bias is introduced.** In the literature, there are different ways to model bias. One way is to rule out certain answers by means of CG knowledge or ungrammatical status of those answers so that the remaining answer is the only active answer intended by the speaker (Guerzoni 2003, Caponigro&Sprouse 2007). Another way uses unbalanced partition of discourse participant's degrees of certainty to add information into CG. Under the “meta-conversational” principle, only unbalanced partition, as a result of Verum focus in questions, is compatible with non-neutral context. Therefore, any prior belief of the speaker against the answer for sure to be added to CG is the bias (Romero&Han 2004). The third way makes reference to contextual evidence: contextual evidence in favor of an answer will make the answer be the bias, while evidence against an answer will make its negation the bias (Büring&Gunlogson 2000). From these cases, we can conclude that there are 2 essential conditions for introducing bias in questions: 1. The selection of a particular answer as an anchor to bias; 2. Strict partial-ordered preference ranking of all possible answers. I will show in this paper that the cases discussed so far do not exhaust the possibilities for introducing bias. Questions with *nandao* (*nandao*-Q) in Mandarin, I claim that they meet the two conditions for bias but crucial to the bias of *nandao*-Q is a kind of Modality that I will elaborate on after discussing its basic characteristics.

***Nandao*-Q: A case study in Bias.** In Mandarin, *nandao*-Qs **necessarily** express bias, i.e. they cannot appear in a neutral context where the speaker has no prior belief of a correct answer and there is no evidence for or against an answer. They cannot be used in a context with a compelling evidence and without the speaker's prior belief of the correct answer. Moreover, *nandao*-Qs can be used without any contextual evidence against the speaker's belief. All of these suggest that, under Sudo's (2013) system, *nandao*-Qs only have an epistemic bias feature. And that epistemic bias feature is a negative one (1).

- (1) (*Nandao*) zhe (*nandao*) jiushi Zijincheng            ma?  
Nandao this    *nandao* just.be Forbidden.City Y/N-Q  
'This isn't the Forbidden City, right?'

In (1), the speaker believes that the correct answer to the question is more likely to be *This isn't the Forbidden City* rather than *This is the Forbidden City*. The description of the bias of *nandao*-Q satisfies at least one of the two essential conditions, i.e. a probability ranking of the speaker's degree of belief (later, we will see how *nandao*-Qs satisfy the first condition). This also suggests that *nandao* is a gradable epistemic modal in Mandarin. However, although gradable modals can provide probability ranking by virtue of their modal meaning, not all gradable modals can express bias in questions. Take *henkeneng* 'probably' in Mandarin as an example, it is also a gradable epistemic modal expressing the probability of its embedded proposition is greater than the negated one. But, the probability ranking cannot be applied among all possible answers in *henkeneng* questions (2).

- (2) (Context: A has no idea of whether Zhangsan will win tonight's game. So, he asks Zhangsan's coach.)  
A: Will Zhangsan possibly win tonight? Coach: It's possible.  
A: Henkeneng ma?                      Coach: Henkeneng./Kenengxing bu gao.  
Probably Y/N-Q                      Probably    Probability not high  
'Is it probable?'                      'Probably./It's not probable.'

As the answer pattern to the *henkeneng* question shows the gradable modal is in both possible answers. In effect, it does not provide a probability ranking between the two possible answers, but does provide

a ranking between one answer and its negated proposition to either of the answers. Thus, it does not conform to the second condition of question bias.

**Syntax of *nandao*.** *nandao* > Foc. Generally, *nandao* can surface freely before VP (1). However, when Subj. is associated with focus-sensitive operators, *nandao* cannot be placed after it (3).

- (3) (Nandao) zhiyou/jiu (\*nandao) [Zhangsan]<sub>F</sub> (\*nandao) xie-le zuoye?  
 Nandao only just nandao Zhangsan nandao write-PERF Homework  
 ‘It is not the case that only [Zhangsan]<sub>F</sub> finished the homework, right?’

***Nandao* > Question.** In colloquial Mandarin, *nandao* can be placed after *–ma* (4). Assuming Y/N-Q particle *–ma* marks the scope of the question, we claim that *nandao* is syntactically higher than Y/N-Q particle *–ma* and scopes over the Y/N-Q.

- (4) [<sub>CP</sub> Zhangsan qu-le Meiguo ma]<sub>Top</sub>, nandao t<sub>CP</sub>?  
 Zhangsan go-PERF America Y/N-Q nandao  
 ‘Zhangsan didn’t go to America, right?’

The syntactic position of *nandao* and its nature of expressing speaker’s epistemic bias resembles much of what Lyons (1977) categorizes as subjective epistemic modals which only qualify illocutionary forces. Here, I will try to show that treating *nandao* as a subjective epistemic modal which qualifies the degrees of speakers’ belief can help us understand its properties. Following Rizzi’s (2001, 2004) cartography, I posit the following syntax for a *nandao*-*p*? question.

- (5) [<sub>ForceP</sub> [*nandao* QUEST] [<sub>IntP</sub> Y/N-*op* [<sub>Int'</sub> [<sub>Int</sub> [+WH]]] [<sub>IP</sub> *p*(*w*)]]]

**Semantics of *nandao*.** In order to represent degrees of belief in semantics, I introduce Halpern’s (1990) type 2 probability structure into the model and let  $\mu$  be the discrete probability function from a set of possible worlds to the real number between [0, 1]. In this way,  $\mu(p)$  is the probability of *p*(*w*) being true (Halpern 1990, 1992; cf. Yalcin 2010, Lassiter 2010). Thus, the core meaning of *nandao*-*p* question can be represented as  $\mu(p) < \mu(W-p)$ , which is the source of bias in *nandao*-Qs.

In order to satisfy the first condition, *nandao* which scopes over question formation needs to target a specific answer as an anchor. However, as standard question semantics (e.g. Hamblin 1973) treats all answers equally in the question denotation, it is not sufficient for this purpose. In order for *nandao* to select a specific answer for probability evaluation, we need a kind of question semantics that can differentiate answers. Here, I will follow Roelofsen & Gool’s (2010) idea of *highlighting* from Inquisitive Semantics and define the highlighted answer(s) of a question *Q* to be:

- (6)  $Q_H = \llbracket Y/N-op(p) \rrbracket_H := \llbracket p \rrbracket_H$  (*p* is the question nucleus). If *p* is an atomic proposition,  $\llbracket p \rrbracket_H = \{p\}$ ; if *p* is composed of a disjunction *a or b*,  $\llbracket p \rrbracket_H = \{a, b\}$ .

With the above definition, we now have a way for *nandao* targeting the highlighted answer.

- (7)  $\llbracket nandao \rrbracket := \lambda Q_{\langle (s,t), t \rangle} \exists \mu \wp_{(s,t)} (p \in Q_H \wedge \mu(p) < \mu(W-p) \wedge W-p \in Q)$ ;

For compositional derivations of (5), I assume Krifka’s (2012) semantics for QUEST speech act and propose the Illocutionary Modification Rule (8), i.e. an extended Predicate Modification rule.

- (8) Illocutionary Modification:

If  $\alpha$  is a branching node,  $\{\beta, \gamma\}$  is the set of  $\alpha$ ’s daughters, and  $\llbracket \beta \rrbracket$  and  $\llbracket \gamma \rrbracket$  are both in  $D_{(\pi, m)}$  (*m* is the type of illocutionary act), then  $\llbracket \alpha \rrbracket := \lambda P \in D_\pi. \llbracket \beta \rrbracket(P) \cup \llbracket \gamma \rrbracket(P)$ .

- (9)  $\llbracket (5) \rrbracket = \exists \mu (\mu(p) < \mu(W-p)) \ \& \text{ At } i, y \text{ is obliged to } x \text{ to assert all and only assertable } p' \text{ in } Q$ .

**Explanations of Mandarin data.** As *nandao* provides a probability ranking for the anchor and other alternatives, it cannot be used in declaratives which has no alternatives in its denotation. As *nandao* evaluates the subjective probability of an answer against that of its opposing polar answer, we expect that *nandao* is incompatible with WH-Qs which cannot have both positive and negative form of an answer in its denotation. Although A-not-A-Qs have both negative and positive polar answers in their denotations, the uniqueness condition in (7) excludes the existence of A-not-A questions with *nandao*, because A-not-A Qs have two highlighted answers. In the paper, I will also explain how previous proposals for question bias fail to account for the syntactic and semantic properties of *nandao*-Q.

**Conclusion.** This paper reviews previous accounts of bias questions and summarizes two essential conditions for question bias. Under these two guiding conditions, we provide a novel compositional account for a special type of bias question, i.e. *nandao*-Qs in Mandarin, which in turn enhances our understanding of bias questions and the mechanism of bias.

**Selected References:** Büring&Gunlogson. 2000. Aren’t positive and negative polar questions the same? Ms. Caponigro&Sprouse. 2007. Rhetorical questions as questions. *Subl*. Guerzoni. 2003. *Why even ask: On the pragmatics of questions and the semantics of answers*. PhD Diss. Halpern. 1990. An analysis of first-order logics of probability. *AI* 46. Krifka. 2001. Quantifying into question acts. *NLS* 9. Lyons. 1977. *Semantics*, Vol 2. CUP. Roelofsen&van Gool. 2010. Disjunctive questions, intonation, and highlighting. *LLM*. Romero&Han. 2004. On negative yes/no questions. *L&P* 27.



The real meaning of the Mandarin adverb *zhende* ‘really’  
Mengxi Yuan  
Johns Hopkins University and City University of Hong Kong

This study examines the semantics of a Mandarin adverb *zhende* ‘really’. The presence of *zhende* does not affect the truth conditions of the assertions in which *zhende* occurs. For example, (1) is true if and only if it rained last night, so is (2).

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| (1) Zuowan xiayu le.<br>last-night rain PERF<br>‘It rained last night.’ | (2) <i>Zhende</i> , zuowan xiayu le.<br>really last-night rain PERF<br>‘Really, it rained last night.’ |
|---|--|

If *zhende* does not affect the truth conditions of a sentence, then what does it do? Intuitively, (2) emphasizes that ‘It rained last night’ is true, whereas (1) indicates no such emphasis. This intuition motivates my analysis of *zhende* as a presupposition trigger: *zhende* presupposes that its prejacent is old information and it is challenged by some participant. Due to this challenge, the speaker of *zhende* finds it necessary to emphasize on the truth of the old information.

**BASIC DATA** The adverb *zhende* ‘really’ is derived from the morpheme *zhen* ‘truth/reality’. This gives rise to the intuition that *zhende* is used to emphasize truth, as summarized in (3).

- (3) Utterances containing *zhende* indicate an emphasis on truth:
- a. By using *zhende* in an assertion, the speaker is emphasizing that the propositional content of the assertion is true.
  - b. By using *zhende* in a question, the speaker is emphasizing that the answer to the question should be true.

The intuition in (3a) can be illustrated with (4). Intuitively, C in (4) is using *zhende* to emphasize that p ‘It rained last night’ is true. C finds it necessary to emphasize the truth of p, because B refused to believe in p although p has been asserted by A. C is emphasizing the truth of p in order to convince B of p. If A did not mention p in the prior context, i.e., p was new information, C’s use of *zhende* would be infelicitous. In this case, C would use a bare assertion ‘It rained’ to express this new information. If B believed in p initially or began to believe in p after hearing A’s suggestion, it would also be infelicitous for C to use *zhende*. This is because every participants believe in p, and thus there is no need to emphasize the truth of p.

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|--|---|
| (4) A: Zuowan xiayu le.<br>last-night rain PERF<br>‘It rained last night.’<br><br>B: Meiyou xiayu.<br>not rain<br>‘It didn’t rain.’<br><br>C (to B): <i>Zhende</i> , xiayu le.<br>really rain PERF<br>‘Really, it rained.’ | (5) Mr. Li: Shang zhouwu ni qu naer le?<br>last Friday you go where PERF<br>‘Where did you go last Friday?’<br><br>Xiaoli: Wo zai xuexiao.<br>I at school<br>‘I was at school.’<br><br>Mrs. Li: Ni bu zai. <i>Zhende</i> , ni qu naer le?<br>you not at really you go where PERF<br>‘You were not. Really, where did you go?’ |
|--|---|

A question containing *zhende* also indicates an emphasis on truth, as stated in (3b). Take (5) as an example. Suppose Mr. Li and Mrs. Li just had a meeting with the teacher of their son Xiaoli, and now the couple are talking with Xiaoli. By using *zhende*, Mrs. Li is emphasizing that Xiaoli should provide her with the true answer to the question. Mrs. Li finds it necessary to emphasize the truth of the answer, because she does not accept the answer provided by Xiaoli to Mr. Li’s question Q ‘Where did you go last Friday?’. If Mr. Li did not ask the question Q, it would be infelicitous to use *zhende*. In this case, Q is a new question and should be expressed without *zhende*. If Xiaoli provided an answer to Q and Mrs. Li accepted this answer, the use of *zhende* would also be unacceptable. This is because when Mrs. Li regards the answer as true, it is unnecessary for her to emphasize the truth of the answer.

The intuitions in (3) motivate my proposal that *zhende* is a presupposition trigger. *Zhende* modifies an assertion/question  $S$  by triggering a presupposition that  $S$  has been asserted/asked but some participant remains uncommitted to (a true answer to)  $S$ , as summarized in (6).

(6) Presupposition triggered by *zhende* in  $zhende(S)$ :

- a.  $S$  has been asserted or asked by some discourse participant  $x$ .
- b. The addressee of  $x$  failed to commit himself to  $S$  or to a true answer to  $S$ .

**FORMAL ANALYSIS** I assume that an assertion denotes a singleton set containing its propositional content, and a question denotes a set of propositions representing all the possible answers to the question (Hamblin, 1971). Based on the concept of ‘Public belief’ (PB, Gunlogson, 2003), the presupposition of *zhende* in an assertion  $zhende(S)$  can be restated as: First,  $S$  is the public belief of some participant  $x$  ( $PB_x \cup S = PB_x$ , where  $PB_x$  is a set of propositions and  $S$  is a singleton set). Second,  $S$  is not the public belief of  $x$ ’s addressee ( $PB_{Addr(x)} \cap S = \emptyset$ ). Thus, the semantics of *zhende* in assertions is defined as in (7).<sup>1</sup>

(7) When  $|S| = 1$ ,  $\llbracket zhende \rrbracket = \lambda S.S(\exists x.(PB_x \cup S = PB_x) \wedge (PB_{Addr(x)} \cap S = \emptyset))$

In a question containing *zhende*, i.e.,  $zhende(S)$ , *zhende* triggers a presupposition that  $S$  has been asked by  $x$  but  $x$ ’s addressee failed to provide a true answer to  $S$ . In other words,  $x$ ’s addressee answered  $S$  by committing himself to a proposition (e.g.,  $q$ ) but the speaker of  $zhende(S)$  does not believe in  $q$ . Given that the speaker is asking the question  $S$  by using  $zhende(S)$  and the speaker does not believe in  $q$ ,  $q$  cannot be a possible answer to  $S$ . Adopting the concept of ‘Public question’ (PQ, Davis, 2011), the presupposition of *zhende* amounts to saying that  $S$  is the public questions of some participant  $x$  ( $S \in PQ_x$ , where  $PQ_x$  is a set of sets of propositions) and the public beliefs of  $x$ ’s addressee (which contains  $q$ ) has no intersection with  $S$  ( $PB_{Addr(x)} \cap S = \emptyset$ ). The semantics of *zhende* in questions is defined as in (8).

(8) When  $|S| > 1$ ,  $\llbracket zhende \rrbracket = \lambda S.S(\exists x.(S \in PQ_x) \wedge (PB_{Addr(x)} \cap S = \emptyset))$

As can be seen from (7) and (8), the semantics of *zhende* consists of two parts. The first part  $\lambda S.S$  says that *zhende* takes in a set of propositions  $S$  and returns the same set  $S$ . That is, *zhende* does not contribute to the at-issue meaning of  $S$ . The second part is the formula within the angle brackets, which formalizes the presupposition introduced by *zhende*.

The semantics of *zhende* explains the intuition in (3). The meaning of ‘emphasis on truth’ results from the combination of the at-issue meaning and the presupposition of *zhende*. E.g., in (4), the assertion containing *zhende* indicates that C commits himself to p ‘It rained last night.’ (the meaning of a bare assertion) and presupposes that some participant, i.e., A has asserted p but A’s addressee, i.e., B remains uncommitted to p (the presupposition of *zhende*). The combination results in an indication that C is emphasizing the truth of p in order to convince B of p. Similarly, in (5), the question containing *zhende* indicates that Mrs. Li is seeking the answer to the question ‘Where did you go?’ and presupposes that she did not believe in the answer provided by Xiaoli. The combination results in an indication that Mrs. Li is emphasizing that the answer provided to the question should be true and she is urging Xiaoli for the true answer.

**CONCLUSION** Mandarin adverb *zhende* modifies a set of propositions  $S$  by introducing a presupposition that some participant  $x$  is committed to (solving)  $S$  but  $x$ ’s addressee failed to commit himself to (a true answer to)  $S$ . Due to the failure of commitment, the speaker of *zhende* finds it necessary to emphasize the truth of (the answer to)  $S$ . This study shows that the meaning of emphasis can be understood as the combination of the speaker’s commitment to some information and the presupposition that this information is old but challenged.

**SELECTED REFERENCES** Davis (2011) *Constraining Interpretation*. Gunlogson (2003) *True to form*. Hamblin (1971) ‘Mathematical models of dialogue’.

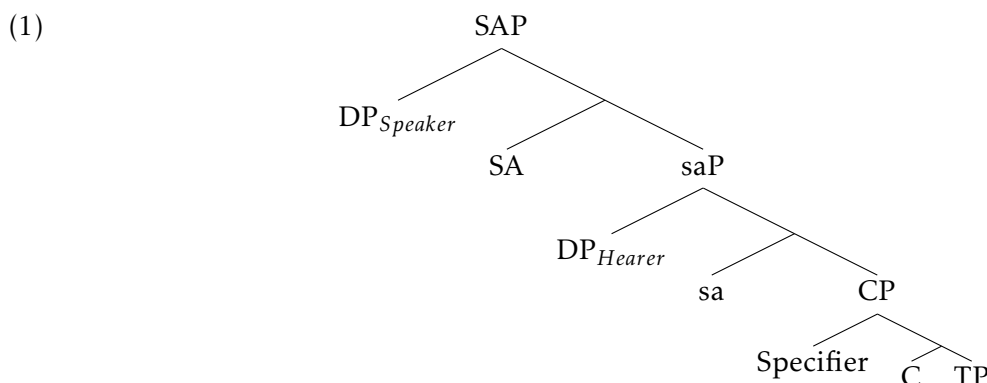
<sup>1</sup>In (7), and also in (8) as below, ‘ $\llbracket \cdot \rrbracket$ ’ is a presupposition operator. If  $\phi_{(\pi)}$  is a formula,  $\pi$  is a presupposition of  $\phi$ .  $S$  is a set of propositions of type  $\langle \langle s, t \rangle, t \rangle$ , and *zhende* is a modifier of type  $\langle \langle \langle s, t \rangle, t \rangle, \langle \langle s, t \rangle, t \rangle \rangle$ .

## Discourse Participants, Attitude Holders and Pronoun Binding

Vera Zu

New York University

This paper provides the following novel observation. A number of constructions, including *speaker-* and *hearer-agreement*, *experiencer predicates*, *conjunct marking*, *switch reference*, and *perspective shift in embedded contexts*, seem to share one thing in common—they all involve a dependency relation between a lower DP/functional head on the one hand and a speaker/matrix subject or a hearer/matrix indirect object on the other. In this paper I adopt an updated version of Ross's (1970) performative hypothesis according to which the utterance of a clause is embedded in a higher structure determining the speech act, proposed by Speas and Tenny (2003) and modified recently by Miyagawa (2013). Their core claim is that the performative structure is implemented by a head, which they call Speech Act or *sa*. The structure is sketched as follows. The *sa* head takes the actual utterance, CP, as its complement, and then it raises to the “shell,” marked by SA.



This structure not only makes it possible to draw parallelism between main clause phenomena and reported speech phenomena, it also provides the proper tools for treating among other things the interpretation of indexicals and bounded pronouns.

As a case in point, take conjunct marking. In Akhvakh, Awa Pit, and many Tibeto-Burman languages, there is one verb form, i.e., the conjunct form, that normally occurs with first person subject in declarative clauses and second person subject in interrogative clauses, and another verb form, i.e., the disjunct form, that occurs elsewhere. This conjunct/disjunct person marking system suggests that language users interpret person relative to the speech act. Given the structure in (1), the pronouns *I* and *you* are bound by a higher DP (i.e., Speaker in declarative clauses and Addressee in interrogative clauses) with the presence of a conjunct marker at the clause periphery. This is similar to pronominal shifting. When *I* and *you* are embedded under a monster operator (Schlenker 2003), they pick out their antecedents from the context of the reported speech.

In this paper, I explore the predictions of this neo-performative hypothesis and its implications for the syntax-semantics interface. I present data from Newari, Uyghur, Tibetan, and Japanese, and demonstrate the desirability of a common structure for the interpretation of pronouns across these constructions.

## References

- Miyagawa, Shigeru. 2013. Surprising agreements at T and C. Ms. MIT.
- Ross, John R. 1970. On declarative sentences. In *Readings in English transformational grammar*, ed. Roderick A. Jacobs and Peter S. Rosenbaum, 222–277. Waltham, MA: Ginn.
- Schlenker, Philippe. 2003. A plea for monsters. *Linguistics and Philosophy* 26:29–120.
- Speas, Margaret, and Carol Tenny. 2003. Configurational properties of point of view roles. In *Asymmetry in grammar*, ed. Anna Maria DiSciullo, 315–344. John Benjamins.

# Student Presenter Index

## List of Student Presenters

Vandana Bajaj (p.11)	Rutgers	vbajaj@rutgers.edu
Haitao Cai (p.12)	University of Pennsylvania	hcai@babel.ling.upenn.edu
Mao-Hsu Chen (p.14)	University of Pennsylvania	chenmao@sas.upenn.edu
Pyeong Whan Cho (p.15)	Johns Hopkins University	pcho4@jhu.edu
Yanyan Cui (p.17)	Georgetown University	yc285@georgetown.edu
Amy Goodwin Davies (p.19)	University of Pennsylvania	amygood@sas.upenn.edu
Sarah Hansen (p.20)	Rutgers	sarah.hansen@rutger.edu
Hillary Harner (p.22)	Georgetown University	hjh34@georgetown.edu
Quinn Harr (p.24)	University of Maryland	qharr@umd.edu
Kaitlyn Harrigan (p.25)	University of Maryland	kph@umd.edu
Yuki Ito (p.27)	University of Maryland	yito@umd.edu
Kristen Johannes (p.29)	Johns Hopkins University	johannes@cogsci.jhu.edu
Sofia Kasyanenko (p.31)	New York University	sk3425@nyu.edu
Jeremy Kuhn (p.32)	New York University	kuhn@nyu.edu
Shih-Yueh Lin (p.34)	New York University	syjefflin@nyu.edu
Mingming Liu (p.36)	Rutgers	markliu@rci.rutgers.edu
Michael McCourt (p.38)	University of Maryland	mmccour2@umd.edu
Drew Reisinger (p.40)	Johns Hopkins University	dreisin2@jhu.edu
Einar Sigurðsson (p.42)	University of Pennsylvania	einarfs@gmail.com
David Rubio Vallejo (p.43)	University of Delaware	drubio@udel.edu
Emily Wilson (p.45)	The City University of New York	ewilson2@gc.cuny.edu
Billy Xu (p.47)	Rutgers	billyxu1983@gmail.com
Mengxi Yuan (p.49)	JHU/City University of Hong Kong	mxyuan2-c@my.cityu.edu.hk
Vera Zu (p.51)	New York University	verazu@nyu.edu